

Field Exchange

Emergency Nutrition Network



- **Scale up of integrated management of acute malnutrition in Afghanistan**
- **Health systems strengthening in Somalia**
- **Treating acute malnutrition in older people in Ethiopia**
- **Resilient farming in Bangladesh**
- **Integrating nutrition and agriculture in Zimbabwe**
- **School feeding in Malawi**
- **Programme monitoring in unstable populations: UNHCR experiences**

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Dear readers

In this issue of *Field Exchange* we are delighted to feature, for the second year running, a special section that shares key outputs of Action Against Hunger's Research for Nutrition Conference held in November 2016. Introduced in an editorial note by Myriam Assefa and Stephanie Stern, we summarise eight research articles based on conference presentations. Topics include relapsing severe acute malnutrition (SAM), photo diagnosis of SAM and innovative approaches to MUAC assessment. The write-up includes capture of panel discussions on overcoming research data management challenges in crisis contexts and how to improve the engagement of communities in research. The attendance and engagement of this conference reflects the appetite for discourse between researchers and programmers – 130 people attended the conference, while the call for abstracts generated 57 submissions.

This issue once again contains numerous articles on nutrition-sensitive and multi-sector programming. A field article by Anne-Marie Mayer, Rose Ndolo and Jane Keylock describes lessons from World Vision's experiences of implementing the ENTERPRIZE project in Zimbabwe. This large, multi-sector, multi-partner project aims to improve food and nutrition security through coordinated activities primarily across agriculture, finance and health sectors. Findings to date reinforce the value of articulating a theory of change and establishing a monitoring framework based on this, with input from programme stakeholders, communities, government and the private sector. Unintended consequences also need to be captured; in this instance, it was determined that targeting farmers with the greatest capacity for increasing agricultural productivity could exclude the poorest and most vulnerable, making nutrition objectives elusive. The authors assert a need for practical guidance to help implement and assess multi-sector programmes under operational conditions and that further case studies would help inform such guidance.

This issue also includes a summary of an updated review of the linkages and evidence of impact of programmes aimed at enhancing agriculture, women's empowerment and nutrition. Markets and women's empowerment were found to be the most important factors that modify the impacts of agriculture on nutrition outcomes. As with many reviews, the conclusion was a need for more research; in this case, into sustainability, scale-up and cost-effectiveness of nutrition-sensitive agriculture programmes. Another article describes an impact evaluation of UK Department for International Development (DFID)-funded integrated livelihoods and nutrition programmes in Bangladesh. Here, no significant impact on infant and young child feeding, dietary diversity or child nutritional status was found.



A Care Group lead mother facilitates a session for mothers with children under 2 years, Zimbabwe, 2016

Another article summarises the findings of a synthesis paper based on three case studies of multi-sector nutrition programming in Nepal, Kenya and Senegal. These case studies were conducted by ENN as part of the DFID-funded Technical Assistance for Nutrition (TAN) programme for the Scaling Up Nutrition (SUN) Movement. The case studies focused on programme implementation and enabling factors at sub-national level. The synthesis describes the type of nutrition-sensitive and multi-sector activities taking place and the degree to which these are embedded in government systems and processes. These case studies are the first in a series that ENN will be conducting over the remaining two years of the TAN programme. The synthesis is therefore a working document, but early findings suggest limited modifications to programming, despite national-level policies and structures geared towards supporting multi-sector nutrition programming. There is also a distinct lack of monitoring and evaluation, which is a critical gap if multi-sector nutrition programming is to be rolled out further in SUN countries and beyond.

Given the demand for more experiences on what works and what doesn't, ongoing implementation challenges and the potential to learn from each other, ENN is launching a new thematic area on en-net in mid-April 2018 on multi-sector nutrition programming. We welcome questions (and responses) from those with experience and interest in multi-sector nutrition programming across a range of sectors. Questions might relate to programme design, coordination of sector activities, monitoring and evaluation, and evidence of impact. We are particularly interested in experiences from countries that might be described as fragile and conflict-affected.

Health system strengthening in fragile contexts is an ambitious and some may consider an 'unattainable' goal where programming delivery is heavily dependent on UN agencies, non-governmental organisations (NGOs) and external funding. An article by World Vision describes an innovative model of partnership for the delivery of health and nutrition services directly through the Ministry of Health (MoH) for Southwest State in Somalia. Governed by a partnership framework and over-

seen by task forces, it has focused on strengthening the key pillars of the health system, addressing not only technical capacity, but leadership and management, with annual performance review. The MoH has demonstrated significant progress through this support. A key outstanding challenge is dependence on short-term/emergency funding; the authors highlight the critical need for donors to provide multi-year funding streams for health systems strengthening in fragile contexts.

Progress on scale-up of acute malnutrition treatment is examined in depth in an article from Afghanistan. The Ministry of Public Health and UNICEF in Afghanistan chart the evolution of integrated management of acute malnutrition (IMAM) scale up between 2003-2017 largely through a government lens. By 2017, the IMAM programme had been scaled up to all 34 provinces, with approximately 78 per cent of districts having at least one component of the programme. Barrier analysis continues to inform ongoing activities, such as integration of ready-to-use therapeutic food (RUTF) into existing supply mechanisms, capacity development of community health workers in screening, and securing provision for IMAM within longer-term projects and funding mechanisms. However, scale up of MAM treatment has not kept pace with that of SAM; SAM treatment targets for 2016 were 40 per cent of the SAM burden and were exceeded (47.5 per cent), while a 30 per cent target for MAM was not met (26 per cent coverage achieved).

Current strategy and plans are ambitious: 2020 targets include increasing coverage of acute malnutrition treatment to 80 per cent of malnourished children under five years of age. Integration of treatment services in the Basic Package of Health Services (BPHS) and Essential Package of Hospital Services is considered the means to sustainable scale-up.

While supplementary feeding programmes (SFPs) have been the default MAM response for many years, new and potentially more effective approaches, such as combining protocols treating SAM and MAM within the same programme, are being researched and in some cases entering mainstream programming. Multiple actors are

currently involved in MAM management, ranging from national government to UN agencies, with evolving mandates and approaches. Researchers are also focusing on different approaches, including behaviour change communication (BCC), new product formulations and nutrition-sensitive interventions. The discourse and practices around MAM treatment are intensifying and evolving and ENN is keen to help capture these developments. We plan to produce a special edition of *Field Exchange* on MAM prevention and treatment at the end of 2018 and are calling on our readers to write up programme experiences and research on this topic. More details are given below.

Older people remain under the radar in nutrition response, with few agencies programming specifically for this demographic. Given that Africa has one of the most rapidly increasing populations of older people, the need for nutrition-oriented programming for this cohort is growing. An article by Kidist Negash Weldeyohannis of Help Age International (HAI) describes an eight-month nutrition (CMAM), water, sanitation and hygiene and livelihoods intervention programme in Ethiopia to target older people in several districts.

This was prompted by district assessments that found global acute malnutrition prevalence of 10.5-15 per cent and a SAM rate of 1-1.1 per cent among older people. Programming was well intentioned but had limitations. Lack of RUTF supplies to treat this older caseload meant supplementary food rations had to be used instead through a parallel programme as WFP had no capacity to absorb an older caseload into its existing SFP.

In Ethiopia, there are no national guidelines on acute malnutrition management for this age group, data are not included in regular facility reporting and older people are not routinely included in needs assessments. Resource constraints generally limited integration with existing services. The authors appeal for greater advocacy, capacity development and resource allocation by donors to meet the humanitarian needs of this neglected group. Given the current shortfalls in overall humanitarian resourcing to address the burden of child undernutrition, this 'call for support' does beg the question: how this can be achieved? Absence of national guidelines is no surprise, given there is no international guidance on acute malnutrition in older people. Whose responsibility is this?

Finally, several research articles featured in this issue highlight gaps, lack of knowledge and

blind spots in our sector. One paper presents an estimate of the prevalence and burden of children aged 6-59 months concurrently wasted and stunted for 84 countries. These children are at even greater mortality risk than those with SAM. Pooled prevalence was three per cent (0-8 per cent), corresponding to nearly six million children concurrently wasted and stunted – and is likely to be an underestimate since it is based on cross-sectional data that does not capture incidence.

An article by Myatt et al takes a fresh look at routine, cross-sectional survey data gathered by UNHCR over a number of years. It is argued that baseline and end line data comparisons fail to capture the dynamic nature of programming between these timepoints. Refugee populations in particular are notoriously "unstable", with camps populations often in a state of dynamic flux. This can confound survey results; e.g. those leaving may be in a better nutritional state than those arriving. The authors propose a new procedure using single-survey data to try and account for this population flux; more work is needed to test and develop new approaches.

Another article raises concerns over inadequate thiamine provision to critically ill inpatient SAM cases using current treatment protocols which may be contributing to significant morbidity and mortality outcomes; refeeding in those with borderline thiamine reserves can precipitate acute thiamine deficiency, which impacts survival and has longer-term neurological consequences. The authors call for a reformulation of F75 and supplementation of breastfeeding mothers of complicated SAM infants under six months of age.

When it comes to acute malnutrition in infants less than six months old, low birth weight infants (LBW) are getting renewed attention. They feature in a recent systematic review that examined impact of nutrition-specific and nutrition-sensitive interventions to reduce LBW incidence. Six interventions were associated with a decreased risk of LBW: oral supplementation with vitamin A, low-dose calcium, zinc, multiple micronutrients; nutritional education; and provision of preventive antimalarial drugs. An important research need is to distinguish impact of such interventions in women who are undernourished; only three of the 23 identified studies did such sub-analysis.

LBW infants were also a key discussion point in a meeting of the Management of At risk Mothers and Infants (MAMI) Interest Group, summarised in this issue. Researchers are examining vulnerability of LBW infants and how this con-

tributes to the burden of acute malnutrition and mortality in both young infants and older children. Emerging findings suggest that LBW infants are more likely to be identified as wasted and stunted at birth and at six months; that elevated risk of mortality persists beyond early infancy; and that being LBW carries mortality risk that cannot be wholly accounted for by low weight. In other words, being born small is even worse than just being small.

Discussion at the MAMI Interest Group meeting highlighted the limitations, as much as the potential, of nutrition interventions for this age group. Anthropometric indicators remain poor proxies for nutrition risk and do not exclusively capture it. Even labelling these infants as 'acutely malnourished' carries the risk of inappropriate intervention and may discourage wider ownership (for example, by the health sector) if those identified as high risk are seen as a 'nutrition' problem. The evidence gap for case definition is stark, albeit improving.

As a nutrition sector, we took ownership and led the way on CMAM, making enormous progress in scaling up effective treatment. However, there has been a cost to locating CMAM within nutrition services rather than health as we struggle to integrate treatment of acute malnutrition within health systems and structures.

Furthermore, our focus on treatment has meant prevention has largely been ignored. Intervention approaches have been dominated by product delivery, especially when it comes to moderate acute malnutrition. MAMI offers – and needs – a fresh approach to identify and manage high-risk groups led by health, as well as nutrition, experts from the outset, with prevention as a guiding principle. The MAMI Group has a rich mix of nutrition, paediatric and mental health programmers and researchers who are aiming to do just this. A critical next step, reflected in the conclusions of the meeting, is a call for support to 'up the game' and develop a Global MAMI Network with country-level research – robust randomised control trials and implementation research – at the heart of a shared agenda that rapidly informs policy and practice.

I conclude with a reminder to get thinking and writing about MAM treatment and prevention programming and research.

Happy reading,
Marie McGrath, Co-editor *Field Exchange*

Special edition of *Field Exchange* on MAM programming – call for articles

ENN is planning a special edition of *Field Exchange* on MAM programming. We are seeking articles that feature current and new programming and research approaches to prevent and treat MAM. This includes nutrition-specific programmes and multi-sector and nutrition-sensitive programming that includes MAM prevention or treatment as an outcome. We especially welcome articles from government.

Submit your article ideas to the *Field Exchange* editors – send us a paragraph outlining the programming experience/research and key learning points and share any relevant publications/reports.

Share this call with your colleagues and counterparts in government.

More guidance on writing for *Field Exchange* and the support we can provide is available at:

<https://www.ennonline.net/fex/writeforus>

The deadline for finalised content to feature in the edition is 1 November 2018.

Contact for submissions or further questions: Chloe Angood, *Field Exchange* sub-editor, chloe@ennonline.net



An older woman receiving her monthly ration of supplementary food, Ethiopia, 2016

Extending support through CMAM to older people in Ethiopia

By Kidist Negash Weldeyohannis



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and response. She has previously worked with UNICEF and CARE in related fields and has a Masters in Public Health.

The author acknowledges the United Nations Office for the Coordination of Humanitarian Affairs Humanitarian Response Fund (UNOCHA-HRF) for financing the project described here, as well as Dr Luca Saraceno and Dr Juma Khudonazarov for reviewing this article and providing constructive feedback.

Location: *Ethiopia*

What we know: Africa has one of the most rapidly increasing populations of older people. There is a lack of national data on socioeconomic conditions and disease burden of older people in developing countries.

What this article adds: In 2016 a rapid assessment by HelpAge International identified high prevalence of global acute malnutrition (GAM) among older people in two drought-prone zones of Ethiopia (10 to 15 per cent). In response, HelpAge International intervened with a nutrition, water, sanitation and hygiene and livelihood intervention. Community-based management of acute malnutrition was limited to use of supplementary food in this age group due to ready-to-use therapeutic food shortfalls, health worker resistance and lack of relevant national guidelines. Complicated cases were referred to government services for treatment; a proportion received free care. External end-of-project evaluation was positive in terms of reported improvement in wellbeing, health conditions and weight gain (not quantitatively assessed). One quarter (26 per cent) of respondents were receiving relief food aid and 28 per cent were enrolled in the productive safety net programme. Challenges included lack of national guidelines on acute malnutrition management, data on older people not included in regular facility reporting, and older people not routinely included in needs assessments. Advocacy, capacity-building among local and international agencies to include and manage the older-age caseload and greater investment by donors are needed.

Situation of older people in Ethiopia

Africa has one of the most rapidly increasing populations of older people. Despite the impact of HIV/AIDS and other communicable diseases on life expectancy across the continent, people are living longer than ever before and the proportion of older people in Africa has increased almost fivefold. Over 40 million older people aged 60 years and over live in Africa; three million of whom are over 80 years of age. By 2050 the population of older people in Africa is projected to increase to 204 million.

Due to limited availability of age-disaggregated data, it is difficult to provide detailed analysis of the socioeconomic conditions of older people in Ethiopia. However, the 2007 Central Statistics Agency (CSA) census report indicated that 3,565,161 (about 4.8 per cent) of the total population are 60 years old and above (CSA, 2012). Of these, about 532,093 (14.9 per cent) live in urban settings, while the rest (85.1 per cent) live in rural areas, which follows a similar pattern to the whole population. The total number of older people is predicted to reach 5.3 million by 2020 (CSA, 2012).

Like many other developing countries, older people in Ethiopia are vulnerable to poverty, food insecurity, malnutrition, limited access to social and health services, and

limited options for livelihoods diversification and security, regardless where they live (HelpAge, 2013). Furthermore, many older people require double protection in that they require care and protection themselves and at the same time support children, grandchildren and ageing spouses.

There is also global evidence of a large increase in the burden of non-communicable diseases (NCDs) among older people in low and middle-income countries, including cardiovascular diseases, hypertension, stroke, diabetes and dementia. In Ethiopia there is currently no countrywide research that shows the effect of NCDs on the health of older people, although the HelpAge study in 2012 found that 75 per cent of older people surveyed were suffering from one or more NCDs and, of these, only 75 per cent were receiving medical care (HelpAge, 2013). The shortage or non-existence of people trained in geriatrics and the management of NCDs, the deprioritising of older people for essential services, unaffordable healthcare costs and distance from health facilities all present major healthcare problems for older people in Ethiopia (HelpAge, 2013).

Adequate food and nutritional intake are critical for maintaining good health and are a key determinant of people's ability to survive and recover from stresses and shocks in disaster-prone areas of developing countries.

Table 1 Impairment among older people per region in Ethiopia, 2013

Impairment	Oromia (%)			Amhara (%)			SNNPR (%)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Respondents with some form of impairment	26.2	43.1	31.8	56.4	50.7	54.2	39.7	42.9	41
Visual	14.6	33.3	20.8	33.3	29.4	31.9	22.4	35.7	28
Weakness	10.7	13.7	11.7	42.1	32.4	38.5	19	16.7	18
Hearing	6.8	17.6	10.4	10.5	5.9	8.8	10.3	19	14
Psychological	0	0	0	5.3	8.8	6.6	0	0	0
Mobility	5.8	3.9	5.2	8.8	23.5	14.3	6.9	4.8	6

Source: HelpAge International and EEPNA (2013)

Older people have specific needs in relation to their general food intake, micronutrient requirements and palatability of food (See figure 1). This makes them particularly vulnerable to disruptions in food security in times of crisis. In droughts and food shortage situations, where the price of food is generally high, older people, who are often among the poorest, are frequently unable to afford enough food for themselves and their families. Furthermore, in cases of food insecurity, older people may choose to give their ration to younger members of their family.

In addition to the worst impact of food insecurity, various (physical, sensory and cognitive) negatively affect older people's food intake and increase their vulnerability to malnutrition. The risk factors underpinning undernutrition among older people are multiple and interconnected (see Figure 1). According to the 2013 vulnerability assessment among older people conducted by

HelpAge International in the Oromia, Amhara and Southern Nations and Nationalities Region (SNNPR) regions of Ethiopia, the percentage of older people with impairments ranged from 31.8 per cent in Oromia to 54.2 per cent in Amhara regions (HelpAge and EEPNA, 2013). Common forms of impairments reported were visual, physical weakness, mobility and hearing, which are highly related to poor production capacity, less income, poor food intake and malnutrition (see Table 1).

Despite the growing body of evidence related to older people's challenges in meeting their nutritional needs in emergencies, there are very few nutrition-specific interventions targeting older people in humanitarian situations, in contrast to pregnant and lactating women (PLW) and children under five years old, for whom intensive and targeted nutrition assistance is well-established practice. The lack of nutrition programmes tailored

Table 2 Result of rapid nutrition assessment by HelpAge

Malnutrition	Adami Tulu Jido Kombolcha (2016) (%)	Teltele (2017) (%)
Global acute malnutrition (GAM) – MUAC<210 mm	10.5	15
Severe acute malnutrition (SAM) – MUAC <185mm	1.6	1
Moderate acute malnutrition (MAM) – 210mm> MUAC ≥185mm	8.9	14

to older people also contrasts with basic humanitarian principles affirming that everyone has the right to humanitarian assistance which is impartial and non-discriminatory.

HelpAge assessments and response

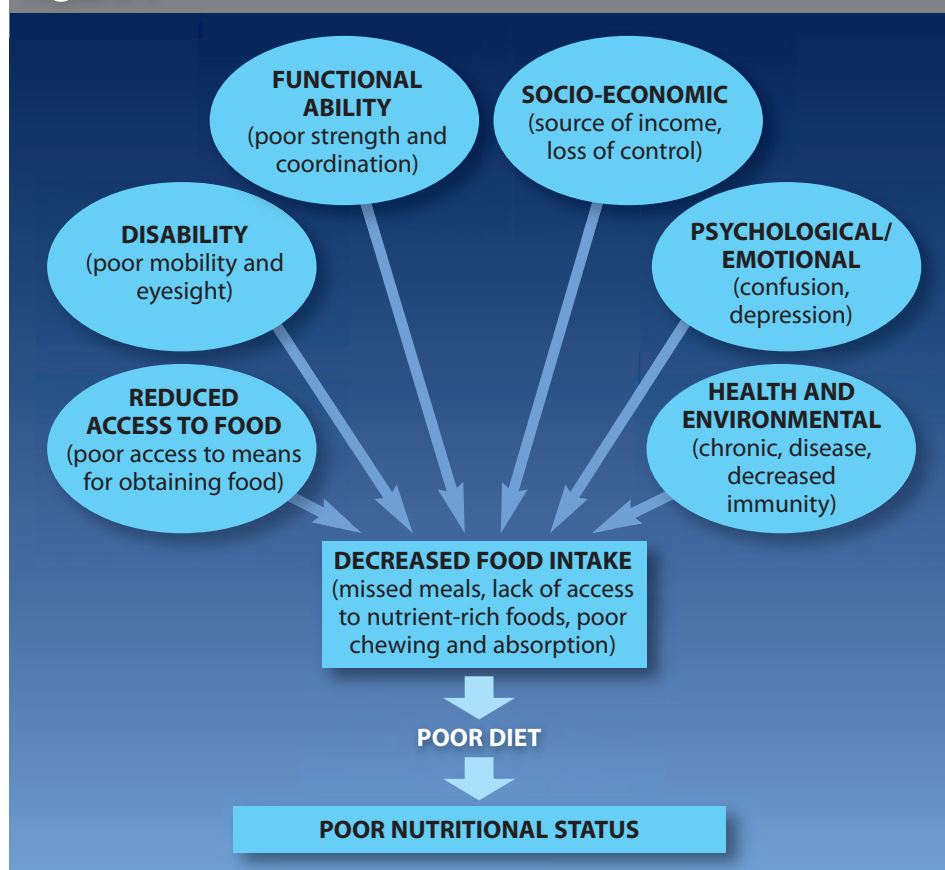
HelpAge conducted two rapid health and nutrition assessments in Adami Tulu Jido Kombolcha woreda¹ of East Shewa zone (2016) and Teltele woreda of Borena zone (2017). Both indicated very high levels of acute malnutrition among older people, including a "serious" global acute malnutrition (GAM) rate in Adami Tulu Jido Kombolcha of 10.5 per cent and a "crucial" GAM rate in Teltele of 15 per cent. The Adami Tulu Jido Kombolcha assessment was conducted in a belg-producing area² following the failure of the Meher harvest, which explains to some extent the high level of malnutrition (although no baseline data are available to compare with other seasons). The assessments were based on the rapid assessment method for older people (RAM-OP) which was developed in 2013 by HelpAge in collaboration with Brixton Health and Valid International. It is not recommended to assess bilateral pitting oedema in older people as oedema may be present due to other common health conditions in this age bracket. Table 2 summarises the findings of both assessments.

Results of the 2016 assessment were used to advocate with donors for support to improve the conditions of older people in this area and meet their urgent needs. The United Nations Office for the Coordination of Humanitarian Affairs-Humanitarian Response Fund (UN-OCHA-HRF) subsequently funded a project to provide life-saving support to older people for eight months between April and December 2016, implemented by HelpAge Ethiopia in four woredas of Oromia region (Adami Tullu Jido Kombolcha, Girar Jarso, Ziway Dugda and Abote). The project was implemented as a multi-sector response, integrating nutrition with water, sanitation and hygiene (WASH) and livelihood interventions, where the nutrition component was implemented only in Adami Tulu Jido Kombolcha

¹ The woreda is the third tier of administrative division of Ethiopia. Woredas are further subdivided into kebeles or wards.

² Belg is one of two rainy seasons per year (the shorter season between February and April), followed by the main meher rainy season from May to September.

Figure 1 Nutritional risk factors for older people



(Source: Borrel, 2001)

Table 3 MUAC cut-offs for older people used in the TSFP

Classification	MUAC (mm)
Severe malnutrition	MUAC <185
Moderate malnutrition	210 ≥ MUAC ≥ 185
No malnutrition	MUAC ≥ 210

Source: HelpAge guideline on nutrition intervention for older people in emergencies (2013)

and Girar Jarso woredas. While these two woredas benefited from nutrition, WASH and livelihood, the rest were targeted for WASH only. Major activities undertaken under each sector:

- Nutrition:** Community mobilisation and screening, identification of acutely malnourished older people, referral of cases, provision of supplementary food, follow-up and referral of SAM cases to health facilities for further medical support.
- WASH:** Rehabilitation of 15 water schemes that benefited 35,834 individuals, training of 124 WASH committees who manage the water points, promotion of hygiene and sanitation.
- Livelihoods:** Provision of seeds and agricultural tools for 9,118 households (wheat, maize and teff³), training of agricultural extension agents and facilitation of follow-up and support in cultivating the seeds. As a vulnerable group, all older people identified as malnourished have benefitted from the seed support.

Project activities and achievements

The project areas are among the most drought-prone woredas in Ethiopia, where agricultural production regularly suffers from erratic rainfall and periods of drought. As a result, communities are highly vulnerable to food insecurity and other disasters. In January 2016 both woredas targeted for the nutrition support were categorised by the NDRMC/ENCU⁴ as hotspot priority one, following widespread El Niño-induced drought, which affected mainly the central highland part of six regional states during 2015 and 2016.

HelpAge implemented the nutrition component of the project using the community-based management of acute malnutrition (CMAM) approach, commonly used for the treatment of children and PLW with acute malnutrition. This is in line with HelpAge guidelines, based on experience with Médecins Sans Frontières in South Sudan, which recommend implementation of all four components of CMAM: community mobilisation; targeted supplementary feeding for treatment of moderate acute malnutrition (MAM); outpatient therapeutic programme (OTP) for treatment of SAM without complications (using ready-to-use supplementary food (RUTF)); and stabilisation centres (SCs) (using therapeutic milks) for treatment of SAM with complications. In practice it was not possible to implement the full CMAM guidelines due to supply shortages, resistance of some health workers and the lack of a national guideline; RUTF was not supplied by the regional health bureau to support this project, so only supplementary food was given for the treatment of MAM and SAM.

The activities were implemented through two local partners: Rift Valley Children and Women Development Organisation (RCWDO) and Sewasew Genet Children Development Organisation (SGCDO). Before the start of the project HelpAge trained 54 health workers (nurses and health officers), health extension workers (HEWs) and partners on basic principles of malnutrition among older people, including risk factors, diagnosis, treatment, follow-up and prevention of acute malnutrition. The HelpAge guideline for emergency nutrition response for older people was used to conduct the training (HelpAge, 2011). Practical demonstrations were given on how to use mid upper arm circumference (MUAC) tapes and how to screen for admission to SAM and MAM treatment programmes. As this was a new approach, 15 community health workers (CHWs) were also recruited and trained to lead and support the HEWs.

Intensive community mobilisation was conducted as part of the intervention by the project team, with the support of government at woreda and community levels in the two districts (HEWs, development agents and community management). Following mobilisation, people aged 60 years and above were screened for acute malnutrition by the HEWs with the support of project staff, using simple colour-coded MUAC tapes (see Table 3 for classification).

Due to funding constraints it was not possible to cover the whole of both woredas, only selected kebeles. These were selected in consultation with woreda officials and community leaders on the basis of the worst effect observed of the drought. As the HEWs and CHWs were used to identify and refer older people, it was assumed that maximum coverage could be achieved, although no coverage survey was undertaken to provide evidence of this.

Identified cases of SAM and MAM were provided with a ration card for the receipt of supplementary food through a targeted supplementary feeding programme (TSFP) established by the project. A monthly ration comprised 6.5kg of corn soya blend (CSB), 1 litre of vegetable oil and 1.5 kg of haricot beans. This was provided for three to four months. This basket of supplementary food provided 1,186 kcal and 41.8g of protein per person per day. This intervention was the first of its kind in both woredas and among the first emergency nutrition responses in the country to consider older people as a vulnerable target group.

The World Food Programme (WFP) ran a concurrent SFP in both target woredas, as with all priority one woredas; however, this was only targeted to children and PLW. It was not possible to procure supplementary food from WFP for older people within this programme due to significant funding constraints; therefore HelpAge ran a parallel programme, using food procured in country. Discussion is ongoing with WFP and the Nutrition Cluster for future streamlining of programmes if the funding situation allows.

During the seven-month project period, supplementary food was provided to 1,898 older people (965 of whom were older women) in the two districts. Of these, 1,733 were identified as MAM. The remaining 165 were older people with SAM. Since the project had no resources for supplies for the management of SAM or capacity to treat associated medical conditions, SAM cases were provided with a supplementary ration and referred to government facilities for further treatment. Through continued discussion and collaboration with the health office at the district level, it was possible for 29 cases of SAM with other medical conditions to receive free medical care in the health centre of Adami Tulu Jido Kombolcha woreda, in addition to re-



Project beneficiaries waiting to receive supplementary food in Adami tullu jido kombolcha woreda, Ethiopia, 2016

³ An annual species of lovegrass native to Ethiopia and Eritrea raised for its edible seeds and a staple ingredient of the Ethiopian diet.

⁴ The Government's National Disaster Risk Management Coordination Commission (NDRMCC) and the UNICEF-supported Emergency Nutrition Coordination Unit (ENCU).

ceiving supplementary food from the project. No information on associated medical conditions or follow-up data was available for these referrals. The remaining SAM cases received supplementary food only.

MUAC of each beneficiary was measured monthly by HEWs and CHWs to determine whether discharge criteria were met. However, reliable data were not recorded and therefore it is not possible to know how many beneficiaries reached the discharge criteria within what time-frame. Data collection is an area that will be improved in the future.

The Government of Ethiopia, WFP and development partners assist chronically food-insecure people through transfers of food and cash during food-deficit periods under the Productive Safety Net Programme (PSNP). There is provision within this strategy for unconditional inclusion of older people in food-insecure households. However, no analysis was made of how many of the project's beneficiaries were in receipt of PSNP support, although during the final project evaluation it was reported that 26 per cent of respondents were receiving relief food aid and 28 per cent were enrolled in the PSNP. HelpAge plans to focus on advocacy for access to the PSNP by older people in the future.

Feedback from partners and beneficiaries

An external final project evaluation was conducted in February 2017. A total of 390 households of older people were selected from the targeted beneficiaries using proportion-to-population size (PPS) sampling technique after selecting 50 per cent of the targeted communities purposively. A desk review of relevant documents complemented seven focus group discussions (FGDs) with project beneficiaries and 26 key informant interviews (KIIs).

Beneficiaries, local officials and stakeholders stated that the project contributed to a reduction in suffering and the prevention of life-threatening conditions among older people, particularly related to critical food insecurity. Older people reported they felt valued in the community when their nutritional needs were addressed, which was not the case during previous emergencies. Although quantitative evidence was gathered on recovery from malnutrition, older people reported that they had regained sufficient strength to perform their day-to-day activities.

Reported positive impact on the wellbeing of older people included improved physical condition and health status, such as weight gain, increased strength and greater ability to move from place to place. According to the household survey, 45.6 per cent of respondents reported improvements in their health conditions; 26.9 per cent reported improvements in their physical conditions; such as weight gain and increased strength; and 23.1 per cent reported that their health status was maintained. Eight-two per cent of older people (321/390) surveyed felt the TSFP was very important and relevant to their situation, while an additional 16 per cent reported it as important.

Challenges and lessons learned

Poor attention and priority are given to older people compared to children and women in emergency situations, particularly in terms of a lack of life-saving interventions. While lack of resources is the main constraint, there is also limited evidence of the vulnerability of older people and the impact of addressing their needs on household wellbeing. There is also poor visibility; older people are rarely included in national-level needs assessments.

There is no nationally adopted guideline in Ethiopia for management of acute malnutrition among older people and no mandate to include older people in screening for acute malnutrition. This contributes to resistance of donors and partners to include older people as a vulnerable group.

Although the needs in the project area were great, available resources for the project were limited, so it was only possible to implement the project in parts of the target woredas (focusing on hotspot kebeles).

Data collection and reporting of this activity was not included in regular health facility reporting tools; this greatly affected the quality and availability of data required to calculate important performance indicators such as cure rate, default rate and death rate of enrolled beneficiaries. This issue will be mitigated in future programming by developing a strong monitoring and evaluation system to be rolled out at the beginning of the project. Opportunities to integrate this into the existing Health Management Information System (HMIS) are being explored.

Engagement of and creating awareness among decision-makers on the magnitude and seriousness of malnutrition among older people has been crucial to the success of the programme. In Adami Tulu Jido Kombolcha woreda a decision was taken by the woreda administration and health office to use the available resources and admit SAM cases for medical treatment, even though this was not specifically budgeted for.

It has also been observed that CMAM is well integrated and resourced within government systems in Ethiopia. The increase in caseload that would result from prioritising older people as a vulnerable group in nutrition emergencies could be absorbed at community-level (assuming food supplies are available); however resources may be lacking to treat SAM cases with medical complications (diabetes, high blood pressure and cardiovascular disease are common underlying conditions) due to the lack of availability of therapeutic supplies. Discussion with the Ministry of Health (MoH), ENCU and UNICEF is underway to make the required resources available.

Recommendations

Older people should be prioritised for support in all humanitarian nutrition interventions, given their vulnerability to malnutrition, their important role in the community and on the basis of humanitarian principles.

Advocacy and capacity-building work is needed among local and international humanitarian agencies to work towards the inclusion of older people in routine screening for acute malnutrition and treatment programmes for acute malnutrition, and to encourage the use of age and gender-disaggregated data to improve monitoring for this age group.

National guidelines on the management of acute malnutrition in Ethiopia must be revised urgently to ensure that older people are included in all aspects from assessment to service delivery. HelpAge has developed a guideline on emergency nutrition interventions for older people, which can be easily adapted to the local context of Ethiopia.

Nutritional guidelines for food distribution suitable for older people must be integrated into all health planning and response plans.

Health management information system (HMIS) data should be disaggregated by age and sex and key indicators for older people included. Alongside this, HelpAge will develop strong monitoring and evaluation systems to enhance learning and improve performance of future projects.

The needs of older people should be routinely included in all four components of CMAM protocols and programmes in Ethiopia, including community mobilisation, supplementary feeding programme, outpatient therapeutic programme and stabilisation centre. Discussions with the MoH and ENCU have already begun to this effect.

Within the health care system, conditions and needs common to older people should be integrated into patient triage, clinical evaluation, treatment, the emergency medical response system and specialty care for SAM cases. Resources must be mobilised to support the inpatient treatment of older people with SAM with medical complications. Greater investment is needed by donors to achieve this.

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A man shows some of the snake gourds he has produced with support from the programme, Satkhira, 2016

Prince Naymuzzaman Khan

Resilient farming in Satkhira, Bangladesh

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The authors would like to acknowledge Solidarités International's team in Bangladesh for its support in reviewing the case study on which this article is based.

Location: *Bangladesh*

What we know: Bangladesh is the sixth-worst extreme weather-affected country in the world, which negatively impacts agriculture, the main economic activity.

What this article adds: In 2016 Solidarités International (SI) supported vulnerable farmers in Satkhira district to improve farming and livelihood resilience and disaster-risk reduction activities, in close collaboration with the Ministry of Agriculture (MoA). This involved supporting access to improved and resistant seeds; improving agricultural practices (better adapted to the micro-climate and soils); and developing integrated farming (dual-crop system). SI teams elaborated business plans with beneficiary farmers and distributed cash grants for sustainable farming enterprises. A qualitative project review found diversification of agriculture activity (reduced monoculture), more resilient crop production, greater income generation (cash crops), greater yield per land area, increased awareness and practice of sustainable farming activities and more diverse food access by households. Working with MoA agriculture extension workers is key to sustainable success. Transformation of agricultural products (e.g. mat making) provides important income-generating opportunities. Resilient seed banks may have a role in emergencies. Active communication with farmers is key to keeping them updated on current farming techniques.

Context

According to the Global Climate Risk Index 2017, Bangladesh is the sixth-worst extreme weather-affected country. The frequency and intensity of climatic events such as floods, droughts and cyclones have escalated, aggravated by climate variability and change. Bangladesh is located in the largest river delta in the world and is heavily reliant on the natural tide system for its prominent agricultural sector, particularly in the southwest coastal region. With the impact of climatic changes and human activity, the country is experiencing dramatic environmental decline, making the region extremely vulnerable to hazards and natural disasters.

Satkhira is a district in southwest Bangladesh located on the bank of the Arpangachhia River. In the 1960s the government constructed a network of polders, embankments and drainage channels in the coastal regions as defence against water intrusion and to increase agricultural production. Poor maintenance of sluice gates, design flaws and the gradual sedimentation of the canals have contributed to serious waterlogging in the Satkhira region. During the monsoon excessive rainfalls inundate the land and inadequate drainage prolongs flooding. Great areas of land remain waterlogged for several weeks and sometimes even months (20 per cent of the land was severely affected by waterlogging in 2015). This is aggravated by cyclones and subsequent storm surges and severe droughts. High water salinity also adds to the problem, caused by saltwater shrimp farming that requires large bodies of salt water; saltwater shrimping has occurred increasingly further inland since the 1980s, sometimes using canals constructed by the government, thereby blocking drainage and causing more waterlogging. All these issues greatly affect the quality of the soil and threaten crop production.

Agriculture is the main economic activity in Bangladesh, providing employment to over 45 per cent of the population (Bangladesh Bureau of Statistics, 2015). Satkhira district is characterised by smallholder subsistence agriculture, based on a saline wet rice ecosystem. Farmers generally only cultivate Aman rice, a type of monsoon-dependent rice sown in June/July and harvested in December/January. The rest of the year, farmers either leave their land fallow due to salinity problems or they cultivate fish and/or vegetables. Households own on average between 33 and 50 decimals of land (less than 0.2 hectares). This is insufficient for many farmers, who lease other fields to extend their cultivation capabilities. Due to the pressures described, small farmers living in the coastal belt struggle to generate a decent standard of living from their agricultural activities and are compelled to adapt their practices.

Intervention for resilient agricultural livelihoods

Solidarités International (SI) implemented disaster-risk reduction (DRR) activities in Satkhira district between 2010 and 2016. It supported communities to identify the impacts of the main hazards and local capacities to face them, and to collaborate on ways they could reduce these vulnerabilities. Based on risk-reduction action plans (RRAPs) developed with communities at the upazila (sub-district) and ward levels, it was determined that specific support should be given to farmers to launch resilient farming and livelihoods activities, with the aim of mitigating the impact of hazards and disasters and reducing their vulnerability. The aim of two projects implemented in Assasuni upazila¹, Satkhira district (the first in 2015; the second in 2016) was to

¹ Specifically, these two projects were implemented in: Dhandia and Nagarghata unions in Tala upazila in 2015 and Borodal and Khajra unions in Assasuni upazila in 2016.

Box 1 List of criteria to identify vulnerable farmers

- Village vulnerable to disasters
- Household severely affected by waterlogging in the past few years
- High level of loss of livelihood and slow or no recovery and/or coping strategies
- Low level and irregular source of income (less than 5,000 BDT per month)
- Ownership of less than 0.5 acres of land
- No access to adequate food sources
- Socially vulnerable households (women and elderly headed households; households with young children, disabled persons, pregnant women or sick persons).

help the most vulnerable households cover their basic needs, while simultaneously laying the foundations for sustainable and long-term livelihood recovery, thereby bridging short-term and long-term humanitarian assistance. SI worked to enhance existing agriculture-based livelihoods by promoting adaptation strategies and mitigation and preparedness techniques to reduce core vulnerabilities. The intention was to encourage a proactive rather than reactive approach to enable communities to build on their own capacities to cope with disasters, should they strike.

Three components of the programme contributed to improved resilient farming: supporting access to improved and resistant seeds; improving agricultural practices; and developing integrated farming, each described in more detail below. These activities were implemented in close collaboration with two Agricultural Extension Officers (AEOs) commissioned by the Ministry of Agriculture (MoA) to work with agricultural research institutions and disseminate new tech-

nologies, inputs and techniques at field level. The project was implemented in Assasuni and Tala upazilas: Borodal, Dhandia, Khajra and Nagarghata unions. A total of 390 farmers were supported to develop integrated farming and 1,000 households received a grant to buy seeds and equipment. SI's team was made up of a team leader and ten community mobilisers.

Supporting access to improved and resistant seeds

To secure food supply in Bangladesh, the development and use of high quality seeds that can adapt to certain unfavourable conditions (such as waterlogging and salinity) is essential. Research institutes, such as the Bangladesh Rice Research Institute and Bangladesh Institute of Nuclear Agriculture, are continuously creating new varieties of stress-tolerant seeds. However, small, isolated farmers are rarely aware of the characteristics of the new varieties and which ones are usable on their land and lack access to markets. SI encouraged the use of improved seeds and facilitated access to them² by providing cash to vulnerable farmers. Together with AEOs and SI community mobilisers, beneficiaries identified the stress-tolerant crops that could easily and efficiently be grown on their land.

Introducing sustainable agricultural practices

Resilient farming entails using agricultural practices that are better adapted and more sustainable to the pedo-climatic context (the specific microclimate soils). Overall, farmers in Assasuni upazila were ignorant of new techniques and practices that would enable them to cope better with worsening hazards such as salinity and waterlogging. The project aimed to improve farm management by using methods and techniques transferred to farmers by AEOs to suit their specific environment. Examples include the use of good quality seeds to improve germination rates and yields; better soil preparation and sowing (line sowing; bed and furrow system to enhance irrigation efficiency and reduce salinity; dosage of manure to fertilise the soil before sowing; integrated farming; land preparation); timely irrigation and drainage (such as alternate wetting and drying technology to allow the leaching of the salts and mulching); use of natural fertilisers and pest management, and land management techniques in saline conditions.

Developing integrated farming

Single crop farming is a risky enterprise, especially in a context of high hazard vulnerability and low resilience capacity. Crops were also needed that could provide a continuous and balanced supply of food and income. Integrated farming, which is the combination of two or more farming and livestock enterprises in a complementary or supplementary way on a single plot of land, enables the optimisation of resources and land and consequently a maximum production per unit area. This technique is particularly adapted to the coastal belt of Bangladesh; specifically, a dual-crop system was found to be most suited to Assasuni upazila. This involves integrated fresh water aquaculture (fresh water white fish

and prawns, which do not have the same negative environmental impact as the salt water shrimp previously farmed), alongside stress-resilient agriculture (paddy and vegetables, such as various types of gourd, pumpkin, beet, spinach, cucumber and potato), with different enterprises according to the cropping season. In rice-fish-vegetable farming, the paddy field is left open to encourage the fish to enter and swim around the paddy. When water levels drop, the fish stay in the ditches surrounding the rice field. The pond is used to water the vegetables growing on the surrounding dykes (described in Table 1).

Demonstration plots were created to serve as venues to teach technologies and to demonstrate differences between traditional and 'modern' techniques. These aroused local interest and contributed to the acceptance and uptake of these new techniques and seeds. Beneficiaries with plots on their land were tasked with sharing information with non-beneficiaries to encourage dissemination further. No support was given to access markets as it was felt that sufficient demand for the produce already existed.

Implementation

SI teams elaborated business plans with beneficiary farmers and distributed grants for sustainable farming enterprises. A typical plan for the distribution and use of a grant is described in Table 2.

Impact of the intervention

Direct observations and individual interviews, as well as analysis of logbooks kept by beneficiaries on the yields of their crops, revealed that the intervention contributed to securing the livelihoods of vulnerable farmers and their families in the target area. More specifically, the activities enabled the following results:

The spread of risks through the diversification of resilient sources of income

A key feature of livelihood resilience is to spread the risks of shocks and seasonality across several sources of income. In preparing this project review, the authors were unable to assess concrete impacts of risk-spreading, as no major climatic event or disaster occurred. However, the efficiency of diversification as a risk-reduction strategy is evident and has been demonstrated in numerous studies (Gil et al, 2017). If one source of income fails, the others can compensate, enabling the household to cope. The project worked to reach this objective in different ways.

First, diversification limited monoculture paddy. Farmers were immediately encouraged to multiply the number of crops cultivated on their land. Vegetables grown included tomato, eggplant, pumpkin, various types of gourd, okra, long yard bean, water spinach, Indian spinach and amaranth. Secondly, better knowledge and access to improved seeds ensured more resilient sources of income. The T-Aman paddy varieties promoted during the trainings are more resistant

² SI prohibits the use of genetically modified organisms; the seeds were checked and validated before being distributed.

Table 1 Types of enterprise in an integrated farming system according to the three main cropping seasons in the coastal belt

Cropping season	Enterprise
Rabi (Oct – March)	Winter vegetables and fruits, fish/shrimp
Kharif 1 (March – July)	Summer vegetables and fruits, pulses, fish/shrimp
Kharif 2 (July – Oct)	Rice, summer vegetables and fruits, fish/shrimp

Table 2 Example of a grant provided by SI for a beneficiary farmer in 2016

Grant	18,000 BDT (211 €)
Modality	Mobile money transfer
Conditions	3 instalments: <ul style="list-style-type: none"> • 1st instalment: 6,000 BDT in April • 2nd instalment: 6,000 BDT in June • 3rd instalment: 6,000 BDT in August
Use	<ul style="list-style-type: none"> • 1st instalment: dyke, land and pond preparation • 2nd instalment: purchase of agriculture and aquaculture inputs (improved seeds, fingerlings, etc.) • 3rd instalment: purchase of fertilizer and other support inputs)

Box 2 Case studies of diversification of sources of income

Nirod and his wife Sobita-Rani expanded their *mele* production with part of the grant they received. In 2015 they grew some *mele* on their 0.33 acres of owned land. In 2016 they rented 0.66 acres of land to augment the production, making almost 60,000 BDT (over 600 €) from two harvests of *mele*. Almost half this income is from selling raw *mele*; the other half is from mat weaving.

Chanchala and her husband cultivated 480 kg of BR-11 Aman rice on 1.2 acres of land in 2015. In 2016 they started integrated farming and changed to BR-10 and BRRI dhan49; they yielded 780 kg on the same surface area.

Before 2015 Parimal produced rice and some fish separately for a total of 69,300 BDT (almost 700 €). With the help of the project, he started producing vegetables on the dykes surrounding his pond and paddy field; he obtained 4,590kg of cucumbers, eggplants, papaya, beans, tomatoes, bananas, okra, Indian spinach and bitter gourd. He sold 3,860kg at different periods of the year for a total of 80,950 BDT (800 €).

to waterlogging and salinity and are higher-yielding. The average yield of hybrid seeds such as BR-10 and BRRI dhan 49 is 5.5 tons per hectare, compared to 2.07 tons for traditional Jamaibabu rice. Similarly, cultivating salt-resistant vegetables throughout the year enabled better yields and consequently bigger regular surpluses to sell on the markets. Thirdly, the spread of risks was further intensified by some farmers through the cultivation of resilient cash crops with a potential added value. Examples of cash crops cultivated were *mele* (a type of reed that originates from the Sunbardan mangrove forest located along the Bay of Bengal which grows well in brackish water (water that has more salinity than fresh water but less than sea water) and can survive in medium salinity level (EC 4 to 8 ds/m) saline land and water) and/or jute, both highly profitable plants. In the case of *mele*, farmers were supported to process it and transform it into mats to generate added value and more revenue. Mat weaving can be done throughout the year, especially during the rainy season, when other farming activities slow down. See Table 3 (seasonal calendar).

Interviews with farmers showed that these three components generated greater and more regular incomes from several sources (see Box

1 for a selection of case studies). The average income per beneficiary implementing integrated farming was 122,068 BDT, compared to 61,363 BDT the previous year at the same period. Three quarters (74 per cent) of beneficiaries said they had improved their income compared to the previous year. Expanding the portfolio of farming and non-farming activities increases farmers' ability to buffer a shock affecting one activity. Coupled with the use of more resistant varieties of rice and vegetables, the diversity of crops and products ensures that revenues are more sustainable and resilient.

Increased awareness of the importance of sustainable farming practices

Natural resources in the coastal belt are fragile and must therefore be exploited in a sustainable and reasoned way to ensure that farmers can maintain their rural-based livelihoods now and in the future. The resilient farming interventions were designed with sustainability in mind and the trainings promoted environmentally friendly principles. Integrated farming is a viable, low-cost, low-risk and sustainable activity that enhances natural biological processes and lessens the degradation of soil quality, with maximum output for minimum input. It is

better than rice monoculture in terms of resource utilisation, diversity and productivity. The optimisation of the land also contributes to reducing salinity levels; when the land is left fallow, the soil moisture evaporates and this consequently increases the concentration of salts.

Moreover, natural fertiliser and pesticide techniques were promoted during the trainings, including the use of organic compost or cow dung, bird perching, sex pheromone traps, nets to capture bugs, light traps, neem leaves and manual control of insects. Farmers also learned how to mitigate the consequences of hazards by preparing and managing their fields more carefully. Example feedback from participants is included in Box 3.

The reduction of food insecurity and improvement of diets

The diversification of crops and increase in production have had nutritional benefits and have provided an important solution to food insecurity in Satkhira district. Regular increased crop production enables continuous access to food and crop diversification provides a broader range of food items, such as grains, vegetables and fish, which leads to a more diverse diet. Interviews with beneficiary farmers confirm this (see Box 4). Moreover, because they could consume larger quantities of products from their farm, households reduced the share of food expenditures in their budget. No data on dietary diversity, food security or household expenditure were available for this period to provide evidence for this.

Lessons learned

The process of writing this article enabled the authors to reflect on this programme and take stock of the intervention in Satkhira district regarding resilient farming practices to improve livelihoods. Several lessons were learned and recommendations made to improve future interventions:

Working in close collaboration with the AEO in charge of implementing the MoA's directives was important to the success of the programme, especially regarding technical capacity-building and the long-term communication between agricultural state authorities and farmers. This relationship can also facilitate the development of markets for transformed products and of new marketing channels.

Access to inputs must be carefully planned to ensure sustainability; farmers must be trained on seed storage and on 'home-made', simple preventive and curative pest and disease treatments. Resilient seed banks can also play a key role in case of an emergency (if crops are destroyed by a flood, for instance) and must be implemented closely with the local authorities and the MoA.

Demonstration plots were a very efficient and effective method to promote good practices.

The transformation of agricultural products should be considered to further spread the risks of crop failure and to generate more income by adding value to the raw product.

Box 3 Feedback from participants

"We had no idea about salinity management before. Now we know how to grow in saline conditions. For example, we cultivate very frequently so the salt doesn't come out. If we let the land to rest, it will be more saline."

"The training we received helped us to improve the management of our land so we can have better yields without damaging it. Now we transplant the rice in rows. We are able to manage weeds and we use organic pesticides. We have increased our visits to the fields and we monitor the crops more frequently, so we have better control of our fields. We also use cow dung as a fertiliser for rice. This has doubled our production – before we made four to five sacks of rice per year, now we make 11 to 12 sacks."

Box 4 Feedback from participants

"Before, we could only take two meals a day and we were sometimes hungry. But since we started growing vegetables, we can eat three meals a day and we don't have to spend so much money of food."

"Integrated farming provides vegetables, rice and fish and in enough quantities for us to eat well and to sell surpluses."



A family that was supported to develop an integrated farming, including vegetables, Aman rice and sweet water aquaculture, 2016

Sharing information and communication with farmers is of prime importance in such a context, where farmers need to continually renew their techniques to adapt to changing and aggravating hazards and disasters.

SI hopes to conduct a follow-up impact assessment in 2018/19; however, lack of funding has meant continuation of this programme by SI was not possible. More broadly, funds for resilience and livelihoods programming have diminished, fuelled by the response to the current Rohingya crisis, which has been prioritised and is dominating agency response.

Conclusions

The agricultural activities described here directly

addressed the livelihood vulnerabilities of Satkhira's disaster-affected communities. Marginal farmers were assisted in the adoption of resilient farming techniques and acquired reflexes and practices to reduce risks associated with seasonality and to be more autonomous and resilient. The improved seeds that were promulgated can be used for several seasons and the income created should enable farmers to renew their seed stock, buy or rent equipment and take on labourers for land preparation.

This type of intervention is very valuable in a context of high-salinity and waterlogging. However, it must be noted that the consequences of climate change and the occurrences of hazards and disasters are very likely to worsen in the

coming decades. If the frequency and intensity of these disasters increase beyond what resilient practices and varieties can bring as a solution, other non-farming livelihood options must be considered. According to researchers from Khulna University (Zahangir and Salauddin, 2015), stress-tolerant varieties have limitations: they might adapt to more adverse conditions, but the yields will be reduced and incomes will consequently decrease. How long will resilient farming therefore be a sustainable solution to securing the livelihoods of the vulnerable farmers of coastal Bangladesh?

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A detailed case study of the experience described in this article is available. *Better farming practices for resilient livelihoods in saline and flood-prone Bangladesh. The experience of SOLIDARITÉS INTERNATIONALE in Satkhira district. May 2017. www.solidarites.org/wp-content/uploads/2017/06/Better-farming-practices-for-resilient-livelihoods-in-saline-and-flood-prone-Bangladesh-1.pdf*

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Season	Rabi – winter		Kharif 1 – dry season				Kharif 2 – monsoon			Rabi – winter		
Food situation	severe food gap	food gap		food sufficiency			severe food gap		very severe food gap		severe food gap	
Hazards	Flood											
	Waterlogging											
	Heavy rains											
	Storms/ cyclones					peak					peak	
	Drought and salinity			peak salinity period								
Aman rice	H						S			G		H
Fish farming	H						S			G		H
Shrimp farming		G		H								S
Summer gourds						S	G	H				
Kohirabi	G	H										S
Okra				S	G	H						
Eggplant	G	H								S		G
Indian spinach	H								S		G	
Tomato								S			G	
Cucumber						S	G	H				
Papaya	G	H				S				G		
Jute			S			G		H				

S = sowing; G = growth; H = harvest

WASH-nutrition barriers and potential solutions in Cambodia

Summary of research¹



A boy draws water in a home-grown school feeding programme in Siemp Reap Province, Cambodia, 2016

WFP/Ratanak Leng

Location: *Cambodia*

What we know: Low coverage of improved water, sanitation and hygiene (WASH) is recognised as an important contributor to the burden of undernutrition in Cambodia.

What this article adds: A recent study investigated barriers to WASH and nutrition integration in Cambodia and identified opportunities to address them. Barriers included lack of technical guidance on integration, siloed governance and funding mechanisms, limited knowledge among personnel outside specialities, donor-driven programme design and lack of clear leadership. There is a risk that efforts to promote WASH-nutrition integration remain theoretical without moving to implementation. Stakeholders described several successful implementation strategies for integrated programmes. Cross-sector steering architecture is essential. Recommendations are made to address barriers and support routine implementation of integrated work.

Globally, it is estimated that half of the burden of child undernutrition is attributable to poor sanitation and hygiene (Prüss-Üstün and Corvalán, 2006). However, many water, sanitation and hygiene (WASH) programmes do not recognise their potential effect on nutrition, while many nutrition initiatives do not include WASH. In Cambodia nutrition and WASH outcomes remain poor by regional standards. One third (32 per cent) of children under five years old are stunted and one quarter (24 per cent) are underweight, while 43 per cent of the population do not have access to improved sanitation and 35 per cent use a non-improved source of drinking water during the dry season (Cambodia DHS, 2014). Low coverage of improved WASH is recognised as an important contributor to the burden of undernutrition in Cambodia (RESULTS UK, 2014) and integrated programming is an emerging priority for both government and development partners.

The purpose of this research was to support future efforts to integrate WASH and nutrition in Cambodia by considering what barriers cur-

rently exist to integration and identifying opportunities to address and overcome them. A stakeholder consultation was conducted with key informants whose work relates to nutrition and/or WASH. Forty representatives from government agencies, development partners and civil society were interviewed, including national, provincial and district-level staff.

In terms of **knowledge and learning**, stakeholders reported a growing evidence base to support integration of WASH and nutrition and increased awareness of global and local evidence. Meetings, trainings and workshops provide forums for learning but are insufficient to foster progress towards integration, particularly at sub-national level. Specific technical guidance on integration is needed. Priorities identified included the appointment of focal points on WASH and nutrition and the generation of local evidence for linkages.

The **policy** environment is siloed. While there are some strategies that draw together policies across multiple sectors, there is no single policy that relates to both WASH and nutrition. A policy framework that is supportive of integration

is needed, including a cross-sector strategy that outlines how existing WASH and nutrition policies contribute to integrated efforts to improve nutrition outcomes. This should be backed up by action plans, supportive institutional arrangements and funding.

Effective collaboration requires clear **leadership**, with mandated leadership responsibilities within existing institutions. Currently, roles and responsibilities are not clearly allocated across sectors or agencies. It is therefore unclear who is responsible for leading on specific aspects of WASH, nutrition, or WASH-nutrition integration. While individual leaders can work across siloed institutions, this is challenging and therefore institutional arrangements are needed that can connect silos. As a first priority, national leaders should provide clear leadership and guidance to sub-national agencies. Coordination mechanisms should also be strengthened, with the clear allocation of leadership roles and responsibilities and the buy-in of high-level leaders.

¹ Burnet Institute (2016) Final report: *Study on WASH-nutrition barriers and potential solutions*. 10 August 2016.

In terms of **governance**, vertical government implementation and funding structures for WASH and separate structures for nutrition are very well established. It is therefore often not feasible to coordinate integration at sub-national level. A national-level coordination mechanism is needed to negotiate an overarching strategy for integration and agree which ministries will take on which responsibilities. Opportunities should also be explored to strengthen existing mechanisms that support development partner alignment and consider how to streamline reporting for government and development partners.

Funding for nutrition and WASH is limited and there is concern that integration will increase competition for funds. This leads to territorialism about sector mandates and discourages participation in cross-sector work. Stakeholders also commented that public and donor funding is usually siloed, whereas merged funding enables integrated work. Advocacy is needed to the Ministry of Economy and Finance for increased budget allocations for both nutrition and WASH, as well as to donors for increased merged funding opportunities.

Lack of **personnel** was identified as a major constraint to integration. Many people have limited knowledge or interest in activities outside their sector. It may be effective to bring together multi-sector teams of people with deep technical

expertise in one area, as well as to have institutionalised focal points, rather than champions who are more personality-driven. Stakeholders reported strong emotional responses to integration – including both fear of change and openness to change – which can be expected to influence the success of integration efforts. Working relationships across sectors (within and between organisations) must be cultivated and supported and integration must be promoted in ways that reassure people of their responsibilities and mitigate territorialism.

For programmes implemented by civil society, programme **design** is driven by the priorities of the donor, which often relate to achieving pre-determined outputs rather than focusing on the achievement of broader outcomes. Stakeholders reported several suggestions for integrated design, including co-location; behaviour change campaigns that include both WASH and nutrition messages; changes to supply-side WASH programmes; and delivery through the private sector. An integrated theory of change or causal framework would support integrated programme design. As a priority, current evidence should be used, including locally generated evidence, during limited windows of opportunity in the design phase to ensure that programmes are as up-to-date as possible. There is a risk that efforts to promote WASH-nutrition integration remain theoretical

without moving to **implementation**. Cross-sector steering architecture that is institutionalised rather than project-driven is essential to support routine implementation of integrated work. Stakeholders described several successful implementation strategies for integrated programmes, including a single contract, shared delivery platform and an integrated design that is implemented in a segmented way.

In terms of **monitoring, evaluation and reporting**, stakeholders are accountable to what they report on. This can discourage integration where reporting lines are siloed and the current institutional context promotes parallel, rather than joint, monitoring. Monitoring and evaluation provide an important opportunity to generate local evidence through special studies. An integrated theory of change or causal framework is needed that includes the contribution of WASH to nutrition.

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Effectiveness of food supplements in increasing fat-free tissue accretion in children with moderate acute malnutrition in Burkina Faso

Summary of research¹

Location: *Burkina Faso*

What we know: There is no consensus on the effectiveness of lipid-nutrient supplement (LNS) compared to corn-soy blend (CSB) in the treatment of moderate acute malnutrition (MAM), or on the role of key factors like milk and soy.

What this article adds: A randomised trial of 1,609 children aged 6-23 months with MAM conducted in Burkina Faso investigated the effectiveness of (a) matrix (i.e. LNS or CSB); (b) soy quality (i.e. soy isolate (SI) or dehulled soy (DS)); and (c) percentage of total protein from dry skimmed milk, in increasing fat-free tissue accretion. Compared to children who received CSB, fat-free mass index (FFMI) accretion increased in those who received LNS. SI did not increase FFMI compared to DS, irrespective of matrix. Having 20 per cent milk protein was associated with greater FFMI accretion than having no milk protein; this difference was not significant ($p = 0.055$), and there was no effect of 50 per cent milk. LNS compared to CSB resulted in 128g (95% CI 67, 190; $p < 0.01$) greater weight gain if both contained SI, but there was no difference between LNS and CSB if both contained DS. The study found that children mainly gained fat-free tissue when rehabilitated. LNS yields more fat-free tissue and higher recovery rates than CSB. LNSs with DS may be improved by shifting to SI.

Background

Moderate acute malnutrition (MAM) is widespread among children in low-income countries, affecting 33 million children at any time (Black et al, 2013) and is a risk factor for morbidity, severe acute malnutrition (SAM) and death. There is limited evidence to inform recommendations on the composition of supplementary foods to treat children with MAM. Supplementary foods for malnourished children are based on a matrix of either corn-soy blend (CSB) or lipid-based nutrient supplement (LNS). There are substantial differences between the two product types in nutritional composition, cost, how they are consumed and logistics needed for delivery. A key source of protein in CSB is soy; this is often dehulled soy (DS), which contains higher levels of anti-

¹ Fabiansen C, Yame'ogo CW, Iuel-Brockdorf A-S, Cichon B, Rytter MJH, Kurpad A et al. (2017) *Effectiveness of food supplements in increasing fat-free tissue accretion in children with moderate acute malnutrition: A randomised 2x2x3 factorial trial in Burkina Faso*. *PLoS Med* 14(9): e1002387. <https://doi.org/10.1371/journal.pmed.1002387>

nutrients (compounds impairing absorption of minerals) compared to more expensive soy isolate (SI). The first LNS product (ready-to-use therapeutic food) was developed to treat SAM and was based on the nutritional composition of the therapeutic milk F-100, containing high amounts of dairy products and no soy. More recently, a range of LNS products, some containing soy, has been developed for treatment of MAM. The inclusion of dry skimmed milk (DSM) in supplements improves the amino acid profile, provides minerals with high bioavailability and reduces the content of anti-nutrients when it replaces vegetable protein sources, but also increases costs. There is concern that children receiving LNS might accumulate too much fat tissue.

Trials assessing the effects of supplements typically use weight gain or nutritional recovery (i.e. weight-for-height z-score (WHZ) or mid-upper arm circumference (MUAC) above specific cut-offs) as the primary outcome and do not consider body composition; however, inadequate accretion of fat-free tissue (i.e. muscle, organ tissue and

bone) impairs body function and health. The aim of this study was to investigate the effectiveness of matrix, soy quality and percentage of total protein from DSM in the treatment of MAM in increasing fat-free mass (FFM) accretion.

Methods

Between 9 September 2013 and 29 August 2014, a randomised 2×2×3 factorial trial recruited children aged 6 to 23 months with MAM in Burkina Faso. The intervention comprised 12 weeks of food supplementation providing 500 kcal/day as LNS or CSB, each containing SI or DS; and 0, 20 or 50 per cent of protein from milk. FFM was assessed by deuterium dilution technique. By dividing FFM by length squared, the primary outcome was expressed independent of length as FFM index (FFMI) accretion over 12 weeks. Other outcomes comprised recovery rate and additional anthropometric measures.

Findings

Of 1,609 children, four died, 61 were lost to follow-up and 119 were transferred out due to sup-

plementation being switched to non-experimental products. No children developed allergic reaction. At inclusion, 95 per cent were breastfed, mean (SD) weight was 6.91 kg (0.93), with 83.5 per cent (5.5) FFM. In the whole cohort, weight increased 0.90 kg (95% CI 0.88, 0.93; $p < 0.01$) comprising 93.5% (95% CI 89.5, 97.3) FFM. Compared to children who received CSB, FFMI accretion increased by 0.083 kg/m² (95% CI 0.003, 0.163; $p = 0.042$) in those who received LNS. SI did not increase FFM compared to DS (mean difference 0.038 kg/m²; 95% CI -0.041, 0.118; $p = 0.35$), irrespective of matrix. Having 20 per cent milk protein was associated with 0.097 kg/m² (95% CI -0.002, 0.196) greater FFMI accretion than having 0 per cent milk protein, although this difference was not significant ($p = 0.055$) and there was no effect of 50 per cent milk protein (0.049 kg/m²; 95% CI -0.047, 0.146; $p = 0.32$). There was no effect modification by season, admission criteria, baseline FFMI, stunting, inflammation or breastfeeding ($p > 0.05$). Over the 12-week supplementation period, LNS compared to CSB resulted in 128 g (95% CI 67, 190; $p < 0.01$) greater weight gain if both contained SI, but there was no difference between LNS and CSB if both contained DS (mean difference 22 g; 95% CI -40, 84; $p = 0.49$) (interaction $p = 0.017$). Accordingly, SI compared to DS increased weight by 89 g (95% CI 27, 150; $p = 0.005$) when combined with LNS, but not when combined with CSB.

Overall, the recovery rate was seven per cent higher for LNS versus CSB (69 per cent versus 62 per cent; $p = 0.002$), and the non-response rate was six per cent per cent lower (24 per cent versus 30 per cent; $p = 0.007$); there was no difference in development of SAM (7.3 per cent versus 8.7 per cent; $p = 0.31$). There were no significant differences between DS and SI with respect to recovery rate, non-response rate and risk of SAM. Likewise, there were no significant differences between 0, 20 and 50 per cent milk protein in recovery rate, non-response rate and risk of SAM.

A limitation of this and other food supplementation trials is that it is not possible to collect reliable data on individual adherence.

Conclusions

Based on this study, children with MAM mainly gain fat-free tissue when rehabilitated. Children given LNS did not put on excessive fat and LNS yielded more fat-free tissue and higher recovery rates than CSB. Results also show that current LNSs with DS may be improved by shifting to SI. The role of milk relative to soy merits further research. These findings support a wider use of LNS in the treatment of children with MAM. The authors conclude that a switch to LNS would lead to greater gain of fat-free tissue and recovery and would benefit millions of children.

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A woman and her child enrolled in a targeted supplementary feeding programme in Dandégou, Burkina Faso, 2012



Effects of nutrition interventions during pregnancy on low birth weight

Summary of research¹



A pregnant woman at Alagaya Refugee Camp, Sudan, 2014

WFP/ Ala Kheir

Location: *Global*

What we know: Low birth weight (LBW) is a major underlying cause of infant mortality and childhood morbidity; LBW is greatly affected by poor maternal nutrition and health.

What this article adds: A systematic review investigated evidence of effective nutrition-specific and nutrition-sensitive interventions during pregnancy for the outcome of LBW. A total of 23 systematic reviews were included, comprising 34 comparisons. Six interventions were associated with a decreased risk of LBW: oral supplementation with (1) vitamin A, (2) low-dose calcium, (3) zinc, (4) multiple micronutrients (MMN); nutritional education; and provision of preventive antimalarial drugs. MMN and balanced protein/energy supplementation had a positive effect on small-for-gestational age (SGA), while high protein supplementation increased the risk of SGA. High-dose calcium, zinc or long-chain n-3 fatty acid supplementation and nutritional education decreased the risk of preterm birth (PTB). Only three reviews performed sub-group analysis to evaluate the effect of interventions for women with different nutrition status. There is a need to further explore the evidence of nutrition-specific and nutrition-sensitive interventions to reduce LBW and to compare the results in different populations, including distinguishing interventions between women who are undernourished versus those who are adequately nourished versus those who are overweight/obese.

Low birth weight (LBW) is a major public health problem. Globally, approximately 16 per cent of infants are born weighing less than 2,500 g, which represents more than 22 million LBW babies per year (UNICEF, 2017). Over 95 per cent of these infants are born in low-income and middle-income countries. The World Health Organization (WHO) defines LBW as weight at birth less than 2500g, irrespective of the gestational age of the infant. LBW is a major underlying cause of infant mortality and childhood morbidity (Lawn et al, 2005). Additionally, there is a clear association between LBW and increased risk for many diseases later in life, such as metabolic syndrome, diabetes mellitus type 2, cardiovascular diseases, hypertension and cancer (Reyes and Manalich, 2005). Poor maternal nutritional status is one of several contributing factors to LBW. Early nutrition-sensitive and nutrition-specific interventions starting before or during pregnancy have the potential to prevent LBW and decrease the risks for adverse health outcomes of LBW infants. A systematic review was undertaken of the evidence for nutrition-specific and nutrition-sensitive interventions to reduce the risk of LBW and/or its components (preterm birth (PTB) and small-for gestational age (SGA)).

Methods

A comprehensive literature search was conducted in MEDLINE, EMBASE, CINAHL and the

Cochrane Database of Systematic Reviews (September 2015). Systematic reviews of randomised controlled trials (RCTs) focusing on nutritional interventions before and during pregnancy to reduce LBW and its components were eligible for inclusion. The methodological quality of the included reviews was measured using A Measurement Tool to Assess Reviews (AMSTAR), which uses 11 distinct questions to evaluate the methods used in the systematic reviews. The primary outcome was LBW, defined as weight at birth less than 2500g, regardless of the gestational age of the infant. Secondary outcomes included very low birth weight (VLBW) (less than 1500g), extremely low birth weight (ELBW) (less than 1000 g), SGA (birth weight below the tenth percentile of gestational age), intrauterine growth restriction (IUGR) and PTB (less than 37 weeks of gestation).

Results

A total of 23 systematic reviews were included comprising 34 comparisons. Sixteen reviews were of high methodological quality, six of moderate and only one review of low quality. Six interventions were associated with a decreased risk of LBW: oral supplementation with (1) vitamin A, (2) low-dose calcium, (3) zinc, (4) multiple micronutrients (MMN); nutritional education; and provision of preventive antimalarial drugs. MMN and balanced protein/energy sup-

plementation had a positive effect on SGA, while high protein supplementation increased the risk of SGA. High-dose calcium, zinc or long-chain n-3 fatty acid supplementation and nutritional education decreased the risk of PTB.

Vitamin A supplementation with other micronutrients (iron + folate) compared with micronutrient supplementation without vitamin A had a positive effect and reduced the risk of LBW by 33 per cent. However, these findings are from a study involving only HIV-positive women and, when comparing vitamin A supplementation alone versus placebo or no treatment, a reduction of LBW could not be observed. Other single-vitamin supplementations during pregnancy did not show any benefits for pregnancy outcomes such as LBW, PTB, SGA or IUGR.

In relation to mineral supplementation during pregnancy, calcium and zinc were effective in improving maternal and infant outcomes. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems led to 80 per cent reduction of LBW for women receiving low-dose calcium (less than 1g per day). High-dose calcium (at least 1g/day) supplemen-

¹ da Silva Lopes K, Ota E, Shakya P et al. *Effects of nutrition interventions during pregnancy on low birth weight: an overview of systematic reviews*. *BMJ Glob Health* 2017;2:e000389. doi:10.1136/bmjgh-2017-000389

tation during pregnancy reduced the risk of PTB by 24 per cent (high GRADE quality) but had no effect on LBW. Zinc supplementation resulted in a 61 per cent reduction in LBW in one review focusing on pregnancy outcomes in adolescent pregnancy. This result is in contrast, however, to a Cochrane review evaluating zinc supplementation during pregnancy, which did not find a reduction of LBW rates but demonstrated that the intervention reduced the risk of PTB by 14 per cent (moderate GRADE quality). All included reviews on MMN supplementation demonstrated a positive effect on the risk of LBW (reduction ranged from 10 per cent to 14 per cent) and SGA (reduction ranged from 10 per cent to 17 per cent).

Another review concluded that protein and energy supplementations contribute to an overall improvement of women's nutritional status and thereby decrease the risk of adverse pregnancy outcomes. In this review, balanced protein/energy supplementation significantly reduced the risk of SGA by 21 per cent (moderate GRADE quality). On the other hand, high protein supplementation compared with low or no protein supplementation was associated with a 58 per cent increased risk of SGA (moderate GRADE quality), which indicates that high protein supplementation alone might be potentially harmful for pregnant women (details on what constituted high/low protein was not provided in the review).

A review investigating the effect of marine n-3 fatty acids on the prevention of PTB and preterm

labour found a 39 per cent reduction of PTB but no effect on LBW. Although there was a beneficial effect, the review concluded that general recommendations could not be given based on their finding due to the limited number of included studies and conflicting results from other studies.

Nutritional education appeared highly effective in reducing the risk of LBW (96 per cent) and PTB (54 per cent, low GRADE quality); however, the evidence was derived from only three studies (one in Bangladesh, one in a rural area in Greece and one in low-income African-American women in the USA). Findings suggest that this intervention may be especially beneficial for undernourished pregnant women, but results must be interpreted with caution due to the limited quality of included trials.

Pregnancy increases the risk of malaria infection and malaria infection is likewise associated with an increased risk of LBW. Consistently, two included reviews show that successful prevention of malaria infection using antimalarial drugs during pregnancy significantly reduced the incidence of LBW by 27 per cent.

Only three reviews performed sub-group analysis to evaluate the effect of interventions for women with different nutrition status. For example, MMN supplementation significantly reduced the risk of PTB for women with lower body mass index (BMI) but not among those with higher BMI. Further research should address nutritional interventions in various populations.

Conclusion

Improving women's nutritional status positively affected LBW, SGA and PTB. Based on current evidence, especially MMN supplementation and preventive antimalarial drugs during pregnancy may be considered for policy and practice. However, for most interventions, evidence was derived from a small number of trials and/or participants. Furthermore, types of participants were not restricted to maternal nutrition status, even though it seems reasonable to suggest that the effect of a nutritional intervention depends on this. Further research is needed to address nutritional interventions in various populations (undernourished versus adequately nourished versus overweight/obese women). There is a need to further explore the evidence of nutrition-specific and nutrition-sensitive interventions to reach the WHO goal of a 30 per cent reduction in the global rate of LBW by 2025.

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Thiamine content of F-75 for complicated severe acute malnutrition: time for a change?

Summary of research¹

Location: *Global*

What we know: Complicated cases of severe acute malnutrition (SAM) are usually severely ill with comorbidities.

What this article adds: Complicated cases of SAM are likely to have low or borderline thiamine reserves that can be rapidly depleted during refeeding. This precipitates acute thiamine deficiency, which can have acute and long-term consequences in critically ill children. F-75 thiamine content does not provide therapeutic dosage at typical volumes consumed to meet current refeeding recommendations. Infants under six months of age with SAM managed with breastmilk or diluted F100 or F75 are at greater risk of developing thiamine deficiency; breastfeeding mothers rarely receiving thiamine supplements. The authors propose that F-75 is reformulated based on recommendations to administer 200 times the recommended daily intake thiamine dose in the first few days of refeeding (up to 100 mg of thiamine /1,000 kcal; (7.5 mg/100 mL)) for early refeeding, almost 90 times more than the current F-75 content. Further studies are warranted to validate this ratio. For breastfed infants under six months old who do not receive F-75, both mothers and infants should be supplemented with thiamine during the acute phase and throughout the breastfeeding period.

Severe acute malnutrition (SAM) is a life-threatening condition requiring urgent treatment, with an under-five case-fatality rate of around 15 per cent (Fergusson, 2009). Since community-based management of acute malnutrition (CMAM) has become the standard of care, the clinical profile of severely acutely malnourished patients admitted to hospitals or inpatient therapeutic feeding centres (TFCs) has changed. These patients are usually very ill and often present with several comorbidities, such as shock, sepsis and pneumonia. Refeeding syndrome is a potentially fatal com-

¹ Hiffler L, Adamolekun B, Fischer PR and Fattal-Vavleski A. (2017). *Thiamine content of F-75 therapeutic milk for complicated severe acute malnutrition: time for a change?* Ann. N.Y. Acad. Sci., 1404: 20–26. doi:10.1111/nyas.13458 <http://onlinelibrary.wiley.com/doi/10.1111/nyas.13458/full>

plication of patient mismanagement and can be misinterpreted as cardiac failure, pneumonia or sepsis. It is characterised by electrolyte imbalances caused by intracellular shifts secondary to refeeding-induced insulin secretion (e.g. hypophosphatemia, hypokalemia and hypomagnesemia). Insulin production and the resulting increase in glucose utilisation and thiamine body requirements may also lead to thiamine deficiency. Complicated severe acute malnutrition (SAM) patients are at risk of thiamine insufficiency (Hailemariam et al, 1985) and critically ill patients have higher thiamine requirements. The authors of this article propose that the thiamine content of F-75, the therapeutic milk formula used in the early stabilisation phase of refeeding in patients with SAM, now seems insufficient and therefore F-75 should be reformulated.

Conditions and risk factors leading to thiamine deficiency in malnutrition

Thiamine deficiency principally affects vulnerable children in communities where dietary habits rely on refined processed cereals or tubers, such as rice, wheat and cassava; notably in southeast Asia, Africa and the Americas. Reduced intestinal absorptive capacity during environmental enteropathy and malnutrition may lead to thiamine insufficiency (sub-clinical low vitamin B1 levels). Gut microbiota is affected in malnourished children, which might further affect thiamine-uptake capacity. During critical illness there is a mismatch between cellular thiamine availability and the increased endogenous metabolic demands brought on by illness, which can trigger clinical thiamine deficiency (thiamine insufficiency with clinical signs/and or low thiamine levels well below reference values) in patients with pre-existing insufficiency. Thiamine insufficiency or thiamine deficiency may be present in children with SAM for these reasons. Rapid initiation of nutritional rehabilitation during refeeding increases intracellular thiamine turnover, which, in a context of pre-existing low whole-body thiamine stores, can precipitate the onset of true thiamine deficiency and may contribute to the mortality of hospitalised SAM patients.

Consequences of thiamine deficiency in critically ill patients

Intensive care patients with thiamine deficiency may experience worse outcomes than other critically ill patients. Recent evidence suggests that thiamine administration to thiamine-deficient

adults with septic shock may significantly increase survival rate (Donnino et al, 2016). The follow-up of the survivors group of an outbreak of acute thiamine deficiency in Israel in 2003, secondary to consumption of a thiamine-deficient soya-based infant formula, demonstrated long-term neurological consequences in the survivors group (Fattal-Valevski et al, 2005). This was especially significant on the children's language development, but they could also present years later with psychomotor impairment and seizures. These data highlight the importance of early intervention when thiamine deficiency is suspected to limit long-term consequences. It also suggests encouraging the use of pharmacological doses of thiamine in critically ill and severely malnourished children at high risk of thiamine deficiency.

Thiamine in F-75 milk

Two therapeutic preparations are used in the treatment of patients with SAM: F-75 (75 kcal/100 mL) in the initial stabilisation phase and F-100 (100 kcal/100 mL) in the transitional and rehabilitation phase. A 600-mL sachet of therapeutic milk contains on average 0.5 mg of thiamine (1.1 mg/1,000 kcal, 0.083 mg/100 ml).

For the prevention of refeeding syndrome, the Cape Town Paediatric Interest Group and the Sydney Children's Hospital suggest the administration of 1-2 mg/kg of thiamine daily during the first week of SAM treatment. However, according to recently published recommendations for refeeding syndrome for children (Pulcinic et al, 2016), thiamine should be administered in a dose of 50-100 mg intravenously or 100-300 mg orally during the first three days of refeeding; at a typical intake for a 10kg child, these children would require 50 to 180 times more thiamine than they would currently receive based on F-75 (over six months) or diluted F100/ breastmilk (under six months)². This is similar to the thiamine dosage recommended during the first few days of refeeding in adults by Stanga et al (2008), which is 200 times higher than the recommended daily intake (RDI) of thiamine in the adult population (200-300 mg). However, high-dose thiamine at initiation of treatment is not the current practice in humanitarian settings. Since it has been shown that children with complicated SAM have borderline thiamine stores, even a very cautious introduction of feedings may induce thiamine deficiency in the absence of a considerable thiamine supplementation.

The average daily intake of thiamine from F-75/F-100 is 1-2 mg at most; one to four times the RDI for this paediatric group. This is even

more significant in infants under six months of age with SAM, who are at greater risk of developing thiamine deficiency. These infants do not receive RUTF or F-100 but only breastmilk or diluted F-100 or F-75, while their breastfeeding mothers rarely receive thiamine supplements.

Recommendations

Considering its exclusive use for in-hospital management of critically ill or complicated SAM patients, the authors propose that reformulation of F-75 is warranted to supply a sufficiently high dose of daily thiamine. The authors endorse the recommendations to administer 200 times the RDI thiamine dose in the first few days of refeeding, which would translate to a pharmacological dose of thiamine of up to 100 mg of thiamine /1,000 kcal (7.5 mg/100 mL) for early refeeding; this is almost 90 times more than the current F-75 content of thiamine. Further studies are warranted to validate the recommended thiamine/caloric ratio of 100 mg/ 1,000 kcal as opposed to the current 1.1 mg/1,000 kcal. Thiamine has an outstandingly clean safety profile to date, with no upper dose limit, which should encourage clinicians to consider using it.

An alternative option would be to maintain the current F-75 thiamine content and treat the complicated SAM patients systematically with oral or intravenous thiamine according to clinical indications. However, for operational reasons, it would be reasonable to reserve thiamine tablets and vials for the treatment of clinical thiamine deficiency or as a metabolic resuscitator in non-SAM critically ill patients. In low-resource settings, which rely heavily on humanitarian aid, F-75 would be an optimal vehicle for high thiamine doses to prevent refeeding complications in SAM patients.

Finally, for both breastfeeding mothers and infants under six months old who are malnourished, the diet should be supplemented with thiamine in the acute phase and throughout the breastfeeding period.

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² Recommended daily intake (RDI) for children is: 0-6m: 0.2mg; 6m-1y: 0.3mg; 1-3y: 0.5mg; 4-8y: 0.6mg.

WFP/Marco Frattini



A child is treated at severe acute malnutrition treatment centre, Al Thawara Hospital, Hodeidah, Yemen, 2017

Consumption of iron-rich foods among adolescent girls in Nepal: Identifying behavioural determinants

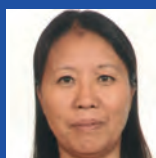
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Location: Nepal

What we know: There are very high rates of iron-deficiency anaemia among adolescent girls in Nepal, which has negative health consequences, particularly during adolescent pregnancy.

What this article adds: A 2017 study in Nepal investigated barriers and enablers of iron-rich food consumption among teenage girls in Kapilvastu, a terai (plains district) of Nepal. Ninety-four adolescent girls (mean age 15 years) were interviewed using a semi-structured questionnaire; participants were assigned to either a 'doer' (n=46), or a 'non-doer' (n=48) group, based on 24-hour recall of eating or not eating iron-rich foods. Most girls in both groups (91 per cent of doers and 92 per cent of non-doers) perceived that a main facilitator for the consumption of iron-rich foods was the availability of green leafy vegetables at home. Half of non-doers perceived that the lack of availability of iron-rich foods at home makes it more difficult to consume iron-rich food, significantly more than non-doers. Significantly more non-doers than doers ($p=0.002$) perceived family income to be important (although only 19 per cent reported this). There were significant differences in perceptions between doers and non-doers regarding advantages of eating iron-rich foods (physical growth and development, source of energy and protection from disease). Both groups would benefit from nutrition education to address misconceptions. Parental support in consuming iron-rich foods, particularly from mothers, was perceived as important in both groups, suggesting that other household members, especially mothers, should be included in nutrition education programmes.

Introduction

The World Health Organization (WHO) estimates that 29 per cent of all women of reproductive age and 38 per cent of pregnant women worldwide are anaemic, half of whom have iron-deficiency anaemia (WHO, 2011). In Nepal, 41 per cent of women aged 15 to 49 years and nearly half of all pregnant women suffer from anaemia (NDHS, 2016). Adolescent girls are particularly vulnerable to anaemia due to menstrual blood loss, the demands of pubertal growth, vulnerability to infection and worm infestation, and reliance on iron-poor, staple crop-based diets (WHO, 2011a). An estimated 43 per cent of adolescent girls (aged 15-19 years) are anaemic in Nepal (NDHS, 2016), with prior studies conducted in Nepal

and India showing even higher prevalence in this age group (50 per cent to 90 per cent). Iron deficiency in adolescents is associated with lowered attentiveness, memory, school performance, school attendance and learning retention; stunted physical growth; delayed onset of menarche; increased morbidity from infection; and reduced physical capacity and work performance (WHO, 2011a). Anaemia during pregnancy increases the risk of fetal mortality and morbidity; low birth weight (LBW); and overall infant mortality, the risk of which is increased further in adolescent pregnancy (WHO, 2011a).

Adequate iron consumption in young girls can improve cognitive performance and iron stores for later pregnancies (WHO, 2016). The

Ministry of Health (MoH) in Nepal recently introduced a weekly iron and folic acid (IFA) distribution programme to adolescent girls in 12 of its 77 districts. Nutrition education can improve compliance in such programmes and education on diet and the importance of consumption of iron-rich foods can complement supplementation. To inform this, it is important to identify behavioural determinants (barriers and enablers) among those who consume iron-rich foods ('doers') and those who do not ('non-doers') within this age group. This study investigates barriers and enablers of iron-rich food consumption among doer and non-doer adolescent girls in Nepal to provide this valuable information to policy makers, planners and implementers of such programmes.

Methods

Cross-sectional data were collected in January and February 2017 from one terai district (Kapilvastu) in Nepal. A questionnaire was developed using standard guidelines (Kittle, 2013) and translated into Nepali. Sixteen data collectors were trained for two days on its use. Enumerators were also given a set of food cards each (pictorial cards displaying local iron-rich foods) to aid interviews. Kapilvastu was selected because of its rich cultural, linguistic and ethnic/caste diversity. The district has a population of almost half a million, including more than 100,000 adolescents, of whom about 50 per cent are females (CBS Nepal, 2011). Multi-stage sampling was used and eight different communities were selected for data collection, based on geographical location (north, south, east and

¹ The USAID-funded Suaahara II Good Nutrition Program aims to improve health and nutrition among women and children in 40 out of 77 districts of Nepal. Suaahara II is supporting Government of Nepal in expanding the adolescents' iron supplementation programme and improving health and nutrition behaviors among adolescents through capacity building, school health programme, media mobilisation, monitoring and research.

Table 1 Three most common responses per group

Determinants	Doers (#, %) (n=46)	Non-Doers (#, %) (n=48)	Difference	Odds ratio	Relative risk	p-value
1. Self-efficacy: What makes it easier to consume iron-rich foods?						
Family income	0 (0%)	9 (19%)	19%	0.00	0.00	0.002
Access to green leafy vegetables at home	42 (91%)	44 (92%)	0%	0.95	0.96	0.619
Access to green leafy vegetables at market	29 (63%)	25 (52%)	11%	1.57	1.50	0.193
2. Self-efficacy: What makes it difficult to consume iron-rich foods?						
Iron-rich foods not available at home	14 (30%)	24 (50%)	20%	0.44	0.47	0.042
Not enough money to buy	23 (50%)	28 (58%)	8%	0.71	0.74	0.273
Market is far for buying	11 (24%)	18 (38%)	14%	0.52	0.56	0.114
3. Positive consequences: What are the advantages to consuming iron-rich foods?						
Physical growth and development	17 (37%)	5 (10%)	27%	5.04	3.9	0.002
Source of energy	19 (41%)	36 (75%)	34%	0.23	0.28	0.001
Good health	29 (63%)	32 (67%)	4%	0.85	0.87	0.440
Protect from disease	9 (20%)	23 (48%)	28%	0.26	0.3	0.003
4. Negative consequences: What are the disadvantages to consuming iron-rich foods?						
Having diarrhoea/vomiting	21 (46%)	26 (54%)	9%	0.71	0.74	0.268
No disadvantages	17 (37%)	9 (19%)	18%	2.54	2.26	0.04
Suffer from cold	9 (20%)	9 (19%)	1%	1.05	1.05	0.564
6. Social norms: Who approves of consuming iron-rich foods?						
Mother	42 (91%)	44 (92%)	1%	0.95	0.96	0.619
Father	35 (76%)	33 (69%)	7%	1.45	1.40	0.287
Teacher	17 (37%)	19 (40%)	3%	0.89	0.9	0.48
7. Social norms: Who disapproves of consuming iron-rich foods?						
Nobody	33 (72%)	38 (79%)	7%	0.67	0.7	0.275
Parents (father and mother)	8 (17%)	7 (15%)	3%	1.23	1.21	0.464
Brother/sister and sister-in-law	5 (11%)	4 (8%)	3%	1.34	1.30	0.473

Table 2 Three most common responses per group

Determinants	Doers (#, %) (n=46)	Non-Doers (#, %) (n=48)	Difference	Odds ratio	Relative risk	p-value
1. Perceived severity: How serious it would be if you become anaemic?						
Very serious	8 (17%)	10 (21%)	3%	0.80	0.82	0.436
Somewhat serious	24 (52%)	33 (69%)	17%	0.50	0.54	0.076
Not serious at all	14 (30%)	5 (10%)	20%	3.76	3.09	0.015
2. Action efficacy: How likely is it that you would become anaemic if you ate iron-rich foods each day?						
Very likely	0 (0%)	6 (13%)	13%	0.00	0.00	0.015
Somewhat likely	20 (43%)	27 (56%)	13%	0.60	0.63	0.151
Not likely at all	26 (57%)	15 (31%)	25%	2.86	2.55	0.012
3. Divine will: Do you think that God approves of you eating iron-rich foods each day?						
Yes	29 (63%)	23 (48%)	15%	1.85	1.75	0.102
Maybe	2 (4%)	7 (15%)	10%	0.27	0.29	0.090
No	15 (33%)	18 (33%)	5%	0.81	0.82	0.390
4. Culture: Are there any cultural rules/ taboos against eating iron-rich foods each day?						
Yes	8 (17%)	6 (13%)	5%	1.47	1.41	0.354
Maybe	5 (11%)	4 (8%)	3%	1.34	1.3	0.473
No	33 (72%)	38 (79%)	7%	0.67	0.7	0.275

west) and participants were recruited voluntarily. In Kapilvastu, one municipality and seven village development committees (VDCs) were selected. Within selected VDCs and municipalities, eighteen wards (the smallest geographical unit in Nepal) were selected for study inclusion.

Each enumerator collected data from three respondents per day in the adolescents' own homes. The first participant was purposively selected by the female community health volunteer (FCHV) and the others were recruited by the first (snowball sampling). During the interview participants were assigned to one of two groups, doer or non-doer. A doer was defined as an adolescent girl who reported having eaten iron-rich foods in the 24 hours prior to the interview. A non-doer was defined as an adolescent girl who reported not having eaten any iron-rich foods in the 24 hours prior to the interview. Data were collected from all 94 adolescent girls approached for interview (46 doers and 48 non-doers) through face-to-face, in-depth, semi-structured interviews.

Each interview lasted up to 30 minutes; results were recorded on paper and coded the same day. To ensure consistency of reporting, coding took place in groups of enumerators through group discussion. Responses were compiled and analysed on an Excel barrier analysis tabulation sheet and in SPSS version 23.0.

Results

The analysis identified key factors that explain the differences between adolescents who consumed iron rich-foods on the previous day and those who did not. The mean age of respondents was 15 years and respondents ate three times on the previous day on average. Tables 1 and 2 provide summary information for the barrier and facilitator constructs generated from the data. Important findings were:

- A high proportion of doers (91 per cent) and non-doers (92 per cent) perceived that access to green leafy vegetables at home would make it easier for them to consume iron-rich foods; significantly more non-doers than doers perceived that greater family income would make it easier to consume iron-rich foods (p=0.002, 19 per cent difference), although the actual number of non-doers reporting this was low (19 per cent).
- Half of non-doers perceived that the lack of availability of iron-rich foods at home makes it more difficult to consume iron-rich food (significantly more than non-doers; p=0.042, 20 per cent difference).
- There were significant differences between the two groups in their perceptions of the advantages of eating iron-rich foods. Doers were 3.9 times more likely than non-doers to believe that physical growth and development were a benefit (p=0.002, 27 per cent difference); non-doers were more likely than doers to report source of energy (p=0.001, 34 per cent difference) and protection from disease (p=0.003, 28 per cent difference) as positive benefits. Girls in both groups commonly cited "general good health" as an advantage (63 per cent of doers and 67 per cent of non-doers).
- In terms of perceived negative consequences from eating iron-rich foods, doers were more than twice as likely to say that there are no disadvantages (p=0.040, 18 per cent difference) and almost half of girls in both groups perceived diarrhoea and vomiting to be a negative consequence.
- There was strong agreement within and between groups of there being parental support for the consumption of iron-rich foods, with a particular emphasis on the positive role of mothers.
- A high proportion of girls in both groups perceived that anaemia would be a serious health problem (52 per cent



Subahara I/Prasiddha

linkages between iron-rich foods and anaemia. This seems to be important for both groups, particularly for non-doers. This study is an initial step in filling gaps in understanding the influences on the dietary practices of adolescent girls in Nepal; additional research is needed, particularly in other parts of the country. This type of research is crucial for designing policies and programmes to improve the consumption of nutritious foods, such as iron-rich foods, and ultimately to improve the health and nutritional status of this population.

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of doers and 69 per cent of non-doers).

- Doers were twice as likely as non-doers to say it is unlikely that they would become anaemic if they eat iron-rich foods ($p=0.012$, 25 per cent difference).
- A high proportion of both doers (63 per cent) and non-doers (48 per cent) believed that God would approve of them eating iron-rich foods (although doers were more likely to report this, the difference was not statistically significant) and most respondents in both groups reported that there were no cultural taboos against consuming iron-rich foods.

Discussion and conclusion

The results of this study show that a main perceived facilitator for the consumption of iron-rich foods among adolescent girls in Nepal is the availability of green leafy vegetables at home. This suggests behavioural change interventions

should target households and, in particular, members with influence over foods purchased and consumed. In terms of household income, non-doers were more likely to cite low income as the reason for there being less green leafy vegetables at home, although the actual proportion reporting this was low. A 2014 adolescent nutrition survey in Nepal (Aryal et al, 2014) found no difference in anaemia prevalence by family monthly income, which suggests that this may not be as important as food choice.

The perceived positive consequences have a significant impact on nutritional behaviour (Beydoun and Wang, 2008); hence nutrition education is important. Results from this study show that there is great opportunity to educate adolescent girls on nutrition to emphasise the positive benefits of consuming iron-rich foods, address misconceptions about the disadvantages of consuming these types of food, and draw

Nutrition-sensitive agriculture: What have we learned and where do we go from here?

Summary of research¹

Location: *Global*

What we know: Agriculture has strong potential to improve nutrition outcomes through improving food availability and access and through enhancing household food security, dietary quality, income and women's empowerment.

What this article adds: A review was undertaken of 45 papers summarising empirical evidence (since 2014) including findings from impact evaluations of a variety of nutrition-sensitive agriculture (NSA) programmes and observational studies that document linkages between agriculture, women's empowerment and nutrition. Results show that NSA programmes improve a variety of diet and nutrition outcomes in mothers and children. The review found marked improvements in recent studies in design, quality and rigour. To improve outcomes, NSA programmes should include health behaviour change communication (BCC); interventions to empower women; actions to improve health and water, sanitation and hygiene (WASH); and provide micronutrient-fortified products. Contextual, cultural, economic and food environment factors modify the impacts of agriculture on nutrition outcomes, with markets and women's empowerment being among the most important. More research is needed into sustainability, scale-up and cost-effectiveness of NSA programmes and understanding their role in, contributions to, and interactions with markets, the food environment and local and national food systems.

A growing number of governments, donor agencies and development organisations are committed to supporting nutrition-sensitive agriculture (NSA) to achieve development goals. Although consensus exists on pathways via which agriculture may influence nutrition-related outcomes, empirical evidence on agriculture's contribution to nutrition and how it can be enhanced remains weak. This paper reviews recent empirical evidence (since 2014), including findings from impact evaluations and observational studies that document linkages between agriculture, women's empowerment and nutrition, as well as pathways, mechanisms and contextual factors that affect where and how agriculture may improve nutrition outcomes.

¹ Marie T. Ruel, Agnes R. Quisumbing, Mysbah Balagamwala 2017. *Nutrition-Sensitive Agriculture: What Have We Learned and Where Do We Go from Here?* IFPRI Discussion paper.



Methods

The search strategy was restricted to articles and papers published in English since a summary of evidence reviews by Ruel and Alderman in 2013 that document results of impact evaluations and observational studies of the linkages between agriculture, women's empowerment and nutrition. After removing duplicates, the total number of papers found was 6,664. After screening their titles and abstracts using agreed inclusion and exclusion criteria, 43 papers remained. Additional articles were added based on knowledge of the authors and health experts, leaving a final total of 45 articles. Papers were included that studied the impact of the following agricultural programmes: biofortification, homestead production/home gardening, irrigation, value chains, livestock and agricultural extension; and the impact on the following nutrition outcomes: anthropometry, infant and young child feeding (IYCF) knowledge and practices, anaemia/haemoglobin; dietary diversity (DD), macronutrient intake and micronutrient intake.

Results

Interventions studies

Impact evaluations were reviewed that used mostly experimental or quasi-experimental designs. A variety of programmes were included, all of which focused on promoting production diversity and increasing access to nutritious foods such as biofortified staple crops, nutrient-rich vegetables and fruits, and animal-source foods.

The most consistent finding was the positive impact of these studies on household and child DD and on the consumption of animal-source foods or fruits and vegetables. Positive impacts on micronutrient intakes were also found in studies that measured dietary intake through a 24-hour recall in diverse settings and through a variety of programme models, including biofortified, vitamin A-rich, orange-flesh sweet potato (OSP), gender-sensitive enhanced homestead food production (EHFP), livestock and dairy value chain programmes, and a fruit and vegetable solar market garden (SMG) irrigation programme. Overall, these programmes were highly successful in meeting their production and consumption goals and, more specifically, in achieving their main objective of improving household and individual access to nutrient-rich foods.

A new set of studies also documented evidence of the impacts of EHFP (with chickens) on child

haemoglobin (Hb) and anaemia in Burkina Faso (Olney et al, 2015) and Nepal (Osei et al, 2017). In Burkina Faso, a group that received a two-year EHFP programme with behaviour change communication (BCC) delivered by a health committee member saw significant increases in child haemoglobin levels (Hb) (+0.7g/dL) and reductions in anaemia (-14.6ppts) in children 3.0-5.9 months of age, compared with a control. Other studies also produced evidence that agricultural programmes could be effective platforms to deliver micronutrient-fortified products targeted to young children. Of the six studies that measured child anthropometry, however, none found an impact on stunting and impacts on wasting were small or marginally significant.

Overall, the new studies have expanded the breadth of agricultural programmes studied and the set of nutrition outcomes measured in children. New studies also started to document some of the untapped potential of agriculture to improve women's nutritional status, especially in countries where maternal undernutrition is a critical problem (Burkina Faso, Nepal and Zambia).

The range of effects on production and consumption varied between studies, but in general impacts on maternal and child DD, food intake, micronutrient status and weight-specific nutritional status indicators were modest. For stunting, the lack of impacts may be explained at least in part by the relatively short duration of most programmes (one to two and a half years) and the wide age range targeted by many, which was often well beyond the first two years of life, when the greatest benefits on child growth from nutrition interventions can be expected.

Several new studies specifically documented impacts along the project-specific hypothesised pathways, strengthening the plausibility of impacts on maternal and child diets and nutritional status outcomes. The review also found marked improvements in recent studies both in programme design and in the quality and rigour of impact evaluations.

Observational studies

The second set of studies reviewed were observational studies that document associations between agricultural practices and nutrition outcomes. An exceptionally large number of such studies have been published in the past three years; many focusing on the importance of production diversity for household, maternal and

child diets. The main takeaway from this literature is that production diversity and livestock ownership are consistently associated with household and child DD and increased intake of essential micronutrients. Livestock ownership is also specifically associated with greater animal-source food intake (especially milk in young children). Evidence of associations with health and nutritional status outcomes is still limited, but milk intake (in households that own livestock) is positively associated with child linear growth.

A second takeaway from this literature is that associations between production and consumption diversity were modified by contextual factors, the most important being market access. Other contextual, socioeconomic and food environment factors were also identified as important effect modifiers of the associations between production, consumption and nutritional status. The quality of the association studies varied but was also generally better than that of earlier studies, with greater attention paid to using appropriate statistical modelling tools, controlling for potentially confounding factors, using robustness checks as needed and focusing on appropriate age groups for nutritional status indicators.

Conclusions

Findings show that NSA programmes improve a variety of diet and nutrition outcomes in both mothers and children, especially when they include nutrition and health BCC and interventions to empower women. Greater benefits for child nutrition are achieved when programmes incorporate actions to improve health, WASH and provide micronutrient-fortified products. Findings suggest that NSA programmes should focus on improving access to and consumption of high-quality diets for all household members, rather than on reducing childhood stunting. A variety of contextual, cultural, economic and food environment factors also modify the impacts of agriculture on nutrition outcomes, with markets and women's empowerment being among the most important. Research priorities include documenting the sustainability, scale-up opportunities and challenges, and cost-effectiveness of NSA programmes and understanding their role in, contributions to, and interactions with markets, the food environment and local and national food systems.

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Exploring multi-sector programming at district level in Senegal, Nepal and Kenya

By Tui Swinnen, Jeremy Shoham and Carmel Dolan, with input from Charulatha Banerjee, Lillian Karanja-Odhiambo and Ambarka Youssoufane



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Location: Kenya, Somalia, Nepal

What we know: There is a shift towards devolved governance in many countries; there has been little examination of its impact on multi-sector nutrition programming.

What this article adds: A series of three country case studies and accompanying synthesis by ENN describe how multi-sector programme implementation at sub-national level in three 'high achieving' SUN countries. In each country, two districts were explored in depth, and within each, a specific multi-sector programme examined. The studies find that devolution is changing the nutrition landscape, with implications for programmes, policies and funding arrangements. Coordination guidance is geared towards national level; sub-national coordination is challenging and has evolved in a way that is "loose", "unstructured" and "opportunistic". There is a lack of robust data on household's receipt of comprehensive sector support. None of the programmes examined collected data on the additional cost of implementing multi-sector nutrition sector programming and have not yet developed robust monitoring systems able to demonstrate their nutrition impact. There are diverse understandings of what 'nutrition sensitivity' means among the many stakeholders consulted.

Background

ENN has published a series of case studies on multi-sector nutrition programming at the sub-national level as part of its Knowledge Management (KM) work under the UK Department of International Development (DFID)-funded TAN programme (supporting learning within the Scaling Up Nutrition (SUN) Movement). ENN's objective was to construct detailed descriptions from sub-national and implementation levels of how sectors are working together to implement programmes and how new programme approaches fit within existing institutional architecture. For practitioners and policymakers working in nutrition, limited evidence and documentation is available on how nutrition-sensitive (see Box 1) and multi-sector programmes are being operationalised and how these interact with existing institutional architecture and structures at the sub-national level. Documentation has often centred around national policies, strategies and frameworks and guidance available is still fairly generic and 'top down'. This series of case studies aims to help fill this gap by providing important lessons learned to help shape future approaches and practice.

This work comprises three country case studies from selected 'high achieving' SUN countries with a strong track record in championing and improving undernutrition: Kenya, Nepal and Senegal. The case studies are based on fieldwork and interviews conducted by ENN's Regional KM specialist team in late 2017. In each country, two districts (or counties) were selected to explore in detail how institutional change and commitments at the national level have translated into new types of programmatic approaches at the implementation level, as well as how concepts of multi-sectorality and nutrition sensitivity are being understood and operationalised. Within each focus district a specific multi-sector programme was examined. In Kenya, focus districts were Homa Bay and Makueni (with some field work also in Busia); the focus programme was the United States Agency for International Development (USAID)-funded agri-nutrition programme Accelerated Value Chain Development (AVCD). In Nepal, the district of Jumla was selected from the western mountains region and Kapilavastu from the Terai, with a focus on the government-led Multi Sectoral Nutrition Plan (MSNP) phase 1. In Senegal, focus districts

Box 1 Making programmes nutrition-sensitive

The case studies and synthesis identify five types of programme or adaptations that can render an intervention increasingly sensitive to nutrition:

- Multiple sectors converge on nutritionally vulnerable households or demographic groups to offer programmes services; e.g. targeting of services to first 1,000 days households.
- Multiple sectors converge at the level of village or commune believed to be vulnerable to undernutrition; e.g. agriculture and health workers use the same list of target beneficiaries to deliver complementary agriculture and nutrition inputs within the same village commune.
- Nutrition messaging is incorporated into the work and activities of other sectors; e.g. education curricula changes to include nutrition components, nutrition behaviour-change communication (BCC) within a social protection programme.
- Nutrition-sensitive sectors change or add inputs into programmes; e.g. replacing poultry with milk-producing animals, introducing seeds for fortified crops, changes in hardware.
- Nutrition-specific platforms utilised to introduce nutrition-sensitive messaging from other sectors; e.g. food and personal hygiene, need for dietary diversity, etc.

were Matam in the north east, bordering the Sahara desert, and Kédougou in the south east, with a main focus on the multi-sector PINKK project in Kédougou and the (now complete) Yaajeende project in Matam. The range of focus districts reflects the significant diversity that exists within these countries in terms of patterns of malnutrition, socioeconomic status of the population and ecological zones. This provided insights into how national infrastructure, plans and approaches are adapted to different regions.

A synthesis document shares key findings and observations on the realities of multi-sector programming based on the three case studies. Emerging changes to practice are discussed, as are challenges and opportunities that sub-national-level stakeholders are experiencing. Key findings from the synthesis are summarised in box 1.

Devolution

High-level commitments around stunting and wasting reduction, along with other improvements in nutrition, must take account of districts' or counties' plans, capacities and resources. The shift towards devolved governance in many countries means that careful analysis is necessary to understand how this may positively or negatively impact the drive towards multi-sector nutrition programming. Little or no work has been conducted on the impact of devolution on multi-sector nutrition programming to date.

The case study countries are at differing stages of decentralisation or devolution, but in all three the trend is towards the decentralisation of power, with budgeting, coordination and implementation increasingly being decided sub-nationally. This is changing the nutrition landscape and has implications for the design of future national programmes, policies and funding arrangements.

Although understanding of the impact of devolution on multi-sector nutrition programming in the three case study countries was largely impressionistic, a few issues are noteworthy. In Kenya, there was a strong sense that devolution has facilitated multi-sector engagement at sub-national level as there is less bureaucracy. In Nepal, the impression was that decentralisation will create new opportunities, but also significant challenges, especially with respect to resourcing and capacity. There is also a frustration that, while data produced through monitoring of national nutrition efforts at the sub-national level is being collected centrally, there is scarcely any feedback from national level. In Senegal, there was a strong sense that national-level nutrition policies and frameworks need to be regionalised and more embedded in sector policies to allow more context-appropriate interventions.

Devolution impacts programme implementation capacity, flexibility of programming and the underpinning institutional architecture. Through devolution, sector or ministerial heads at the national level have less control over expenditure, what is prioritised and how sectors

work together on the ground in nutrition. Adaptation is needed to ensure that guidance and support can still be provided to the districts in the form of policy guidance, capacity building and aligning actions around national goals and targets. This is an important area for future documentation and enquiry.

Coordination

Coordination between sectors is critical to enable multi-sector action. However, available guidance on how to coordinate multi-sector programming is mainly generic and 'high level', outlining the need for a set of enabling factors; e.g. a Common Results Framework attached to a national plan, a 'multi-sector platform', and a high-level representative of government office convening on nutrition. This form of guidance is mainly geared towards the national level and is not easily transferable to sub-national institutional and administrative arrangements. Furthermore, institutional architecture and coordination processes, especially at sub-national level, are highly context-specific and, in many countries, evolving towards devolution. As a result, it is difficult and may be unwise to generalise about the optimal processes for enhanced sub-national, multi-sector coordination.

The case studies clearly show coordination to be a key challenge in the implementation of multi-sector programmes across multiple levels. Some challenges observed include limited incentives to coordinate with other sectors at the sub-national level, limited financial resources to effect district-level coordination, and the existence of multiple parallel coordination meetings for nutrition and related sectors. New multi-sector approaches to nutrition have been introduced at the programmatic level, requiring input from multiple sectors, but the structures and institutions in place have not yet evolved to enable this.

As a result of these challenges a type of coordination has evolved in all three countries at sub-national, operational level variously described as "loose", "unstructured" and "opportunistic".

In Nepal, part way through the implementation of the first phase of the national MSNP, a Technical Support Unit (TSU) was introduced in each programme district to better coordinate the seven implementing ministries. To date, the TSUs have been a 'game changer' in the way the MSNP works, facilitating routine meetings between the sectors and carrying out other crucial tasks that previously had no 'institutional home', such as creating activity plans, tracking progress against set targets and sending quarterly reports and monitoring data to central level. A non-governmental organisation (NGO), HERD, seconded staff to each TSU. In the Kenya case study, the important role of development partners in helping to coordinate sector activities was also highlighted.

Delivery

A primary consideration in the case studies was the extent to which programmes have enabled

more comprehensive sector support for household members and what lessons there are for future programming design and scale-up. It is commonly understood that households who receive a comprehensive package of services that simultaneously address the underlying causes of malnutrition have better outcomes, but what this looks like 'on the ground' is still not well documented. None of the case study programmes collected robust data on the proportion of households in the intervention area in receipt of multi-sector/multiple interventions. This information is critical for convergence and targeting of multi-sector programming and therefore needs further attention and enquiry. Smaller-scale programmes seem to be able to deliver a 'complete package' to target households, but the extent to which this sometimes resource-intensive approach can be implemented by government and at scale is another issue requiring attention.

Cost and resources

None of the case study country programmes collected data on the (additional) cost of implementing multi-sector nutrition sector programming. This is complex, requiring precise definition or categorisation of what activities or processes are, or contribute to, nutrition-sensitive, multi-sector programming; e.g. substituting milking animals for poultry, adding nutrition messaging to a sector intervention and targeting particular households. Without this information, it is difficult to assess the cost-effectiveness of multi-sector nutrition programming; or indeed, what funds need to be made available by government and development partners to enable programming. In Nepal, there were reports from both MSNP study regions that money made available for sectors was not adequate to implement real change to programming and MSNP-specific funding was dwarfed by the larger sector-specific spend. At best, the small sums of money made available by government simply reminded sectors to consider the nutrition sensitivity of their work.

Monitoring and evaluation (M&E)

The programmes studied have not yet developed robust monitoring systems able to demonstrate the nutrition impact of multi-sector interventions, although in the case of Nepal, evaluation of MSNP I identified this as a substantial gap and plans have been made to monitor impact on nutrition and other outcomes in the next phase. In Senegal, the programme in Matam (Yaajeende) conducted baseline, mid-term and end-term evaluations, which included nutrition impact assessments. (So far these have demonstrated only limited impact on nutrition indicators).

Given the nature of the changes brought about by multi-sector programming (mainly changes in targeting or convergence, BCC and project inputs), there is a pressing need and substantial opportunity to demonstrate effectiveness and impact of the interventions.

Three key points are made based on the findings from the case studies. Firstly, effecting and

enabling multi-sector programming is considerably more difficult than has perhaps been realised. Effort and changes required to enable multi-sector programming must therefore be matched by proven benefit (on nutrition), making M&E a critical area for focus in future programmes. Secondly, the type of changes to programming that can occur in a multi-sector approach (with the exception of targeting and convergence) have not yet been proven to impact nutrition. For example, the evidence base for nutrition-sensitive agriculture and water, sanitation and hygiene (WASH) is not strong and the evidence around BCC is also inconclusive. Thirdly, there are hitherto unique opportunities for measuring impact of a multi-sector approach, given the momentum for it in many countries, yet these opportunities are not currently being capitalised upon. The gradual rollout of the programmes in Kenya and Nepal offers the perfect

opportunity to conduct research with control or comparison groups.

Understanding nutrition sensitivity

It was clear from interviews conducted that there are diverse understandings of what 'nutrition sensitivity' means among the many stakeholders consulted. In some cases, stakeholders saw their work or the work of their sector as 'already sensitive to nutrition', i.e. contributing to food production, and did not necessarily understand the need to tailor or adapt programmes or change the way in which they are measured. This suggests that, while many stakeholders appeared to understand the need for a multi-sector approach to tackle undernutrition, fewer understood nutrition-sensitivity or the impact pathways that lead to undernutrition. The multi-sector approach was articulated by some stakeholders as simply

requiring that every sector 'does its bit' for nutrition, largely through business-as-usual, rather than tailoring or adapting approaches or the way that programmes are measured.

This series is the first in what ENN hopes will be several rounds of this kind of documentation carried out under this project. By focusing on documentation at the sub-national level, it is hoped that a richer understanding of multi-sector practice and programming will emerge to inform and improve future practice, programme design and implementation.

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All three case studies and the synthesis report are available for download online at: www.ennonline.net/ourwork/knowledgemangement/sunkm

Children concurrently wasted and stunted: A meta-analysis of prevalence data of children 6–59 months from 84 countries

Summary of research¹

Location: *Global*

What we know: Wasting and stunting are often present in the same geographical populations and can exist concurrently in the same children, increasing risk of mortality; the burden of concurrence is currently not known.

What this article adds: This study provides the first multiple country estimates of the prevalence and burden of children aged 6–59 months concurrently wasted and stunted using data from Demographic and Health Surveys (DHS) and Multi-indicator Cluster Surveys (MICS). In this study the pooled prevalence of children concurrently wasted and stunted in 84 countries was found to be 3.0%, 95% CI [2.97, 3.06], varying from 0% in Montenegro to 8.0%, 95% CI [7.2, 8.9], in Niger. Nine countries had a concurrence prevalence >5%, the suggested threshold for concern and intensification of identification and treatment efforts. Prevalence of concurrence was highest in the 12 to 24 month age group 4.2%, 95% CI [4.1, 4.3], and significantly higher among boys 3.54%, 95% CI [3.47, 3.61], compared to girls; 2.46%, 95% CI [2.41, 2.52] and higher in fragile and conflict-affected states 3.6%, 95% CI [3.5, 3.6], compared to stable countries 2.24%, 95% CI [2.18, 2.30]. Results indicate a need to systematically report on this condition within country and global monitoring systems.

The pooled 84 country prevalence estimate for children 6–59 months of age experiencing either wasting or stunting was found to be 38.9%, 95% CI [38.7, 39.0]. This means that only 61.1%, 95% CI [61.0, 61.3], of children in the 84 countries escape both conditions.

The estimated prevalences from this analysis were calculated to correspond to nearly 6 million children concurrently wasted and stunted in the 84 countries. The authors note that given the

transitory nature of wasting in particular, where a child can experience several episodes of wasting during a set period, using cross-sectional data insufficiently estimates the actual prevalence (Garenne et al., 2009). This means that the above is likely to be an underestimate of the true burden of children experiencing these two deficits concurrently. See figure 1. For a graphical representation of the results by country.

Reducing the prevalence of children who are wasted and stunted are global priorities. Wasting

and stunting are often present in the same geographical populations (Victora, 1992) and it is recognised that children can be stunted and wasted at the same time, 'concurrently wasted and stunted' (IFPRI 2015). Though the relationship between these manifestations of undernutrition at the level of the individual child and the mechanisms leading to this state of "concurrence" are poorly understood (Angood et al 2016), evidence suggests that children with both deficits are at a greatly elevated risk of mortality (McDonald et al., 2013).

This paper highlights the issue that despite the above, there are no global estimates of the prevalence and burden of concurrence (UNICEF et al., 2016). It is in fact rarely reported, though the data required to estimate concurrence is readily available in national surveys (Saaka & Galaa, 2016). The authors note that reporting on global figures for the prevalence of different nutritional deficits separately, underestimates the true proportion of the global population affected by nutritional deficits as a whole and, ignores this critical proportion of children affected by multiple deficits who may require additional nutritional support.

¹ Khara, T., Mwangome, M., Ngari, M. and Dolan, C. (2017) Children concurrently wasted and stunted: A meta-analysis of prevalence data of children 6–59 months from 84 countries. Maternal and child nutrition, September 2017. DOI: 10.1111/mcn.12516

The analysis presented in the paper aims to address this gap by providing the first multiple country estimates of the prevalence and burden of children aged 6–59 months concurrently wasted and stunted using data from Demographic and Health Surveys (DHS) and Multi-indicator Cluster Surveys (MICS). The aim was to approach a global estimate though sufficiently recent data (last 10yrs) was available for just 84 countries. For countries with more than one dataset available the most recent dataset was chosen. Country-specific estimates were calculated and pooled using the random-effects meta-analysis to yield the 84 country estimates (Hamza, Reitsma, & Stijnen, 2008). Burden by country was calculated using country population figures from the global joint estimates database (UNICEF et al 2016). The analysis also explored age, sex, regional, and contextual differences, and estimated of the proportion of children affected by either of these conditions (wasted or stunted).

The pooled prevalence of children concurrently wasted and stunted in the 84 countries was found to be 3.0%, 95% CI [2.97, 3.06]. The prevalence of concurrence varied across countries from 0% in Montenegro to 8.0%, 95% CI [7.2, 8.9], in Niger. Nine countries had a concurrence prevalence greater than 5%. Six from sub-Saharan Africa (Niger, Burundi, Djibouti, Chad, Sudan, and South Sudan) and three from Asia (Timor-Leste, Yemen, and India). The authors note that a country prevalence of >5% severe

wasting would warrant concern and intensification of efforts to identify and treat children. Though concurrence is associated with similar mortality risks, its prevalence is not monitored, and cases are not routinely identified, therefore, no specific action can be taken.

The estimated prevalences from this analysis were calculated to correspond to nearly 6 million children concurrently wasted and stunted in the 84 countries. The authors note that given the transitory nature of wasting in particular, where a child can experience several episodes of wasting during a set period, using cross-sectional data insufficiently estimates the actual prevalence (Garenne et al., 2009). This means that the above is likely to be an underestimate of the true burden of children experiencing these two deficits concurrently. See figure 1. For a graphical representation of the results by country.

Prevalence of concurrence was found to be highest in the 12- to 24-month age group 4.2%, 95% CI [4.1, 4.3], and was significantly higher among boys 3.54%, 95% CI [3.47, 3.61], compared to girls; 2.46%, 95% CI [2.41, 2.52]. Fragile and conflict-affected states reported significantly higher concurrence 3.6%, 95% CI [3.5, 3.6], than those defined as stable 2.24%, 95% CI [2.18, 2.30]. The authors note that these patterns mirror higher prevalences of wasting and stunting when analysed separately. Particularly in the

case of the pattern of heightened nutritional vulnerability of boys, the data suggests that further investigation is needed.

The pooled 84 country prevalence estimate for children 6–59 months of age experiencing either wasting or stunting was found to be 38.9%, 95% CI [38.7, 39.0]. This means that only 61.1%, 95% CI [61.0, 61.3], of children in the 84 countries escape both conditions. The authors note that this is a very stark metric for understanding the extent of undernutrition in these countries and refer to country disaggregated data from this analysis that was reported in the Global Nutrition Report 2016, in which it can be seen that in a number of countries (Benin, Djibouti, Yemen, Niger, Chad, Guinea-Bissau, Ethiopia, Congo DRC, Burundi and Somalia, India, Pakistan, and Laos), over half the population of children is suffering from one of these deficits (IFPRI, 2016).

Given the high risk of mortality associated with concurrence, the authors conclude that the levels of prevalence and burden reported in their analysis, indicate that there is a need to systematically report on this condition within country and global monitoring systems and, for researchers programmers and policy makers to prioritise investigation into the extent to which these children are being reached through existing programmes.

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WFP nutrition activity at Kutupalong camp in Ukhiya, Cox Bazar

WFP/Saikhat Mojumder

Humanitarian-development nexus: nutrition policy and programming in Kenya

By Carmel Dolan and Jeremy Shoham



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This article provides a summary of a detailed case study carried out during a field visit to Kenya by ENN¹. ENN would like to acknowledge Irish Aid for funding this work and thank all those interviewed for their time.



Jonah Klein

Location: Kenya

What we know: There is global commitment to strengthen the linkages between humanitarian and development programming.

What this article adds: A recent ENN field-based case study in Kenya examined experiences of the humanitarian development nexus (HDN) through a nutrition-specific and nutrition-sensitive programming and policy lens. Kenya is on track to meet World Health Assembly nutrition targets, largely due to successful scale-up of high-impact nutrition interventions, particularly integrated management of acute malnutrition and a surge model for treatment in Kenya's arid and semi-arid counties. Improved risk reduction and quicker, more effective response evidenced in the 2016/17 drought response are attributable to national government growth; stronger government leadership; the Ending Drought Emergency framework; devolution; strengthened health systems; and scalable social protection systems for the most vulnerable. Ongoing challenges include limited community mobilisation in the 'surge' model; variation in multi-sector collective outcomes and priority setting/contingency planning at devolved level; weak influence of nutrition in shaping high-level frameworks, design of social protection programmes; and tensions between nutrition-specific and nutrition-sensitive investments. The Scaling Up Nutrition Movement has not yet given rise to a multi-sector platform that gains nutrition leverage and visibility. Action is needed at global level to ensure nutrition joins the discourse around HDN.

Among the ten commitments in the Grand Bargain that were articulated during the World Humanitarian Summit in Istanbul in 2016, was "the need to strengthen linkages between humanitarian and development programming". The consensus on this has grown with the realisation that an estimated 70 to 80 per cent of humanitarian programmes take place in protracted emergencies, where short-term humanitarian programming is inappropriate. Taking up this mantle, the United Nations Office for Coordinating Humanitarian Affairs developed the New Way of Working (NWW) framework, which is predicated on four pillars: joined up analysis of acute and long-term needs; joint humanitarian and development partner planning with collective outcomes; joint leadership and coordination, building on opportunities and comparative advantage; and financing modalities to support collective outcomes. Organisations like the World Food Programme

(WFP) are now shifting their programming from short-term emergency response plans to a country strategy model with longer-term financing windows of three to five years and the inclusion of childhood stunting reduction as a declared goal. The Global Nutrition Cluster (GNC) is also turning its attention to an integrated model of programming, whereby integration is not just promoted between the clusters/sectors but also with longer-term government and civil society structures and capacity strengthening.

ENN aims to capture humanitarian development nexus (HDN)-related experiences in the coming years and disseminate examples of what is working. This article summarises the main findings of the first of several planned case studies. Research was carried out during a short visit to Kenya in 2017 using a nutrition-specific and nutrition-sensitive programming and policy lens and includes a brief case example of Wajir county.

Nutrition policy in Kenya

Kenya's economy is growing; it has a 2030 development vision to reach middle-income country status and its humanitarian system architecture has largely been overtaken by greater government investment in resilience building, social protection programmes and early response systems.

Kenya is on track to meet many of the World Health Assembly (WHA) nutrition targets, attributed to its success in scaling up high-impact nutrition interventions (HINIs) over the past decade. A key element of this is the integrated management of acute malnutrition (IMAM), which has been increasingly integrated into the health system. In addition, a surge model allows for the scaling up of treatment in a number of the vulnerable arid and semi-arid lands (ASAL) in response to crisis. In recent years, the Government of Kenya (GoK) has established social protection programmes (SPPs), including the Hunger Safety Net Programme (HSNP) in four ASAL counties (65 per cent GoK-funded) and a cash transfer (CT) programme for up to half a million people. There are also GoK-funded SPPs for the elderly, severely disabled, and orphans and vulnerable children, as well as an asset-creation CT programme implemented by the WFP.

Resilience programming has become a major component of Kenya's national Mid-Term Development Plan (MTDP) and is a key pillar of the Ending Drought Emergencies (EDE) framework. Central to the EDE is the strengthening of systems that allow earlier responses to threats before a full-scale emergency arises, including diversification of livelihoods in the ASAL counties and risk anticipation. This has largely replaced the need for more traditional humanitarian response in Kenya. The National Drought Management Authority (NDMA), which rolls out

¹ Shoham J and Dolan C. (2017) Case study of the humanitarian development nexus in Kenya.



A woman collects grain from sorghum plants in Turkana, Kenya, 2013

WFP/Rose Onjala

the EDE, straddles humanitarian and development programming and is devolved to the 23 ASAL counties. Nutrition is a cross-cutting concern and stunting is one of the key indicators for monitoring EDE progress. Within government, the mandate for nutrition policy development, planning and coordination resides with the nutrition unit of the Ministry of Health (MoH). In spite of the excellent work done by the unit over many years, it maintains a somewhat marginalised position within government. A multi-sector nutrition platform (MSNP) is lacking; therefore cross-sector coordination of nutrition-specific and nutrition-sensitive programming is limited.

Drought response

The response to the 2011 drought that affected large parts of Kenya, particularly the 23 ASAL counties, was characterised as late, poorly coordinated, with low levels of government investment and leadership, little attention to drought resilience building, and high levels of both acute malnutrition and child mortality. In contrast, the response to the ongoing 2016/17 drought started earlier and was more appropriate; the current drought has seen high levels of global acute malnutrition (GAM) but lower mortality. This is possibly to do with lower levels of severe acute malnutrition (SAM) due to scale-up of the integrated management of acute malnutrition (IMAM) and greater resilience to food insecurity this time around. In general, the 2016/17 drought has demonstrated progress in how Kenya's systems have become orientated to reduce risk and respond more quickly and effectively to crisis. Several factors have contributed to this and, taken together, have enabled a considerable degree of strengthened humanitarian and development linkages. Specifically, the following enabling factors have been identified:

1. National economic growth Kenya is now classified as a lower middle-income country (LMIC).
2. Strong government leadership for the crisis response, with humanitarian partners providing gap filling rather than first-line response and development partners' investments aligned with national risk-reduction priorities.
3. Devolution of government since 2012. In a context of fully devolved government, the role of local government has provided a freedom to manage budgets directly and

determine county-level priorities.

4. The elaboration and initial implementation of the EDE framework to achieve greater sector and humanitarian-development system linkages.
5. Strengthened health systems and establishment of a surge capacity model for the early treatment of wasting.
6. Establishment of scalable social protection systems for the most vulnerable (including the HSNP).

Ongoing challenges

Despite Kenya's substantial progress towards a significantly integrated humanitarian and development capacity, many challenges still need addressing. After many decades of reliance on humanitarian food aid as the main modus operandi in the crisis-prone northern ASAL counties, there has been a shift away from this approach in recent years. This has perhaps prematurely reduced the capacity to deliver food aid, before there is sufficient resilience, risk reduction and development in crisis-prone counties. The IMAM surge programme in Kenya is in many ways an ideal type of programme for resource-poor and vulnerable populations in drought-risk counties; however, community mobilisation and outreach achieved during the 'surge' process has not been maintained. Given that SAM coverage levels in Kenya are low, this is a lost opportunity.

Sub-nationally, devolved county structures are a critical enabler to ensure pre-crisis planning, early response and response based on community felt needs. This responsibility has resulted in strengthened local capacity, which obviates the need to wait for a national response or for humanitarian partners to access external funding. To date, counties often don't have agreed multi-sector collective outcomes and do not all prioritise risk reduction and/or ensure adequate use of early-response contingency funds.

The necessary architecture for HDN is akin to the enablers required for nutrition-specific and nutrition-sensitive scale-up, albeit at a higher level (EDE is enshrined in law). Both have a multi-faceted lens and objectives linked directly to development/economic targets, as well as to mitigation (prevention), early response (such as mass screening to prevent death from severe acute malnutrition) and surge systems (treatment).

In Kenya, nutrition is still not adequately positioned to influence the shape of high-level frameworks, the design of SPPs, CTs and resilience programming, or to advocate for the targeting of the nutritionally vulnerable at the individual, household or geographic levels. Nutrition in terms of the HDN in Kenya is largely limited to implementation of nutrition-specific interventions; i.e. response built on strengthened government systems through high-HINIs and the integrated management of acute malnutrition (IMAM) are not yet resourced to full scale. This is evidenced by the high levels of acute malnutrition in the current ASAL crisis.

The declaration of an emergency brings in more human and financial resources for nutrition-specific surge activities, but typically these are not sustained by subsequent sector/development efforts. Whether nutrition-specific investments build resilience is debateable, although HINIs seem to have an (undefined/non-evidenced) role in Kenya's progress in reaching some WHA targets.

There is a general tension between the levels of nutrition-specific and nutrition-sensitive investments in Kenya, which in turn reflects an unresolved divide (despite progress) between the humanitarian and development sectors. This plays out in terms of the differing/competing objectives and design considerations, which often ignore nutrition, and in terms of widely differing target populations. Current levels of investment for the nutrition-sensitive sectors in the ASALs cannot reach levels of coverage and geographical convergence needed to see a population level impact on nutrition.

Nutrition in Kenya is not yet an influencer or driver of change, although this is not because of a lack of effort on the part of the nutrition sector. This is a key risk for nutrition generally and in the context of a rapidly evolving HDN agenda, as well as the growth in cash-related and social protection programming. Because nutrition in Kenya is marginalised, HDN, SPP and CT-related objectives at best view nutrition as an outcome indicator (for example; stunting in the case of the Kenya EDE), as opposed to a key design and targeting consideration.

Nutrition is being left behind in the HDN discourse and this is one area that global nutrition leadership must influence; if one hoped-for outcome of HDN is a lowering of the incidence and prevalence of child wasting and stunting, then even greater efforts are needed to get nutrition expertise at the table of the HDN 'movers and shakers' at global and country level. In countries like Kenya, a higher-level forum which can influence other sectors across humanitarian and development approaches (such as the HSNP) is needed. The Scaling Up Nutrition (SUN) Movement has not yet given rise to a multi-sector platform to gain nutrition leverage and visibility.

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Community management of uncomplicated malnourished infants under six months old: barriers to national policy change

By Sonja Read and Marie McGrath

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The authors extend thanks to Professor Marko Kerac of London School of Hygiene and Tropical Medicine for his help in conceptualising and directing this work, to all at country level who took time to share their experiences with us, and to Irish Aid, who funded the review through ENN.

Location: *Yemen, Malawi and Vietnam*

What we know: WHO 2013 guidance on SAM treatment recommends community-based management for uncomplicated cases in infants under six months old (infants < 6m); this has not been adopted in country-level policy.

What this article adds: A small, qualitative study examined barriers to including community-based management of acute malnutrition in infants < 6m in recent national guidance updates in Yemen, Malawi and Vietnam. Identified barriers include low awareness of current WHO recommendations; lack of practical anthropometric indicators for community assessment and means to monitor infants closely; weak country-level evidence on interventions, including cost-effectiveness; concerns regarding caseload, health worker capacity, skillset needed and risks of outpatient care; and lack of simple management protocols and tools. Lack of systematic screening for infants < 6m means potential caseload and spectrum of case types in different settings are unknown; policy makers (often clinicians) are informed by experiences managing inpatient complex cases. These gaps led to country-based consensus not to include community-based management as an option; external expert technical input and advocacy were not sufficient to bring policy change. Country-level evidence (robust research) to address context-specific questions is critical for international guidance uptake and to further inform both global and country-level policy updates. Community-friendly anthropometric indicators are needed to help identify at risk infants.

Background

Globally, 8.5 million infants under six months old (infants < 6m) are estimated to be acutely malnourished, of whom 3.8 million are severely malnourished (Kerac et al, 2011). Until recently, policy guidance centred on inpatient management only, limiting coverage, accessibility and type of intervention availability and not reflecting the spectrum of need and severity amongst this population of at-risk mothers and infants (ENN, 2010). Recognising this, the latest WHO guidance on SAM treatment (WHO, 2013) now distinguishes between complicated and uncomplicated severe acute malnutrition (SAM) among infants < 6 months and recommends the latter be treated in outpatient care (WHO, 2013). However, positive global policy development has not yet been reflected at country level; a recent review of 48 national SAM/CMAM (community-based management of acute malnutrition) guidelines found that inpatient care still dominates for this age group; none recommend outpatient case management (McGrath, 2016). While translating in-

ternational recommendations to national guidelines takes time, countries who have revised their national SAM guidelines since 2013 have not made a provision for community-based management of this age group. There are indications that additional barriers may prevent national policymakers from aligning guidance with WHO.

This study aimed to understand the issues and challenges involved in making a national policy shift from inpatient-only care to outpatient management for uncomplicated, malnourished infants < 6m.

Process

Three case studies were conducted on Yemen, Malawi and Vietnam, where national CMAM/IMAM (integrated management of acute malnutrition) guidelines were recently revised but the 2013 WHO recommendation of managing uncomplicated SAM infants < 6m as outpatients was not adopted. Countries were selected where outpatient management of uncomplicated malnourished infants < 6m was considered as part of

the guidelines review process, but where it was decided against including this recommendation.

Sampling was purposive and done to saturation. Twelve key informants were interviewed; five for Yemen, five for Malawi and two for Vietnam. Key informants represented a variety of stakeholders involved in the guidelines development process, including representatives from Ministry of Health (MoH) (n=1); UNICEF, other United Nations (UN) organisations, and WHO (n=4); a local non-governmental organisation (NGO) (n=1); academia (n=1); a service provider (n=1); and people with a technical support role to the MoH (n=4). Only two key informants were interviewed for Vietnam due to non-responsiveness and a language barrier. Interviews were conducted by phone or Skype. One phone interview was completed with written answers due to weak internet connection and one interview was submitted in writing for the convenience of the key informant. Key informants reviewed interview transcripts to ensure views had been accurately captured; five out of 12 key informants did so.

Thematic analysis was carried out to identify the main barriers and issues that policy-makers face in adopting the WHO guidelines on the treatment of the < 6m age group with uncomplicated SAM. Each interview was coded and themes were formed from codes.

Key findings

All three countries implement preventive and inpatient activities for infants < 6m, but not outpatient care. In all countries investigated, community-based management provision was proposed for inclusion in the guidelines by a person in a technical support role to the MoH. After discussions among stakeholders and/or a technical committee with the MoH, outpatient treatment for uncomplicated infants < 6m was not endorsed. In all cases, exclusion was based on a majority consensus. Barriers identified have been grouped under technical, political, operational and epidemiological barriers.

Technical barriers

There was reluctance to distinguish between com-



Supplementary suckling as part of inpatient management

plicated and uncomplicated SAM cases in this age group, especially in Yemen and Vietnam. Many considered all severely malnourished infants < 6m to be complicated cases who need close monitoring and whose condition may quickly deteriorate. It was often mentioned that cases usually have comorbidities that require inpatient care and are challenging to manage even in inpatient settings.

Lack of appropriate diagnostic criteria and tools to identify, manage and follow up infants in the community was cited in all three countries as a major barrier to outpatient treatment. Lack of official mid-upper arm circumference (MUAC) cut-offs and the impracticability of weight-for-length measurement (current WHO recommendation for anthropometric assessment of this age group) make identifying infants in the community difficult. Likewise, there is no straightforward method to closely monitor the condition of infants in the community by health workers in order to evaluate how the child's condition changes and identify when they should be referred to inpatient care. Some key informants suggested MUAC might make identifying infants easier. In Malawi the importance of looking at wider causes of malnutrition in SAM infants was also emphasised, while expressing difficulties for CHWs to do this.

As outpatient management of infants <6m consists largely of breastfeeding support, it was regarded by many as a preventive measure that is already covered by general infant and young child feeding (IYCF) activities. In Yemen this generated debate as to whether what is perceived as 'prevention' should be part of a treatment guideline; this was a major barrier to policy change. Some voiced that a severely malnourished infant indicates failure of community-based prevention and breastfeeding support and therefore warrants inpatient treatment.

All countries, especially Yemen, raised questions on what constitutes 'treatment'; to be given something substantial – beyond feeding support – was expected. This in turn raised fears that expectation of product-driven 'treatment' would undermine exclusive breastfeeding (EBF). The lack of a tangible, ready-to-use therapeutic food (RUTF)-like intervention for infants < 6m made decision-makers hesitant to implement community-based care for this age group: "Because they are still young, we can't give RUTE, so we run out of options – there's not much to give them to go

home." (Malawi) and: "[Infants <6m] should be admitted to hospital because there's no treatment for [SAM] children under six months[in the community]" (Vietnam). The inappropriateness/impracticality of using milk-based products in communities was also raised.

Non-breastfed cases were considered an especially challenging group to cater for; both for hygienic reasons (milk feeds are considered inpatient interventions) and because giving products instead of breastmilk is seen as a threat to EBF, the core message of community health workers for that age group.

All countries called for more evidence on the effectiveness of community-based management of uncomplicated infants < 6m, particularly national evidence. Lack of implementation protocols was a significant barrier; in Malawi this was a major reason for the MoH not to include outpatient treatment for infants. Even key informants who were familiar with the C-MAMI tool¹ suggested that a barrier to implementation was lack of a clear protocol to follow. A tested approach to treating infants < 6m and success stories would facilitate policy uptake of C-MAMI.

For many stakeholders in the guidelines review process, outpatient care for infants <6m was a new concept and there was a general lack of in-depth knowledge about how infants <6m could be identified, managed and monitored in the community; several key informants posed this question in the interview, asking about the C-MAMI tool (ENN and LSHTM, 2015) and the WHO recommendation on SAM infants <6m. Technical support staff in two countries were posed questions by the MoH regarding case management that they could not answer: "People kept asking how this can work in the local context and we didn't have answers, so if we don't have answers, we can't have it in the guidelines" (Malawi).

Political barriers

Several key informants emphasised the need for guidelines to be practical, with an easily followed protocol. In all countries, MoH cut down substantially from the draft guidelines in general; infant <6m community management was typically removed as seen as complicated and "confusing" (Yemen). Not all key informants were aware of the WHO guidance regarding outpatient treatment of infants. Implementing outpatient treatment did not receive wide support and it was a consensus in each country that outpatient treatment for infants would not be included. In one country, the MoH's consultative committee comprised of clinicians who strongly preferred admission to inpatient care.

Implementing infant <6m outpatient care was also not a priority/difficult to achieve given other more pressing issues. In Yemen ongoing conflict meant the priority for guidance was on CMAM delivery in the emergency response; in Vietnam, attention has been on integration of treatment in the national health system. In both countries, inpatient treatment for infants <6m was included for the first time in the latest revision.

Language may have hindered adoption; what materials there are currently are English-only.

Operational barriers

In all countries the capacity of community health workers (CHWs) and/or community volunteers, on whom screening and management of SAM infants in the community would depend, was identified as a major barrier to implementing outpatient care. Low level of education coupled with the degree of responsibility that this service would entail was not considered appropriate. Key informants hesitated to give CHWs responsibilities such as determining whether an infant <6m should receive inpatient or outpatient care, especially with the current diagnostic tools available; at what point a child is referred to a facility if their condition deteriorates; and supporting a SAM child with breastfeeding (since "breastfeeding promotion has already failed at that point"). Referral for inpatient care was deemed the easiest action for CHWs.

The appropriateness of current outpatient therapeutic programme (OTP) models to care for infants < 6months was questioned in terms of monitoring children, providing milk feeds in the community and lack of functioning referral lines if the infant's condition deteriorates. There is no strong alternative to inpatient treatment: "We thought that [treating SAM kids as inpatients] is obvious unless maybe our communities are really equipped." (Malawi).

Epidemiological barriers

Epidemiological barriers featured more prominently in Vietnam, where SAM in infants <6m has not been observed and is not regarded as a burden. Some key informants from other countries mentioned that malnutrition in this age group is rarer. Lack of easy diagnostics, for its part, makes it more difficult to establish a burden of disease.

Discussion

In each country, several factors contributed to the fact that community-based management of acute malnutrition in infants <6m has not been adopted by national policy-makers. Barriers are 'ideological' – such as no recognition of uncomplicated and complicated SAM in infants, 'practical' – accepting that some infants could be treated as outpatients but implementation is difficult, and 'personal' – guideline-development stakeholders draw on personal experience with caseload management which influences decision-making, especially in the context of lack of national evidence. Many felt there wasn't enough MAMI expertise at national level.

Many perceive C-MAMI as already covered by preventive IYCF activities and those whom it fails require inpatient care. Many consider SAM infants as complicated with concurrent illness; this may reflect the caseload they have experience of, rather than the spectrum of potential caseload since there is no systematic screening of all

¹ Both identification and management of acute malnutrition in infants <6m are outlined in the C-MAMI tool which was developed under the leadership of ENN and London School of Hygiene and Tropical Medicine and modelled on the IMCI approach as a first step to catalyse programme development. This is undergoing pilot and development through field implementation but requires intervention trials to determine effectiveness.

infants. Little is known of the profile of those malnourished infants who are currently not detected in communities in different contexts.

Management of the uncomplicated cases group sits between preventive activities and inpatient treatment and touches on IYCF, health and CMAM/IMAM; this multi-sectorality likely fuels uncertainty regarding where community-based management for this age group belongs and who should drive it.

There is currently no community-friendly anthropometric indicator to help identify acutely malnourished infants in communities, especially those at highest risk. Appropriate tools are also needed to track infants and refer them to inpatient care if their condition gets worse.

C-MAMI is not perceived as an easy intervention. Indeed, without knowing the burden, who benefits from C-MAMI, and with existing preventive activities for infants, compounded by uncertainties related to outpatient management, referral by CHWs to inpatient care is considered the safest option for country stakeholders. Non-breastfed infants in the community remain a special concern.

In all countries we investigated, C-MAMI was proposed for inclusion by some “champion” but was not sufficient to effect policy change. Knowledge of WHO guidelines’ recommendations for infants <6m was not widespread or were not considered applicable to the context.

Introducing C-MAMI has training implications; lack of outpatient and staff capacity to address the needs of SAM infants and questions regarding capability and workload of CHWs to ‘step up’ on MAMI were major barriers across all countries.

Conclusions and recommendations

There are significant and understandable barriers to national policy change to accommodate community-based management of acute malnutrition in infants < 6m; some political but many practical. Barriers should not be interpreted as a sign that MAMI is not relevant at country level; a recent global research prioritisation by No Wasted Lives identified management of acute malnutrition in infants < 6m as the third top priority research question needed to inform scale-up². Country-level research to investigate local burden, case profile (complicated, uncomplicated) and answer context-specific questions on feasible, cost-effective interventions are necessary. Where MAMI is located – in nutrition or health, in treatment or prevention – requires further scrutiny and will likely vary by setting; ‘whatever works here’ should be the guiding principle. To date, small-scale pilots on implementation of the C-MAMI tool have relied on models that rely on significant NGO support; plans are underway for implementation research in government settings. However, robust randomised trials in multiple settings with government collaboration are critical to inform both national and international policy up-

dates and protocol development. International policy development must be accompanied by dissemination that includes translation. There is an urgency to identify community-friendly anthropometric indicators to help identify at-risk infants in the community.

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² *Prioritising acute malnutrition research: preliminary results of a CHNRI survey. Field Exchange 55, July 2017. p68. www.ennonline.net/fex/55/acutemalnutchnrisurveyprelim*

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Shock-responsive social protection systems research

Summary of research¹

Location: *Global*

What we know: Cash is increasingly used in humanitarian response; there is limited evidence on the potential for government social protection schemes to respond to ‘shocks’.

What this article adds: Research was carried out including six country case studies, a literature review and global consultations to explore the potential role for long-term social protection systems in response to large-scale shocks. The study found different options for shock-responsive adaptation (tweaking design/piggybacking existing programmes; expanding existing programmes (topping up support to beneficiaries or adding beneficiaries); or aligning with humanitarian systems. Context-specific considerations during programme design include the level of political will; regulations; government capacity; financing and conflict. Operational considerations include carrying out effective needs assessments; deciding on appropriate transfer values and distribution modes; and good communication with beneficiaries and non-beneficiaries. Collaboration between social protection, disaster risk management and humanitarian actors is important at all levels; there are examples in the case studies of different coordination bodies, but much more coordination is needed. The authors make 12 recommendations to policy-makers and programmers.

The Shock-Responsive Social Protection Systems study is a UK Department for International Development (DFID)- funded research programme (2015 to 2018) led by Oxford Policy Management (OPM), in a consortium with Overseas Development Institute (ODI), Cash Learning Partnership (CaLP) and INASP. Its aim is to strengthen the evidence base on when and how social protection systems can better respond to shocks in low-income countries and fragile and conflict-affected states (FCAS) in order to minimise negative shock impacts and reduce the need for separate humanitarian responses. The study aimed to explore the potential role for long-term social protection systems in the response to large-scale shocks, either before or after the crisis occurs, and opportunities for coordination/integration of humanitarian interventions, disaster risk management (DRM) and social protection. Six case studies were undertaken (Pakistan, Philippines, Mozambique, Lesotho, Mali and the Sahel region), as well as a literature review and a series of consultations globally.

¹ O'Brien C, Scott Z, Smith G, Barca V, Kardan A, Holmes R, Watson C and Congrave J. (2018). *Shock-Responsive Social Protection Systems Research: Synthesis Report.* Oxford Policy Management, Oxford, UK.

The research focused on social assistance, including cash and in-kind transfers, school feeding programmes, public works programmes and food subsidy. This synthesis report consolidates the evidence and lessons learned.

Shock-responsive adaptation may occur through design tweaks to an existing programme, by piggybacking on another programme, vertical expansion (topping up support to beneficiaries), horizontal expansion (temporarily extending support to new households) or by alignment of social protection with humanitarian systems. Key principles for preparing an effective shock response are described in Box 1.

Contextual factors that influence the design of shock-responsive programmes

The policy-making context will affect programme design, including the level of political will/openness to preparedness activities at government level. Opinions vary between countries on whether social protection programmes should be embedded into law (some felt that a legal basis assured programme longevity; others felt it introduced rigidity and limited flexibility). Government capacity is also important; all countries studied had some (although this was often stretched even without a shock) and some countries had little prospect of surge capacity in crisis. In these contexts, non-government actors are likely to be a key part of the human-resource capability in shock response for the long term. In order to embed a 'shock-responsive' element into a long-term, government-led social protection programme or system, it is necessary to understand many aspects of its financing. Governments studied could identify resources for shock response in many sectors (such as agriculture or health); however, in some cases robust processes were lacking for anticipating the size of funding requirements. A separate challenge is how to mobilise resources so that contingency funds are not discovered to be lacking when they are needed. It is likely that a combination of funding sources, topped up by humanitarian appeals where required, will be appropriate. Options available to governments may include contingency funds, disaster insurance and contingent credit lines, although all options have limitations as well as benefits. Conflict was identified as an important factor that can increase

the need for shock-responsive social protection, but also undermine the capacity for response.

Operational factors in the implementation of shock-responsive social protection

A key operational factor to consider is the assessment of need for shock-responsive social protection. There is likely to be overlap between beneficiaries targeted for social protection and those targeted by humanitarian and DRM actors and therefore overlap in the most appropriate form of needs assessment. Another important consideration (preferably during preparedness planning) is the appropriate value of transfers. This will depend on what needs to be covered (basic survival or rebuilding livelihoods); trade-offs between scale, sufficiency and political support; and support provided by other agencies. Appropriate modes of transfer must be identified (manual versus digital distribution), depending on context and disruptions caused by the shock. Experiences in Pakistan, Lesotho and the Philippines highlight the need to communicate with beneficiaries and non-beneficiaries to ensure that social protection programmes are well understood by communities, including who is targeted and why.

How humanitarian, DRM and social protection systems can best work together

Collaboration among social protection, DRM and humanitarian actors may be strengthened by promoting common understanding of the different fields and their complementarity and by improving policy engagement and coordination of programmes and delivery systems. This should happen at all levels (not just national). In many countries, collaboration is currently limited. Examples were found of coordination groups that combined government, donor and non-governmental agencies, including forums for data collection and analysis (such as the Cadre Harmonisé in the Sahel); technical working groups on specific themes (e.g. cash working groups); groups that manage disaster response (e.g. the District Disaster Management Teams in Lesotho, humanitarian clusters, or the UN Humanitarian Country Teams); alliances for advocacy and policy coordination; temporary committees; and periodic conferences.

The authors present 12 recommendations, described in Box 2.

Box 1 Key principles for shock-responsive social protection

1. Strengthening routine social protection is worthwhile in its own right for building resilience.
2. Vulnerability and needs assessments are needed to decide if social protection is a suitable vehicle for addressing a shock.
3. Interventions are likely to work better if planned in advance, through early decision-making, active planning and early delivery of support.
4. Mature social protection contexts have more options in a crisis.
5. Shock-responsive social protection will never meet the needs of all households who need assistance, so coordination with other interventions is essential.
6. Measuring success requires the identification of appropriate indicators that can be compared across humanitarian and social protection responses and that cover outcomes and impacts, not just inputs and outputs.

Box 2 Recommendations for shock-responsive social protection

For policy-makers:

1. Don't overlook the value of strengthening routine social protection in reducing the negative consequences of shocks.
2. Consider how to increase the ability of social protection programmes and delivery systems to withstand the shock themselves and to continue to function in a crisis.
3. In relation to particular shocks or types of shock, analyse systematically whether and how social protection can best contribute to a response.
4. Increase ex-ante (forecast-based) planning and action.
5. Develop guidance on shock response through social protection (e.g. roles and responsibilities, protocols for accessing data, etc.).
6. Build strategic collaboration across sectors: it does not happen organically.
7. Pay close attention to adverse impacts.

For programme implementers:

8. Take into account that many social protection programmes can become more shock-responsive with simple design tweaks.
9. Ensure that finances are available to facilitate the adaptation of programmes and systems. Robust processes need to be in place for anticipating and releasing funds.
10. Consider capacity constraints to avoid a negative impact on the underlying social protection programme or system (e.g. by overburdening staff).
11. Promote coordination between individual interventions within the wider emergency response where appropriate.
12. More monitoring and evaluation information on the efficiency and effectiveness of shock-responsive social protection is required to understand whether they provide a better alternative than other responses.

WFP/Deniz Aktus



A woman holds an electronic food card in Akçakale camp, Sanliurfa Province, Turkey, 2018



A participant of the World Vision Zimbabwe nutrition programme, Zimbabwe, 2016

Dexter Hati/World Vision Zimbabwe

Operational factors in the integration of nutrition into agriculture and livelihoods programmes in Zimbabwe

By Anne-Marie Mayer, Rose Ndolo and Jane Keylock



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nutrition programming and policy influence at national and international levels.



Jane Keylock is a nutrition and food security specialist and partner at NutritionWorks. She provides technical assistance and support for multi-sector policy and programming to government ministries, United Nations agencies and civil society organisations in Africa and Asia.

Location: *Zimbabwe*

What we know: Nutrition-sensitive agriculture has emerged as a new approach with guiding principles on programme design; however, little guidance currently exists on the operationalisation of such programmes.

What this article adds: A case study by consultants working for World Vision UK was undertaken as a learning exercise for World Vision, partners and a wider audience of practitioners, researchers and decision-makers. It shows that there are many opportunities and challenges to design, implement and assess multi-sector programmes for nutrition. Establishing clear objectives, a theory of change and a monitoring framework involving not only programme stakeholders but communities, government and the private sector are important. Multi-sector programmes are challenging due to their traditionally separate sectors. A good approach is to coordinate at all levels, understand the context, assess assumptions, agree objectives, be participative, harmonise training materials and give attention to any unintended consequences. A fully mainstreamed gender component is essential to optimise the pathways from agriculture to nutrition. Targeting farmers with the greatest capacity for increasing agricultural productivity could exclude the poorest and most vulnerable, making nutrition objectives elusive. A practical guide to implement and assess multi-sector programmes for nutrition under the real constraints experienced by the implementers is needed and further case studies would help achieve this.

Introduction

While the current guidance on nutrition-sensitive programming is useful for design and evaluation (FAO, 2013; SPRING, 2014), the implementation of multi-sector programmes has not been so well described. This research seeks to understand more fully issues related to the implementation of nutrition-sensitive agriculture and livelihoods programmes using a case study of the Ensuring Nutrition, Transforming and Empowering Rural Farmers and Promoting Resilience in Zimbabwe (ENTERPRIZE) project. The conceptual pathways between agriculture and nutrition (SPRING, 2014) and guiding principles for the design of agriculture programmes for nutrition (FAO, 2013) were used in the design of the ENTERPRIZE programme.

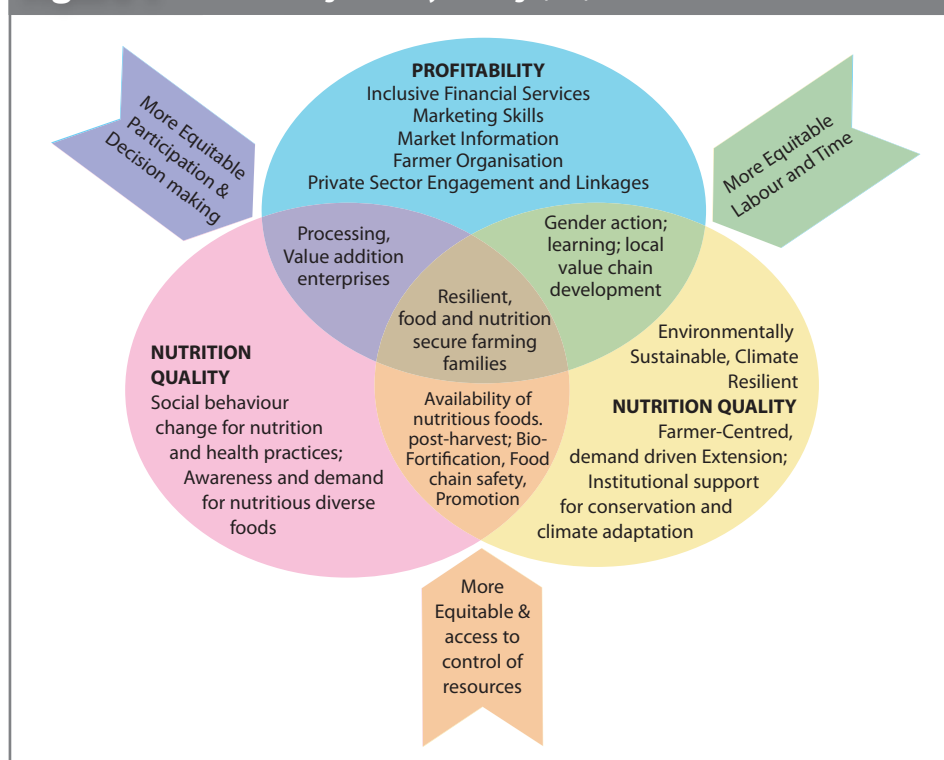
ENTERPRIZE is a multi-sector project in Mashonaland Central Province in Zimbabwe led by World Vision Zimbabwe (WVZ). It is one of three sub-projects of the Agricultural Productivity and Nutrition (APN) component managed by the Food and Agriculture Organization of the United Nations (FAO). The APN is one of three components of the Livelihoods and Food Security Programme (LFSP) funded by the UK Department for International Development (DFID). It also includes the market development (MD) component led by Palladium (an international advisory and management company) and the monitoring, reporting and evaluation (MR&E) component

led by Coffey (who provide international development assistance services).

ENTERPRIZE aims to benefit 25,500 farmers directly and 75,650 households indirectly by improving food and nutrition security through coordinated activities primarily across agriculture, finance and health sectors. It is a complex project with links across many sectors and partnerships covering government, non-governmental organisations (NGOs), financial institutions and the private sector. Figure 1 shows the original theory of change (ToC) for ENTERPRIZE. The total budget for the project to date is US\$5.3 million over the 40-month course of the project.

Nutrition in ENTERPRIZE includes 'nutrition-specific' and 'nutrition-sensitive' actions. Nutrition-specific activities include behaviour change communication (BCC), such as the promotion of infant and young child feeding (IYCF); improved hygiene; health-seeking behaviours and cooking demonstrations. Nutrition-sensitive activities include value chains of nutrient-dense foods; a gender empowerment strategy; support for diversified crop production; promotion of biofortified crops; farmer trainings; and promotion of post-harvest management, processing and preservation methods. The

¹ DFNSC multi-sector committee is designed to coordinate government nutrition activities at district level. It includes agriculture, livestock, health, environmental health, youth affairs, community development and social services.

Figure 1 ENTERPRIZE original theory of change (ToC)

project supports the District Food and Nutrition Security Committee¹ (DFNSC) and ward-level committees. Targeting varied for different components. Nutrition-specific actions were targeted for the first 1,000 days (pregnant and lactating women (PLW)) via care groups, irrespective of socio-economic classification. Nutrition-sensitive actions targeted middle-income farmers using Farmer Groups, in line with LFSP targeting guidelines.

An ENTERPRIZE-specific log frame was developed from the broader APN LFSP log frame. The following nutrition-relevant indicators were included: prevalence of households with moderate or severe hunger (based on the household hunger scale (HHS)); household dietary diversity (based on the household food consumption score (HFCS) and minimum acceptable diet (MAD)); proportion of households purchasing nutritious foods (including biofortified products); proportion of households producing diverse nutritious foods (including biofortified crops); and proportion of households practicing positive nutrition behaviours

Box 1 Gender Action Learning System (GALS)

GALS is a participatory facilitation process led by trained local facilitators and replicated through community-based, trained 'champions'. It comprises a series of tools that enable household members to negotiate their needs and interests and find innovative, gender-equitable solutions. GALS begins with dialogue at farming-family level on resource and labour planning, family visioning, identification of preferred value chains, mapping the market, and analysis of key production and marketing constraints and opportunities.

(including diversified consumption, exclusive breastfeeding and improved water, sanitation and hygiene (WASH)). Measures of nutritional status (wasting and stunting) were not included.

Methods

The case study seeks to address the gap in evidence on operational factors in the implementation of nutrition-sensitive agriculture and livelihoods programmes. The case study was carried out from October 2016 to January 2017, in the second year of the project. Interview questions were designed to address the focal question:

"In seeking to make agriculture and livelihood programmes nutrition-sensitive, what are the operational opportunities and challenges that programmes face? What lessons can be drawn from practical experience?"

A literature review was conducted on multi-sector programming for nutrition to draw lessons from previous experiences. Key factors identified relating to the success of programmes were: adoption of a shared vocabulary and agenda; design and plan for deep engagement with communities and governments; a portfolio approach for nutrition to maximise nutritional outcomes; clear guidance from the design stage for holding actors accountable for planned coordination and collaboration efforts; a system of robust technical assistance to ensure quality implementation; and establishment of a stronger environment for collaboration, learning and adaptation (various sources, including SPRING and Feed the Future 2016). These factors were used as a basis for the assessment of ENTERPRIZE.

Interviews were conducted in Harare with WVZ, ENTERPRIZE and APN national partners. This was followed by visits to Gurube and Mount

Darwin Districts, for three days each, where 16 group discussions were conducted with District ENTERPRIZE teams, DFNSCs, Internal, Savings and Lending (ISAL) groups, community health and agriculture extension workers, care groups and farmer groups. The report reflects the situation at the time of the study.

There were limitations to the method. Some key partners were not interviewed, including private sector partners (value chain actors), DFID Zimbabwe (LFSP donor), Palladium (MD lead), Coffey (MR&E lead) and HarvestPlus (responsible for biofortification promotion). The assessment therefore missed out on valuable opinions in key areas, including value chains and MR&E. Another limitation was that the interview sites and respondents were not selected at random but chosen by the project and therefore their selection may have introduced bias. There was also a tendency towards positive responses, possibly related to the expectations of beneficiaries.

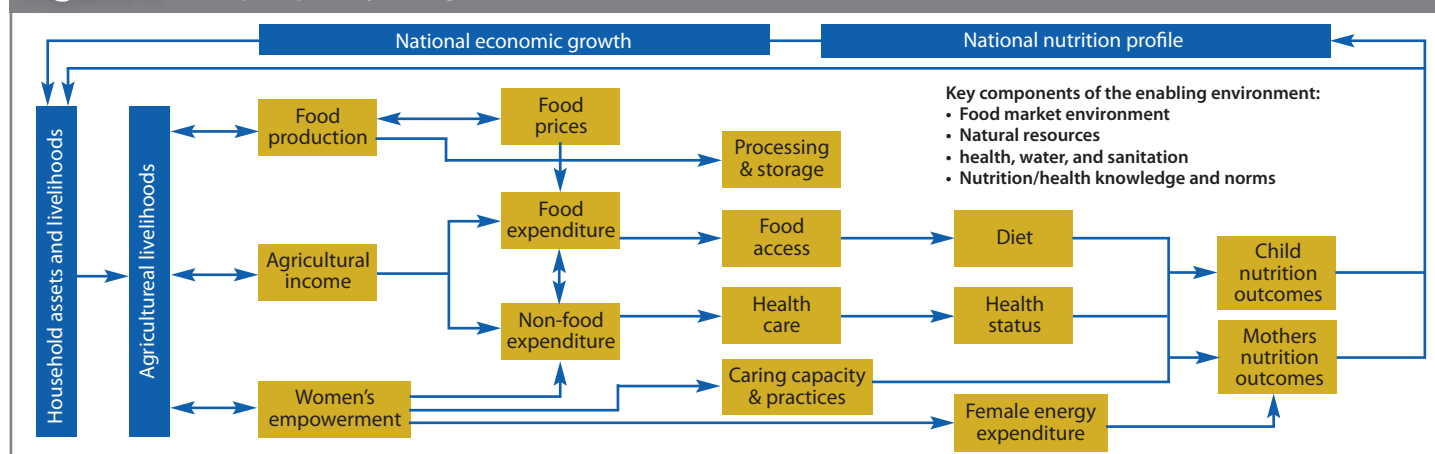
Findings

Assessment of need and context: Several surveys were carried out during the start-up phase of the project, including a contextual analysis; baseline survey; knowledge, attitude and practices (KAP) survey; barrier analysis to fine-tune behaviour change communication (BCC) activities; and a gender analysis to develop the gender strategy. These studies guided the design of ENTERPRIZE. Analyses on socio-economic differences in malnutrition were not conducted but would have further informed the targeting criteria.

Development of a theory of change (ToC): The pathways from programme activities to improved nutrition were not included in the original ToC diagram but were drawn out during meetings with project partners during the assessment (see Figure 2). The ToCs presented in project documents did not describe clearly the ways in which project activities could impact nutrition outcomes. The potential for nutrition impact would be improved if these pathways had been monitored to understand and respond to changes during project implementation. Nutrition was a substantive outcome with clear approaches and intervention for PLW and young children, but the impact pathways for other components were not drawn up during project design.

The gender pathways are strong in this project and Gender Action Learning System (GALS) (see Box 1) is a key component that facilitates the other pathways. The GALS component has supported other programme activities, such as the rollout of trainings. As women have greater influence in their communities, men seem more willing to take on a broader range of tasks than before. Respondents' testimonials also suggest that GALS has had a strong positive impact on nutrition through women's power to influence household decisions around food and nutrition.

The assessment revealed that value chain activities within the programme were designed to increase income, rather than produce affordable, nutritious food for local or distant consumption. This may limit the impact of the programme on

Figure 2 Conceptual pathway from agriculture to nutrition

nutrition outcomes. Although the criteria for selection of value chain crops included those that are nutritious, including biofortified maize and beans, more work needs to be done beyond production to enhance the nutrition sensitivity of the entire value chain. Improving water availability for agriculture or health was not included in the design of the project; this proved to be an important limitation of the project in the context of the drought that was occurring in Zimbabwe at the time of the assessment.

The project supports the production and marketing of diverse foods, but a key question is what food is available and affordable to the poor (farmers or non-farmers) in practice. It would be helpful if the project explored some of the links between production and consumption (who produces what and who consumes what). Assumptions in the project log frame have not been assessed and could affect successful nutrition outcomes, such as 'access to nutrition foods from markets', 'no serious or macro-economic instability' and 'no severe or prolonged drought'.

Targeting: Nutrition-specific activities are appropriately targeted to the first 1,000 days (PLW and children under two years of age), irrespective of socio-economic classification. However, farmers groups targeted middle-income farmers with capacity to increase productivity and not the poorest or better-off. Whilst the review identified that poorer and more well-off farmers also accessed support, omitting the poorest and most vulnerable from targeted activities is a key limitation of the programme that reduces the potential to improve nutrition.

Integration or co-location and coordination: In the initial years before the DFNSC was up and running, challenges in the coordination of trainings and other community activities were common, leading to conflict between farmer and care group activities. As the committee has evolved, there have been positive changes in this respect.

ENTERPRIZE activities are co-located at district-level (the same districts are included in all activities). Within wards, however, the same households are not necessarily targeted for all activities. The district ENTERPRIZE teams are also located together under one roof, making

coordination easier. Other initiatives such as learning visits to other LFSP projects have helped cross-sector communication. *The Healthy Harvest*² training manual naturally integrates agriculture and nutrition 'from farm to fork' and DFNSC nutrition training helps build understanding of the pathways between agriculture and nutrition. However, there have been coordination challenges, such as a lack of clear strategy and resources for DFNSCs and different priorities and targets for each sector. Also, agriculture extension has insufficient resources for nutrition training in practice.

Training, capacity-building and behaviour change communication activities: The project is delivered through government structures and it supported the establishment of the DFNSC in its initial training and ongoing meetings; WVZ participates in the DFNSC as an NGO member. The DFNSC and WVZ work together on community trainings and monitoring activities and the DFNSC is involved in training ward extension staff who are frontline facilitators at field-level.

Nutrition training is delivered through care groups, with training cascading to reach the 'first 1000 days' target group. There is also some nutrition material covered in training to agriculture extension workers using the *Healthy Harvest* manual. The DFNSC has received some nutrition training but the level of staffing for nutrition is probably not adequate for the scope of work to deliver the full nutrition components. In future, the project would benefit from a shared curriculum on nutrition across sectors.

Implementation: The project has been adapted well to the context and implemented according to timeframes and targets, even during the severe drought in 2016. Several factors enabled successful implementation, including supportive government policies, a strong focus on gender, effective cascade training models including practical demonstrations and tailored BCC messages, and strong human resources. However, there have been several challenges related to implementation, including:

Resource and co-ordination issues around training: There have been limited resources for training

and sometimes poor communication between the different government and NGO partners involved.

Lack of cross-learning across training models: Training materials related to the Healthy Harvest manual are not available in easy-to-use formats for the cascade training. There is no plan to roll out the training with a different message each month and barriers to practice have not been adequately determined. It would be helpful for the agriculture extension department to learn from the care group BCC rollout in these respects.

Insufficient inputs: There appears to be a chronic shortage of seeds for crops other than maize. Even the biofortified seeds supplied by the project had initial supply problems. Other seeds of naturally nutritious grains such as pulses, small grains and vegetables also have supply problems. This, a lack of inputs and lack of water affects farmers' ability to plant the crops suggested in the training.

Price issues: Commodity groups are not getting good prices from buyers and buyers dictate the price. Farmers reported that prices in the market are low for produce which then affects the farmers' motivation to grow these crops.

Challenges for agricultural diversification: During the 2015/16 drought, agriculture was challenged; diversification became difficult as farmers concentrated on staple production. Agricultural diversification has also been challenged by national maize supporting policies (such as provision of maize seeds and other inputs).

MR&E: There is considerable effort to collect the required data by ENTERPRIZE and government partners, through extension staff, community promoters, lead mothers and lead farmers. However, the project is complex and more routine quantitative data is collected than can be analysed; there is also limited qualitative routine monitoring. There is an accountability system in place for beneficiaries to receive information on the project and provide feedback on services, but this is not structured for nutrition

² An FAO nutrition training manual for community workers on good nutrition and the growing, processing and preparation of healthy food.

monitoring purposes. The dissemination of the findings of the considerable MR&E effort to communities is also underdeveloped.

Impacts on nutrition: At baseline, chronic malnutrition (stunting) was 26.8% and global acute malnutrition (GAM) in 6-59 months children was 3.2% (DHS 2015). It was not considered appropriate to include stunting as an impact indicator, given the short duration of the project. Wasting not considered as an indicator, which has since been identified as a missed opportunity and something to consider in future phases of this and other programmes. Communities reported several positive knowledge and behavioural changes related to nutrition; for example, use of new food groups for children's porridge; support for women to prioritise food for young children; improved nutrition and hygiene knowledge; and improved conservation agriculture practices. Importantly, women reported that feeding practices had improved because conservation agriculture saves time and heavy workload. Respondents reported many challenges related to the drought which have an impact on nutrition, particularly the lack of water, reduced agricultural production, reduced income from sales and lack of agricultural diversification.

Unintended nutritional consequences: Potential unintended consequences related to nutrition have not been fully explored by ENTERPRIZE. These could include the production of highly processed foods through the value chain, contributing to the 'double burden' of malnutrition and chronic disease; nutritious foods sold rather than consumed at home; and exclusion of the poorest farmers, which could leave them relatively worse off compared to others.

Scaling up and sustainability: The ENTERPRIZE project is contributing to the Scaling Up Nutrition Movement (SUN) by supporting the DFNSC, contributing to MR&E systems and tackling gender inequities. Some agricultural approaches used in the project, such as conservation agriculture and climate-smart agriculture, will be environmentally sustainable compared to the high-input, high-tillage, mono-crop alternatives; however, an alternative to herbicides is needed to prevent contamination of crops and possible exposure of farmers to health risks. Whether the committee will be able to continue the joint planning, coordination and monitoring activities without external project support remains an open question.

Throughout the project the government faced financial constraints to adequately finance agricultural and nutrition extension. It is therefore unlikely that the government will take up the entire package of interventions in this programme in the immediate future. Further funding for this programme would help to consolidate the gains made while the enabling public sector/government environment improves. Efforts have been made to work with government ministries at district and national levels during implementation and learning and best practices have been shared with government stakeholders at national learning events. There is willingness at the district government level to take up project activities after transition, once finances allow. Policy at national level has also been influenced by the programme, particularly in the support of small grains and biofortification and national subsidies to promote conservation agriculture.

Discussion and lessons learned

Lessons learned from the ENTERPRIZE case study are described in Box 2.

Conclusions

The effort to introduce 'nutrition-sensitivity' into existing and new programmes is crucial to address the urgent and widespread problems of malnutrition globally. ENTERPRIZE has made considerable efforts to integrate nutrition into its ENTERPRIZE project; however, internal and external challenges remain. Since this review, ENTERPRIZE has responded to lessons learned to improve nutrition sensitivity by expanding targeting of nutrition and diet messaging to groups beyond PLW to include neighbourhood women, men's forums and extended family members. Reach has been improved to the most vulnerable villages with high levels of malnutrition through community-level food fairs in those villages. Agriculture training has been extended to nutrition care groups, health technicians and village health workers on agronomy practices for biofortified, vitamin A-rich maize and iron-rich beans, post-harvest management, food storage and preservation techniques. Care groups and farmers have also been trained in the *Healthy Harvest* agriculture module to increase their skills on diversified food production, and care groups have been supported to set up household micro-gardens and continue to manage community nutrition gardens to promote inclusive production. In addition, all 1,530 lead crop farmers have been trained on key nutrition messages, harvest and post-harvest handling procedures, value addition and processing.

To strengthen monitoring practices, the project has implemented quarterly monitoring of DFNSC activities, monthly monitoring of uptake of agriculture and nutrition services and practices through focus group discussions with beneficiary communities, and monthly accountability monitoring and feedback with farmer households. Further case studies and an implementation guide would help move this work forward.

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The full report is available from World Vision: www.worldvision.org.uk/files/2315/1024/1152/IntegratingNutritionwithAgricultureCaseStudy.pdf

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Box 2 Learning points from the ENTERPRIZE case study

- **Guidelines:** Develop a practical guide for the design, implementation and assessment of nutrition-sensitive programmes, to complement existing guidelines.
- **Partnerships:** Form early partnerships with district government, community and the private sector to establish ownership and understand complementarities and trade-offs.
- **Assessing needs and context:** Assess the environmental, social, political, cultural, economic and nutrition contexts and groups affected by malnutrition, based on existing data where possible.
- **Theory of change (ToC), programme design and targeting:** Test the design assumptions through monitoring and surveys and use results to revise ToC, activities and approaches; involve the community and partners in ToC development to verify assumptions and open new possibilities; explore the full potential of value chains (and even 'value webs' to analyse the whole food system); integrate and fully fund a safety net component; ensure the poorest groups participate in farmers groups, value chains, subsistence production and income-generating activities; include a gender component (such as GALS); target the right groups (first 1,000 days for nutrition-specific activities and a wider group for nutrition-sensitive activities, ensuring the poorest are included).
- **Implementation and coordination:** Allow for a longer implementation period than would be necessary for single-sector programmes; plan for integration and coordination at project design; target barriers to behaviour change specific to the community; ensure funding is flexible to allow adaption to observed changes.
- **Training and capacity-building activities:** Include nutrition expertise from the earliest design stage; train all groups involved using a multi-sector curriculum and materials (livelihoods, agriculture, nutrition and health); develop communication, coordination and integrated data management skills within the programme.
- **Monitoring and evaluation (M&E):** Link the ToC to M&E plans; involve beneficiaries in participatory monitoring; monitor data to consider the effect of the programme on the poor and extreme poor; include a coordination process level indicator; include a mechanism to recognise and mitigate unintended consequences (open ended questions).
- **Sustainability:** Support government structures to build sustainability; build social accountability through extension work, safety nets, climate smart approaches and sustainable agriculture, all underpinned by engagement of communities.

A counsellor advises mothers on IYCF at a health centre in the Protection of Civilians (PoC) site, Western Bahr el Ghazal, South Sudan, 2017

Enhancing infant and young child feeding in emergency preparedness and response in East Africa: capacity mapping in Kenya, Somalia and South Sudan

Phil Hatcher-Moore/ UNICEF

By Patrick Codjia, Marjorie Volege, Minh Tram Le, Alison Donnelly, Fatmata Fatima Sesay, Joseph Victor Senesie and Laura Kiige



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Laura Kiige is a Nutrition Specialist with UNICEF Kenya, supporting maternal infant and young child nutrition. Laura previously worked for the Ministry of Health Kenya, including as the programme manager for infant and young child nutrition.

Location: *Kenya, Somalia and South Sudan*

What we know: There is increasing demand to address infant and young child feeding (IYCF) needs during emergencies in Eastern and Southern Africa regions.

What this article adds: UNICEF and Save the Children Regional Offices for Eastern and Southern Africa undertook a regional capacity mapping on infant and young child feeding (IYCF) in Kenya, Somalia and South Sudan to provide a regional overview, identify capacity gaps and inform country (government and partners) action. It involved a desk review (literature, key informant interviews) and country-level workshops to validate results. An assessment tool was developed comprised of six pillars (policy, human resources, coordination, information/knowledge management, programme delivery and financing) and markers to analyse IYCF and infant and young child feeding in emergencies (IYCF-E) country capacity. Common gaps included weak policy provision and legislative frameworks for IYCF-E, significant capacity gaps (coordination, staff skillset), limited assessment/information systems that include IYCF-E, limited integration of IYCF beyond health and nutrition, and lack of funding. Country-specific findings will inform country-level IYCF-E improvement strategies and actions and the national government, national Nutrition Cluster and other partners will track progress of the implementation of action points with technical guidance from UNICEF/ Save the Children regional offices. In 2018, the capacity mapping will be extended to other countries in the region, based on previous lessons learned.

Background

The Horn of Africa continues to face challenges resulting in nutrition emergencies that greatly affect young children and their families. Key triggers are food insecurity, conflicts, disease outbreaks and climate change, among others. In these contexts, the risks of illnesses, acute malnutrition and mortality among young children are augmented; protection and support of recommended feeding practices is a critical safeguard but often falls short in practice. A review by Save the Children in 2012 found that infant and young child (IYCF) interventions were not delivered

at scale during acute or protracted emergencies globally. Key bottlenecks to the scale-up of IYCF in emergencies (IYCF-E) included limited technical capacities on IYCF-E, insufficient preparedness for emergencies, lack of national coordinating bodies, funding constraints and low prioritisation. These also reflect the regional experiences of UNICEF and Save the Children in Eastern and Southern Africa, where more emphasis is placed on the treatment of severe and moderate acute malnutrition despite increasing demand for IYCF-E expertise in countries facing chronic and acute emergencies.

Table 1 Pillars and markers to analyse IYCF and IYCF-E country capacity

Pillar	Key markers
Policy and plans on IYCF/IYCF-E	Extent to which IYCF/IYCF-E is reflected in policies, strategies and plans for the country
Human resources capacity on nutrition	Extent to which the country has IYCF/IYCF-E-skilled personnel to manage its needs
Co-ordination mechanisms	Extent to which IYCF/IYCF-E actions are coordinated at country level
Information system and knowledge management	Extent to which progress for IYCF/IYCF-E actions can be tracked
Programme delivery	Extent to which IYCF/IYCF-E actions can effectively be delivered in the country
Budgeting and financing	Extent to which IYCF/IYCF-E actions are budgeted and financed in the country

To address these barriers, Save the Children and UNICEF Regional Offices, under a regional framework of collaboration, agreed to focus on IYCF-E as a core priority and specifically to undertake an IYCF-E regional capacity mapping exercise. The objectives were to provide a regional overview on IYCF-E, identify key capacities, bottlenecks and gaps, and inform governments about their current IYCF-E capacity needs.

Methodology

The capacity mapping assessment took place in two phases: *phase 1 – assessment and validation* and *phase 2 – validation*.

The assessment phase (phase 1) comprised of a desk review and interviews with key informants on IYCF-E preparedness and response, including the identification of key gaps, bottlenecks and good practices in Kenya, Somalia and South Sudan. The situations in the three countries varied and included large-scale nutrition development programmes combined with localised emergencies (Kenya) and longer-term humanitarian crises (South Sudan and Somalia). The desk review served to define relevant programmatic areas for effective IYCF-E. It appraised non-governmental organisation (NGO) programme internal and external evaluation reports and national policies, strategies and action plans relating to IYCF and IYCF-E. Key informant interviews (KIIs) targeted personnel from humanitarian organisations, government, United Nations (UN) agencies and donors. Based on the analysis, six pillars were identified to analyse

the IYCF/IYCF-E capacities of a country (see Table 1). Indicators and programme markers inspired by the desk review on IYCF were selected for each pillar and a scoring system was developed to rank each country pillar and overall IYCF-E capacity. The adopted scoring system was 0 to 5 (5 being the highest) and responses were presented in a graphical manner. Each country's score represents its performance in a particular IYCF action area. The total possible score was 145 (*policy and plans=50, human resource=20; coordination=15; information system=15; programme delivery 25; budgeting and financing=20*). The percentage score for each action area was calculated and scores from each action area were combined to create an overall country score.

The first phase was conducted mainly in the first quarter of 2016. Assessment results of this phase were presented to the IYCF/IYCF-E counterparts from government, the UN and civil society in each country. Initial scores were reviewed and, when needed, stakeholders explained the rationale scoring. This phase was made possible thanks to the generous support of DFID to UNICEF ESARO.

The second phase involved the validation of results through stakeholder consultation in country-level workshops, supported by the Global Technical Rapid Response Team financially supported by the Office of US Foreign Disaster Assistance (OFDA). Final scores were validated by a wider range of stakeholders during

validation workshops held within each country in 2017 (Kenya; Hargeisa and Mogadishu in Somalia; and South Sudan). Some of these final scores were revisited again by the participants. Stakeholders were based on a purposive sample, with efforts made to cover as wide a range of partners as possible. This included the IYCF Focal Points from the Ministries of Health for Kenya, South Sudan and Somalia, as well as the nutrition and health professionals overseeing IYCF programmes integrated into nutrition and health. Boxes 1 to 3 provide an overview of country findings and validated scores.

Results of the regional analysis

The results of the capacity mapping assessment validated by each country, displayed in Figure 1, show that all the countries had some mechanisms in place for IYCF, such as:

- Availability of national IYCF guidelines and programmes (and in some cases IYCF-E guidelines);
- A joint statement or legislation on the Code of Marketing of Breast-Milk Substitutes (BMS Code)¹;
- Availability of IYCF training packages, or a mechanism to conduct trainings initiated by governments or partners;
- Use of multiple communication channels for IYCF messages;
- Participation in global events like the World Breastfeeding Week;
- Availability of some form of monitoring and evaluation framework (although reporting did not always include IYCF);
- An active Nutrition Cluster or coordination mechanism.

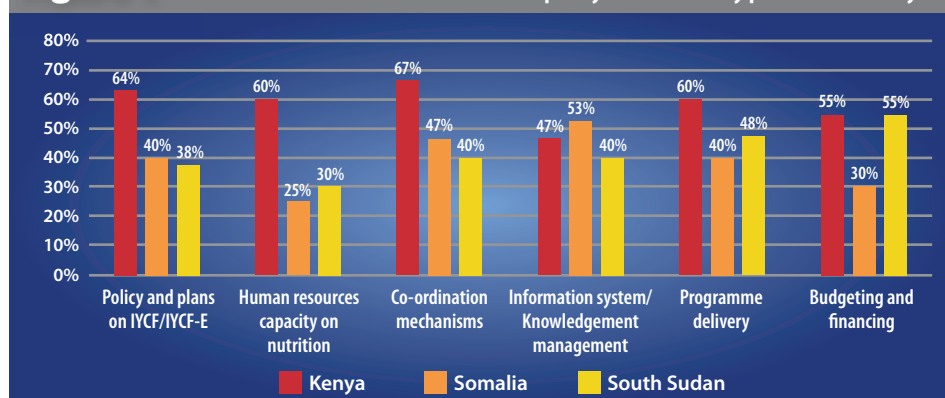
Key findings by pillar are summarised in figure 1.

IYCF/IYCF-E policy level

IYCF policy provides the general framework for implementation of IYCF activities in 'normal' times, while an IYCF/IYCF-E policy incorporates implementation of IYCF in emergency contexts. Key areas assessed were:

- Availability of IYCF/IYCF-E policy/strategy /guideline developed;
- Availability of legislation on IYCF with specific consideration of emergencies;
- Recent (within last five years) guidelines to plan, implement and evaluate IYCF/IYCF-E activities;
- A contingency plan developed to promote, protect and support exclusive breastfeeding and appropriate complementary feeding and to minimise the risk of artificial feeding (with specific reference to the BMS Code); and
- Institutional roles for implementing IYCF/ IYCF-E programmes are clearly defined and operationalised.

In all three countries, IYCF/IYCF-E programmes were developed as 'national programmes' managed by the Ministry of Health (MoH) in collaboration with UNICEF, often driven by global and regional priorities. Kenya and Somalia had

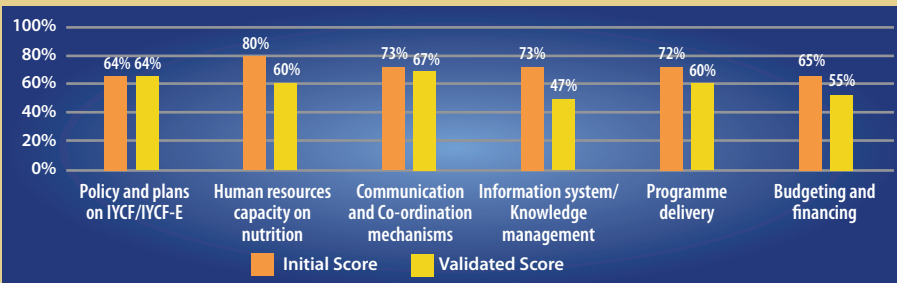
Figure 1 Validated results from overall IYCF-E capacity assessment by pillar and country

¹ www.who.int/nutrition/publications/infantfeeding/9241541601/en/

Box 1 IYCF-E capacity mapping assessment results Kenya

Kenya has put in place mechanisms to support IYCF-E that include having a supportive and legal framework for nutrition, enhanced coordination mechanisms, information systems and a funding mechanism for IYCF-related activities (directly or indirectly). After validation, the total score for Kenya was 60 per cent, with gaps in information and knowledge management,

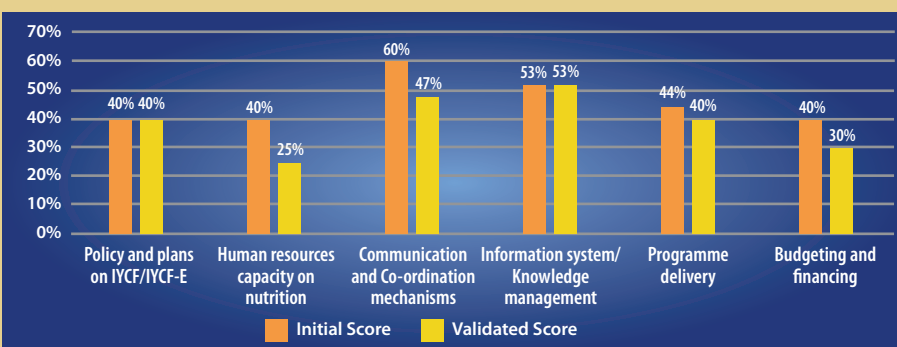
human resources, budgeting and financing. Overall, the participants in the validation felt the IYCF-E capacity mapping assessment results accurately reflected the situation in the country. Participant feedback indicated that some of the indicators were overrated (human resources and information systems); validated scores below reflect these changes.



Box 2 IYCF-E capacity mapping assessment results Somalia

A strong (nutrition cluster) coordination mechanism is in place to support service delivery. While policies and systems have been strengthened, gaps remain in implementation, follow-up and engagement of all stakeholders. The total score for Somalia was 39 per cent after validation. The major constraints identified were on service delivery, relating to budget allocation and the high dependency of the country

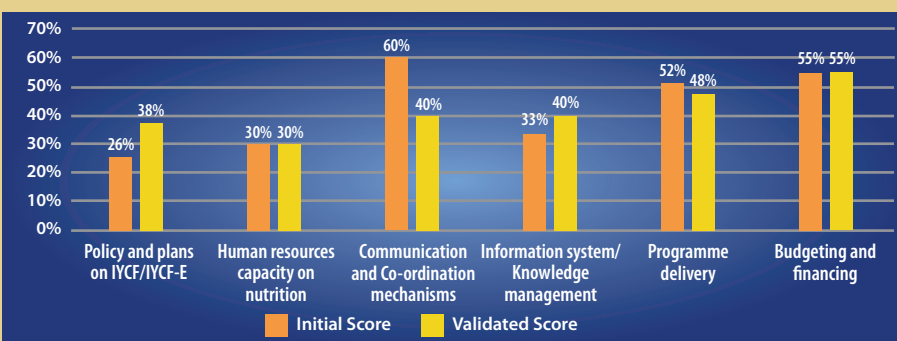
on external funding; weak IYCF-E coordination between the Nutrition Cluster and other stakeholders; inadequate implementation of policies and strategies due to government structures not being fully functional at district and community level; and limited operational capacity by government for policy implementation and enforcement.



Box 3 IYCF-E capacity mapping assessment results South Sudan

Capacity for implementation of IYCF-E activities is limited in South Sudan. With support from partners, the government has put in place some mechanisms to support implementation of activities. Key to note is the development to the IYCF strategic plan which has incorporated IYCF-E. Some of the key successes in South Sudan are availability of a coordination mechanism, integration of IYCF-E in the Rapid Response Mechanism and available funding for IYCF. The total score for South Sudan was 41 per cent after validation. Health and nutrition human resources were the main barriers identified and

were characterised by: lack of clear job descriptions and targets; insufficient and irregular paid compensation; lack of supportive supervision and quality control mechanisms at all levels; lack of basic information about numbers, composition and geographical distribution of health providers in the private sector; insufficient coordination of human resource development across different parts of the health system; limited continuing educational opportunities and professional development; and poor recruitment and weak retention capacity of states and counties.



IYCF strategies and policies in place (standalone or integrated); while South Sudan was using the UNICEF community IYCF package to roll out IYCF trainings nationwide (South Sudan has since developed and disseminated the country IYCF strategy). In Kenya, the full BMS Code is legislated; for Somalia and South Sudan there are no legal measures as yet². The assessment revealed that more attention was needed to improve knowledge and dissemination of the BMS Code and reporting of Code violations by the implementing agencies in all countries.

Based on the analysis, the rating on the availability of a legal framework supporting IYCF-E was 40 per cent (20 per cent for South Sudan, 40 per cent for Somalia and 60 per cent for Kenya). In Kenya, IYCF-E is included under the 2013 operational guidelines, in addition to specific guidance for the promotion and support of infant and young child nutrition in emergencies. In Somalia and South Sudan, a specific IYCF-E section was not developed within the national IYCF national strategy and policy at the time of the first phase assessment.

Human resources capacity for IYCF-E

Adequate and supportive supervision by a staff knowledgeable on IYCF-E was missing in all countries. Essential materials for IYCF-E assessments such as standard questionnaires and orientation packages were also lacking, and staff were not adequately resourced to implement IYCF-E programmes such as counselling, community support groups and community education and care for pregnant and lactating women (PLW), especially during emergencies. Specific expertise on IYCF-E, such as on social marketing, community empowerment, advocacy and communication for development in humanitarian settings, were assessed as limited in the three countries.

Coordination and communication mechanisms on IYCF/IYCF-E

Capacities varied within the three countries, but all needed to improve national multi-sectorial coordination and collaboration across sectors and coordination between agencies at the early onset of an emergency and during needs assessment. South Sudan was the furthest along in having a multi-sectorial IYCF action plan and an IYCF-E steering committee. Somalia had several coordination mechanisms mainly through the Somalia Nutrition Cluster. In Kenya, effective IYCF and emergency nutrition coordination mechanisms were established within the MoH structure and under their leadership and support; excellent collaboration among all the partners was reported. IYCF strategies for Kenya and Somalia were developed by the government in partnerships with UN agencies and the non-governmental sector. At the time of the assessment, the South Sudan Government was developing its IYCF strategy with the support of UNICEF and the Nutrition Cluster partners.

² Marketing of BMS: National implementation of the international code. Status Report 2016.



Women and young children attend a health education session at a UNICEF-supported outpatient therapeutic feeding clinic, Baidoa, Bay Region, Somalia, 2018

IYCF-E information system and knowledge management

This area was rated average in all three countries. While integration of IYCF into health systems in Kenya began in 2007, there is limited reporting of maternal and infant and young child nutrition (MIYCN) national indicators in district nutrition surveillance and surveys. In Somalia, to support humanitarian nutrition information systems, the Nutrition Cluster has created an Assessment Information Management Working Group (AIMWG) to provide guidance on assessment planning, design and implementation, and validation of assessments and surveys including IYCF. In South Sudan, routine Health Monitoring Information System (HMIS) that includes IYCF indicators is largely non-operational. To address this gap, a new overall information system has been developed by the Nutrition Cluster Nutrition Information Working Group (NIWG) for emergency nutrition site-level programme data and information; this includes IYCF-E.

IYCF promotion, counselling and support programmes

This appeared to be active in all three countries assessed. Activities include revitalisation and adoption of mother and child-friendly related policies and guidelines; individual and community-level IYCF counselling, establishment of mother and baby-friendly spaces; bottle exchange programmes (where feeding bottles are exchanged for cups); and distribution of ready-to-use foods (RUFs) for children and women. Complementary feeding support involves promotion, counselling and linkage to other sectors; no robust programmes for complementary feeding were identified in any of the countries. Although all three countries had some form of existing IYCF programming in stable times, scale-up of these programmes during crisis was rare and ad hoc, mainly due to limited funding, competing priorities and limited expertise to manage this.

IYCF budgeting and financing

While there is government leadership on IYCF in Kenya and South Sudan, none of the countries had independent government financing specific for IYCF programming. The main sources of funding for IYCF and IYCF-E activities are from the UN agencies, donors and agencies' own funding. Funding is a major constraint for all

implementing IYCF-E programmes and is rarely provided for standalone IYCF-E activities. IYCF-E is not considered 'life-saving', so it is not prioritised or sustained for long-term activities (including preparedness). IYCF-E funding is also often cut first in case of budget constraints. While nutrition funding has increased in all three countries, funding for IYCF/IYCF-E programming has not.

Common gaps across countries

Common gaps for the three countries were:

- Lack of inclusion of IYCF-E in national policies and training curriculums: IYCF policies or strategies are in place in many of these countries, but do not encompass an emergency section, which would delay the inclusion of IYCF in any emergency response;
- Limited dissemination of national policies, legislation on the BMS Code, etc. In countries where these strategies exist, the dissemination of such documents to the humanitarian community is limited and therefore not in use or endorsed;
- Limited integration of IYCF-E with other sectors; very limited knowledge about IYCF by sectors other than Health and Nutrition;
- Inability of NGO and health workers to differentiate IYCF and IYCF-E, leading to confusion on the IYCF priorities in emergencies;
- No or limited monitoring of BMS Code violations;
- Limited budget allocation to IYCF-E programming;
- Lack of awareness of IYCF-E indicators to be included in assessments;
- No system for data collection and monitoring specifically for IYCF-E;
- IYCF-E is often not prioritised in cluster or coordination meetings.

The main reasons identified for not undertaking IYCF-E activities were:

- IYCF is not considered a life-saving intervention during emergencies and is not prioritised by non-technical staff;
- Competing priorities, poor sensitisation across agencies and lack of clear IYCF-E policy;
- Limited funding for IYCF-E programming;
- Context constraints including insecurity,

poor access and lack of government leadership or guidance on IYCF-E;

- Insufficient human resources or expertise in local and international staff members and the absence of technical staff on the ground;
- Capacity gaps among partners, government facilities and field teams.

Conclusions and next steps

The results of the IYCF-E capacity mapping assessment reflect a need to pinpoint IYCF actions and strategies in the East Africa region to specifically address fundamental gaps in policy, capacity, coordination, information management, programming and financing. Understanding and cohesion across development and humanitarian actors and sectors needs considerable improvement. In East and Southern Africa, UNICEF and Save the Children are important partners for IYCF-E and work closely with governments and NGOs; they are positioned as important and influential stakeholders in this area. Governments, donors, NGOs, breastfeeding associations and other stakeholders have critical roles to play in advocating for and mainstreaming IYCF-E across sectors and in emergency response and mobilising resources.

UNICEF and Save the Children Regional Offices jointly developed the IYCF-E capacity mapping assessment tool. The capacity mapping exercise demonstrated the value of gathering health and nutrition professionals to agree collaboratively on the current gaps and status of the IYCF-E implementation in a specific country and agree on a common action plan involving all key stakeholders and agencies. The next step for each country is to use the findings of the capacity mapping to develop IYCF-E improvement strategies and actions targeting the main issues and barriers identified, as well as tracking progress made. Additional technical support to countries may be required, by UNICEF, Save the Children and other nutrition agencies at national level with critical involvement from the government and national Nutrition Clusters.

The capacity-assessment process can be used in other countries in Eastern and Southern Africa region by any partner to foster the development of a specific action plan for better integration of IYCF during emergencies by governments and the humanitarian community.

UNICEF and Save the Children Regional Offices will revise the assessment tool based on learnings from the validation process and capacity mapping will be extended to other countries in the region in 2018.

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Joint IAEA-WHO-UNICEF workshop on biological pathways to better understand the double burden of malnutrition

While stunting and wasting are still important public health problems in low and middle-income countries, rapid nutrition and epidemiologic transitions have led to increased rates of obesity and associated non-communicable diseases (NCDs). This double burden of malnutrition exists at national, household and individual levels. There is need for integrated nutrition actions – the “double-duty actions for nutrition”¹ – tailored to address several forms of malnutrition. Isotope techniques can complement routine methods by accurately measuring body fatness and breastfeeding practices. Therefore, the International Atomic Energy Agency (IAEA) jointly with the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) organised a workshop on the analysis of biological pathways to better understand the double burden of malnutrition and to inform action planning.

Fifty participants from United Nations (UN) Organisations (WHO, UNICEF, IAEA and the Food and Agricultural Organization (FAO)), academia, policy, ministries of health and non-governmental organisations (NGOs) met in Vienna from 3-5 October 2017 to discuss the double burden of malnutrition, its epidemiology, the biological pathways that drive it and how policy and interventions can be framed to address the phenomenon. The role of nuclear techniques in understanding the biological pathways and in assessing the impact of interventions was emphasised.

The main target areas for interventions were identified as baby-friendly initiatives² (e.g. in hospitals), promotion of healthy feeding and physical activity in pre-school and school environments, supporting healthy living and breastfeeding at workplaces, and engaging with food sectors to promote healthier options. Stable isotope techniques will become increasingly important in providing accurate evidence to enable the design and evaluation of such interventions, especially those related to infant and young child feeding (IYCF), physical activity and body composition, and the evaluation of diet quality. The workshop focused on bridging from biology to context-relevant interventions and considerations for policy.

Workshop participants agreed that, although the biological mechanisms contributing to the double burden of malnutrition are not yet fully understood, sufficient evidence is available to implement interventions addressing the problem. Participants identified knowledge gaps to be addressed in order to improve the understanding of the multiple factors contributing to the double burden of malnutrition and ensure effective double-duty actions. These include: to improve understanding of the biological pathways linking early nutrition to later risk of NCDs; communicate biological evidence in plain language to ensure successful translation and integration into nutrition interventions; and to integrate multiple sectors (e.g. health, agricultural, environmental, education and trade) in nutrition actions and policies to respond to the complex causes of the double burden of malnutrition. Finally, it was emphasised that current assessment methods are not adequately addressing the double burden

of malnutrition, either at individual or at population level.

IAEA, in cooperation with WHO and UNICEF, will organise an **International Symposium on Understanding the Double Burden of Malnutrition for Effective Interventions** in Vienna 10-13 December 2018 to provide scientists, public health professionals, implementers and policy-makers an opportunity to share experiences and develop action plans to fight malnutrition in all its forms. Abstract submission is open until 23 April 2018.

www.iaea.org/events/understanding-the-double-burden-of-malnutrition-symposium-2018

¹ Double-duty actions include interventions, programmes and policies that have the potential to simultaneously reduce the risk or burden of both undernutrition and overweight, obesity or diet-related NCDs. www.who.int/nutrition/publications/double-duty-actions-nutrition-policybrief/en

² www.unicef.org/uk/babyfriendly/



Participants at the IAEA-WHO-UNICEF joint workshop in Vienna



A child's height being measured by SENS trainees

Improving nutrition surveys: New developments and changes at UNHCR

By Timo Luege, Caroline Wilkinson and Maeve de France



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Caroline Wilkinson is the Senior Nutrition Officer for the United Nations High Commission for Refugees (UNHCR) and was fully involved in the

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Maeve de France has been an Information Management Project Manager for CartONG for three years. Prior to this she worked for five years in the private

sector as a geographical information management project manager.

Over the last two years, the number of people facing crisis-level food insecurity has grown from 80 million to 135 million (FSIN, 2017). At the same time, many humanitarian organisations providing food and nutrition services (in kind or cash-based) are struggling with ever-increasing funding gaps, which have repeatedly forced them to cut back assistance.

Given that aid organisations need to reach more people on decreased budgets, it is ever more important that the money is spent as efficiently as possible. Surveys and assessments are an essential part of ensuring that sparse funds go to the most urgent crises and that in each crisis the most vulnerable are prioritised.

UNHCR's Standardised Expanded Nutrition Survey (SENS), described in Box 1, is based on the Standardised Monitoring and Assessment of Relief and Transitions (SMART) methodology and provides valuable data to identify urgent needs, and changes in needs, in refugee contexts. Over the last five years the number of SENS surveys has risen from 63 in 2012 to 109 in 2016.

But every survey is only as good as the data it captures. Since 2011 UNHCR and its implementing partner for mobile data collection (MDC), CartONG, have been using MDC to increase data quality. As part of that collaboration, the percentage of SENS surveys that use MDC has grown from 32 per cent in 2013 to 95 per cent in 2016.

Most recently, UNHCR and CartONG have focused on three areas to further increase the quality of SENS for all humanitarian organisations that are using it.

1) Making SENS trainings less burdensome

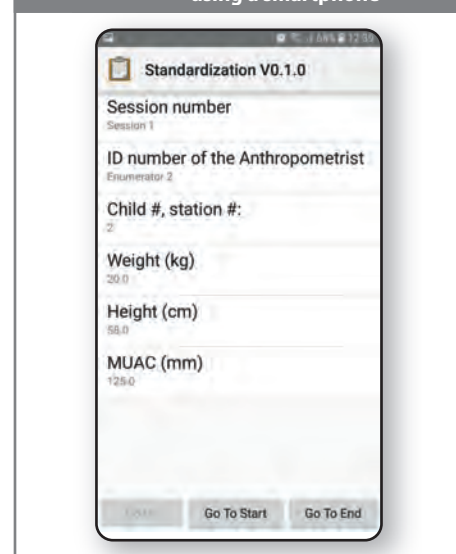
Gathering anthropometric data is labour-intensive. A typical survey team consists of four to six people who must carry scales and height boards, take measurements and record data. There are many opportunities for mistakes to creep in, particularly when getting information from children or infants. To reduce the likelihood of data-capture errors, UNHCR and partners train all enumerators rigorously. This involves a five-day training that includes, among other things, what is known as the standardisation test. Conducting a standardisation test for anthropometric measures is a fundamental part of the training, since it

allows objective assessment of the precision and accuracy of the measurements made by the enumerators, their strengths and weaknesses.

During the standardisation test, up to 20 enumerators measure ten children, usually aged between 18 and 59 months. Each measurement is repeated twice by each enumerator for each child, with a time interval between both rounds of measurements. Collecting all measurements takes between half a day and a full day, which is exhausting and tiring for both the survey team and the children. At the end of the day the measurements are compared with reference data collected by the trainer and that information is used to determine which enumerators are capable of which role, or whether some enumerators need additional training prior to the start of the survey. Until now, the facilitator has manually entered the captured data into a spreadsheet at the end of the day, a process that took a considerable amount of time and was a potential source of data input errors.

While UNHCR has used smartphones to capture SENS data for many years, prior to 2016 they had not been used for the standardisation tests that are part of the enumerators' training. The main advantages of using smartphones for the standardisation tests are that data entry is much faster; there are fewer data entry errors; and it is harder for trainees to "cheat" during the training; for example, by manually copying data that has been captured earlier (see Figure 1). While this process still has some technical challenges that need to be resolved, the technical implementation has already improved significantly from Jordan in 2016 to Burundi in 2017. UNHCR and CartONG are confident that the remaining technical issues can be ironed out in 2018 and that full support for MDC for the SENS survey standardisation tests can be made available soon.

Figure 1 Screenshot of a standardisation test using a smartphone



Box 1 Summary of SENS report contents

A SENS report includes information on the following data:

- Levels of malnutrition and key health indicators in children
- Levels of anaemia in children and women
- Feeding practices of infants and young children
- Access to food at the household level
- Access to safe drinking water, toilets and hygiene practices at the household level
- Access to and use of mosquito nets at the household level

¹ CartONG, a long-time partner of UNHCR, is a French non-profit organisation committed to furthering the use of mapping, mobile data collection and information management in emergency relief and development programmes.

2) Monitoring and verifying the sampling strategy through geolocation

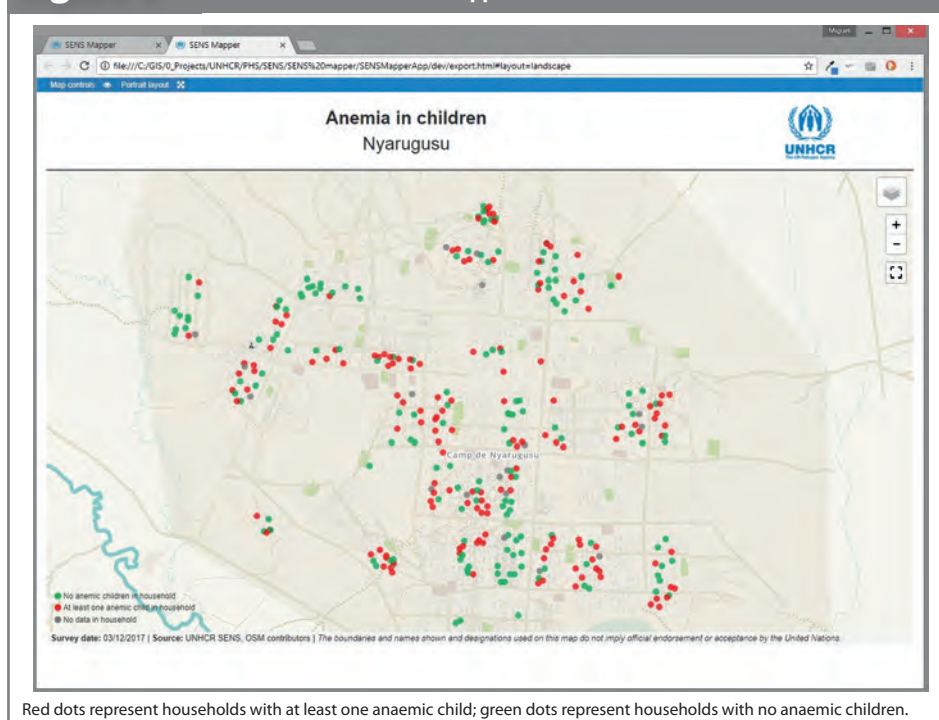
A typical SENS survey takes between 30 and 45 minutes per household, so most teams can only talk to between 12 and 17 families per day. Particularly in large refugee camps, this means relying on random sampling to ensure that the data are representative. In some cases, with multiple teams working in different parts of a camp or town, it can be difficult for the survey manager and supervisors to monitor progress of the teams and to ensure that the sampling methodology is being followed by all team members. By setting the smartphones to collect global positioning system (GPS) data, together with the survey data, supervisors can see precisely which houses were visited and whether this was in line with the agreed sampling strategy. In addition, supervisors can see whether teams have taken unusually long or were uncharacteristically fast when collecting data in specific locations, either of which might indicate data quality issues.

3) Putting SENS on the map

While most nutrition experts feel very comfortable reading long tables with rows of data, this information is not always easy to convey to donors or to use in reports for non-experts. Maps can help make technical data more easily consumable for a wider audience. The new SENS mapper is a free, browser-based data viewer that can quickly show the distribution of SENS data on a map, including indicators for nutrition, safe drinking water and mosquito net coverage and where there are gaps.

While it is generally accepted that malnutrition is not geographically clustered, these maps can nevertheless be useful advocacy tools. Possible

Figure 2 Screenshot of the free SENS mapper



Red dots represent households with at least one anaemic child; green dots represent households with no anaemic children.

examples include showing that malnutrition levels are very different for new arrivals compared to refugees who have had access to food and services in a camp over a longer period. Similarly, a map could highlight areas of a camp where refugees have insecticide-treated nets but are not using them.

The free SENS mapper has just been published and can be accessed through the UNHCR map portal (http://maps.unhcr.org/apps/mdc_mapper/sens/index.html). The SENS mapper can easily

create visualisations like those displayed in Figure 1 if SENS data is captured with smartphones.

For more information, contact: hqphn@unhcr.org

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New online training: Accelerating behaviour change in nutrition-sensitive agriculture from the SPRING project

SPRING

The Accelerating Behavior Change in Nutrition-Sensitive Agriculture online training is a one to two-day course for people who design and implement agriculture projects. It provides participants with knowledge and skills to help agriculture projects become more nutrition-sensitive, maximising the contribution of agriculture to nutrition in family, farm, market and community systems. Participants practice applying proven behaviour-change approaches to

identify context-appropriate, nutrition-sensitive agricultural practices and to focus project resources effectively on increasing their use.

By the end of this training, participants will:

- Understand agriculture's role in improving nutrition;
- Use guiding questions to assess which agricultural practices are most likely to contribute to nutrition in the project context;
- Know how to use behaviour-change methods to engage people, prioritise practices, reduce barriers to improved practices and create enabling physical and

market environments for them; and

- Establish a commitment to developing a behaviour-change strategy for current and future work.

The interactive course guides participants through narrated slides, quizzes, exercises, handouts, videos and links to helpful resources. If you have any difficulty accessing the course, encounter any problems or have any feedback, please email us at info@spring-nutrition.org

To access the course, go to: www.spring-nutrition.org/publications/training-materials/accelerating-behavior-change-nutrition-sensitive-agriculture

Management of At risk Mothers and Infants (MAMI) meeting

A one-day meeting of the Management of At risk Mothers and Infants (MAMI)¹ Special Interest Group (SIG) took place in London on 17 January 2018. The meeting was hosted by ENN in collaboration with the London School of Hygiene and Tropical Medicine (LSHTM) and Save the Children and funded by ENN (with Irish Aid funding) and Save the Children.

The aim of the meeting was to identify synergies, opportunities, priorities and next steps to help develop the evidence base on MAMI, building on the 2016 meeting of this interest group (see www.ennonline.net/mamimeetingreport). The meeting was also informed by the proceedings of a one-day shared meeting with the ENN-led Wasting & Stunting Technical Interest Group (WaSt TIG) that took place the day before the MAMI gathering.

The meeting was opened by Marie McGrath ENN with a reminder of the call for actions presented at the shared MAMI/WaSt meeting on 16 January:

- Support to develop a **global MAMI Network**, a coordinated network for capture and learning (research and operational experience); a vision was outlined that requires financing.
- **Robust evidence** (in the form of randomised controlled trials) is now needed to complement the strong operational research that is ongoing.
- The need to **scale up**. Lessons can be learnt from the CMAM scale-up process; pilots are critical, informed by country agendas.
- A greater MAMI voice (**advocacy**).

A morning of presentations directly spoke to priority areas worked on since 2016 and informed four afternoon working groups.

Sharing experiences and research

Natasha Lelijveld (ENN consultant/ACF/LSHTM) shared the results of a systematic review by ENN, LSHTM and CHAIN of anthropometric and clinical methods for detecting severe acute malnutrition (SAM) in infants under six months (infants <6m) (see www.ennonline.net/mamicasedetectionreview and www.ennonline.net/fex/55/methodstodetectcases). The authors propose the use of mid-upper arm circumference (MUAC) and weight-for-age z-score (WAZ) alongside simple, clinical indicators and identification of kwashiorkor as the standard indicators for this age group. Infants born small or preterm should have the same anthropometric indicators of admission due to their heightened risk of mortality.

Tim Campion-Smith (ENN consultant, University of Oxford, KEMRI-Wellcome) presented findings from a review of non-feeding interventions (micronutrient supplementation, deworming, antibiotics, maternal supplementation) undertaken by ENN, LSHTM and KEMRI-Wellcome. Scant direct evidence and weak evidence overall meant clear recommendations to inform programmers could not be made. Next steps were identified in a dedicated afternoon working group.

Jay Berkley (KEMRI-Wellcome) presented preliminary findings of a secondary data analysis of a cohort of 1,103 infants from birth to 12 months in Burkina Faso by ENN, LSHTM, KEMRI-Wellcome and others. The analysis aims to identify the anthropometric indicator that best identifies infants at highest risk of death; if MUAC measured at birth can be used as a marker of risk (like low birth weight (LBW)); and if LBW influences the interpretation of anthropometry. Babies were born more wasted than stunted (30% wasted; 10% stunted; 17% underweight). Twenty-one per cent of babies were LBW. MUAC <9 cm measured at birth identifies infants at high risk of death. Measuring MUAC at one month of age and severe underweight (WAZ <-3) shows good predictability for mortality (WAZ <-3). Results are due for publication in mid-2018.

Mary Lung'aho and Louise Day (Save the Children consultants/Nutrition, Policy and Practice) shared preliminary results of an evaluation of the C-MAMI tool (www.ennonline.net/c-mami) in Bangladesh and Ethiopia. Findings will be used to develop an updated version of the tool, available mid-2018.

Katie Beck (Partners in Health) presented the results of a study to examine outcomes of preterm and LBW infants discharged between 2011 and 2013 from neonatal units in Rwanda. One to three years later, of 86 children with median age 22.5 months, 47% had feeding difficulties and 40% reported signs of anaemia; 79% were stunted, 9% wasted and 38% underweight. The Rwanda Ministry of Health has since established paediatric developmental clinics (PDCs) in 2014, with support from Partners in Health and UNICEF, to provide integrated clinical, nutritional, social and developmental services to infants born with perinatal complications. This service provision was updated in 2017 to include more nutrition counselling and interventions and an adapted C-MAMI tool; this work is ongoing.

Nicki Connell (Save the Children) shared experiences from two strands of MAMI work in Bangladesh. First, Save the Children is piloting the C-MAMI tool in Barisal, Bangladesh until November 2018. Intervention and control clusters (two distinct sub-districts in Bangladesh) have been established, using the tool in intervention clusters and existing Ministry of Health protocols in controls. In addition, Save the Children is piloting the C-MAMI tool in the Rohingya response in Bangladesh. Funded by UNICEF and with UNHCR support, a camp-based, broad, multi-sector approach has been established between sectors which includes Food Security, Nutrition (encompassing blanket supplementary feeding programmes, infant and young child feeding, water, sanitation, and hygiene (WASH)) and Health.

Martha Mwangome (KEMRI-Wellcome, Kenya) shared interim findings of a clinical trial to explore the role of breastfeeding support in recovery of malnourished infants <6m. Results so far show that a strategy to use peer supporters

to support breastfeeding in an inpatient setting is acceptable and effective to re-establish exclusive breastfeeding. On average, infants receiving breastfeeding support gained weight and MUAC after discharge but this was not sufficient to improve WAZ and weight-for-length z-scores (WLZ); infants discharged after meeting WHO exclusive breastfeeding discharge criteria may have improved growth after discharge.

Collective thinking

The meeting divided into four working groups to examine policy, programming and research informed by the morning's presentations and to agree on priority next steps for MAMI. Groups reconvened in plenary to share their conclusions, discuss each area and agree on priorities and next steps.

Group one examined what anthropometric indicators should be used in programming and research to identify nutritionally vulnerable infants. MUAC and WAZ were agreed as anthropometric indicators of choice to identify at-risk infants; further analysis is needed to identify MUAC thresholds. There is good potential to build the evidence gap on thresholds and caseload through analysis of existing data sets. Further primary research should test non-anthropometric discharge criteria; in infants <6m, health and feeding criteria are key determinants rather than anthropometric status. Research should include follow up of discharged infants <6m.

Group two examined how to address gaps around MAMI programming faced by implementing agencies in the immediate and longer term. Actions to address immediate gaps include a call for a global UN/cluster joint statement of MAMI and development of an inter-agency forum/mechanism to share learning, experiences and resources. Longer term, buy-in from wider coordination structures to ensure assessment of this age group and inclusion in emergency response and external advocacy, including donors, is needed.

Group three examined key questions, interventions and outcomes to assess MAMI. The key research question to answer is where does a MAMI intervention 'sit' (e.g. health, CMAM programme) and how does the delivery platform of a MAMI package vary by context? Research should test a broader package of interventions to examine the effectiveness/added value of each component for specific target groups; test refinements to the C-MAMI tool; test discharge criteria; demonstrate effectiveness and cost-effectiveness; and examine delivery mechanisms and continuum of care. The primary outcome should be growth; mortality would be ideal, but likely not feasible. Research should be conducted in different geographies and contexts, including emergencies.

Group four discussed findings of the non-feeding review in more depth and examined means to achieve consensus on recommendations for programmers. Discussion points included: the importance of context when examining evidence; antibiotics and resistance; community versus inpatient treatment; and questions on case fatality in infants < 6m. The group identified the need for urgent research on prioritised questions and the need for policy (WHO) and political (to in-

¹ Formerly "management of acute malnutrition in infants under 6 months", the term "MAMI" has been updated to reflect evolution in thinking and scope of the initiative.

fluence donors) advocacy on critical gaps that currently 'paralyse' programmers. It was agreed that a Delphi consultation process could be used to secure consensus.

Reflections and conclusions

Through plenary discussion, priority next steps were identified: actions the MAMI SIG can undertake; actions that involve collaboration with the WaSt TIG; and actions deemed a priority but beyond current capacity of the MAMI SIG to take forward. Specific actions were themed around further examination of existing datasets to provide more evidence; next steps for the C-MAMI tool; advocacy; and opportunities for

joint analysis with the WaSt TIG. Plenary voiced that the move to discussion of 'failure to thrive' in this age group, rather than 'acute malnutrition' is welcome. WHO should take the lead in clarifying language/terminology.

Implementation research needs to be conducted with rigour, be systematic and seek to avoid loss to follow-up. A short window of opportunity exists for MAMI to conduct research within the context of programmes and recruit control populations; an opportunity that must be seized. Care must be taken as there are risks as well as benefits of identifying at-risk infants, depending on what intervention is prompted. An appeal was made from

ENN for funders to step up and help move the MAMI collective work to achieve the vision of a MAMI global network.

The meeting was closed by Nicki Connell, who reinforced the value of the MAMI SIG collective as a group that challenges the status quo, brings ideas and is not afraid to discuss and question them.

The full meeting report can be downloaded here: www.ennonline.net/mamimeetingreport2018

The meeting report for the MAMI-WaSt meeting can be found here: <https://www.ennonline.net/mamiwastmeetingjanuary2018>

Wasting and Stunting Technical Interest Group (WaSt TIG) meeting

On the 15th of January 2018 the Wasting and Stunting (WaSt) Technical Interest Group (TIG) held their third face-to-face meeting at Trinity College, Oxford. This group of 30 experts¹ in child growth, nutrition, and epidemiology, was formed in January 2014 to guide the ENN's WaSt project² (funded by USAID/OFDA and Irish Aid). A separation in the nutrition sector in the conceptualisation of child wasting and stunting over recent decades, along the humanitarian/development divide, has resulted in the evolution of separate policy, programmes, research and funding for these two manifestations of undernutrition. The WaSt TIG coordinated by the ENN have been working over the last four years to improve our understanding of the relationship between wasting and stunting to find out if this separation is justified.

Having published a research prioritisation in 2016 (Angood et al, 2016) the WaSt TIG have subsequently, prompted by a limited funding base, available datasets and enthusiasm of its members, focused on mining existing data to answer some of these priority questions. The meeting brought together the members of the group to present and discuss analyses on the relationship between wasting and stunting carried out over the last two years on existing data by TIG members; agree upon the policy, programme and research implications of the findings of these analysis; and define future priorities for the WaSt TIG.

Carmel Dolan (ENN) opened the meeting, thanking participants for their ongoing enthusiastic engagement over the last four years, welcoming new members, and recapping on the work of the WaSt TIG during that time.

Tanya Khara (ENN) presented a meta-analysis of prevalence and burden of children concurrently wasted and stunted (weight-for-height z score (WHZ) <-2 AND height-for-age z score (HAZ) <-2, or concurrent WaSt) in 84 countries from MICS/DHS³ datasets. This analysis, published in October 2017 (Khara et al, 2018), was born out of concern for the apparent high risk of death as-

sociated with multiple anthropometric deficits and the lack of reporting on the overlap between wasting and stunting, despite the data being available routinely. Key findings presented included:

- Concurrent WaSt ranged from 0-8% (in children aged 6-59 months); with nine countries >5%.
- Pooled prevalence was 3.0% (95% CI 2.97 to 3.06) signifying a burden of approximately six million children (6-59 months) in the 84 countries.
- Concurrent WaSt was highest in the 12-24 months age group and more common in boys.

It was emphasised that this analysis is not a global one as national data from the last 10 years was only available for 84 countries. The work has had influence however, with the WHO/UNICEF 2016 Joint Estimates report recognising that we don't know the level of concurrence globally, www.who.int/nutgrowthdb/estimates.⁴

Mark Myatt (Brixton Health) presented analysis of 2,426 cross sectional surveys conducted between 1992 and 2015 of almost 1.8 million children in 51 countries. The key finding of this analysis, already submitted for publication, was confirmed by modelling using the WHO growth standards themselves - it is impossible to be WHZ <-2 z score AND HAZ <-2 z score and not be weight-for-age (WAZ) <-2 z score. This means that the highly elevated risk of death for children concurrently wasted, stunted and underweight (hazard ratio of 12.3 compared to children with no anthropometric deficits) found in analysis of 10 mortality cohorts (McDonald et al, 2013), is actually the mortality risk for children concurrently wasted and stunted.

Additional findings of this analysis were:

- In most countries for which we have data, stunting and wasting are associated with each other; wasted children are more likely to be stunted (than non-wasted children) and stunted children more likely to be wasted (than non-stunted children).
- Children with concurrent WaSt are more

wasted than children who are wasted only and more stunted than children who are stunted only.

- Concurrent WaSt is more prevalent in younger children, and in boys.
- Children who are both stunted and wasted can be detected with excellent sensitivity and very good specificity using WAZ and with acceptable sensitivity and specificity using MUAC.

Further analysis was also presented and discussed exploring the relationship between being both wasted and stunted and mortality. This particularly explored whether it is all or a subset of children with concurrent WaSt that were most at risk of mortality and what indices/case-definitions would be most appropriate to identify those cases at most risk of dying who may need to be treated within community based management of acute malnutrition (CMAM) programmes. Preliminary findings from analysis of longitudinal data from Niakhar in Senegal comprising 5,144 children who were followed without treatment was presented and issues such as factoring age into the analysis and the caseload implications of looking at WAZ as a means of identifying high risk children with concurrent WaSt were discussed.

Sophie Moore (Medical Research Council (MRC) Unit, The Gambia at the London School of Hygiene and Tropical Medicine & Department of Women and Children's Health, King's College London, London) and Simon Schoenbuchner (MRC Elsie Widdowson Laboratory, Cambridge) presented analysis of MRC cohort data from The

¹ <https://www.ennonline.net/ourwork/researchandreviews/wast/wasttigmembers>

² <https://www.ennonline.net/ourwork/reviews/wastingstunting>

³ Multiple Indicator Cluster Survey/Demographic and Health Survey

⁴ A postsript to this is that since the meeting UNICEF has published online figures for the prevalence of children concurrently wasted and stunted ('overlapping malnutrition estimates') for all the national surveys in its database. <https://data.unicef.org/topic/nutrition/malnutrition/>

Gambia, which retrospectively examined infant and child (birth to two years of age) nutritional status from three long-standing MRC surveillance villages (1976–2012). Key findings included:

- Season of birth is a predictor of growth patterns; children who are born at the start of the annual wet season fail to thrive in the early post-natal months.
- Children who are wasted in the wet season, even if they recover weight in the dry season, are more likely to be wasted again in the next wet season.
- At the peak prevalence, 10% of boys were concurrently wasted and stunted, compared to 5% of girls.
- Current wasted status increases a child's odds of being stunted in three months' time by a factor of 3.2; current stunted status increases the odds of the child being wasted in three months' time by a factor of 1.5.

The important implications of these analyses for programmes and policy were discussed at length by the WaSt TIG, also considering other analysis of data from children during and after treatment for severe acute malnutrition (SAM) presented at the meeting by Sheila Isanaka (Harvard) and Jay Berkley (KEMRI), and in light of current initiatives within the nutrition sector. The WaSt TIG decided to produce two briefing documents, one focused on policy and the other on programme implications for wide circulation, followed by a Lancet views piece which will propose a bold re-framing of how we understand wasting and stunting. The group also agreed to meet remotely to discuss other specific priority pieces of follow-up work in 2018 which may include seeking permission to access additional mortality cohorts for similar analysis and further exploration of the heightened male vulnerability demonstrated in analysis conducted so far.

For additional information about the ENN's WaSt project and the WaSt TIG, please contact: Tanya Khara, email: tanya@ennonline.net

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en-net update

By Tamsin Walters, en-net moderator

Over the past three months, 37 questions have been posted on en-net, generating 59 responses. The forum areas for Prevention and management of moderate acute malnutrition and Assessment generated most discussions. Twenty-six vacancy announcements have been posted, which have accumulated 8,474 views on the website.

An interesting discussion arose from what seemed a relatively straightforward question in the Prevention and management of severe acute malnutrition area. The question was asked, in a health facility where there are both severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) services, under which criteria should we classify discharge of an admitted SAM case who reaches the anthropometric criteria for transfer to MAM? Should such a case be discharged as “cured” to provide data on the SAM cure rate, or as “transferred to SFP-MAM”, which would result in a zero SAM cure rate?

Contributors to the discussion suggested various ways to approach this. Reference was made by the en-net technical moderator to a paper by Maust et al (2018) reporting on integrated programming in Sierra Leone, which examined two different protocols: ‘standard’ management and ‘integrated’ management.

In standard management, a child is transferred from an outpatient therapeutic programme (OTP) to a supplementary feeding programme (SFP) with a mid-upper arm circumference (MUAC) >11.5cm or weight-for-height Z-score (WHZ) > -3, being considered as “discharge cured”. The child is later discharged “cured” from SFP with a MUAC of >12.5cm or WHZ > -2. This approach is used where there are two different treatment programmes in different locations.

This approach is potentially problematic because the use of MUAC >11.5cm/WHZ > -3 as standalone criteria has not been shown to be safe for discharge, so categorising a child as “cured” using just these anthropometric markers (unless combined with some other criteria such as a minimum stay + absence of oedema + clinical wellness, etc.) represents a risk and is not supported by existing evidence. Moreover, the intention in the programmes, although they are separate, is to continue treatment in SFP after OTP and as such the child is not truly discharged from treatment until cure is obtained in SFP.

In the integrated protocol, a child receives graduated treatment depending on whether they are SAM or MAM and recovery for MAM + SAM is reported together and compared against sphere standards. In this model, the same health facility conducts the full treatment.

There are potential difficulties with reporting in the integrated scenario when using Sphere standards because the acceptable mortality rates for OTP and SFP are different, which may cause problems if there is a mortality rate greater than three per cent in OTP. Combined reporting is one option; another is reporting the negative outcomes for the OTP and SFP components separately.

Using either approach, the criterion of “transferred to SFP” would be considered a successful outcome for OTP, though it is not the same as “cured” and should not be reported as such. A child cannot be cured twice from one episode of acute malnutrition, so reporting needs to consider the community-based management of acute malnutrition (CMAM) programme as a whole (and see recovery as a continuum), rather than considering each component as a different programme. The narrative that accompanies programme monitoring data can clarify this in reporting and in this way a combined recovery rate could be reported for OTP and SFP.

In summary, reporting depends on having clarity in terms of the nature and design of the programme and the purposes of reporting (e.g. to donors or to national databases). There are

many ideas on how to report and protocols aiming for standardisation, but there is a need to think clearly about what we are actually reporting on.

If the aim is for graduated programmes where a child with SAM is treated as MAM when their MUAC reaches >11.5cm or WHZ > -3, then a step change is needed in the way we report. Although the concept of reporting recovery for OTP and SFP combined is controversial, it more closely resembles the reality of the intended continuum of care. Reporting negative outcomes separately (for OTP and SFP) also has validity, since the factors for default, death and non-response may be different for each phase of the graduated treatment. This is clearly seen when we have “early” or “late” defaulters in OTP for different reasons, for example.

This discussion also raised a caution to ensure that a child originally identified as SAM for treatment should be considered a “recovering SAM” case when their condition improves, rather than being reclassified as an “SFP-MAM” case. Changing the classification of a SAM child to MAM on the basis of anthropometric cut-offs achieved overlooks the child's history of profound physiological compromise. Likewise, any discharge criterion should also ensure a focus on physiological recovery.

To read more or join this discussion, go to www.en-net.org/question/3185.aspx

To join any discussion on en-net, share your experience or post a question, visit www.en-net.org.uk or www.fr.en-net.org

To give feedback on the site, please write to post@en-net.org

Contributions

Sameh Al-Awlaqi, Tammam Ali Mohammed Ahmed, Paul Binns and Dr Narendra Patil.

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Famine in Somalia: Competing Imperatives, Collective Failures, 2011-12

Book review¹



By Solange Fontana

Solange Fontana is a DPhil candidate in International Development at the University of Oxford. Prior to returning to academia, she worked as a humanitarian field practitioner, where she was interested in the intersection of livelihoods and protection. During the 2011-12 famine in Somalia and crisis in the Horn, she was regional emergency food security advisor for a large international charity.

Famine in Somalia: *Competing Imperatives, Collective Failures 2011-12* is an incisive, well-researched book whose implications reach far beyond famine and Somalia. A 21st-century Famine Crimes (de Waal, 1997), Maxwell and Majid take their readers into the murky world that creates famine. They expose the politics and examine the complex mixture of decisions and events that tipped crisis into a famine, costing the lives of an estimated 260,000 men, women and children. Famine in Somalia reminds us that famine is neither inevitable, nor solely the result of environmental degradation and drought. It is the outcome of processes, precipitated by human agency; whether due to the decisions and actions taken by Al Shabaab and the Transitional Federal Government (TGF) or inaction – as in the case of the international community. In our globalised, hyper-connected world there may be “no excuse for famine” (p.15), but it remains horrifically common. If it was Somalia yesterday, it is distressing images from Yemen and Syria that dominate the news today. Tragically, as the Deyr rains fail and donors prevaricate, it is depressingly likely to be Somalia again tomorrow. Even in our comfortable, western economies malnutrition and deprivation stalk those who have little voice. Famine is alive and well; in this pressing book, Maxwell and Majid explain why.

As one of only 58 known cases of famine since 1870 (de Waal, 2018), the Somali famine of 2011-12 stands out as an important case study thanks to the plethora of information and early-warning data available². Despite ample warnings, field agencies and donors failed to agree on what this information was telling them and how they should react. The hesitancy of donors and agencies, aggravated by internal competition and concerns over delivering humanitarian assistance in a context like Somalia, and directives linked to the ‘War on Terror’, led to a “dangerous delay” in response (Oxfam and Save the Children, 2012) with tragic consequences. Yet the international and humanitarian community was not acting in a vacuum, as Maxwell and Majid’s perceptive analysis of “com-

peting imperatives” makes clear. As relevant as Famine in Somalia is to both famine and Somali studies, the book’s implications extend far beyond its subject and geographic area. It should be obligatory reading for anyone working in crisis or in crisis-prone areas, whether academic, diplomat, policy-maker or practitioner. Moreover, its accessible style and the authors’ unusual inclusion of Somali narratives speaks to an even broader audience.

For a practitioner, and one involved in the 2011-12 response, Famine in Somalia makes uncomfortable reading, but Maxwell and Majid are unusual aid academics, and their extensive practitioner experience pervades the book. Their nuanced, compassionate critique sidesteps the issue that affects similar academic analyses – valid criticism, but few actionable (or feasible) suggestions for change. If in the last chapter (chapter 10: Preventing Famine: An Unfinished Agenda) the authors offer high-level suggestions for a “way out” (p.192), in chapters 5 and 6 they sensitively use Somali narratives to illustrate how elements missed by current assessment practices – the impact of historic exclusions, people’s networks of support and rural/urban linkages – skew our understanding of ‘vulnerability’ and ‘resilience’ in such contexts. Like so much in the book, the elements that emerge from the experiences of ordinary Somali householders are not exclusive to Somalia or famine. Rather, they reflect common elements of daily life in crisis, from experiences of living with conflict in eastern Congo, to refugee and migration narratives. Capturing these elements and mapping the institutions and mechanisms that order people’s daily lives would not only give practitioners a better understanding of what constitutes ‘vulnerability’ and ‘resilience’ in crisis, but could also identify alternate ways to channels assistance – particularly pertinent in areas which require remote working.

More than a simple milestone in famine literature and Somali studies, Famine in Somalia makes a strong empirical case for rethinking how we ‘look at’ crisis, from proposing an over-

arching framework for contextual analysis, to suggesting how we might re-evaluate local assessment practices. Furthermore, it challenges the humanitarian community to reconsider how we currently understand ‘vulnerability’ and ‘resilience’ in such circumstances.

It is a pressing book, with an important message. Yet, by focusing on Somalia, its title fails to reflect its scope. More appropriate would have been *Competing Imperatives, Collective Failures, Famine in Somalia: 2011-12*. Famine in Somalia may be a case study of famine, but the competing imperatives and complex mix of collective failures it describes are common features of crisis-escalation worldwide. It is competing imperatives and collective failures that are behind the current situation in Yemen and over 30 years of conflict in eastern Congo and which, tragically, despite books such as this, risk causing a repeat of yet another famine in Somalia in the not-so-distant future.

The editors invite Field Exchange (FEX) readers to submit reviews of books that are relevant to the FEX audience. Please contact Chloe Angood with your ideas at chloe@enonline.net

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¹ From Analysis to Practice – *Famine in Somalia: Competing Imperatives, Collective Failures, 2011-12* by Daniel Maxwell and Nisar Majid. London: C. Hurst & Company, 2016. v + 269 pp. Maps. Illustrations. £22.00 ISBN 978-1-84904575-9

² Note de Waal defines famine as a food security crisis with a death toll of over 100,000. This is different to the Integrated Food Security Phase Classification (IPC), whose thresholds are designed to capture the beginning to famine and where all three outcomes of mortality must be evident – in particular, CDR > 2/10,000/day; wasting GAM > 30%, and food consumption (near complete Food Consumption gap for >20% of the population) for an area to be classified famine-prone. See www.ipcinfo.org/ipcinfo-detail-forms/ipcinfo-resource-detail0/en/c/178965/

Getting on the same page: Reaching across disciplinary boundaries to improve nutrition

Lidan Du and Heather Danton



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An agriculture project in Tshikapa, August 2017

The multi-sector nature of the global malnutrition problem has been made widely known since the publication of UNICEF's Conceptual Framework of Malnutrition (UNICEF, 1990). Nutrition has since been elevated in policy agendas; it is one of the three high-level objectives of the US Government's Global Food Security Strategy being implemented through the Feed the Future initiative and features prominently in the Sustainable Development Goals (SDGs) (SDG 2 particularly). In fact, nutrition is related to all SDGs (Webb, 2014).

In our work on USAID's multi-sector nutrition project, Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING), our key task is to build evidence and provide assistance to help countries deliver better nutritional results from agriculture and economic development initiatives supported by the Global Food Security Strategy. Agriculture is one area that offers opportunities for nutrition-sensitive interventions (Ruel and Alderman, 2013). However, existing evidence has yet to prove the impact of nutrition-sensitive agriculture programmes on reducing child stunting, a commonly used nutrition indicator (Webb and Kennedy, 2014).

Researchers at the International Food Policy Research Institute (IFPRI) reviewed and highlighted results from nutrition-sensitive agriculture programmes implemented and reported on since 2014 and identified several knowledge gaps and research priorities (Ruel et al, 2018). Through the programmes that SPRING has been sup-

porting, we have repeatedly observed two of the issues that Ruel et al pointed out in their review. One is the failure to explicitly consider pathways linking agricultural (inputs) to nutrition (outcomes) in programme and research design. The other is the lack or inappropriate use of metrics to demonstrate links between agriculture and nutrition.

At SPRING we recommend that agriculture and economic growth projects mandated to contribute to nutrition adopt an explicit programme impact pathway to inform their monitoring systems to both define and track progress toward realistic nutritional outcomes. However, such a recommendation does not necessarily translate easily with sector specialists, even when intentions toward multi-sector coordination and collaboration are desired and required.

Why is working across sectors so hard?

One of the keynote speakers at the Agri-Chain & Sustainable Development conference in Montpellier, France in December 2016 shared her perspectives on the challenges of multi-sector integration and how a better mutual understanding could help the agriculture and nutrition sectors to work better together. She proposed four key directions of opportunity and change: inter-sectorality; inter-disciplinarity; trans-disciplinarity; and partnered research. Her key argument under inter-disciplinarity pointed to the need to overcome barriers in languages, concepts, assumptions and styles of working across different disciplinary backgrounds.

This inter-disciplinarity argument led us to reflect on our own experiences and observations working across disciplines and sectors. Our deliberations centred on the technical characteristics that are so deeply entrenched in the respective disciplines of agriculture and nutrition – from training to application of knowledge to the differing ways in which we work. We agree that these difficulties are related to some of the fundamental differences in our paradigms. We compiled a list (Table 1) to help articulate the gaps in our shared vision and objectives; to come up with solutions and strategies to close these gaps; and explore where and how we can apply our comparative advantages to strengthen collaboration.

This paper discusses some of the challenges posed by disciplinary paradigms that often hinder technical staff from working effectively in a multi-sector fashion. It is also important to note that while the silos created by disciplinary imperatives may ensure a high level of technical rigor and often respond to funding priorities of donors or governments, similar challenges of sector silos also permeate government and donor institutions; yet the households and individuals that our programmes work with rarely perceive themselves as living in sector or disciplinary siloes.

How do we solve this dilemma? We offer a few thoughts below, based on our work with mostly large-scale value chain and market systems development projects. We welcome inputs from other experts and practitioners to enrich this discussion (see contacts at the end).

- In addition to responding to the demand of end markets which may be located far from areas of production, the selection of nutrient-rich value chains for agricultural investments should also take into account – and attempt to mitigate – known nutritional deficiencies prevalent among smallholder producer households. Value-chain assessments conducted for economic growth activities should include an understanding of nutritional needs so that programmes can measure the extent to which growers and their families are able to receive some nutritional benefits from the production.
- An explicit nutrition-sensitive agriculture programme theory of change is needed in the design, implementation, monitoring and evaluation of agricultural value-chain projects to generate much-needed evidence. Quantitative and qualitative data should be collected to narrow in on the key facilitating and inhibiting factors that are at play along the multiple agriculture-to-nutrition pathways (Herforth and Harris, 2014).
- Efforts are needed to better understand and respect differences in programme approaches, priorities and paradigms; establish a common language to communicate across disciplines; and develop consensus on how disciplines complement each other in multi-sector programming, especially at government and donor levels. This will begin to break down the inter-disciplinary barriers that prevent multi-sector programming from

being truly effective and to facilitate policy, planning and funding that will support sustained outcomes for nutrition.

- Special efforts must be made to check the many (often unchecked) assumptions along each and every step of the agriculture-to-nutrition pathways so that they are clearly spelled out in programme theories.

SPRING is developing a training resource package and guidance (to be released in May 2018) that will serve as tools for implementers to improve multi-sector programme design and maximise results for nutrition – stay tuned!

For more information or to contribute to this discussion, contact: lidan_du@jsi.com, heather_danton@jsi.com or post a question on [en-net](http://en-net.org), www.en-net.org

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Table 1 Disciplinary differences between agriculture and nutrition practitioners/researchers

	Agriculture	Nutrition
Goal	<ul style="list-style-type: none"> Food availability, income for market system actors and commodity competitiveness Investments often focus on only a small number of (often staple) crops 	<ul style="list-style-type: none"> Diversity, moderation and balance in diets Investments often focus on feeding and dietary practices and facility and community-based services
Narrative for nutrition	Productivity growth will drive up income and take care of nutrition	Food security, care and hygiene and sanitation will ensure sound dietary intake and health
Measurement	<ul style="list-style-type: none"> Indicators built on averages with relatively low accuracy level Aim to measure change in economic status Data often extrapolated and taken from farm land and agro-businesses Key measures: Yields, gross margin, incremental sales and technologies adopted, etc. 	<ul style="list-style-type: none"> Indicators require high level of accuracy Aim to measure changes in physiological status Data collected at individual and household level Key measures: Anthropometric, biological, clinical and dietary indicators
Target beneficiaries	Tend to be smallholder farmers able to take some risk	Tend to be the most vulnerable rural households
Development approach	<ul style="list-style-type: none"> Economic rationality (Pelletier, 2001) Facilitate large-scale value-chain promotion Could harm existing farm market systems High demand on natural and productive resources 	<ul style="list-style-type: none"> Technical and social rationalities Adapt established nutrition practices to local contexts Could be in conflict with cultural norms High demand on human resources
Assessment approach	Less emphasis on processes and delivery mechanisms in favour of market components and value-chain actor roles	Greater emphasis on processes, delivery and implementation science
Behaviour-change mode	Demand driven: Present information and let people make choices	Supply driven: Emphasis on proactive messaging and behaviour change
Gender implications	Tend to engage men but increasing emphasis on women's empowerment	Tend to engage women but engagement with other caregivers is increasing
Self-perception of linkage to the other sector	<ul style="list-style-type: none"> Primary responsibility is to increase food production and sales Developing interest in the nutritional value of home-grown and purchased foods for household consumption 	<ul style="list-style-type: none"> Good nutrition cannot be sustained without consistent supply of nutritious foods and resources to access other services and products. Developing attention to how demand influences supply

An eight-month old child eats RUTF, Indragandi Hospital, Kabul, Afghanistan 2016



Khalilqary/UNICEF

Scale-up of IMAM services in Afghanistan

By Ahmad Nawid Qarizada, Piyali Mustaphi, Jecinter Akinyi Oketch and Shafiqullah Safi



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The findings, interpretations and conclusions in this article are those of the authors and do not necessarily represent an official position by UNICEF.

Location: Afghanistan

What we know: While there has been progress on stunting reduction in Afghanistan, the prevalence and caseload of acute malnutrition remain high.

What this article adds: Since 2003, the Government of Afghanistan has provided strategic direction on public health nutrition. Current strategy and plans include 2020 targets to increase coverage of acute malnutrition (80 per cent target) through nutrition and health interventions. Integration of treatment services in the Basic Package of Health Services (BPHS) and Essential Package of Hospital Services is considered the means to sustainable scale-up. In 2015 and 2016, an action plan to scale up integrated management of acute malnutrition (IMAM) across the country was implemented. By 2017, the IMAM programme was scaled up in all 34 provinces and nearly 78 per cent of districts had at least one component of the IMAM programme. Overall programme performance exceeded Sphere standards, with some provincial exceptions. Bottleneck analyses in 2015 and 2017 identified good progress but ongoing challenges, including ready-to-use therapeutic food (RUTF) stockouts, low outpatient department integration in BPHS and inadequate community health worker training on screening. Actions to address these bottlenecks and monitoring continue. Other plans underway to support quality scale-up include: integration of routine RUTF supply provision within longer-term projects and funding mechanisms; comprehensive capacity building by Ministry of Public Health with technical support from UNICEF, World Health Organization and World Food Programme; further scale-up in high-burden, low-coverage provinces; and IMAM integration into mobile teams in hard-to-reach areas.

Background

Afghanistan has one of the world's highest rates of child mortality, with 55 children under five (U5) dying for every 1,000 live births (DHS, 2015); a major risk factor in this is malnutrition. Despite improvements in some nutrition indicators over the last decade, such as a reduction in stunting prevalence from 60.5 per cent in 2004 to 40.9 per cent in 2013, global acute malnutrition (GAM) has risen (from 8.7 per cent to 9.5 per cent over the same period) (NNPS, 2013). There is significant variation between provinces in rates of stunting (ranging from 24.3 per cent in Ghazni to 70.8 per cent in Farah) and wasting (ranging from 3.7 per cent in Faryab to 21.6 per cent in Uruzgan). In 2013, eight provinces had wasting prevalence above the 15 per cent World Health Organization (WHO) emergency threshold.

More recent surveys based on weight-for-height z-scores (WHZ) show continued high rates of acute malnutrition. In Farah province in 2017, prevalence of GAM and severe acute malnutrition (SAM) among children U5 was 10.8 per cent and 1.2 per cent respectively (SMART survey, 2017) and, in Kandahar, was 8.3 per cent and 1.3 per cent respectively (SMART survey, 2017). Childhood illness (in particular diarrhoea and acute respiratory infections) and underlying poor sanitation and environmental conditions remain key drivers of acute malnutrition in the country, as well as sub-optimal breast-

feeding and complementary feeding practices among infants and young children. In 2013, only 58.4 per cent of infants under six months were exclusively breastfed and 41.3 per cent of infants age 6-8 months were being given solid, semi-solid or soft foods (MoPH, 2013).

Nutritional risks and vulnerabilities among young children and pregnant and lactating women (PLW) have been exacerbated by conflict-driven displacements that have disrupted livelihoods. In 2017, conflict spread particularly to the north, northeast, and east of the country, with nearly 150,000 people newly displaced as a result (FEWSNET, 2017). Increased conflict has also reduced humanitarian access, including to life-saving and preventative nutrition services, lowering programme coverage and sustaining high levels of acute malnutrition in internally displaced persons (IDP) camps and conflict-affected provinces. According to the United Nations High Commission for Refugees and the International Organization for Migration, an estimated 32,593 documented and 218,218 undocumented people returned to Afghanistan from Pakistan and Iran during the first half of 2017, often returning to contexts with widespread conflict and displacement and limited livelihoods opportunities. Children and PLW in this population are at higher risk of malnutrition. For this reason, the nutritional needs of returnee and refugee population groups are a priority for the Afghanistan Nutrition Cluster.

Box 1 Strategic priorities for the Afghanistan National Nutrition Policy and Strategy, 2009-2013

1. To advocate for and increase awareness of healthy eating among the general population;
2. To reduce the prevalence of major micronutrient deficiency disorders, in particular iron, folic acid, iodine, vitamin A and zinc, throughout the country and prevent possible outbreaks of vitamin C deficiency illnesses such as scurvy;
3. To strengthen case management and increase access to quality therapeutic feeding and care at health facility and community levels;
4. To ensure that all commercial and home-produced foods are safe for consumption;
5. To monitor the nutritional situation in Afghanistan and strengthen the monitoring and evaluation of nutrition strategies and programmes to inform development planning and emergency responses;
6. To ensure that responses to treat and prevent moderate acute, severe acute and chronic malnutrition are timely and appropriate and that increases in moderate acute malnutrition (MAM) and SAM are effectively managed;
7. To increase the percentage of child caregivers adopting appropriate IYCF practices; and
8. To strengthen in-country capacity to assess the nutrition situation and design, implement, monitor and evaluate public nutrition interventions.

National Nutrition Strategy in Afghanistan

When the Public Nutrition Department (PND) was established in 2003, the first National Nutrition Policy and Strategy (NNPS) for Afghanistan was developed for the period 2003 to 2006 to guide the nutrition-related work of the Ministry of Public Health (MoPH). This document adopted a public nutrition approach, based on the UNICEF conceptual framework of malnutrition. To address subsequent priorities and challenges, the NNPS was revised for the period 2009 to 2013. Eight strategic priorities were proposed, which were later integrated into the MoPH Strategic Plan for 2011-2015 (see Box 1).

The Government of the Islamic Republic of Afghanistan (GoIRA) has expressed its commitment to enhancing food and nutrition security for the Afghan people in several policies, strategies and programmes and in the signing of several international covenants. In 2012, the GoIRA developed the Afghanistan Food Security and Nutrition Agenda (AFSEN). Its objectives were to assure the availability of sufficient food for all Afghans; improve economic and physical access to food, especially by vulnerable and food insecure population groups; ensure stable food supply over time and in disaster situations; and promote better diets and adequate food utilisation, particularly among women and children.

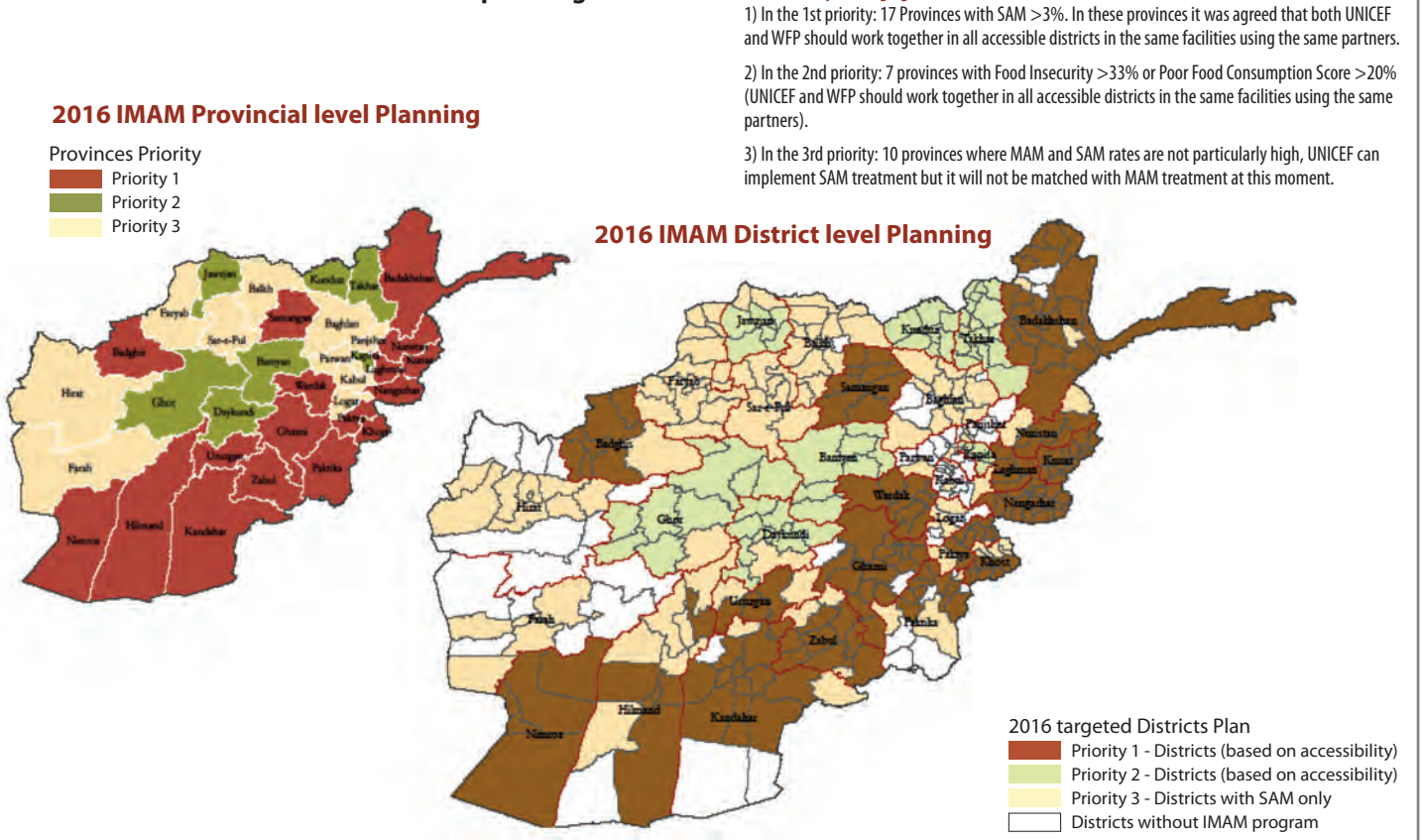
In 2015, the NNPS was updated in line with this for the period 2015 to 2020, with intermediate results around increased access to nutrition services and products; improved nutrition behaviours and practices; improved quality of nutrition services and products; and a strengthened social, regulatory and political environment for nutrition. Significant attention is given in this strategy to improving coverage of acute malnutrition services. Included as a key indicator under the first intermediate result is “increased access to and availability of nutrition services and products”, with a treatment coverage target for children U5 with acute malnutrition of 80 per cent in 2020, compared to 34 per cent at baseline in 2015.

Strategic approach to acute malnutrition management in Afghanistan

The GoIRA strategy to achieve 80 per cent coverage by 2020 is to ensure a continuum of care through the implementation of complementary health and nutrition interventions. The PND/MoPH is also strengthening the implementation of public nutrition within a Basic Package of Health Services (BPHS) and an Essential Package of Hospital Services (EPHS) by encouraging and supporting innovations in nutrition-specific services; developing necessary guidelines, standard operating procedures and job aids for BPHS/EPHS staff; and providing technical support through training, regular assessments, monitoring, supportive supervision and mentoring.

Figure 1 Priority provinces for IMAM scale-up in Afghanistan in 2016

AFGHANISTAN - WFP and UNICEF IMAM planning for 2016



The GoIRA has expressed commitment towards a multi-sector approach through the AFSEN 2012 and the MoPH is promoting a multi-sector approach to tackling malnutrition by encouraging cooperation across government sectors to strengthen the effectiveness of the national nutrition strategy. Support has been given to the MoPH from Ministry of Agriculture, Irrigation and Livestock (MAIL), Ministry of Labour, Social Affairs, Martyrs and Disabled (MoL-SAMD), Ministry of Rural Rehabilitation Development (MRRD), and Ministry of Education (MoE). Key multi-sector initiatives implemented so far include: reviewing school and literacy course curricula to effectively integrate practical nutrition skills; strengthening partnerships between health service providers (such as non-governmental organisations (NGOs) that support BPHS implementation) and stakeholders; advocating for the production, processing and storage of diverse foods; responding to local nutritional requirements; implementation of Community Led Total Sanitation (CLTS); and documenting lessons learned to improve community-based nutrition promotion and inform future scale-up (NNPS, 2009).

Evolution of integrated management of acute malnutrition (IMAM) in Afghanistan

An international NGO launched the first programme for acute malnutrition management in Afghanistan in 1996, based on diverse guidelines and treatment protocols. After the establishment of the PND in 2003, with the support of UNICEF and WHO, the MoPH developed its own treatment guidelines adapted from WHO guidelines for management of acute malnutrition. In 2008, the PND introduced community-based therapeutic care (CTC), which was designed to address the limitations of previous nutrition programme models and maximise coverage and access to nutrition services. National nutrition guidelines and protocols were then revised accordingly. CTC was replaced two years later with community-based management of acute malnutrition (CMAM), which was integrated into the national health system. CMAM surpassed the limitations of CTC through full integration into all aspects of nutritional programming. The initiative in-

cluded: education and nutrition outreach, management of MAM, outpatient treatment for children with SAM with a good appetite and without medical complications, and inpatient treatment for children with SAM and medical complications and/or no appetite.

Integration of acute malnutrition management into government health services system

Although the vision of CMAM was to integrate malnutrition management within the national health system, in practice it was implemented with support from the Nutrition Cluster as an emergency response mechanism. In order to address needs at all levels and develop a sustainable programme model, the MoPH decided to scale up management of acute malnutrition through the BPHS and EPHS and, in doing so, redirect its focus from 'emergency' to 'development'. Pilots in Takhar, Badakhshan, Balkh and Herat provinces indicated the need for a comprehensive and integrated guideline with clear definitions to help health workers at different levels to detect and manage acute malnutrition properly. Therefore, in January 2014, MoPH endorsed the IMAM national guidelines developed by UNICEF and MoPH to fully implement this programme (MoPH/PND, 2014). The IMAM guidelines covered the detection of acute malnutrition at different levels of the health system; treatment of acute malnutrition through outpatient and inpatient departments; counselling of mothers and caretakers; and assessing/managing the main causes of malnutrition (including micronutrient deficiencies, suboptimal infant and young child feeding (IYCF) and poor home-based caring practices).

Since 2014, the IMAM approach has been implemented harmoniously throughout the country by government, public health institutions and BPHS and EPHS implementing partners and has enabled the scale-up and strengthening of nutrition programming. Sustainability of the programme has been ensured by support from regular development funds and resources. During emergencies, Nutrition Cluster resources have been mobilised and innovative approaches employed to increase coverage and improve the quality of services to reach those in additional need (MoPH, 2012).

IMAM scale-up plan and priority provinces

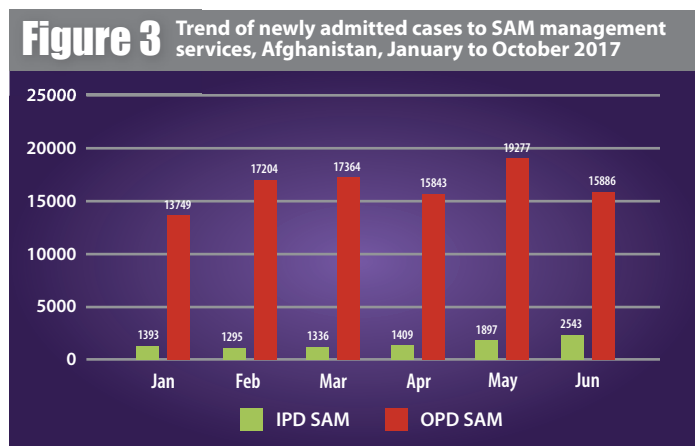
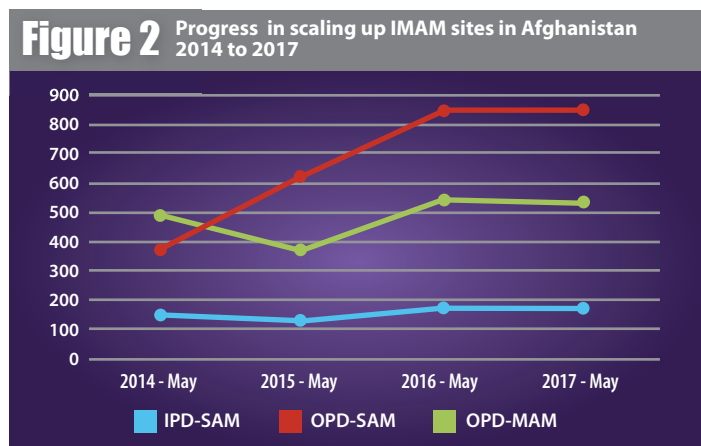
PND/MoPH and nutrition partners including UNICEF, WHO, World Food Programme (WFP) and the Nutrition Cluster develop an annual strategic action plan for IMAM scale-up at national level and in 34 priority provinces. In 2016, priorities were as follows (see also Figure 1):

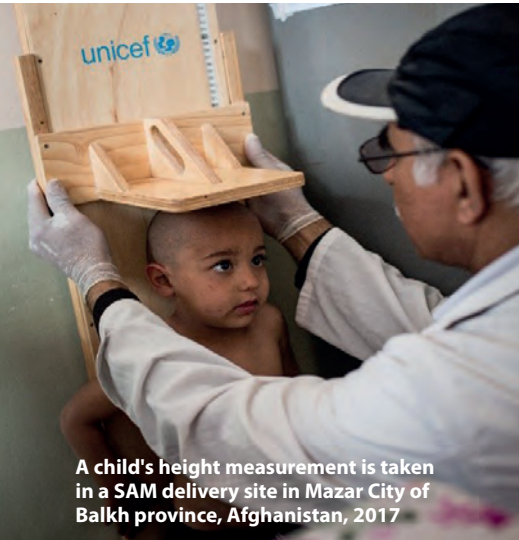
1. Priority 1: 17 provinces with SAM > 3 per cent to receive collaborative support of UNICEF and WFP in all accessible districts to provide SAM and MAM services concurrently through all accessible government health facilities.
2. Priority 2: Seven provinces with food insecurity >(33 per cent) or poor food consumption score (>20 per cent) to receive collaborative support of UNICEF and WFP in all accessible districts to provide SAM and MAM services concurrently through all accessible government health facilities (same as priority one, but using different selection criteria).
3. Priority 3: Ten provinces where MAM and SAM prevalence is not particularly high; UNICEF can implement SAM services only (no support required from WFP).

In 2016, the IMAM programme aimed to reach **40 per cent** of the SAM burden (171,770 SAM cases out of 423,520 national burden of SAM in children 0 to 59 months old) and **30 per cent** of the MAM burden (254,743 MAM cases out of the national 764,021 MAM burden in children 6 to 59 months old). Actual numbers reached in 2016 were 201,470 SAM cases (above the target) and 199,018 MAM cases. PND/MoPH and nutrition partners will need to work together in all priority districts to fill service gaps in the future.

Analysis of coverage and performance of IMAM in Afghanistan

The IMAM programme was scaled up in all 34 priority provinces and nearly 78 per cent (313/399) of the districts had at least one component of the IMAM programme by 2017. Inpatient SAM (IPD-SAM) management services expanded to 63 per cent (92/147) of regional, provincial and districts hospitals (RH, PH & DH) or 178 health facilities by 2017. Outpatient





A child's height measurement is taken in a SAM delivery site in Mazar City of Balkh province, Afghanistan, 2017

Dr. Wahinda/ UNICEF

Performance monitoring framework for IMAM in Afghanistan

To scale up the IMAM programme efficiently in Afghanistan, it was crucial to identify and address the bottlenecks that hinder the access to and effective coverage of the programme and explore root causes and solutions to overcome them. Direct coverage assessment of the IMAM programme was initiated in late 2014; since then coverage assessments have been undertaken in targeted provinces. Bottleneck analysis (BNA) for improving access and enhancing coverage of IMAM was introduced in 2015 for performance monitoring. The results of the national SAM BNA analysis for 2015 and 2017 are shown in Figure 5. Similar analysis was done for each of the six regions (results available on request).

SAM (OPD-SAM) management services were scaled up and operational in 1,028 sites in 34 provinces, covering 50 per cent per cent (855/1,999) of comprehensive, basic and sub-health centres (CHC, BHC and SHC) and 63 per cent (92/147) of RH, PH and DH. In terms of the outpatient management of MAM (OPD-MAM), services were scaled up and operational in 631 sites in 26 provinces, covering 30 per cent (563/1,836) of comprehensive, basic and sub-health centres and 47 per cent (68/147) of RH, PH and DH. In 2017 nearly 53 per cent (546/1028) of health facilities had both MAM and SAM complements of the IMAM operating together. Figure 2 shows the growth in IMAM services from 2014 to 2017.

From January to June 2017, admissions of OPD-SAM ranged from 10,431 to 21,505 cases. Admissions of IPD-SAM were in the range of 1,020 to 1,897. The IMAM programme reporting rate ranged from 70 to 95 per cent for OPD-SAM and from 70 to 85 per cent for IPD-SAM services (see Figure 3). The overall SAM programme performance status was above Sphere standards during this same period (>75 per cent recovery rate); however, recovery and defaulter rates were below Sphere Standards for the management of SAM (i.e. <75 per cent recovered and >15 per cent defaulted) in six provinces (Badghis, Faryab, Kabul, Sarepul, Uruzgan and Wardak) for OPD/IPD SAM management services (see Figure 4).

Overall, comparison of the BNA analysis in 2015 and 2017 shows a significant improvement in the quality of SAM/ IMAM programming, particularly in the areas of human resources and quality/effective coverage of services. The highly significant improvement in human resources capacity can be explained by UNICEF and WHO countrywide trainings that took place following the 2015 BNA (explained in more detail below). However, many shortcomings remain, as follows.

The 2017 analysis revealed that only 64.1 per cent of OPD-SAM management sites did not encounter stockouts of ready-to-use therapeutic foods (RUTF) (far below the good performance threshold of ≥ 80 per cent); stock management training and inclusion of RUTF in the essential drugs list were identified as important solutions.

In terms of geographic access, only 40.6 per cent of BPHS health facilities were providing OPD-SAM management services at the time of assessment; better mapping for scale-up and monitoring of IMAM expansion are needed at provincial levels.

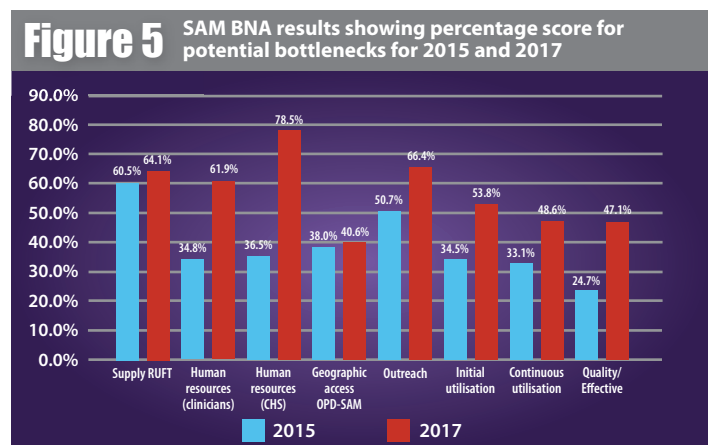
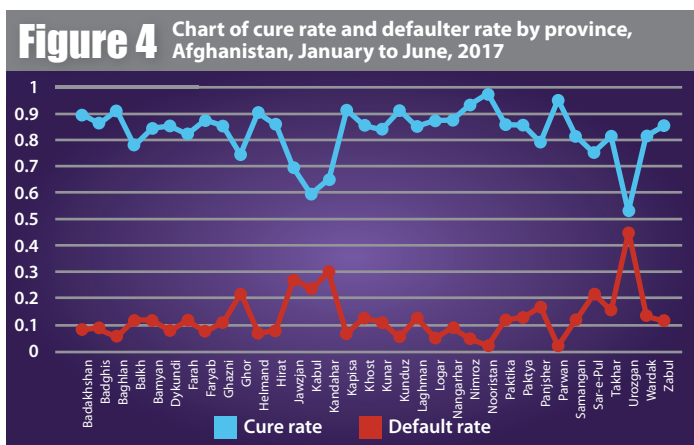
For outreach, 66.4 per cent of community health workers (CHWs) were trained on mid-upper arm circumference (MUAC) screening; to improve on this, advocacy for more training is needed for CHWs in the new Community-based Nutrition Package (CBNP)¹. Better performance monitoring is also required.

Only 53.8 per cent of SAM children were admitted for SAM treatment (initial utilisation); this low score is due to low prioritisation of the community component of IMAM, resulting in poor early case identification and referral; this will be strengthened in future through country-wide implementation of the CBNP.

Only 48.6 per cent of SAM children were admitted and continued treatment (continuous utilisation) (five per cent of cases discontinued treatment); to improve on this, nutrition staff must be hired in each health facility, nutrition recording tools must be simplified and more training must be given to CHWs. The recovery rate for children with SAM was 47.1 per cent (and defaulter rate over six per cent); the assessment identified supportive supervision and quality of recording and documentation as key areas for improvement to improve the quality of SAM management services.

Overall, the 2017 BNA revealed that IMAM programme implementation in Afghanistan improved, with positive changes in all areas since the 2015 assessment. However, a detailed operational plan for IMAM scale-up is needed based on these findings to ensure equitable scale-up with a clear road map towards its successful accomplishment, as well as the provision of the necessary support at provincial level. Findings of the BNA must be shared with all partners and donors to ensure incorporation of identified actions in national and provisional-level plans to reduce bottlenecks. Particular attention must be paid by the PND to addressing the gap in the community component of IMAM and to working with the Nutrition Cluster to explore how this component can be monitored. Similar attention must be paid by PND and UNICEF to improving quality supply-chain management to save costs and improve IMAM scale-up. Future BNAs can be improved through greater participation of nutrition partners and donors; integration of the BNA into routine IMAM monitoring with the inclusion of BNA indicators in the IMAM database; and the integration of other nutrition components into the BNA exercise.

¹ The Community-based Nutrition Package (CBNP) is a practical, comprehensive, minimum service delivered at community level as an adjunct to health facility services that aims to provide a robust delivery platform for sustainable, high-impact nutrition interventions with the BPHS package.



Way forward

Tracking and monitoring progress

As identified in the NNPS for 2015-2020, addressing acute malnutrition is one of the MoPH/PND current priorities. Continued tracking of progress through IMAM monitoring is essential to meet the targets set in this plan and to be most effective, BNA monitoring must be integrated within it. Furthermore, the upgrading of the national nutrition reporting database from offline to online mode is in the final stages; this will support the timely submission of quality performance reports from the field-level and improve the feedback mechanism.

Nutrition Counsellors - new cadre to support skilled nutrition counselling at health facility level

Further strengthening the BPHS/EPHS system is the primary way to achieve sustainable IMAM services. UNICEF is advocating to the MoPH/PND to further strengthen the nutrition package to address all forms of malnutrition, within routine programming. As a result of such advocacy, nutrition counsellors are currently being hired for every health centre in 18 provinces, with primary responsibilities identified around maternal nutrition and IYCF counselling, growth monitoring, anthropometric assessment, nutrition education, facility tracking and monthly reporting.

Integration of nutrition supplies and capacity building into System Enhancement for Health Actions in Transition (SEHAT)

It is planned that nutrition supplies, equipment procurement and distributions, as well as capacity building, are carefully integrated into the SEHAT project (a fund, supported by the World Bank, US Agency for International Development (USAID) and European Union to support BPHS and PHS service delivery) and receive sustainable development funding. At the end of 2017, UNICEF is advocating to include RUTF supplies for routine SAM treatment without complications under this project, while additional emergency-related supplies will continue to be procured through emergency funding. Other supplies procured by UNICEF and WFP are still not included in the SEHAT.

Comprehensive capacity building approach

The 2015, the BNA revealed human resources to be a key bottleneck for the delivery of quality IMAM services at scale. In response, UNICEF has provided support to the government and implementing NGOs through trainings on nutrition standard operating procedures (SOP), with a significant focus on IMAM, and by partnering with WHO to provide trainings on in-patient management of acute malnutrition across the country. This explains the major improvement in human resource capacity revealed in the 2017 BNA.

Further improvements are expected as a result of the introduction of the CBNP to strengthen the community component of nutrition interventions including IMAM, and the revision of the IMAM

A health worker examines a child at an outreach clinic supported by UNICEF in Nangarhar province, Afghanistan, 2017



Aziz Frouzari/UNICEF

package (including the operational guidelines and training package) by the MoPH with the technical support of UNICEF. In addition, supportive monitoring and supervision has been strengthened through the use of MoPH staff at different levels, UNICEF field office staff, and third-party monitors (TPMs), as well as a network of nutrition “extenders” (one per province) who triangulate data received from TPMs; data is used to support improvements in programme development and planning, implementation, monitoring and programme management.

Scale up to high burden, low coverage provinces

In 2016 UNICEF supported the government to scale up SAM treatment coverage in three of the priority one provinces with high burdens of SAM: Wardak, with SAM burden of 26,271 children and only coverage of 3.1 per cent (12 OPD-SAM sites), Paktia with SAM burden of 25,505 children and coverage of 18.6 per cent (25 OPD-SAM sites) and Lagman with SAM burden of 11,411 children and coverage of 27.3 per cent (26 OPD-SAM sites). Activities have included the establishment of additional OPD-SAM sites, capacity building at district and facility levels, implementation of “days for active screening only” by CHWs, performance-based incentives for CHWs and improvements in screening and referrals (including use of a new tracking tool by CHWs). The results from this pilot scale-up will be used to inform further scaling up of SAM treatment in high burden-low coverage areas throughout the country. MoPH/PND and UNICEF are currently supporting BPHS partners working in these three provinces to implement the scale-up plan. In addition, and based on the BNA analysis, a discussion has started on the scaling up of OPD-SAM in three more provinces (Parwan, Kapisa, and Panjsher) through similar activities.

Scale-up of IMAM through mobile health and nutrition teams

IMAM services in Afghanistan are hampered by lack of access to remote health facilities. In order to improve coverage of IMAM services UNICEF and the Nutrition Cluster supported government to develop guidelines for the integration of nutrition into mobile health teams in order to improve access to IMAM services in hard to reach areas. With the support of UNICEF and

nutrition cluster, four integrated mobile health and nutrition teams established in four districts of Faryab province and eight integrated teams established in eight districts of Kandahar provinces.

Conclusions

The MoPH has done an excellent job of developing an essential nutrition policy, strategies and guidelines according to guiding principles that promote comprehensive, equitable and sustainable care for those in need, based on the global evidence base. Evidence shows that IMAM services have gradually scaled up and improved in Afghanistan. In total, 236,121 acutely malnourished children were provided with life-saving treatment services in 2014, followed by 315,890 in 2015, 400,488 in 2016 and 457,000 in 2017. Significant improvements can be seen in the quality of IMAM services implemented and in scale-up and integration into the routine health system. More supportive supervision and mentoring are needed in the health system to maintain quality and to complete the integration of RUTF in the MoPH essential drug list. A formative evaluation of the IMAM approach is also needed to gather evidence on results, lessons learned and good practices and shared widely to inform future policy and programming to improve the treatment of acute malnutrition. Efforts are also needed to further strengthen the health system in Afghanistan so that acute malnutrition can be addressed as part of the routine health service, with capacity to scale up in response to emergencies. This must become embedded in the contingency planning of development strategies, policies and practices.

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Monitoring and evaluation of programmes in unstable populations: Experiences with the UNHCR Global SENS Database

By Melody Tondeur, Caroline Wilkinson, Valerie Gatchell, Tanya Khara and Mark Myatt



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Location: *Global*

What we know: Monitoring and evaluation of nutrition programmes, including those for refugee populations, is routinely based on repeated cross-sectional surveys, comparing baseline and endline data on outcomes and process indicators.

What this article adds: In 2016 a formal analysis of the United Nations High Commission for Refugees (UNHCR) database of Standardised Expanded Nutrition Surveys (SENS) revealed shortcomings in the current approach. Current analyses are based on before and after cross-sectional surveys that assume that the populations surveyed are stable (births and deaths in balance and low migration). However, refugee populations are characterised by instability (due to new and temporary arrivals and exits) and therefore reduced prevalence and increased coverage cannot necessarily be attributed to programme change. New analytical approaches are needed that take instability into account. Analysis of time-series data that shows long-term trends and exceptions is ideal, but data are required over long periods with regularly spaced points (usually not possible in SENS surveys). A new procedure is proposed that involves fitting a LOWESS curve to the point estimates of indicator values (based on raw data; e.g. mid-upper arm circumference and weight-for-height z-score) using data provided by a single survey that compares values of individuals exposed and not exposed to an intervention. Visual analyses (box plots) and statistical analyses (Kruskal Wallis rank-summary test) are performed to interpret results. This approach still has limitations and more work is needed to test this method and develop new approaches.

Background

UNHCR and its partners have been collecting data on the health and nutrition status of refugees and related populations and nutrition programme coverage for many years. The method most frequently used is repeated cross-sectional surveys that follow the SMART model. The survey design is known as the *Standardised Expanded Nutrition Survey* (SENS) method. This is an expanded SMART survey that collects data for many indicators in areas including acute and chronic malnutrition;

anaemia; diarrhoea; vitamin A supplementation; immunisation; infant and young child feeding (IYCF); food security; water, sanitation and hygiene (WASH); and long-lasting insecticidal bednets¹.

SENS surveys are used for needs assessment (prevalence indicators) and monitoring and evaluation (prevalence and coverage indicators). An effort to systematically collect survey reports and

¹ Details of the set of indicators entered into the UNHCR Global SENS Database at headquarters are available on request.

Table 1 The SENS survey database

Item	Detail	Number of surveys
Surveys	Africa Region	570
	Asia Region	71
	Middle East & North Africa Region	47
Population	Refugees	661
	Refugees (unregistered)	4
	Host community	21
	Mixed refugees and host community	2
Context	Protracted (≥ 3 years)	512
	Non-protracted (< 3 years)	108
	Emergency	60
	Other/not specified	8
Dates	Earliest year	1,997
	Latest year	2,016
Countries*	Number of countries	38

* This is for location of camps, not countries of origin of the camp populations

Box 1 The procedure used to work with short, irregular and sparse data

We analysed reported results (i.e. indicator values with 95% confidence limits) from the SENS summary database rather than raw survey data.

The earliest data point in the SENS summary database is in 1997. Time data (t) was recoded to month of data collection starting from January 1997:

$$t = (\text{year}-1997) \times 12 + \text{month number}$$

For a single location you would use time from the first M&E survey.

Indicator estimates and their associated confidence limits were expressed as proportions. The sampling distributions of each indicator at each data point were recreated from the indicator estimate (p) and the associated upper and lower 95% confidence limits (UCL and LCL). Variance was estimated as:

$$\text{Variance} = \left(\frac{\text{UCL} - \text{LCL}}{2 \times 1.96} \right)^2$$

The effective sample size (n) was then estimated as:

$$n_{\text{effective}} = \left\| \frac{p(1-p)}{\text{Variance}} \right\|$$

This procedure addressed the issues of missing and unadjusted (i.e. for design effects) sample sizes. Adjustment for design effects was desirable because cluster samples often have smaller effective sample sizes than the number of children who are sampled.

The sampling distribution for each indicator at each time point was recreated as:

$$\text{Binomial}(n_{\text{effective}}, p)$$

The recreated sampling distributions were resampled a large number ($r = 9,999$) of times. A matrix ($M1$) with r rows (where r is the number of resampled replicates used) and one column for each time point was produced. For example:

row	t=138	t=154	t=165	t=176	t=192	t=214	t=227
1	0.138	0.206	0.131	0.147	0.194	0.117	0.147
2	0.154	0.207	0.116	0.136	0.194	0.122	0.118
3	0.130	0.198	0.120	0.140	0.142	0.111	0.132
4	0.162	0.193	0.139	0.138	0.183	0.172	0.106
9999	0.162	0.184	0.109	0.121	0.197	0.111	0.155

A LOWESS smoother with span = 1 (i.e. all data) and three 'robustifying' iterations were applied to each row of the matrix $M1$ to yield a second matrix ($M2$). The cells of this second matrix hold the LOWESS smoothed values for each row in matrix $M1$. For example:

row	t=138	t=154	t=165	t=176	t=192	t=214	t=227
1	0.152	0.156	0.159	0.161	0.152	0.144	0.138
2	0.160	0.156	0.154	0.152	0.141	0.129	0.122
3	0.128	0.130	0.132	0.133	0.131	0.128	0.125
4	0.166	0.163	0.162	0.162	0.156	0.144	0.136
9999	0.160	0.154	0.151	0.148	0.142	0.144	0.144

The trend line consisted of per time-point estimates calculated as summaries of the columns of matrix $M2$. The central trend was calculated as the median of each column of matrix $M2$ and 95% confidence limits for the central trend calculated as the 2.5th and 97.5th percentiles of each column of matrix $M2$.

The LOWESS smoother is described in Box 2.

survey datasets for storage in a central repository started in 2009. By 2016 the global SENS database comprised of 688 survey reports and corresponding survey datasets covering populations in protracted crises (≥ 3 years), non-protracted crises (< 3 years), and emergency situations in 38 countries in the Africa, Asia and the Middle East and North Africa regions (see Table 1). The SENS database has been extensively used for ad hoc analyses. In 2016 a formal analysis of the available datasets was conducted for the first time to review country trends and inform future

survey design and approaches to data analysis. This article describes some of the findings from the analysis, which suggest that traditional assumptions on monitoring and evaluation in refugee settings may need to be reviewed.

A common model of monitoring and evaluation

Monitoring and evaluation (M&E) of programmes is commonly based on repeated cross-sectional surveys which collect and report on *outcome indicators* (such as the prevalence of

wasting) and process indicators (such as the *period coverage* of vitamin A supplementation). Seasonal effects are minimised by using surveys undertaken at the same time each year. Biases are kept constant by using the same design of survey, case definitions and data-handling methods for all surveys.

The simplest approach to monitor impact is to have baseline and *endline* surveys taken at the same time each year to control for seasonal effects (see Figure 1).

Impact is evaluated as the change (i.e. the difference) in prevalence between baseline and endline:

$$\text{impact} = \text{endline prevalence} - \text{baseline prevalence}$$

For programmes running over many years, surveys of the same design are taken at the same time of year for each year that the programme runs (see Figure 2). Impact can be evaluated in a similar manner as with baseline and endline surveys:

$$\text{impact} = \text{prevalence at } t_n - \text{prevalence at } t_{n-1}$$

at each year, or as:

$$\text{impact} = \text{prevalence at } t_{\text{final}} - \text{prevalence at } t_0$$

for the entire duration of programme. This sort of data may also be treated as a *time series*, as displayed in Figure 3 which shows the prevalence of stuntedness in four Algerian refugee camps between 1997 and 2012.

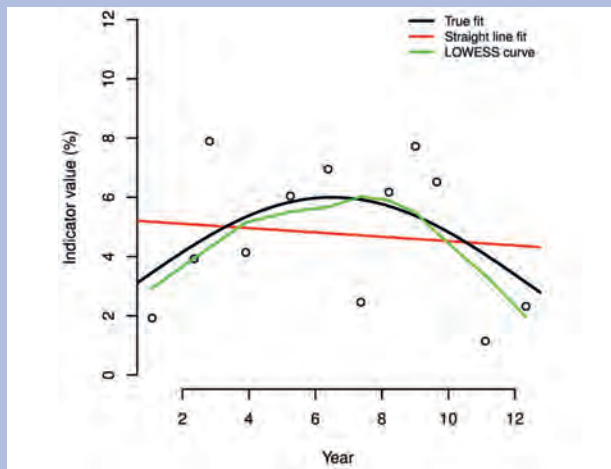
The same approach can be applied to process monitoring (such as the monitoring of programme coverage); the difference being that the aim is to see coverage increasing over time and reaching and remaining above a critical minimum coverage standard, such as the SPHERE standards (www.sphereproject.org).

This approach to programme M&E makes some strong assumptions about the population in which a programme is being delivered, including that the population remains stable during the review period. In a stable or *steady state* population birth rates and death rates will be roughly in balance and there will be low levels of migration into and out of the programme area (see Figure 4). If these conditions are met then observed reductions in prevalence and observed increases in coverage may be attributed to programme activities.

However, a steady state population cannot be relied on in a refugee context and the M&E approaches outlined above may yield misleading results. Instability may be due to new arrivals (see Figure 5) who increase the size of the population, may put pressure on services, and may degrade programme performance. There may also be increased prevalence and reduced coverage. Arrivals may also be more at risk than the rest of the population and may arrive in poor health, which will increase prevalence. Figure 6 shows the prevalence of global acute malnutrition (GAM), defined as WHZ < -2 and/or oedema, in the Dadaab-Dagahaley refugee

Box 2 The LOWESS smoother

LOWESS (locally weighted scatterplot smoothing)* is a form of regression analysis that draws a smooth line through a time-series plot or scatter plot to help identify trends or relationships between variables. The method copes well when noisy, irregular and sparse data make it difficult to discern a trend. The plot below shows how well LOWESS can identify a trend in data generated using a mathematical function (shown as 'true fit') that was then made noisy and irregular:



LOWESS is a *non-parametric* method for fitting a smooth curve to data points. A parametric method assumes that the data fits a given function. This can lead to fitting a curve or a line that misrepresents the data (as is the case with the 'straight line fit' in the plot shown above). Non-parametric smoothers like LOWESS try to find the curve of best fit without assuming the data must fit a particular function. In many cases, non-parametric smoothers are a good choice. This can be seen in the plot shown above.

* Many data-analysis systems provide functions to perform LOWESS smoothing. In some systems (e.g. SPSS) it is called 'LOESS'. Microsoft Excel can do LOWESS smoothing using the XLSTAT add-in or the Peltier Tech Charts for Excel add-in. A free Excel add-in is also available. The RobustFit utility from the University of St. Andrews provides LOWESS smoothing. The Dataplot package from the US National Institute for Science and Technology also provides LOWESS smoothing. The analyses in this article were performed using the R language and environment for statistical computing.

camp in northern Kenya between 2007 and 2015. It shows how prevalence in a relatively stable population can be disrupted by new arrivals. The long-term trend was quickly re-established but this can only be seen in hindsight.

Instability may also be due to exits (see Figure 7), which have the immediate effect of decreasing the size of the population and other difficult-to-predict effects (such as a positive effect on coverage as pressure on services is reduced), or a negative effect on prevalence if the most at-risk and those in poor health remain. In refugee settings, large numbers of exits are often accompanied by restructuring of services, which can lead to short-term reductions or failures in coverage. In the Damak refugee camps in Nepal, for example, resettlement of refugees from seven camps led to the camp population dropping from 117,282 to about 23,059 between 2005 and 2014 and five of the original seven camps being closed (see Figure 8). Reports, surveys and key informant interviews indicate that the resettlement programme substantially changed camp dynamics and camp management became more challenging; those who were resettled more quickly had higher socioeconomic status than those remaining in the camps and households with children with health complications were slower to resettle. This may partially explain some of the observed deteriorations in indicator values. Resettlements and population movement due to camp closures and mergers appear to have led to considerable year-to-year

variability in key indicators, including the prevalence of GAM (see Figure 9).

Instability may also be due to a combination of new arrivals and exits (see Figure 10) leading to a considerable turnover in population. Figure 11 shows the number of refugees and asylum seekers by county of origin for the Kakuma refugee camp in northwest Kenya between 2004 and 2017. Depending on the condition of arrivals and exits and the effect of fluctuations in the population on service delivery, this 'churn' can drive shifts in indicators away from long-term trends. Arrivals will often be in a poorer state than the existing camp population and/or exits; prevalence indicators will tend to go up and coverage indicators down. Despite this, the camp management and its partners in the Kakuma camp appear to have controlled prevalence, as well as achieving and sustaining high levels of programme coverage. Figure 12 shows the prevalence of GAM, defined as WHZ < -2 and/or oedema, and the six-month period coverage of vitamin A supplementation in the Kakuma camp in northwest Kenya between 1997 and 2015.

An additional source of instability is temporary exits and returns, the consequences of which can be difficult to predict (see Figure 13). In cases where exits are household members leaving the camp to seek work with income accruing to the household in the camp, the effect will probably be to improve the condition of a portion of the camp population, which may be reflected in

Figure 1 A simple baseline/endline evaluation

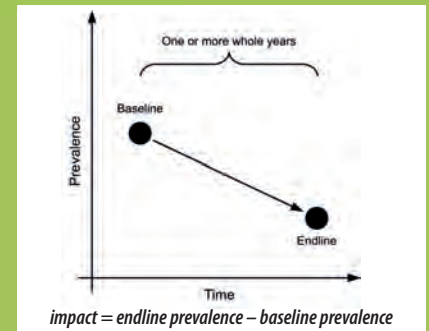


Figure 2 Evaluation over several years

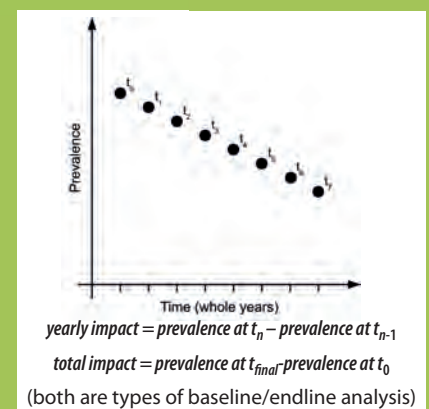
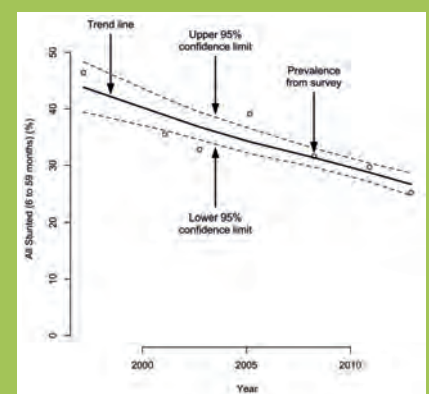
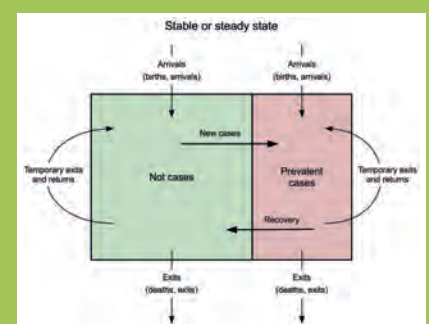


Figure 3 Prevalence of stuntedness in four Algerian refugee camps (1997-2012)*



* Stuntedness defined as HAZ < -2 using WHO growth standards

Figure 4 Diagrammatic representation of a stable or steady state population



positive changes to outcome indicators. In other cases exits may have returned home but subsequently return to the camp, having fled worsening security. In this case there may be negative changes to outcome indicators. It is known that temporary exits and returns occur in all, or almost all, refugee camps. The numbers involved are, however, extremely difficult to monitor.

In examining the SENS database it was originally thought the baseline/endline model would apply. It became clear during data analysis and interpretation that, due to population instability, this model would not always apply. Alternative M&E strategies were needed.

Monitoring and evaluation strategies

The use of contextual information related to the nature of instability in the camp populations was first considered to help interpret results. However, it is often difficult to find a complete or near-complete set of useful information due to data not always being routinely collected and reported, data not being shared between partners, and some data being very difficult to collect (e.g. exits may be hidden to maintain access to rations and other benefits).

The analysis of data as a time series was found to be useful as it allowed the identification of long-term trends and their exceptions (as seen in Figures 6 and 12). However, this approach does not work with a single survey or a pair of surveys and large numbers (i.e. 20 or more surveys) are usually required. Few programmes last for 20 years or can provide 20 years of annual data (only one location out of 248 in the SENS database had over 20 data points), which makes this impossible to achieve.

Standard methods for the analysis of trends in times series assume regularly spaced data points, which was not always achieved in surveys in the UNHCR database. For example, in one setting (Ouri Cassoni in Chad) data were available from surveys conducted in July-August 2008, November 2009, October-December 2010, September-November 2011, January-March 2013, November 2014 and December 2015. The data points in this example are about 16, 12, 11, 16, 21, and 13 months apart and there is no data from 2012.

Standard methods for the analysis of trends in times series also do not tolerate 'sparse data' (i.e. data with missing values) very well, but in the SENS database the scope of surveys often changed over time, with some indicators being reported on an irregular basis.

The problems of shortness (i.e. few data points), irregularity and sparseness often occurred together. This limited the type of analysis that could be performed. Even a simple decomposition of a time series into, for example, trend, seasonal and noise (random) components using moving average models would not have been possible².

Given the limitations with the data, a non-standard data analysis procedure was used. This

is described in Box 1 and Box 2. This procedure addresses issues with the SENS summary database (e.g. actual rather than effective sample sizes being reported) and provided 95 per cent confidence limits for trend lines. A very much simpler but still useful analysis could be performed by fitting a LOWESS (locally weighted scatterplot smoothing) curve just to the point estimates of indicator values (see Figure 14). LOWESS can work with short, irregular and sparse time series, but is of little use when there are very few (i.e. ≤ 5) data points. Another approach was tested that uses only the data provided by a single SENS survey. The approach assumes that interventions/programmes are evidence-based and very likely to have impact on the health of covered individuals and, if delivered with high coverage, will have impact on the population.

Effectiveness was examined by looking at indicator values in individuals exposed and not exposed to an intervention. Using binary outcome indicators as the starting point, prevalence ratios were calculated:

$$\text{Prevalence Ratio} = \frac{(\text{Prevalence in covered persons})}{(\text{Prevalence in persons not covered})}$$

If the prevalence ratio (PR) is below one, there may be a positive effect on the outcome (i.e. the intervention is associated with reduced prevalence). If PR = 1, the intervention is not associated with the outcome. If PR >1, there may be a negative effect on the outcome (i.e. the intervention is associated with increased prevalence). There are problems with this approach. When prevalence is low (as is likely to be the case with severe acute malnutrition (SAM), severe anaemia and other severe conditions), there will be very few cases of the condition of interest. When coverage is high, there are will be few persons not exposed to the intervention. Low prevalence and high coverage together or singly reduce the statistical power of the analysis.

To overcome these problems the raw data (e.g. MUAC, WHZ) used to create the binary indicators were used. This approach provides more statistical power because the raw measurements contain more information than the binary indicators created from them. The problem of small numbers of cases was removed and the problem of small numbers in unexposed (i.e. not covered) groups due to high coverage reduced.

A combination of visual analyses (using box plots) and statistical analyses (using the Kruskal-Wallis rank-sum test) was used. Figure 15 shows an annotated box plot of haemoglobin (Hb, in g/dL) by vitamin A supplementation status from a SENS survey undertaken in Cox's Bazaar in Bangladesh in March 2012. It is clear that children covered by the vitamin A supplementation programme tended to have higher Hb than children not covered by the vitamin A supplementation programme. The Kruskal-Wallis rank-sum test is a non-parametric, one-

² The use of moving averages with more regular time series is covered in the FANTA SQUEAC/SLEAC technical reference: www.fantaproject.org/monitoring-and-evaluation/squeac-sleac

Figure 5 Diagrammatic representation of instability due to arrivals

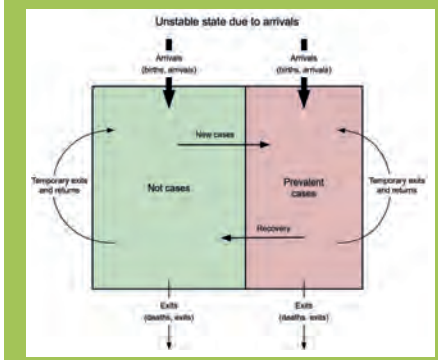
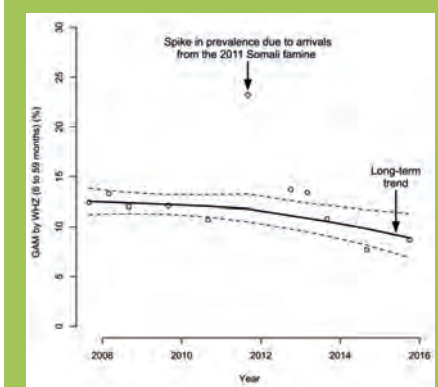


Figure 6 Prevalence of GAM in Dadaab-Dagahaley refugee camp (2007-2015)*



* GAM defined as WHZ < -2 and/or oedema

Figure 7 Diagrammatic representation of instability due to exits

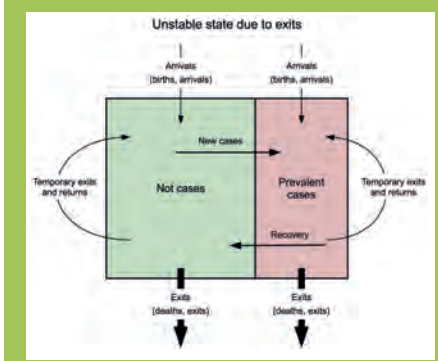


Figure 8 Population of Damak refugee camps in Nepal (2005-2014)

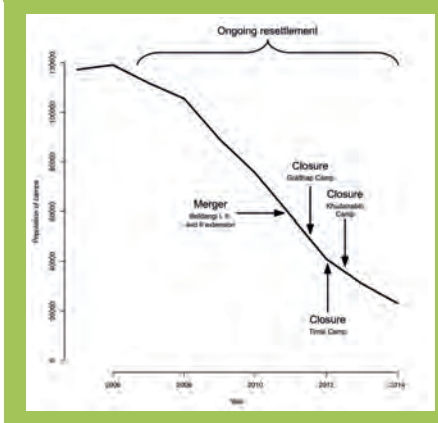
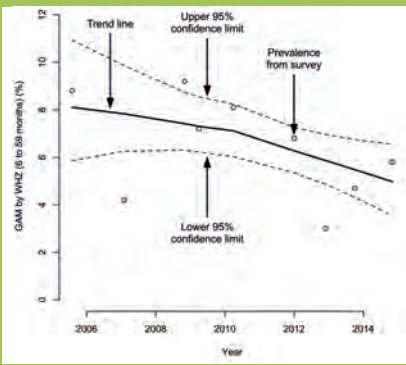


Figure 9 Prevalence of GAM in Damak refugee camps in Nepal (2005-2014)*



* GAM defined as WHZ < -2 and/or oedema

Figure 10 Diagrammatic representation of instability due to arrivals and exits

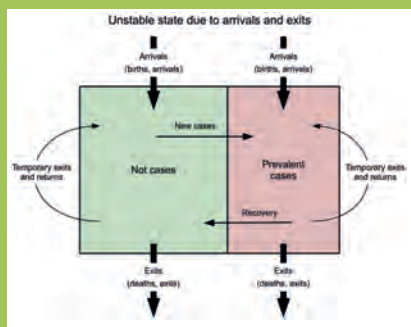


Figure 11 Number of refugees and asylum seekers by county of origin for the Kakuma refugee camp in northwest Kenya (2004-2017)

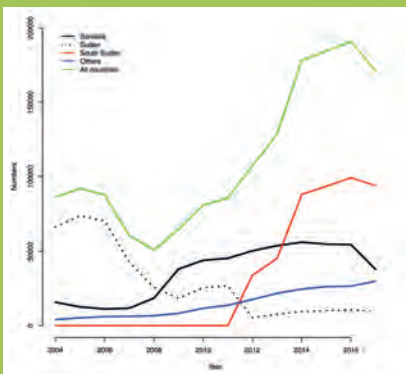
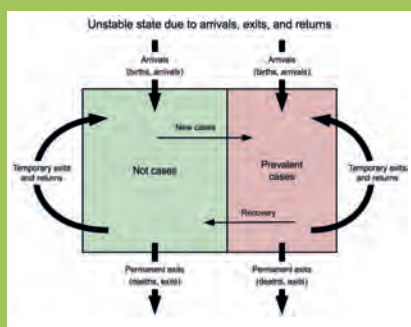


Figure 13 Instability due to arrivals, exits and temporary exits and returns



way analysis of variance that makes no assumptions (i.e. of normality and equal variance) about the distribution of data in the two groups. For the data shown in Figure 15, the median Hb was 11.5g/dL in the covered group (i.e. those reported as having received vitamin A supplementation in the previous six months) and 10.9g/dL in the not-covered group ($p < 0.0001$).

Both analyses suggest that the vitamin A supplementation programme was having a positive effect on Hb and the prevalence of anaemia. The coverage of vitamin A supplementation was 91.3% (95% CI = 85.7% - 96.9%). It can be concluded, therefore, that the vitamin A programme was being delivered with high coverage and was likely having a positive impact on Hb and the prevalence of anaemia, although progress was still to be made.

This was a useful approach but is not without problems. In settings with poor and/or patchy coverage the observed effect may be due to coverage being achieved in better-off groups of the population. The approach is also still susceptible to instability in camp populations. A negative finding such as deworming being associated with lower MUAC, for example, may be due to proper attention being paid to deworming new arrivals and less attention being paid to deworming existing camp residents.

Common sense needs to be applied when using this approach with targeted interventions. For example, an analysis of MUAC or WHZ by coverage of a targeted supplementary or thera-

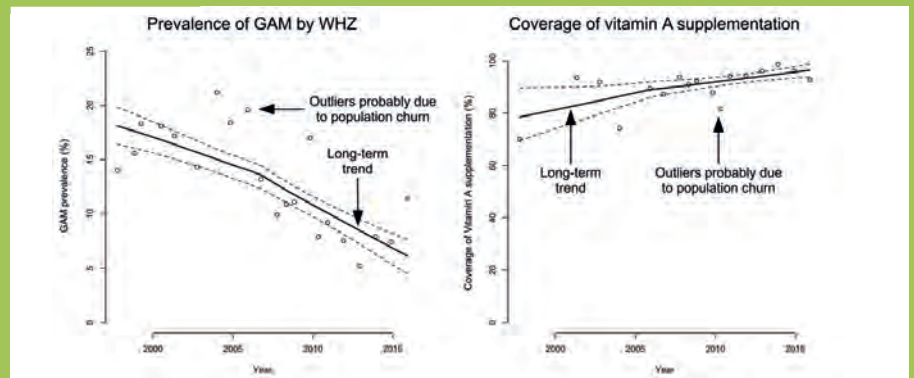
peutic feeding programme is expected to show poorer anthropometric status in covered cases since these children are selected because they have low MUAC or low WHZ (or are at risk of developing low MUAC or low WHZ). This is not an issue with interventions that target specific age groups since these programmes are 'blanket' programmes for the target age groups. Analyses should, however, be limited to members of the target age groups.

Conclusions

Analysis of the SENS survey database was not as straightforward as originally envisaged. The simple baseline/endline analysis was not always appropriate due to instability in refugee populations and can, in unstable populations, yield misleading results. As a result, public health and nutrition interventions in refugee settings may be having a positive impact while prevalence remains high. A stubbornly high prevalence of GAM does not always mean that public health and nutrition programmes are failing but may be due to one or more forms of population instability. Examining and reporting individual effectiveness, as in the analysis relating to Figure 15, may prove useful in such settings.

In this study, simple analytical approaches have been devised that can be applied to the analysis of data from refugee situations to avoid problems described. Work is needed to further examine these issues and test, develop or replace these methods, which are likely to have broad applicability.

Figure 12 Prevalence of GAM by WHZ and the six-month period coverage of vitamin A supplementation in the Kakuma camp in northwest Kenya (1997-2015)*



* GAM defined as WHZ < -2 and/or oedema

Figure 14 Example of a simple LOWESS plot

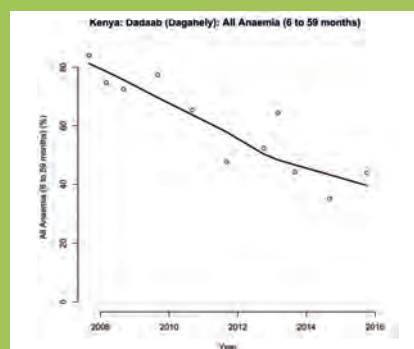
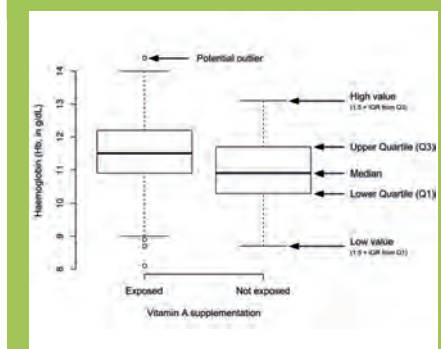


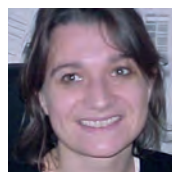
Figure 15 Box plot of haemoglobin by Vitamin A supplementation



RESEARCH for NUTRITION CONFERENCE

OPERATIONAL CHALLENGES AND UPTAKE IN PREVENTION AND TREATMENT OF UNDERNUTRITION

By Miriam Ait-Aissa and Stephanie Stern



Myriam Ait-Aissa is currently Head of Research and Analyses at Action Against Hunger – France (Action contre la Faim). She has been involved for over fifteen years in many multi-sectoral research programmes aiming at improving the treatment and the prevention of undernutrition.



Stephanie Stern leads the Action Against Hunger Knowledge LAB project. She previously worked at the Strategy and Analysis Department of Save the Children International and was a research fellow at IRIS, the French think tank on international relations and strategic affairs.

The fight against undernutrition is a protracted struggle. Although some very positive initiatives have been launched in recent years to tackle undernutrition worldwide, the global context is ever more challenging due to political conflicts, famines and disasters precipitated by climate change, leading to large-scale and often protracted humanitarian crises. While wasting and stunting are declining globally, both remain high; 155 million children are currently estimated to be stunted and 52 million wasted. Levels of hunger are also on the rise, with 815 million people reported to have suffered from hunger in 2017; 38 million more than the number reported in 2015 (FAO, 2017).

It therefore remains crucial for governments and the humanitarian community worldwide to identify and roll out effective, scalable interventions to tackle undernutrition. Due to the increasing complexity of different contexts, more analysis is required to truly identify the context-specific roots of undernutrition to better inform programming. We need to identify effective and scalable preventive interventions, as well as figure how to provide accessible, adequate care to undernourished children. Critically, health and other government systems must be strengthened in order to improve reach and ensure long-term sustainability.

Building the evidence base is critical to inform scale-up and mobilise the necessary resources; quality research is needed to identify effective solutions, demanded in a Lancet call for a stronger evidence base and research in humanitarian contexts (Lancet, 2017). Sharing best practices and lessons learned among practitioners working in the nutrition and health sectors, along with engagement of stakeholders from other relevant sectors, is a vitally important part of this process.

Action Against Hunger launched the Research for Nutrition conference in November 2016 (FEX, 2017) with the aim of enhancing knowledge of the latest available evidence on the identification

of effective interventions to treat and prevent undernutrition. Based on its success, a second conference took place in November 2017 in the Pavillon de l'Eau in Paris. A call for abstracts generated 57 submissions; 17 were selected for oral presentation and 15 for poster presentation. A total of 28 high-level speakers participated in the conference, either presenting their work or to share lessons on specific topics during panel discussions. One hundred and thirty individuals attended the conference, representing 66 organisations. Nineteen individuals represented national or international institutions and donors; 82 attended from operational agencies (humanitarian organisations), 31 from academic organisations and seven from private-sector bodies.

The oral presentations comprised a rich array of research around the key topics of undernutrition and mortality; diagnosis and treatment of undernutrition; effects of multi-sector interventions on nutrition and health; and effects of community-based initiatives to prevent undernutrition. The research agenda on acute malnutrition defined by No Wasted Lives (www.nowastedlives.org) was also presented. For the session on undernutrition and mortality, a meta-analysis of operational surveys to examine the relationship between drought and child mortality in Ethiopia was presented, followed by an analysis of associated mortality risk of in-treatment children by mid-upper arm circumference (MUAC) and/or weight-for-height z-score (WHZ). Research on the diagnosis of undernutrition included a presentation on new MUAC measurement devices. This was complemented by an 'Innovation Lab' session in which emerging research on three innovative ways of measuring nutritional outcomes was presented: the SAM photo diagnosis app, the Body Bioelectric Impedance Analysis (BIA) and the leptin test.

Nutrition security is a complex issue that requires coordinated efforts from different sectors, especially in emergency settings. Three presentations shared

results and discussion from interventions aimed at assessing the effects of preventive interventions on nutrition and health outcomes.

The first panel discussion focused on the topic "How to overcome data management challenges in research in crisis contexts". The second, entitled "How to improve the engagement of communities in research," was dedicated to uptake of research by communities. Both sessions produced lively and interesting discussion that engaged the audience in debate. The conference evaluation confirmed that participants appreciated the level of exchange.

We are delighted to collaborate with ENN again to share outputs from the meeting. Summaries of presented research are included in this edition of *Field Exchange*, with links to video recordings where available. In some cases, peer review publication is pending so findings could not be published in this issue; these will be summarised in future *Field Exchange* issues.

The 2017 Research for Nutrition conference again proved highly successful, providing a valuable forum for exchange between researchers and programmers; we look forward to facilitating another in 2018.

Links to posters, presentation videos and interviews are available at: www.ennonline.net/researchfornutritionconference2017

For general information about the conference, visit: <http://research-for-nutrition-conference.org/> or #R4NUT

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Key findings from the Click-MUAC Project

Summary of conference abstract¹

By Angeline Grant, Zvia Shwartz, James Njiru, André Briend and Mark Myatt



Angeline Grant is Senior Nutrition and Health Advisor at Action Against Hunger US. Angeline has previously worked in the areas of nutrition assessment,

nutrition programme implementation, nutrition cluster coordination and nutrition-sensitive programming in West Africa, East Africa, the Middle East and South East Asia.



Zvia Shwartz currently works as the Research Uptake Technical Advisor for Action Against Hunger US, working closely with colleagues to ensure

that evidence and results produced from research projects are effectively communicated to key stakeholders in policy and practice and used to inform decision-making.



James Njiru is Research and Learning Coordinator at Action Against Hunger Kenya Mission. James has over 12 years' experience in nutrition programming

in policy formulation, project/programme design and management, MIYCN, health system strengthening and advocacy.



André Briend, a Medical Doctor with a PhD in nutrition from Paris University, with over 30 years of experience in research in pediatric nutrition in developing countries. Currently he is Adjunct Professor at the University of Tampere, Department for International Health, Finland, and Affiliated Professor, Department of Nutrition, Exercise and Sports, Faculty of Science, University of Copenhagen, Denmark.



Mark Myatt is a Consultant Epidemiologist and Senior Research Fellow at the Division of Ophthalmology, Institute of Ophthalmology,

University College London. His areas of expertise include infectious disease, nutrition and survey design.

Location: Kenya

What we know: Mid-upper arm circumference (MUAC) is increasingly used for community screening to detect acute malnutrition; screening by mothers is being explored.

What this article adds: A study in Kenya by Action Against Hunger described the performance of three Click-MUAC devices measured against a gold standard (study team measurements) for classification of nutritional status. Mothers/caregivers and clinic staff demonstrated good sensitivity and excellent specificity using the Click-MUAC tapes and the uniMUAC tape. The uniMUAC tape performed best for both mothers/caregivers and clinic staff (sensitivity and specificity); one-to-one instruction and recent improvements in design may have helped. Action Against Hunger is now piloting a simplified version of the uniMUAC tape for mothers/caregivers in Isiolo County.

Background

Regular screening for acute malnutrition at community level is key to improving the coverage of acute malnutrition treatment. Frequent screening can also enhance early detection, which can potentially lead to shorter treatment times, leading in turn to reduced programme costs (Sadler et al, 2017; Puett et al, 2013). The measurement of mid-upper arm circumference (MUAC) is the most common form of anthropometric screening used at community level to detect acute malnutrition. Until recently, this has primarily been carried out by community health workers (CHWs) or community-based volunteers. However, emerging evidence (Alé et al, 2016; Blackwell et al, 2015) points to the important role that mothers and other caregivers can also play in this process by screening their own children for acute malnutrition.

Building on this recent evidence, Action Against Hunger (AAH) set out to develop a set of three prototype Click-MUAC devices to support the mother/family MUAC approach and to test them in an operational setting. The idea was to simplify and standardise the measurement of MUAC to increase the sensitivity and specificity² of mother and caregiver classifications of acute malnutrition.

Study objectives

The primary aim of the study was to describe and compare the performance, in terms of agreement, of the three Click-MUAC devices against a gold standard³ for the classification of nutritional status. A secondary aim was to determine the difference in agreement among mothers/caregivers using the Click-MUAC devices and mothers/caregivers using a MUAC insertion tape.

Methods

The study team developed three Click-MUAC devices with the help of plastics specialists, using a plastic printing injection process (see Figure 1). The study also used a universal design, colour-banded MUAC insertion tape ("uniMUAC"), designed and produced by a consortium of non-governmental organisations (NGOs) and academics led by Médecins Sans Frontières (MSF) (see Figure 2). The study was designed as a prospective, non-randomised, non-blinded, clinical diagnostic trial to describe and compare the performance of the devices. It was implemented in Isiolo County, Kenya, from September 2016 to January 2017. Mothers/caregivers and clinic staff used the Click-MUAC devices and the uniMUAC insertion tape to classify the nutritional status of the child and these classifications were compared to a gold standard measurement taken by the study team.

Key findings

An article describing the results of the Click-MUAC study in full is currently pending publication (Grant et al.). In summary, the study was successful in describing and comparing the performance of the devices. A total of 1,040 children were assessed over the course of the study and the minimum sample sizes (n=115) were reached

¹ Presentation at the Action Against Hunger Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.

² In this study sensitivity was defined as the ability of a device to correctly detect patients with the condition (SAM or MAM); specificity was defined as the ability of a device to correctly detect patients without the condition (SAM or MAM).

³ The gold standard for this study was the mean of three MUAC measurements taken by the study team with a universal MUAC tape ("uniMUAC").

Figure 1 The three Click-MUAC prototypes used in the study*



* Devices 1 and 2 have an internal circumference of 115 mm. Device 3 has an internal circumference of either 115 mm or 125 mm depending on how the device is latched

Figure 2 Features of the universal design MUAC insertion tape used in the study

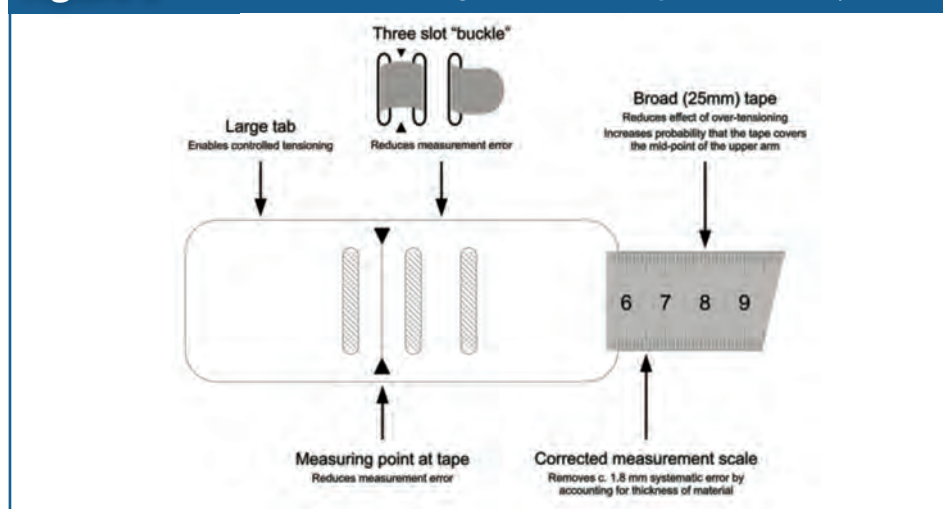


Figure 3 Simplified version of the uniMUAC tape



for all categories (MUAC ≥ 125 mm; 115 mm \leq MUAC < 125 mm; and MUAC < 115 mm).

Mothers/caregivers using the Click-MUAC devices demonstrated good sensitivity and excellent specificity in the classification of severe acute malnutrition (SAM) using all four devices and global acute malnutrition (GAM), comprising both SAM and MAM (only possible using Click-MUAC device three and the uniMUAC tape). This was

also the case for clinic staff. The results, notably for sensitivity, are higher here than in previously reported mother-MUAC studies. The Click-MUAC device that enabled the classification of both SAM and MAM (prototype three) was the best performing Click-MUAC device.

However, the most surprising aspect of the study was the fact that, while the Click-MUAC devices performed well, the device that performed

best was the uniMUAC tape and the difference in performance was statistically significant. Both mothers/caregivers and clinic staff showed excellent results for sensitivity and specificity in the classification of acute malnutrition (GAM and SAM) using the uniMUAC tape.

Conclusion and next steps

The results of this study indicate that, although the Click-MUAC devices performed well, the uniMUAC insertion tape performed best for mothers and caregivers in classifying the nutritional status of their own children. It is thought that certain new design features of the uniMUAC tape (see Figure 2) may have helped to improve its sensitivity for the classification of acute malnutrition. It is also thought that some design issues (concerns with skin-pinching for Click-MUAC devices one and two and unwieldiness for Click-MUAC device three) may have contributed to reducing the sensitivity of the Click-MUAC devices compared to the uniMUAC tape.

The results for sensitivity for the classification of acute malnutrition by mothers/caregivers are higher than in previously reported studies for all devices (both Click-MUAC and uniMUAC). This may be due to the method of demonstration of the devices, which was a one-on-one demonstration to the mother/caregiver by the study team, whereas previous studies used mass demonstration techniques. Previous studies also used conventional MUAC tapes, whereas this study used a uniMUAC tape with an improved design; this may also have contributed to the increase in the sensitivity of the classifications.

Overall, the findings from the Click-MUAC project help to bolster the evidence that mothers and caregivers can indeed understand MUAC measurement and perform measurements with good sensitivity and specificity. All devices performed well; however the uniMUAC tape performed best and – crucially – can be manufactured more cheaply. AAH strongly supports the mother/family MUAC approach and is now involved in piloting a simplified version of the uniMUAC tape for mothers/caregivers (see Figure 3) in an operational pilot in Isiolo County. Data collection on this stage of the Click-MUAC project is ongoing with the intention of examining the uptake of the approach by mothers/caregivers, its potential impact on admissions and the level of buy-in from the local health system and authorities.

For more information, contact: Angeline Grant, email: agrant@actionagainsthunger.org
Published findings can be found at this link: <http://bit.ly/2EP5sis>

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Evaluation of mobile application to support the treatment of acutely malnourished children in Wajir county, Kenya

Summary of presentation¹

By Emily Keane, Natalie Roschnik, Joanne Chui, Ibrahim Ahmed Osman and Hassan Mohamed Osman



Emily Keane is a Nutrition Advisor with Save the Children, with particular focus on supporting programmes delivering the community-based management of acute malnutrition. Emily has worked for ten years supporting nutrition and health programmes in Africa and Asia.



Natalie Roschnik is Senior Nutrition Advisor with Save the Children UK's Programme Policy and Quality Department, leading a team of advisors to support UK-funded development nutrition programmes in Africa and Asia. Natalie has worked with Save the Children for nearly 20 years, supporting school health and nutrition research and programmes in Africa and Asia.



Joanne Chui has worked on nutrition programming in Kenya and is a registered dietitian. She holds an MSc in Nutrition for Global Health and a BSc in Dietetics.



Ibrahim Ahmed Osman is a Clinical Nutritionist with a BSc in nutrition and dietetics with information technology from Maseno University, Kenya. He currently works with Save the Children International as Reproductive Maternal and Newborn Health Officer in Wajir field office, Kenya.



Hassan Mohamed Osman is Area Programme Manager with Save the Children, managing both humanitarian and development programmes in Kenya. Hassan is a community health expert and management consultant, having worked in the humanitarian and development field for 11 years. Hassan is a registered public health nurse with a BSc in community health and development.

The mobile health application development and piloting was made possible thanks to the financial support of the Office of U.S. Foreign Disaster Assistance (OFDA). The project would not have been successful without the support and contribution of the Kenyan Ministry of Health and County Health Department in Wajir, World Vision (WV), Save the Children (SC) country office staff and participating health workers, community volunteers and caregivers. The project would like to thank the UK Department for International Development (DFID) and the Transform Nutrition Research Consortium for funding the mobile health application evaluation and research.

Location: Kenya

What we know: Integrated management of acute malnutrition (IMAM) is a proven approach to identify and treat acute malnutrition; however its effectiveness is limited if treatment protocols are not followed and data is unreliable.

What this article adds: A mobile health application (app) developed to help health workers deliver IMAM services was evaluated in 40 health facilities in Wajir, Kenya, over one year. The study found that the app reduced the number of reporting errors by 25 per cent; provided caseload and treatment data to decision-makers within 1.3 days of collection; increased the accuracy and reliability of treatment outcome data; and improved health workers' adherence to the IMAM treatment protocol. The study found that effectiveness is dependent on health workers being well trained and having adequate time to manage cases and ongoing software support. Next steps to address challenges include simplification of protocols, working closer with Ministry of Health (MoH) on data management and exploring scale-up linked to existing health services.

Background

World Vision and Dimagi (an international technology development organisation) developed a mobile health app in 2013 to support the integrated management of acute malnutrition (IMAM). The application aimed to guide health workers through IMAM protocols and provide accurate and timely data for district health managers to respond to changes in caseloads and treatment outcomes, manage supplies and inform national statistics. The app was piloted in Chad, Kenya, Mali, Niger and Afghanistan between 2014 and 2016 by World Vision, International Medical Corps (IMC) and Save the Children (SC) (Frank et al, 2017). In January 2015 SC, through Transform Nutrition, launched a study to evaluate the impact of the IMAM app on the quality of IMAM treatment and data in 40 health facilities in Wajir, Kenya, including remote locations.

How the IMAM app works

The IMAM app is used on tablets or mobile phones and provides health workers with simple, step-by-step guidance on the assessment, treatment or referral of children visiting the IMAM programme. The app is built on the open source CommCare platform, which uses a touch swiping function to take health workers through IMAM

steps. It reminds them of the treatment protocol, counselling messages and return dates and calculates z-scores and numbers of ready-to-use therapeutic food (RUTF) sachets needed. It also records each child's information, making child follow-up and defaulter tracing easier. Data are regularly uploaded to the 'cloud', which enables the provision of live and accurate data for county-level management.

Methods

Forty health facilities from three sub-counties in Wajir were selected and randomly allocated to the intervention and control groups (See Figure 1). The 20 intervention facilities received a tablet with the IMAM app and 31 health workers from these facilities were trained over three days to use the tablet. Routine child-level IMAM data during the one year prior to the study were collected retrospectively from paper registers in all 40 facilities (N=1,200) to estimate accuracy of reporting and similarity between the intervention and control groups. After the app was introduced, the same paper register data was collected from the 20 control health facilities (N=903) and compared with the equivalent data

¹ Presentation at the Action Against Hunger Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.

Figure 1 Description of the mobile app intervention

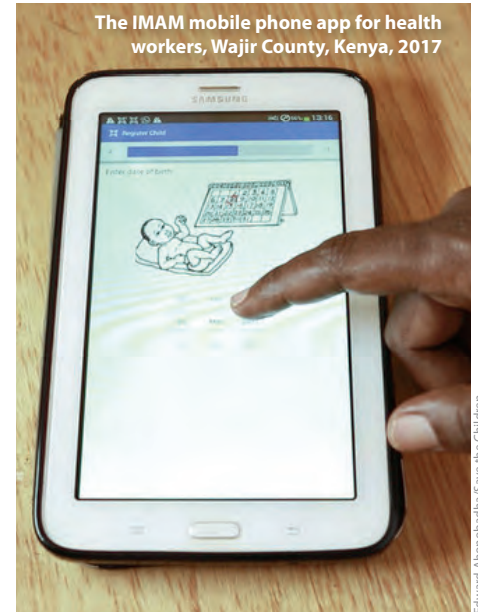
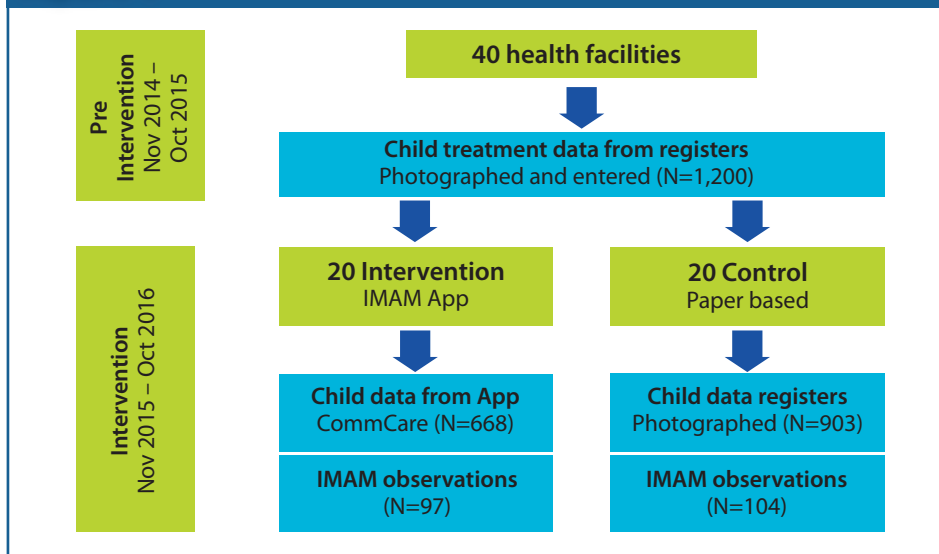
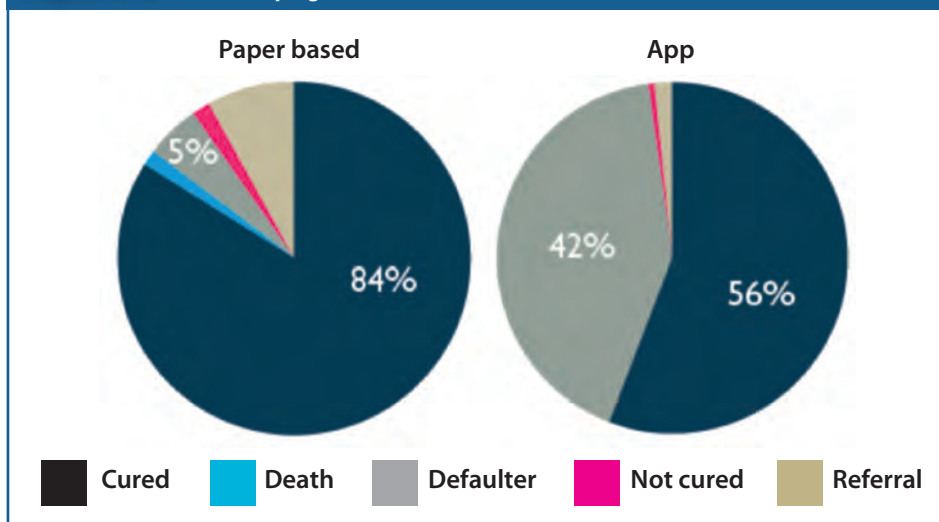


Figure 2 Proportion of children cured, defaulted, died or not cured when they exited the IMAM programme



generated by the app in the 20 intervention facilities (N=668) over the same one-year period. Direct observations of health workers providing IMAM services were carried out in both groups over three months to assess adherence to IMAM protocols.

Preliminary results

The app reduced data errors

Only 73 per cent of data from the 20 control health facility registers was usable (from the intervention period). The rest was either missing, unreadable or implausible. Exit data in particular was lacking; only 46 per cent of exit data and 37 per cent of data on exit outcome was usable. By contrast, 100 per cent of patient data from the 20 intervention health facilities via the IMAM app was usable and available. There were no missing or unreadable data because the app identified gaps and errors and prompted the health workers to correct and complete them while they were assessing the child.

The app provided 'live' data to decision-makers

In the control facilities using a paper-based system, it took several weeks for data on child treatment to be available to decision-makers. At the end of each month, health workers compiled summary reports of aggregated data from individual treatment data from the registers and physically sent the report to the sub-county office, where data officers entered the data into the national online Health Management Information System (HMIS). It typically takes 40 days from the compilation of monthly reports to data becoming available. It was also common for reports and data to be lost in the transfer process. When the data was entered into the HMIS it could be accessed and viewed at sub-county, county and national-level management teams.

App data took on average 1.3 days (0.4 – 9 days) to become available in the HMIS. When health workers saw a patient, data were collected

and stored on the local memory of the tablet in real time. When the tablet had access to the internet these data were then automatically synced and uploaded onto the cloud server, where the data could immediately be viewed by management teams at all levels. The variation in time for data to be uploaded between health facilities reflects variations in internet signal strength between locations.

The app improves adherence to the IMAM protocol

Ninety-nine per cent of MUAC measurements observed in the intervention group were conducted correctly, compared with 84 per cent in the control group. MUAC measurement errors in both groups included misplacing the MUAC tape along the arm, lifting the arm while measuring and pulling the tape too tight or too loose, which can lead to misdiagnosis. The app has visual prompts and instructions to remind the health worker how to take measurements accurately, which helped to reduce errors.

Across the 18 recommended medical checks that should be performed to identify other health problems, 40 per cent of tests were carried out in the intervention group compared to 11 per cent in the control group. Only 13 per cent of children observed in the control facilities underwent an appetite test compared to 39 per cent in the intervention facilities. Although the app increased the likelihood that IMAM steps are followed, many protocols were still not carried out in the intervention group, despite the app prompting health workers to do so. Focus group discussions with health workers showed that time constraints were the main reason for skipping medical checks, as well as having no dedicated space within health facilities to conduct the appetite test in privacy (desired by many caregivers).

Cure rates may be overestimated in the paper-based system

As the individual child data from the registers had many issues with missing and unusable data,

A health worker screening a child for malnutrition, using the IMAM mobile app, Wajir County, Kenya, 2017



Edward Ahomoba/Save the Children

data that were entered into the district HMIS from aggregated summary reports were analysed and compared to data obtained from the app. Reports from the 40 study facilities prior to tablets being introduced stated 95 per cent cure rates, suggesting that the majority of children who were admitted to the IMAM programme were cured. The app data, however, tells a very different story. In the 20 intervention facilities, only 56 per cent of children were cured and 42 per cent had defaulted compared to 84 per cent and 5 per cent respectively in the control facilities over the same period (See Figure 2).

Defaulters are often linked to operational issues such as RUTF stockouts at the health facility or long distances between home and health facility, which reduce caregivers' willingness and ability to attend the IMAM service. Baseline assessment showed no significant difference between intervention and control facilities in these factors. The vast difference in cure rates suggests therefore that cure rates may be over-reported by health workers using the paper-based system. Assessment of individual treatment data from the registers showed that health workers rarely classified children as defaulters, even if it appeared that they had missed three consecutive visits. This may be because the quality of individual treatment data was very difficult to interpret, given that so much data were missing and the lack of consistency in how data were recorded. It is also very difficult to summarise data from individual treatment records into monthly summary reports, which may also contribute to errors in the reporting of defaulters.

Many children were misdiagnosed in the paper-based system

A reanalysis of height, weight and MUAC measurements found that weight-for-height Z-score (WHZ) is the most complex method for health workers in assessing a child, as it relies on the health worker first correctly measuring the child's height and weight and then identifying the WHZ from a three-way table. A reanalysis of all WHZ scores from the raw weight and height data in the paper registers found that 28 per cent of WHZ scores were incorrectly calculated in control facilities. A reanalysis of children's admission weight, height and MUAC data found that 17 per cent of children were wrongly admitted to the IMAM treatment programme (they were not severely malnourished).

The mobile app automatically calculates the WHZ score based on the entered height and weight of the child, therefore reducing errors in the classification of WHZ and eliminating incorrect admissions. Data using the app were found to be 99.3 per cent accurate (with the small number of errors being due to issues with app functionality early on, which were later corrected).

Operational challenges

Even when using the app, health workers continue to miss key IMAM steps, particularly relating to the medical checks and appetite test. This is because the treatment protocol takes time and health workers working in remote, low-resource health facilities with high caseloads are forced to take shortcuts.

The effectiveness of the app relies on health workers being properly trained and supported and the app functioning well. This requires ongoing support from software developers for software improvements and bug fixing. In instances where issues with bugs were discovered but not quickly resolved, it impacted on health workers' motivation and willingness to use the tablet and app. Due to the rapid turnover and movement of health workers between health facilities, ongoing refresher training and supportive supervision during field visits were essential.

Conclusions

The paper-based systems did not provide reliable data in good time to allow decision-makers to respond to surges in caseloads and address operational challenges. The IMAM mobile app improved adherence to the IMAM protocol in intervention facilities and provided real-time, accurate data to decision-makers.

The IMAM app has the potential to dramatically improve the speed of response to surges in caseloads, identify and resolve operational bottlenecks, and improve coverage, quality of care and treatment effectiveness. However, its effectiveness is dependent on health workers being well trained and having adequate time to manage cases, and ongoing software support being available to ensure that the app functions properly.

Next steps

A range of next steps are currently being explored for use of the mobile app, pending further funding, including:

- Simplification of protocol: the experience of

implementing the research showed operational challenges for health workers working in busy clinics with high caseloads to deliver the treatment protocol in its entirety and to a high quality, pointing towards the need for simplifications in the treatment protocol.

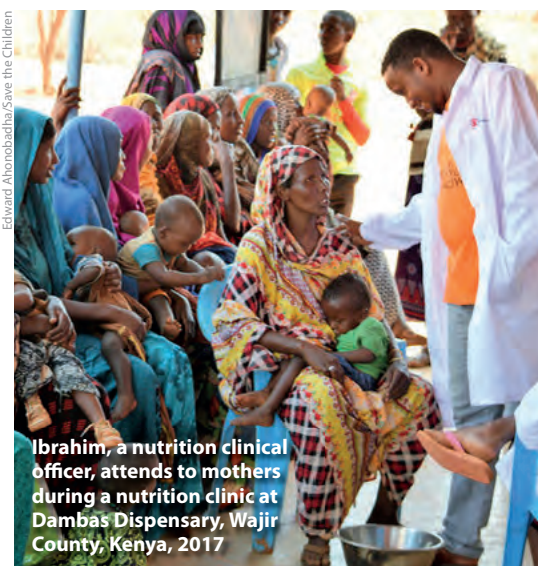
- Expansion of the app to other services, or linkages to other mHealth solutions: as the management of acute malnutrition is a service that is increasingly integrated into health systems, there are opportunities to add or link IMAM app components to other mHealth solutions for other services that health workers deliver; such as integrated management of childhood illness, antenatal care and postnatal care.
- Enhanced use of data by decision-makers: there are opportunities to work more closely with the ministry of health staff to analyse and respond to the data that is available in 'real time', particularly responding with resources (staff and supplies) to surges in case loads, especially in drought/emergency contexts.
- Scale up within the health system: there are a number of outstanding operational and research questions relating to scaling up mHealth interventions within a health system that need to be answered, including: costing and cost effectiveness of the intervention; how to link data directly into the national reporting system (without the need for additional data entry); linkages with an expanded set of services; and data protection and cyber security issues.

For more information, contact: Emily Keane, email: e.keane@savethechildren.org.uk

A video of the mobile app can be downloaded from <http://bit.ly/2Gsazbq>

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Edward Ahomoba/Save the Children

Ibrahim, a nutrition clinical officer, attends to mothers during a nutrition clinic at Dambas Dispensary, Wajir County, Kenya, 2017

Relapse after treatment for moderate acute malnutrition: Risk factors and interventions to prevent it

Summary of presentation¹ based on published research²

By Heather Stobaugh and Mark Manary



Dr Heather Stobaugh has a PhD in Food Policy and Applied Nutrition and works in global nutrition research at RTI International. She has experience working as a consultant and technical advisor for development and emergency nutrition programmes around the world and conducting rigorous research, clinical trials and operational research with Washington University in St. Louis and Tufts University.



Dr Mark J Manary was one of the first champions of ready-to-use therapeutic food (RUTF) for use in the community-based management of acute malnutrition (CMAM). The scope of his work includes developing and introducing novel foods, active prevention schemes and gut microbiota and metabolome in kwashiorkor and marasmus, and devotes several months each year to overseeing clinical and translational studies in Malawi, Sierra Leone and Ghana.

This research was supported by a sub-award funded by Family Health International under cooperative agreement/grant AID-OAA-A-12-0005, which was funded by the United States Agency for International Development.

Location: *Malawi*

What we know: Little is known on post-discharge outcomes of children treated for moderate acute malnutrition (MAM).

What this article adds: A cluster-randomised controlled trial in Southern Malawi assessed whether a package of five health and nutrition interventions helped sustain recovery for one year after MAM treatment. A total of 1,497 children who recovered from MAM at 21 supplementary feeding programme (SFP) study clinics were enrolled. The treatment group received counselling (as per control) and on discharge were given eight weeks of lipid-based nutrient supplement (LNS), albendazole, 14 weeks of zinc supplementation, an insecticide-treated bed net and malaria chemoprophylaxis during the rainy season. Fifty-one per cent sustained recovery for one year. Many children experienced multiple relapses and relapsed cases took longer to recover on admission. Half of all relapses occurred within three months of discharge. There was no significant difference between relapse-free survival curves for the intervention and control groups; linear growth and illness patterns were also similar for both. The strongest predictors of relapse or death after SFP discharge were lower anthropometric measurements during SFP treatment. Findings suggest not all MAM children carry the same risk; programming implications need further examination.

Background

Children with moderate acute malnutrition (MAM) are generally treated with a supplementary food for several weeks in a community-based supplementary feeding programme (SFP) until they are discharged as recovered after achieving an anthropometric threshold. Little is known about post-discharge and longer-term health and nutrition outcomes. This study assessed whether a package of simple and affordable health and nutrition interventions, added after achieving anthropometric criteria for nutritional recovery from MAM, could improve the proportion of children who sustained recovery for one year after treatment. This cohort was also used to explore factors related to sustained recovery, which remains an elusive but important goal in SFPs.

Methods

This study was a cluster-randomised, controlled, clinical effectiveness trial conducted in southern Malawi. Children aged 6-62 months³ were enrolled from 21 SFPs at the time of recovery from MAM (mid upper arm circumference (MUAC) \geq 12.5 cm). Upon enrolment the control group received nutrition counselling, which consisted of messages regarding optimal complementary feeding, care-

giver recognition of common childhood illnesses and appropriate health-seeking behaviours. The treatment group received the same counselling plus a package of five additional interventions, including: 1) 40 g/d of a lipid-based nutrient supplement (LNS) for eight weeks after SFP discharge; 2) a single dose of deworming medication (albendazole) at SFP discharge; 3) a 14-day course of zinc supplementation starting at the time of SFP discharge; 4) an insecticide-treated bed net at SFP discharge; and 5) sulfadoxine-pyrimethamine for malaria chemoprophylaxis once a month for three months during the rainy season. These interventions have all individually been proven safe, effective and affordable in this context for improving the overall health of children.

Informed consent was obtained from all caregivers. Upon enrolment, anthropometric measurements were taken and information on demographic characteristics, health history and household food insecurity was collected. Children were followed for one year and reassessed at follow-up visits at one, three, six and 12 months post-SFP discharge. Additional monthly visits were scheduled during the height of the rainy season (December through February), when malaria pro-

phylaxis was also provided at the intervention sites. Caregivers were also encouraged to return to the clinic at any time they perceived their children's health or nutritional status to worsen. The primary outcome was the proportion of children who sustained recovery, which was defined as maintaining a MUAC \geq 12.5 cm without bipedal oedema at all follow-up visits during the 12 months after initial recovery from MAM.

Relapse-free survival curves were developed with the use of the Kaplan-Meier method and were compared using the log-rank test. A Cox proportional model for a multivariate analysis

¹ Presentation at the Action Against Hunger Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017. A video of the presentation can be found here: <https://youtu.be/pawPaxhhiZo>

² Stobaugh HC, Bollinger LB, Adams SE, Crocker AH, Grise JB, Kennedy JA, Thakwalakwa C, Maleta KM, Dietzen DJ, Manary MJ, et al. Effect of a package of health and nutrition services on sustained recovery in children after moderate acute malnutrition and factors related to sustaining recovery: a cluster-randomized trial. *Am J Clin Nutr* 2017;106(2):657-66.

³ Children were enrolled into SFP at 6-59 months. If a child was 59 months upon SFP enrolment and received treatment for 12 weeks, s/he could be 62 months old at discharge, which was the time of study enrolment; therefore the enrolment criteria for age was 6-62 months old.

was used to identify risk factors for a failure to sustain recovery throughout the follow-up period. The outcome variable in the Cox regression model was either a poor outcome (defined as relapsed to MAM, developed severe acute malnutrition (SAM), or died) compared with a sustained recovery or unknown outcome.

Results

A total of 1,497 children recovered from MAM at 21 SFP study clinics and were enrolled in the study. After excluding ten children due to incorrect enrolment criteria, 1,487 children were included in the final analysis, with 718 children at control sites and 769 at 11 intervention sites.

Of the 1,487 children included in the final analysis, 754 (51 per cent) sustained recovery throughout the 12-month follow-up period, whereas 541 (36 per cent) relapsed to MAM; 73 (5 per cent) developed SAM; 15 (1 per cent) died, and 104 (7 per cent) were lost to follow-up. Many children experienced multiple relapses; of those who relapsed to MAM only, 26 per cent, 10 per cent, and 5 per cent of children relapsed 2, 3, and ≥ 4 times, respectively. In addition, of those who developed SAM, 69 per cent of children also relapsed to MAM more than once. Children who relapsed to MAM multiple times required longer treatment for those relapses during the follow-up period than children who relapsed only once ($P < 0.001$). Furthermore, MUAC dropped significantly in children who relapsed to MAM multiple times compared to children who relapsed only once ($P < 0.001$). Risk of relapse or death was highest during the period immediately after discharge from an SFP, with approximately 50 per cent of all relapses (to either MAM or SAM) occurring within the first three months of initial recovery from MAM.

Analysis with the use of the Kaplan-Meier method showed no significant difference between relapse-free survival curves for the intervention

and control groups ($P = 0.380$; log-rank test). Secondary outcomes, including linear growth and illness during the 12-month follow-up period, were similar across both groups. In a Cox regression model, factors that had a protective effect against relapse or death included: having a larger MUAC on SFP admission ($P < 0.01$); having a larger MUAC on SFP discharge ($P < 0.001$); and having a higher weight-for-height z-score (WHZ) on discharge ($P < 0.01$). Children were also less likely to relapse or die if they received RUTF as opposed to ready-to-use supplementary food (RUSF) during treatment ($P < 0.05$).

Discussion

This study has shown that the provision of a package of basic health and nutrition interventions to children recovering from MAM did not result in a significant increase in the proportion who sustained recovery for one year. Nearly half of all children who successfully recovered from MAM failed to sustain that recovery for one year following SFP treatment. A diversity of poor outcomes was observed among those who failed to sustain recovery. Some children experienced one short, mild episode of MAM and quickly recovered after re-enrolment in an SFP to remain free from MAM or SAM thereafter; while other children repeatedly relapsed with more severe episodes of acute malnutrition that required long treatment without any sustained recovery. These vastly different trajectories highlight the fact that, although children in SFPs are all classified with the same type and severity of malnutrition (i.e. MAM), not all children with MAM are at the same risk of poor short- and long-term outcomes. This result suggests that a uniform approach for treating all children with MAM may not be best for ensuring that all reach sustained recovery.

The strongest predictors of relapse or death after SFP discharge were lower anthropometric measurements during SFP treatment; therefore

the severity of malnutrition at admission to feeding programmes is linked to increased risk of mortality and relapse in children after treatment. Likewise, the higher the MUAC and WHZ score on discharge, the more likely the child is to sustain recovery. It is possible that children who present with more severe malnutrition (i.e. lower MUAC) have additional underlying biological deficiencies that take longer to recover than can be identified by simple anthropometric measurements. Children with higher discharge anthropometric measurements may have reached a better overall health status and are more resilient when exposed to new infections that might otherwise precipitate relapse. This does not necessarily translate to the need for longer time receiving supplementary food in an SFP; rather, treatment protocols may need to adapt to go beyond the mere provision of supplementary food.

Conclusion

Children who successfully recover from MAM after receiving treatment in an SFP are likely to relapse during the following year. A package of basic health and nutrition interventions provided at the time of discharge and during the rainy season did not significantly reduce the proportion of children who sustained recovery. Although most SFP protocols provide the same treatment to children with MAM regardless of the anthropometric measure, our results suggest that treatment and follow-up procedures may benefit from individualisation. Our findings also suggest a potential benefit of treating high-risk children with MAM to higher anthropometric targets to reduce relapse and mortality after discharge. However, this treatment would certainly increase the immediate cost (as well as having long-term cost savings), which is an essential factor to consider before any programmatic change.

For more information, contact: Heather Stobaugh, email: HStobaugh@rti.org



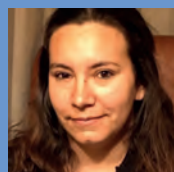
Child being treated for acute malnutrition in Malawi, 2014

Kim Hedge

Development of a SAM photo diagnosis app

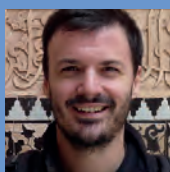
Summary of presentation¹

By Laura Medialdea Marcos, Iván Molina Allende and Antonio Vargas Brizuela



Laura Medialdea Marcos is Principal Researcher for the SAM Photo Diagnosis project for Action Against Hunger Spain. She is a PhD candidate in the

application of geometric morphometric techniques to physical anthropology.



Iván Molina Allende is the project manager for the SAM Photo Diagnosis project for Action Against Hunger Spain. He has

experience in research and evaluations for development cooperation projects.



Antonio Vargas Brizuela is Head Senior Nutrition Advisor at Action Against Hunger Spain. Antonio is a medical doctor specialising in public health and tropical medicine with over 17

years of experience as a general practitioner and health adviser, many of them in development projects in Latin America and Africa.

Location: Senegal

What we know: There are limitations to anthropometric identification of severe acute malnutrition (SAM) in children.

What this article adds: Geometric morphometric (GM) techniques have been used to develop an Android mobile app prototype to diagnose SAM, based on photos of body parts. The method was validated based on 150 healthy Spanish children. A sample of 150 normal weight and 150 Senegalese children with SAM (weight-for-height and MUAC-for-age <-3 z score) was used to quantify morphological differences. The project found significant morphometric differences between Spanish individuals according to their age and sex ($p < 0.0001$); two 'shapes' have been identified coinciding with growth peak. Diagnosis of SAM was 93 per cent based on whole body and 100 per cent based on body parts. Further modifications to the app have been undertaken to improve functionality. Further work includes increasing sample sizes to test the approach, technological advances to improve automated diagnostics and user friendliness, and ultimately integration within routine health systems (as ehealth tools).

Background

The SAM photo diagnosis app is an innovation that responds to the need to improve screening, diagnosis and treatment of severe acute malnutrition (SAM). Anthropometric indicators currently used to diagnose SAM have limitations at population level. Weight-for-height z-score (WHZ) calculation requires well trained health staff and accurately calibrated equipment in good condition. Mid upper arm circumference (MUAC) is easier to use by non-health professionals and requires simpler and cheaper equipment; however intra-observer error is an issue. Therefore, measurement errors are quite likely to take place in SAM screening and diagnosis (Corsi et al, 2017; Marrodán et al, 2013; WHO, 2006). In the last decade there has been a huge technical advance in the field of geometric morphometric (GM) techniques (Slice, 2005; Zelditch, 2004), which has opened up more research into the study of the morphometric variations among biological forms. GM techniques consist of a collection of tools capable of registering the shape of objects for visualisation and quantification of the differences between them. This approach offers a new, innovative opportunity to assess SAM in children.

The potential

The study of the variation in body shape of children under five years of age had not previously been explored with GM techniques. This area is of interest not only for the diagnosis of SAM but also (among other uses) for the study of child growth and its relationship to a wide range of factors, such as environmental, genetic and sociocultural influences. In addition, work is ongoing to involve the community as active agents in the prevention and diagnosis of SAM. The usability and adaptability of tools to support this, suited to local sociocultural realities and sensitive to local contexts and sustainability issues, are highly relevant.

The innovation

The project hypothesised that GM techniques are able to identify shape differences between children of normal weight (NOR) and those with SAM (aged 6-59 months). The main objective of the project was to design a prototype for an Android mobile application (app) which, based on GM techniques, could be validated as an effective and reliable technique for in situ diagnosis of SAM by photographing parts of the body. The development of this tool could help to increase

the diagnostic coverage of SAM and thereby strengthen community-based management of acute malnutrition (CMAM) programming at all levels (from health facility to community level) and for a variety of users, such as national health workers, humanitarian workers and academics.

Methods

A sample of 150 healthy NOR children (percentile (p)30-p70 WHZ and/or MUAC for age) between 6 and 59 months of age of Spanish origin was used to validate the methodology designed to record and assess the morphological changes of the body by age and sex. Subsequently, a sample of children between 6 and 59 months of age of Senegalese origin was sub-divided into 150 healthy NOR children and 150 SAM children without complications and used to quantify the morphometric differences of this population according to their nutritional status. SAM cases fulfilled both WHZ and MUAC criteria (WHZ and z-score MUAC for age <-3): children with both deficits were chosen to visualise and quantify morpho-

¹ Presentation at the Action Against Hunger Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.

metric differences among extreme morphologies. Information about the present study was provided to participating children's families, who signed an agreement form for both participation and acceptance of privacy policies concerning data management. Photographs in anterior view were recorded for each participant in controlled conditions, photographing the same predetermined body regions (extremities and trunk) in the same position for each child, with the child wearing underwear. Although not possible in the prototype, the final app will automatically extract body contour and destroy the real images after the diagnosis is made, as the contour alone is enough to assess nutritional status. This will provide an important level of child protection. The next step was to develop a classifier to allow an effective diagnosis. Finally, a prototype of an Android app was designed.

Results

Our results show significant morphometric differences between Spanish individuals according to their age and sex ($p < 0.0001$). Two highly differentiated shapes corresponding to the children under and over 24 months were visualised, coinciding with the particular growth peak of the child. When diagnosing SAM, an accuracy of SAM diagnosis above 93 per cent in the Senegalese population was obtained when studying the whole body, increasing to 100 per cent when analysing parts of the body separately. An app

prototype which replicates the experiment carried out has already been developed. This prototype permits the systematic registration of photographs as well as image processing and application of a diagnostic algorithm. A methodology to code individuals has also been included. Such a methodology will allow sending and receiving data through the app as well as data storage in a web service. An auxiliary desktop app was also developed to manage and configure the mobile app for the generation of templates and for image processing obtained from digital photographs (made through regular camera shots by third parties) for future research.

Future steps

Future steps include scientific, technological and human-centred design approaches. Concerning the scientific approach, the work will focus on increasing sample sizes to improve diagnostic accuracy, investigation of morphological variability of SAM among populations, and exploration and study of different malnutrition profiles (including WHZ only, MUAC only and stunting). Technological advances will include deep learning and machine learning methods (an artificial intelligence that allows the device to learn and improve the accuracy of the diagnostic functionality as the sample size grows) to automate image registration, processing and classification (where aspects of diagnosis that currently require manual intervention from the user will be automated, such as identifi-

cation of landmarks on the child's body). Finally, once the app is functional, it will be upgraded with a user-centred design, with interactive and didactic functionalities, to enable adaptation to specific contexts and allow integration into routine health systems as an ehealth (digital health) tool.

A video about the SAM photo diagnosis app can be found here: <http://bit.ly/2HDbvZk>

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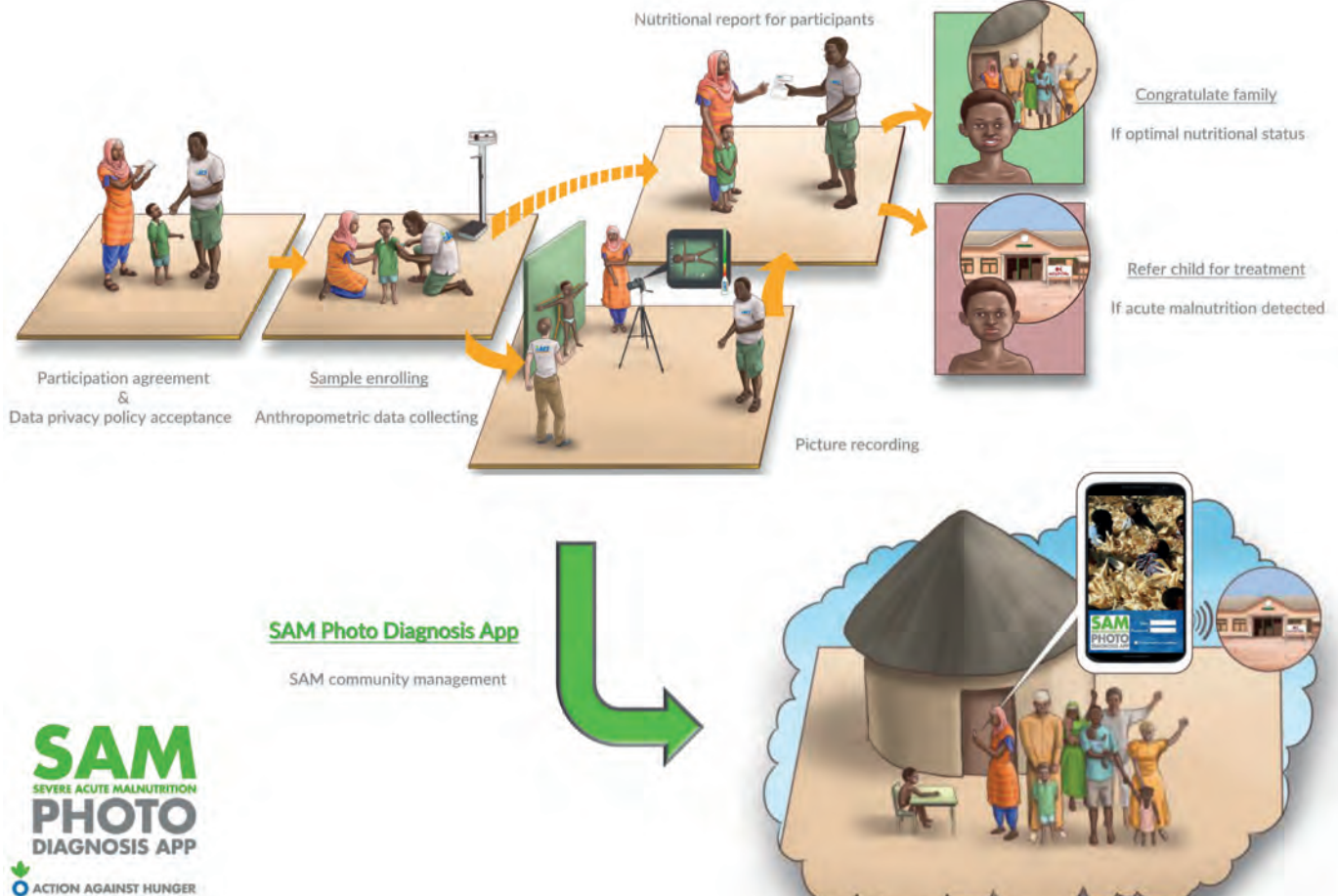
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This research was funded by the PATH-led and UK Department for International Development (DFID)-funded Nutrition Embedding Evaluation Program (NEEP), with co-funding from the International Food Policy Research Institute (IFPRI) and Save the Children. The research was conducted by IFPRI, University of Malawi Chancellor College, Wadonda Consultants and Save the Children. The authors would also like to thank all the national, district and community partners, particularly the Ministry of Gender, Children, Disability and Social Welfare; the Ministry of Agriculture, Irrigation and Water Development; the Department of HIV/AIDs and Nutrition under the Ministry of Health; and the 60 NEEP communities.

Improving child nutrition and development through community-based child care centres (CBCCs) in Malawi

Summary of presentation¹

By Aisha Twalibu, Natalie Roschnik, Aulo Gelli, Mangani Katundu, George Chidalengwa, Peter Phiri and Helen Moestue

Location: *Malawi*

What we know: Linking nutrition, agriculture and education may benefit child nutrition and development.

What this article adds: Community-based childcare centres (CBCCs) are community-managed rural pre-schools serving 45 per cent of the child population. Provision of mid-morning porridge is a key incentive to attend. Save the Children and University of Malawi Chancellor College developed a nutrition and agriculture training programme for CBCCs to overcome identified challenges to CBCC food provision. Support included provision of seeds and chicks, demonstration gardens, formation of village savings and loans (VSL) groups to help households start small businesses, purchase supplies and for emergency use, and development of nutritious recipes for CBCC and household use. An IFPRI-led cluster randomised trial evaluated the impact of the programme at one year. Preliminary findings include improved caregiver knowledge of nutrition, household and individual dietary diversity; improved diversity of agricultural production; improved pre-school meal quality and frequency; improved dietary intake of both pre-schoolers (children aged 3-6 years) and their younger siblings (children aged 6-4 months); and a protective effect on height-for-age z-scores of children aged 6-24 months. Sector divides were not a barrier at community level.

Background

Community-based childcare centres (CBCCs) are rural pre-schools managed by the community to provide a safe and stimulating learning environment to children aged three to six years and better prepare them for school. There are around 12,000 CBCCs in Malawi, serving approximately 45 per cent of the pre-school population. A key moment in the CBCC day is mid-morning porridge, which is prepared by parents with food contributions from the community. If porridge is not provided, children tend to stay at home and eventually the CBCC closes. A mapping exercise of 690 CBCCs in four districts conducted by the World Bank in 2011, which involved visiting each CBCC, found that half the CBCCs were closed. The main reason cited for closure was lack of food (Newman, McConnell and Foster, 2014). CBCC closure is a particular problem during the lean season when food insecurity is high.

found that some communities were still able to provide food for the CBCCs all year round, against all odds. Community capacity and commitment, leadership, organisation and communication between the CBCC and community were key to CBCC success in acquiring and providing meals. The research also found that, with basic training, communities could prepare more nutritious meals in the pre-schools (rather than basic maize porridge) and that these meals were then replicated at the household level, potentially benefitting other household members, including younger siblings (Katundu, 2014).

The intervention

Building on the findings and experiences described above, Save the Children and University of Malawi Chancellor College developed a nutrition and agriculture training programme for CBCCs. In it CBCCs were

However, separate research conducted by Save the Children in 110 CBCCs in 2014

¹ Presentation at the Action Against Hunger Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.

Box 1 New recipes promoted in the CBCC programme

Parents were trained to prepare a wide range of meals using locally available products, which were then prepared in the CBCCs and in the households, including:

- **Porridges:** maize or rice porridge enriched with groundnut powder, dry fish powder, dry vegetables, mango, soya, millet, beans, carrot and oil.
- **Legume snacks:** pigeon pea sausage, cassava kidos (boiled cassava dipped in eggs and vegetables and fried), soya coffee, sweet potato doughnuts, peanut butter and soya snacks.
- **Vegetable snacks:** pumpkin-leaf meatballs (made with pumpkin leaves, salt and eggs), orange-flesh sweet potato juice, sweet potato leaf juice, dried vegetables (for preservation), pumpkin leaves and amaranthus in groundnut powder and sweet potato leaf snack.
- **Fish products:** dry fish with groundnut powder, dry fish with tomato and onion.
- **Fruit products:** pawpaw, guava and lemon juice, pawpaw relish (unripe pawpaw cooked with groundnut powder, tomato and onion) and banana bread.
- **Soya milk**

used as a platform for training and practising new recipes and agricultural techniques to be replicated at household and community levels. The programme drew together the (WALA) programme (funded by USAID Food For Peace), the CBCCs wraparound programme (funded by the Conrad N Hilton Foundation) and the Malawi recipe book and guide for agricultural production practices (a Government of Malawi publication). National and district-level partners representing early childhood development (ECD), nutrition and agriculture provided input to the programme. The intervention had an agriculture and a nutrition component, described below.

Agriculture component

Two three-day agricultural production trainings were conducted in each CBCC community by trained Agriculture Extension Development Officers (AEDOs) prior to planting times (December and August) and targeting parents, CBCC management committee representatives, lead farmers and community agents (community focal points for the project). The training focused on land preparation; selection of nutritious crops (local orange maize, orange-flesh sweet potatoes, soya beans, pigeon peas, cowpeas, groundnuts, green leafy vegetables, carrots, spinach and tomatoes); production techniques; pest and disease management; manure making and application; harvesting; storage; and processing. The CBCC garden was used as a demonstration site and a place to try new agricultural production techniques and learn ways to utilise the foods. The trained household members (mostly women caregivers) worked in the garden with regular support from AEDOs. Households and CBCCs received crop and vegetable seeds and sweet potato vines. They were also trained in chicken production and each CBCC and household received 30 chicks and ten chicks respectively to boost production (and consumption) of animal-source foods.

Village savings and loans (VSL) groups were formed to help households save and access funds

to start small businesses, purchase supplies for the CBCC and use in case of emergency. The VSL groups were also used to discuss business management and nutrition. Farmers were subsequently organised into groups to increase their bargaining power when purchasing inputs, such as seeds and fertilizer, and to sell their produce.

Nutrition component

Nutrition training was conducted by AEDOs and government nutrition assistants trained by University of Malawi Chancellor College targeted CBCC management committee members, CBCC caregivers (teachers), lead farmers and parents. The training focused on essential nutrition and hygiene practices; nutritious food selection in different seasons; food storage, preservation and preparation; CBCC meal planning; and adaptation for the household and younger children. Trainings combined theory and practice, including recipe presentations and preparation in small groups, and discussions of their nutritional value and alternatives when certain foods are unavailable. Since parents take turns preparing CBCC meals, parents continued to practise new recipes at the CBCC, which could then be replicated at home, receiving ongoing support from community agents. Box 1 describes the recipes promoted. The most popular ones taken up in the CBCCs were the enriched porridges (with groundnut, vegetable and fish powder) and sweet potato doughnuts. The others were mainly taken up at household level.

The evaluation

With funding from the PATH led, DFID-funded NEEP programme, IFPRI and Save the Children, a cluster randomised trial was set up to evaluate the impact of the CBCC nutrition and agriculture intervention on pre-school meals (frequency and quality), household production and diets and the nutritional status and development of pre-school children and their younger siblings. The evaluation was led by IFPRI in partnership with University of Malawi Chancellor College and Save the Children.

The study was conducted in 60 rural communities with CBCCs supported by Save the Children's ECD programme in Zomba district. The evaluation combined quantitative and qualitative methods with two rounds of surveys timed one year apart, including child, caregiver, household, community and CBCC-level data collection. The 60 communities were randomly assigned to the intervention (described above) or a control group. The evaluation targeted all children aged 0-6 years in the 60 selected communities and their parents. The primary reference group was children aged 3-6 years at baseline; the secondary reference group was their younger siblings aged 6-24 months at baseline. Study outcomes included individual dietary intake and dietary diversity scores, household food production (quantity and diversity), anthropometry and child development. A total of 1,200 households were surveyed (20 per community). The study protocol has been published and can be consulted for further details (Gelli et al, 2017). A follow-up survey was conducted at the end of 2017 to examine longer-term trends and is currently under analysis.

Preliminary findings

Preliminary results (in press) found that, within one year of implementation, the intervention improved caregiver knowledge of nutrition, household and individual dietary diversity, diversity of agricultural production, and pre-school meal quality and frequency. It also improved dietary intake of both the pre-schoolers (3-6 year-olds) and their younger siblings (aged 6-24 months), driven by a higher frequency of consumption of nuts, pulses, fruit and vegetables. Most surprisingly, the intervention had a protective effect on height-for-age z-scores of children aged 6-24 months, preventing the steady decline observed in the control group.

Lessons learned

This project showed that community pre-schools can provide an effective platform for behaviour change and scaling up nutrition and agricultural practices. CBCCs are highly valued by the community because they provide childcare and prepare young children for school. Since food insecurity is one of the main underlying barriers to CBCC success, integrating agriculture and nutrition capacity-building activities within the CBCC helps address multiple problems (food insecurity, malnutrition and developmental delays) at the same time, supporting the goals of three sectors that tend to work in parallel (education, nutrition and agriculture). Unlike primary schools, CBCCs are small (around 40-50 children per centre) and entirely community-managed. The community therefore has the mandate and incentive to find solutions and, in most cases, has a system in place to provide daily meals to children in the CBCCs. This intervention is simply building the capacity of the community to improve what it is doing already. The strong community and parent engagement and ownership means the benefits trickle down to the household and younger siblings and promote long-term sustainability. Although working across sectors comes with several challenges, particularly around coordination of a large number of stakeholders with different agendas, we have found that the sector divides are predominantly at national or programme level, not at community level.

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A three-minute video of the intervention is available at <https://vimeo.com/219710521>

A short blog about the intervention can be read at: <http://bit.ly/2uqLPY7>

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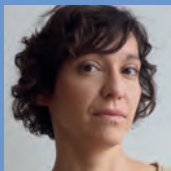
Short and long-term droughts, food security and child mortality in Ethiopia: Can sub-national surveys tell us more about the success of mitigation efforts?

Summary of presentation¹

By Tefera Darge Delbiso, Chiara Altare, Jose Manuel Rodriguez-Llanes, Shannon Doocy and Debarati Guha-Sapir



Tefera Darge Delbiso is a Research Associate with the Center for Research on the Epidemiology of Disasters (CRED). He has a multidisciplinary background, broad and progressive work experience in research, teaching and consultancy, and an extensive record of publication in reputable journals.



Chiara Altare holds a PhD and an MSc in Public Health from the University of Louvain, Belgium. She has ten years' experience in research and evaluation in development and humanitarian settings and is currently working as Impact

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Jose Manuel Rodriguez-Llanes is a disaster and conflict epidemiologist. He obtained his PhD from the CRED, Louvain School of Public Health, Belgium. He is currently a scientific officer at the European Commission Joint

Research Centre, where he investigates the measurement and drivers of resilience to food and nutrition security in disaster and conflict settings.



Shannon Doocy is an Associate Professor with the Johns Hopkins Center for Refugee and Disaster Response. She has worked in numerous countries in collaboration with United Nations agencies, governments and non-

government organisations, and has published extensively on the impact of natural disasters and conflict on public health in emergencies.



Professor Debarati Guha-Sapir is the Director of the CRED and a Professor at Université catholique de Louvain. She has been involved in field research and training in emergency and humanitarian issues for more than 30 years.

The authors would like to thank all agencies that conducted the surveys and shared their reports with the Complex Emergency Database team, FEWS NET for providing the food security data, and Global Drought Monitor for the drought data. This research was supported by the Association pour l'Epidemiologie de Désastres, Université catholique de Louvain and Fond National de Recherche Scientifique.

Location: Ethiopia

What we know: There is a lack of global and country-specific evidence on the health impacts of climate change, especially drought, and the impact of programmes to mitigate public health and nutrition consequences.

What this article adds: Recurrent droughts now pose an unprecedented threat in Ethiopia; more than 80 per cent of the population is dependent on subsistence and rain-fed agriculture. The effects of drought on child mortality in Ethiopia between 2009 and 2014 were explored using 88 small-scale, complex emergency database (CE-DAT) mortality surveys (55,219 children) and Famine Early Warning Systems Network (FEWS NET) data, coupled with intensity of drought exposure. Most of the surveys were in highly populated regions; 95 per cent were stressed/crisis-level food security. The under-five death rate (U5DR) was lower than emergency threshold and baseline threshold for sub-Saharan Africa. This is consistent with general positive child mortality trends in Ethiopia but may be an underestimate due to inaccessibility of some crisis-affected areas. There was no association between U5DR and both short and long-term droughts. Areas with minimal food insecurity had higher U5DRs than stressed areas; the latter may attract more support. Child mortality was associated with prevalence of wasting that remained high (>10%) in crisis-affected areas. The findings reflect important progress in drought resilience; further targeted interventions are needed.

Background

The health impact of droughts is intuitive, although indirect and complex. Drought has been associated with excess mortality and can cause nutrition and health problems, aggravate chronic diseases, reduce crop and livestock production, contribute to inflation of food prices and trigger drought-induced migration. The severity of its effects depends on socioeconomic conditions, infrastructure development, stability and the general environment, which directly influence the resilience capacity of the population (Stanke et al, 2013).

Drought mitigation efforts have improved enormously over the last few decades; however, in recent times, the frequency of droughts and their impacts have increased in Ethiopia, with incidents now occurring annually in some parts of the country. The majority of the population in Ethiopia is also highly vulnerable, as more than 80 per cent of people are dependent

on subsistence and rain-fed agriculture; the 2015-2016 El Niño induced-droughts caused a drop in agricultural yield of up to 80 per cent in some areas. Consequently, recurrent droughts now pose an unprecedented threat in Ethiopia.

Rigorous synthesis of empirical data on the health impacts of climate change in general and droughts in particular are lacking in Ethiopia and elsewhere in the world. This, in turn, creates an evidence vacuum in terms of evaluating the impact of ongoing programmes to reduce the public health impact of droughts and guide effective adaptation strategies. To address this research gap and provide a sound quantitative synthesis, the effects of drought on child mortality in Ethiopia between 2009 and 2014 were explored, considering real-time data on the intensity of drought exposure.

¹ Presentation at the ACF Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.



Camels and cattle being led in the drought-stricken Somali Region of Ethiopia, 2017

Methods

Under-five death, nutrition and vaccination data: A total of 88 sub-national (small-scale) mortality surveys were extracted from the Complex Emergency Database (CE-DAT) (Altare and Guha-Sapir, 2014). The surveys were conducted between January 2009 and December 2014 by humanitarian agencies operating in Ethiopia. Surveys were selected based on the following criteria: 1) conducted in permanent resident populations; 2) used probability sampling methods; 3) based on a three-month recall period; and 4) the under-five death rate (U5DR) and/or sample size was provided or could be estimated.

The following indicators were extracted: U5DR; prevalence of child wasting, measles antigen-containing vaccines (MCV) coverage; survey coverage area of the *woreda* (the third tier of regional administration); and survey month and year.

Drought exposure data: The standardised precipitation evapotranspiration index (SPEI) was used. This is an improved index to identify the spatial and temporal extent of drought exposure and its intensity. The SPEI is calculated for different timescales (for example; one, three, six and 12 months), considering the combined effect of precipitation and temper-

Table 1 Results from Bayesian Poisson meta-regression models of small-scale mortality surveys from Ethiopia, 2009–2014.

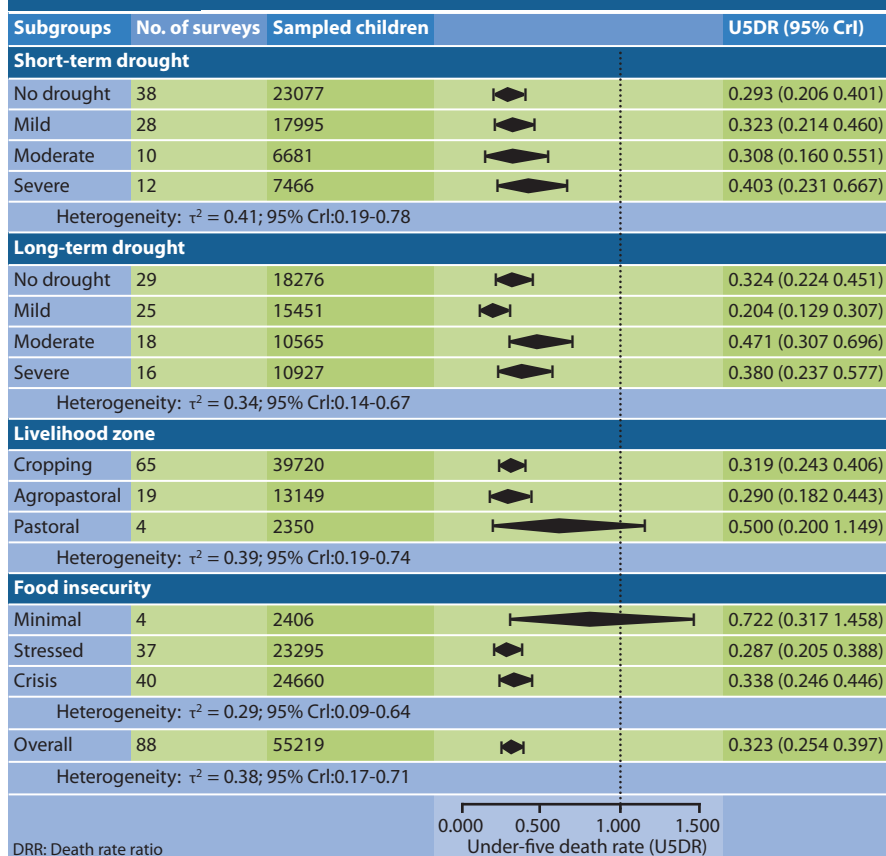
Moderators	Model 1		Model 2	
	Posterior DRR	95% CrI	Posterior DRR	95% CrI
Drought exposure				
No drought	Ref			
Mild drought	0.97	0.61; 1.54	0.76	0.44; 1.28
Moderate drought	1.37	0.69; 2.63	1.62	0.98; 2.71
Severe drought	1.27	0.73; 2.26	1.2	0.71; 2.01
Food insecurity				
Minimal	2.36	1.05; 5.02	2.36	1.09; 4.68
Stressed	Ref			
Crisis	1.08	0.72; 1.63	1.14	0.77; 1.69
Livelihood zones				
Cropping	1.04	0.62; 1.74	1.1	0.67; 1.82
Agropastoral	Ref			
Pastoral	1.25	0.45; 3.45	1.66	0.64; 4.39
Prevalence of wasting				
MCV coverage	1.09	1.04; 1.14	1.07	1.03; 1.12
Heterogeneity: (95% CrI)				
	1.00	0.99; 1.01	1.00	0.99; 1.01
	0.19 (0.01; 0.54)		0.13 (0.01; 0.44)	

ature. The different timescales are important for assessment of drought effects on child mortality as effects are likely to vary with the frequency and duration of droughts. Thus, in this study, the three-month and 12-month SPEIs were used to identify the short and long-term droughts, respectively. The SPEI data was downloaded from the Global Drought Monitor and categorised into: no drought (SPEI > 0); mild drought (-1 < SPEI ≤ 0); moderate drought (-1.5 < SPEI ≤ -1); and severe-to-extreme drought (severe drought hereafter) (SPEI ≤ -1.5).

Food security and livelihood zones data: Food security and livelihood zones data were obtained from the Famine Early Warning Systems Network (FEWS NET), which provides evidence-based analysis on early warning and food insecurity. FEWS NET uses the Integrated Food Security Phase Classification (IPC), a set of tools and procedures that identify and classify the severity of food insecurity. The IPC classifies areas with food insecurity into five phases: minimal, stressed, crisis, emergency and famine. The drought, food security and livelihood zone data were then matched with a CE-DAT survey of a given area using global positioning system (GPS) coordinates.

Statistical analysis: The datasets were merged across space and time and a random-effects meta-analysis was undertaken to summarise survey results and explore heterogeneity across independently conducted but methodologically similar small-scale surveys. Variability was explored across the survey estimates using the between-survey variance statistic. To explain the variability, meta-analyses were performed on sub-groups based on survey-specific contextual moderators (drought exposure levels, food insecurity and livelihood zones). A meta-regression analysis was subsequently undertaken, adjusting

Figure 1 Pooled U5DR and 95% CrI's, stratified by short- and long-term drought exposure, food insecurity and livelihood zones from 88 small-scale mortality surveys from Ethiopia, 2009–2014.



for additional moderators, prevalence of wasting and MCV coverage. A fifth of included surveys had zero counts for U5DR, leading to undefined variance estimates. To circumvent this problem, the Poisson regression model was used for meta-analysis in a Bayesian framework.

Results and discussion

Overall, 55,219 children under five years old were covered in the 88 surveys included in the meta-analysis. The surveys covered seven of the 11 administrative regions in Ethiopia. Most of the surveys were from the three highly populated regions of the country: Oromia (38, 43.2%); Amhara (22, 25.0%); and the Southern Nations, Nationalities and People (18, 20.5%). More than half the surveys (50, 56.8% and 59, 67.0%) were conducted in areas affected by mild-to-severe drought in the short and long-term, respectively. The overwhelming majority of the surveys (84, 95%) were conducted in areas suffering from stressed or crisis-level food insecurity. Sixty-five (73.8%) were conducted in cropping areas (See Figure 1).

Results of the pooled analysis showed that the U5DR during the study period of 0.323/10,000/day (95% credible interval (CrI): 0.254-0.397) (see Figure 1) is lower than both the emergency threshold death rate of 2.1/10,000/day and the baseline threshold of 1.07 for sub-Saharan Africa. This result is consistent with the fact that Ethiopia, in general, has shown great improvement in reducing child mortality and successfully achieved the millennium development goal (MDG) three years ahead of the 2015 deadline. The result may also reflect the positive contribution of humanitarian agencies in supporting national programmes to improve health, thereby reducing mortality. However, possible underestimation of mortality due to inaccessibility of some of the crises-affected areas and exclusion of non-permanent residents (such as refugees) should not be ruled out. Emergency thresholds may also

need to be reviewed as current thresholds date back to 1997, when the Sphere project (Humanitarian Charter and Minimum Standard in Disaster Response) was launched.

Results from the sub-group meta-analysis and meta-regression show no association between U5DR and both short and long-term droughts during the study period (See Table 1). This can be partially explained by the resilience capacity Ethiopia has developed to deal with droughts and food shortages. This has involved the strengthening in recent years of weather forecasting and early warning systems; increased timeliness and predictability of relief assistance; rollout of the national productive safety net programme (PSNP), which minimises vulnerability to food insecurity among chronically food-insecure households in famine-prone areas; and road network development over the last decade, which has helped farmers to access markets and helped relief providers to access remote villages.

Results also show that areas with minimal food insecurity had higher U5DRs than areas reporting stressed food insecurity (See Table 1). It may be that these areas do not attract the support of government and aid agencies and therefore do not receive the assistance that contributes to the improvement of child survival, such as healthcare, food assistance and other relief commodities.

Results also confirmed the well-documented finding that child mortality increases with increased prevalence of wasting (See Table 1). Despite the declining trend, the prevalence of wasting in crisis-affected areas in Ethiopia remains high, at more than 10% (Delbiso et al, 2017). Targeted interventions are therefore needed to improve child nutrition, thereby boosting child survival.

Model 1 investigates the effect of short-term droughts on child mortality. Model 2 investigates the effect of long-term droughts on child mortality; both are adjusted for survey-specific moderators

(food insecurity, livelihood zones, prevalence of wasting and MCV coverage).

Conclusions

The estimated pooled U5DR was below both the emergency and the baseline threshold for sub-Saharan Africa. This reflects the huge progress that has been made in reducing child mortality in Ethiopia, but may also indicate important sub-populations not represented in the data (non-permanent residents, inaccessible crisis areas) and the need to review and update existing emergency mortality thresholds. The study also found that, within the surveyed population, both short and long-term drought exposures were not associated with U5DR; however, minimal food insecurity was associated with elevated U5DR. This is consistent with earlier findings that moderate drought-affected areas presented elevated wasting prevalence (Delbiso et al, 2017) and indicates that these areas should not be overlooked by intervention programmes, particularly the Ethiopia PSNP. The results of this study reflect the enormous progress made in developing drought resilience and show that further targeted interventions are crucial to reduce the prevalence of acute malnutrition in order to further reduce the U5DR.

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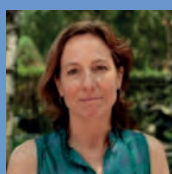


Human and Animal Health Post

TreatFOOD study in Burkina Faso

Summary of presentation¹ of published research²

By Susan Shepherd



Dr Susan Shepherd is Director of Clinical and Operational Research for ALIMA.

The TreatFOOD study was conducted in Burkina Faso from 2013–2015 by ALIMA and the University of Copenhagen with support from the World Food Programme (WFP), DANIDA, European Civil Protection and Humanitarian Aid Operations (ECHO), Médecins Sans Frontières (MSF) and the Arvid Nilssons Fond. The main objective of the study was to assess the effectiveness of a three-month supplementation with newly developed food supplements for the management of children aged 6–23 months with moderate acute malnutrition (MAM) in Burkina Faso. As of 2017, ten publications have resulted from the study. Highlights of key results were presented, including most recently published findings.

Method

Children with MAM were treated with lipid-based nutrient supplement (LNS) or corn-soy blend (CSB). Investigators assessed the effectiveness of (a) matrix (LNS or CSB); (b) soy quality (soy isolate) (SI) or de-hulled soy (DS); and (c) percentage of total protein from dry skimmed milk (0 per cent, 20 per cent, or 50 per cent), in increasing fat-free tissue accretion. Primary outcome was the effect on accrual of fat-free (lean body) mass; secondary outcomes included linear growth, recovery rate, physical activity, motor milestones, morbidity, food supplement acceptability, haemoglobin concentration, serum acute phase proteins, IGF-1, serum ferritin, essential fatty acid concentrations and thymus size.

Between 9 September 2013 and 29 August 2014, a randomised 2 × 2 × 3 factorial trial recruited children aged 6 to 23 months with MAM (defined by mid-upper arm circumference (MUAC) ≥115 mm and < 125 mm and/or weight-for-height z-score (WHZ) ≥-3 and < -2) in Burkina Faso. The intervention comprised 12 weeks of food supplementation providing 500 kcal/day as LNS or CSB, each containing SI or DS, and 0 per cent, 20 per cent or 50 per cent of protein from milk. Fat-free mass (FFM) was assessed by deuterium dilution technique. By dividing FFM by length squared, the primary outcome was expressed in-

dependent of length as FFM index (FFMI) accretion over 12 weeks.

Findings

Of the 1,609 children recruited into the study, four died, 61 were lost to follow-up and 119 were transferred out due to supplementation being switched to non-experimental products³. No children developed allergic reaction. At inclusion, 95 per cent were breastfed and mean (SD) weight was 6.91 kg (0.93), with 83.5 per cent (5.5) FFM. In the whole cohort, weight increased 0.90 kg (95 per cent confidence interval (CI) 0.88, 0.93; $p < 0.01$) comprising 93.5 per cent (95 per cent CI 89.5, 97.3) FFM. Compared to children who received CSB, FFMI accretion was increased by 0.083 kg/m² (95 per cent CI 0.003, 0.163; $p = 0.042$) in those who received LNS. In contrast, SI did not increase FFMI compared to DS (mean difference 0.038 kg/m²; 95 per cent CI -0.041, 0.118; $p = 0.35$), irrespective of matrix. There was no effect modification by season, admission criteria, baseline FFMI, stunting, inflammation, or breastfeeding ($p > 0.05$). LNS compared to CSB resulted in 128g (95 per cent CI 67, 190; $p < 0.01$) greater weight gain if both contained SI, but there was no difference between LNS and CSB if both contained DS (mean difference 22g; 95 per cent CI -40, 84; $p = 0.49$) (interaction $p = 0.017$). Accordingly, SI compared to DS increased weight by 89g (95 per cent CI 27, 150; $p = 0.005$) when combined with LNS, but not when combined with CSB.

A limitation of this and other food supplementation trials is that it is not possible to collect reliable data on individual adherence. In addition, the study was under-powered in terms of detecting any statistically significant difference in milk content.

Conclusion and reflections

In this study, children with MAM mainly gained FFM when rehabilitated. LNS yielded more fat-free tissue and higher recovery rates than CSB. Moreover, current LNS formulation with DS may be improved by shifting to SI. The role of milk relative to soy merits further research.

The overall findings of the TREATFood study support a wider use of LNS in the treatment of children with MAM. A switch to LNS would lead to greater gain of fat-free tissue and recovery and would benefit millions of children.

Another study by the same group found a high degree of morbidity in this population, with nearly 90 per cent of children manifesting clinical

signs of illness and/or elevated biomarkers of inflammation (i.e. C-reactive protein and α-glycoprotein) (Cichon et al, 2016).

An additional two analyses from the same study found that children less than 67cm in length with MAM by MUAC only (i.e. MUAC ≥115 mm and < 125 mm but WHZ ≥-2) had similar ponderal growth rates (Fabiansen, 2016) and did not gain excessive fat during supplementation when compared to children ≥67 cm in length with MAM by MUAC only (paper in submission). Currently, protocols for management of acute malnutrition in many African countries (including Cameroon, Central African Republic, Chad, Guinea, Ivory Coast, Mali, Mauritania, Senegal and Togo) instruct health personnel to measure MUAC only of children aged 6–59 months with length ≥67 cm when assessing eligibility for MAM or severe acute malnutrition (SAM) treatment programmes. In Ethiopia, admission by MUAC alone for SAM treatment is restricted to children with lengths >65 cm. These analyses provide strong evidence that the use of length as a criterion for measuring MUAC of children aged 6–59 months should be discontinued in policy and practice.

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¹ Presentation at the ACF Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017.

² Fabiansen C, Yaméogo CW, Luel-Brockdorf A-S, et al. Effectiveness of food supplements in increasing fat-free tissue accretion in children with moderate acute malnutrition: A randomised 2 × 2 × 3 factorial trial in Burkina Faso. *Tumwine JK, ed. PLoS Medicine*. 2017;14(9):e1002387. doi:10.1371/journal.pmed.1002387.

³ 17 children were supplemented with Plumpy'Sup due to unconfirmed suspicion of salmonella contamination of their experimental supplement, while 102 children deteriorating into severe acute malnutrition (SAM) were switched to therapeutic foods.

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How to improve the engagement of communities in research?

Summary of panel discussion¹

Alice Obrecht of ALNAP moderated this session. Panellists were Gwen Luc of Action Against Hunger (AAH) Link Nutrition Causal Analysis (NCA) project, Lillian Omutoko of the University of Nairobi and Stephen Kodish of the World Food Programme (WFP), who were asked to talk about their area of work and how they had engaged communities in research.

Gwen Luc described the approach of Link NCA, which is a participatory method of assessing the causes of malnutrition in a community and facilitating agreement on which ones to prioritise. Researchers meet to examine available evidence on the prevalence of malnutrition and the range of underlying causes. Communities decide whether the causes identified represent priority problems for them and hold discussions with the researchers to reach agreement on how they can be addressed. The methodology can be adapted to different contexts; the aim is to use existing data to better understand the mechanisms that lead to malnutrition. There is a focus on risk factors identified by the community: what the community considers to be its main problems and the central risks underlying malnutrition. Community action plans are developed which identify problems, solutions and what is needed to put them into action in the prevailing situation. Social behaviour-change communication (SBCC) approaches are used to examine how to address the problems identified.

Lillian Omutoko spoke about HIV/AIDS research and vaccine development in three African countries with high prevalence and infection rates: Uganda, Kenya and South Africa. In each country vulnerable populations were fully engaged in the research. Each situation involved marginalised and highly vulnerable people in environments where there were a high number of deaths. Research was dependent on communities to the extent that HIV vaccine development would not have been possible without community engagement. Communities were involved in recruitment of trial participants as well as ongoing outreach throughout the research period. The project provided leadership development to train community leaders in research development with the aim of avoiding the exploitation of communities and to encourage ownership of the trials and the findings.

In urban, informal settlements of Nairobi there were various forms of engagement with communities. The research protocol required establishment of community advisory boards to guide researchers on managing expectations of com-

munities and how to pursue community entry and engagement. Communities were trained and supported, based on their needs, which could either be community-driven or research-driven.

Stephen Kodish described how WFP moved from food aid to specialised foods and at that point recognised an increased need to concentrate on demand as well as supply. He illustrated an example from Kakuma refugee camp where a micronutrient powder (MNP) distribution achieved just 30 per cent uptake by the target population. This highlighted the importance of involving communities and developing culturally appropriate messaging, which entailed more in-depth consultation and research in communities than the organisation had previously contemplated. Critical to this approach was taking the findings of the qualitative and ethnographic studies back to the community to check them before finalising the conclusions. Sometimes this validation exercise resulted in a change to the final conclusions.

Some common themes emerged from the experiences shared in terms of the need to work flexibly and openly with communities and to prepare to be genuinely community-led where necessary.

Complementarity of researchers and communities in working towards effective solutions

The Link NCA model seeks to ensure that research findings are taken up by the community and therefore has an emphasis on agreeing practical and effective solutions. For example, in a Niger Link NCA, the impact of women's workload was highlighted as one of the multi-sector causes of malnutrition. Researchers sought to sensitise men and women and encourage men to assist women with household chores, such as collecting water. Women identified that carts were the solution; men would not carry water on their heads for fear of being laughed at, but they could collect water with a cart. This example highlights that it is essential to identify not just technical solutions but approaches that are also culturally acceptable

and feasible. In this case, the complementarity between the technicians/experts and the community led to an effective solution.

Combining formal and informal approaches

Both formal and informal approaches are required when working with communities. For example, the HIV/AIDS researchers promoted the establishment of advisory boards in each community they worked in. Approaches to setting up these boards were contextual and often informal. For example, in South Africa pre-existing women's groups formed the advisory boards. This helped with retention of board members and enabled strong outreach as the women's groups had already established access to vulnerable households in the community. In Uganda, football and drama were employed for sensitisation and dissemination of research. In Kenya, groups with higher prevalence of HIV, such as lakeside fishing communities, were the focus for community engagement and SBCC. Defining which community approach is best is a context-driven decision.

Methodological challenges when working with communities

There was discussion about how to mix quantitative data with 'something of value' from the community and how to ensure rigour in qualitative approaches to obtain data that represent some 'truth'. There are established rigorous methods to carry out social, qualitative work and analytical methods are available. However, much participatory work is unpublished and therefore may be less available to those seeking reference to robust studies. Measuring the impact of community engagement is a challenge and innovative partnerships are needed between researchers and communities to develop a successful approach.

A difference of power exists between a community and researchers and there are also power differentials within the community. To reach the most vulnerable in a community is often no easy task and there is a need to establish models to guide engagement of communities. Examples were given of work in Niger and Chad where women were not used to giving their opinions. Community entry to carry out research is not easily achieved; it requires contact people and the authority to find the people in the community that you need to work with.

Who is the community? Who is asking the questions? The researchers are frequently the ones defining the issues and the research priorities. An example was shared of an evaluation of a cash-transfer programme in northern Kenya. Non-governmental organisations (NGOs) and local government were invited to identify community groups, after which the evaluators met with eight community groups. They listened to them to understand their context before posing any questions

¹ Panel discussion at the ACF Research for Nutrition Conference, Pavillon de l'Eau, 13th November, 2017.

and asked them to rank the issues of importance to them. This revealed that the evaluators had overlooked discrimination in the community (of orphans and single mothers) and issues were presented that they had not previously considered.

Does all research require community engagement?

While opinions differed over whether all research requires community engagement, it was noted that 'community' may be represented at different levels and government or local authority representatives might be good places to start. However, engagement should start at the design phase and continue all the way until feedback of analysis and findings is given to the community; this final part is too often left out. In some of the Uganda and Kenya HIV studies participants complained that they were being treated as 'guinea pigs'. A lack of trust between the researchers and the community resulted in the research having to stop. This highlights that the community needs

to perceive the benefits of the work for its members and that their willingness to take part is critical.

From research to programme design

It was noted that the Link NCA tools are also applicable to operations and can be used for community consultation to assist in understanding contexts and adapting programmes accordingly. The tools facilitate a process of looking together with communities for solutions and developing community action plans adapted to the context. More visible results have been noted in programmes that have invested in a higher level of community engagement to develop culturally sensitive approaches. However, time available for assessment of the situation is one factor that often restricts effective use of this methodology.

The social dynamics of poverty need to be understood to enable design of appropriate programmes, which means talking to the community and understanding population dynamics. For ex-

ample, in many communities, a discussion with mothers quickly reveals that fathers and/or mothers-in-law are the ones who make the decisions. Programmes focusing on discussion and counselling solely with mothers are therefore liable to have limited success. People living in poverty often have a social network to draw on, which merits thorough understanding. Simple questions such as, 'Who can you go to if you need food tonight?' can help tease these out. Knowledge and beliefs of the target community also need to be well understood; for example, during the Ebola emergency many people did not understand viruses enough to value the protection of hand-washing.

Conclusion

This rich and varied sharing of experiences concluded with a strong affirmation of the value of engaging communities in research and a recognition of the need to continue to enhance current practices and seek innovative methodologies to improve the quality of that collaboration.

How to overcome data management challenges in research in crisis contexts

Summary of panel discussion¹

This session was moderated by Eva Leidman, of Centers for Disease Control and Prevention (CDC). Presentations were given by Mary Hodges of Helen Keller International (HKI), Karine Le Roch of Action Against Hunger (AAH) and Oleg Bilukha of CDC. Each presenter shared research they had undertaken, challenges experienced and results achieved.

Karine Le Roch (AAH) spoke about the follow-up of severely acutely malnourished children project (FUSAM), a psychosocial intervention in children aged 6-24 months in Saptari, Nepal.

Action Against Hunger conducted a randomised controlled trial (RCT) to assess the effectiveness of the addition of psychosocial support in an outpatient therapeutic programme (OTP). OTP sites were randomly assigned as either intervention sites (n=6) or control sites (n=6). The study was conducted in partnership with the Government of Nepal Ministry of Health (MoH), Child Health Division, Saptari District Public Health Office and the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr'b) and supported by UK Aid, PATH, R2HC, Elrha and Wellcome Trust.

The study experienced significant challenges due to the 2015 earthquake, insecurity in 2015 and 2016 and floods in 2016. Although the original plan had been to monitor the study closely with real-time data capture and analysis, staff evacuations led to reliance on remote project management and loss of good visibility and quality control. Significant difficulties ensued in supervising record-keeping and physically extracting the data booklets from each site for analysis, as well as accessing homes for data collection due to floods and curfews.

In addition to these unexpected events, there was slow integration of psychosocial services into the healthcare system due to unfamiliarity with the approach and lack of recognition of the support required. Study sites were spread geographically, which created challenges in reaching beneficiaries and exacerbated pre-existing low treatment compliance, largely attributed to conflicting beliefs within the community.

Significant differences were found in child development scores between the group that received both psychosocial and nutritional support and the control group that had received only nutritional support. However, these differences were no longer significant at 11 months post-intervention

and they never reached the level of children in the non-SAM group.

Mary Hodges (HKI) reported on a project to implement Essential Nutrition Actions (ENA) at the six-month point of contact for children at clinics before and during the Ebola crisis in Sierra Leone. The project was initiated prior to the Ebola outbreak in response to a government request to adapt the mass vitamin A supplementation (VAS) campaign conducted twice a year to a routine service at the six-month contact point (6MCP).

HKI established three groups to test three different approaches:

1. VAS integrated within expanded programme on immunisation (EPI) (at six months).
2. VAS integrated within EPI plus preparation of complementary food with the mother's participation and then feeding of her infant by spoon.
3. As group two plus routine 'quality' confidential one-to-one counselling on family planning (FP) (provided in a private room with a dedicated health worker) and provision of short-term FP commodities as appropriate or referral for long-term provision.

The results showed that routine VAS at 6-8 months was 60 per cent, 72 per cent and 75 per cent in the three groups respectively; 96 per cent of children achieved full vaccination status at six months in all three groups. In Group 3, 62 per cent of mothers received routine counselling on family planning at the 6MCP. Of these, 70 per cent accepted family planning commodities, helping to fill the 'contraceptive gap'. It was evident that the 6MCP for routine VAS enabled mothers to access routine family planning and boosted VAS coverage.

¹ Panel discussion at the ACF Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017. A video of the panel discussion can be found here: <https://youtu.be/UVigavl8MM0>

Mothers prepare maize, from the community garden, to make nutritious meals for the children attending a Save the Children supported preschool in Zomba district, Malawi



Jonathan Hyams/Save the Children

In response, HKI scaled up this integrated approach and trained health workers from 11 out of 14 districts before Ebola broke out. Of 74 people trained in Kailahun district at the beginning of the Ebola outbreak, 16 died of the disease within six weeks.

HKI continued to support and monitor services throughout the emergency. It found that, of the clinics that had fully integrated the 6MCP, attendance fell significantly less during the Ebola crisis in integrated clinics (39 per cent) than in non-integrated clinics (59 per cent). The main reasons underlying this were the benefits perceived by mothers in preparing a complementary food to feed their infants, and, in terms of family planning, preventing pregnancy at a time when maternity services were scarce and pregnancy was regarded as risky.

Since then HKI has been scaling up the 6MCP with the Ministry of Health to 340 of 1,281 health facilities nationwide and has plans and funding to complete the scale-up and expand to a 6MCP within four years.

Oleg Bilukha from CDC talked about conducting nutrition surveys in difficult places. UNICEF often coordinates surveys but has a focus on children and women. He posed several questions, including what happens when the elderly are the most vulnerable or when wasting prevalence is low? He also observed how infant and young child feeding (IYCF) activities are often the 'knee-jerk' reaction in response.

Recently in the Ukraine, the Nutrition Cluster carried out three investigations that required modification of cluster survey methods:

1. An IYCF survey among displaced women living outside the conflict zone

This survey focused on women with children under two years of age. Participants were difficult to find. Lists of women were sought that included addresses or telephone numbers, and methods to update the lists explored, to ensure that they were representative for selection for the study. Some women were registered with the government, but the government was not willing to share data; others were registered with non-governmental organisations (NGOs)/United Nations (UN) agency programmes. There was an anticipated challenge of potential high non-response. During the survey, 20 per cent non-response/telephone number not working was recorded; some women

had left the area, while others were afraid to meet. The surveyors adopted a protocol of calling three times before moving on to the next name on the list and used a quota sample, continuing down the list until the sample size was achieved.

2. A representative survey of older people (over 60 years of age) in the conflict zone

The team recorded anthropometry (weight, MUAC, arm demi-span), diet diversity and food frequency, as well as chronic disease, access to medicines, disability and mental health. The team members followed cluster survey methodology as the available population data were reliable and there was little displacement at that time. Electoral precinct data enabled specification of boundaries and households. Three random start points were identified in each cluster and interviewers went from these points to select houses randomly. Approximately 40 to 50 per cent of households included older people; however around 50 per cent of households did not answer the door, while others refused to participate.

3. A survey of pregnant women living in areas around the conflict frontline, to include anaemia assessment

The main challenge with a survey of pregnant women is that they represent a small percentage of the population. It would require 15 to 20 household visits to find one pregnant woman, so a household visit methodology is not conducive for this type of study. The study was therefore designed around antenatal clinics. In Ukraine a woman is obliged to register as early as possible in pregnancy and attend for regular, compulsory check-ups, IYCF interventions, nutritional status assessment and access to humanitarian assistance. The survey team randomly selected clinics and days and surveyed all women who attended to achieve a semi-representative sample. Working through clinics also enabled them to use the last haemoglobin test result from the clinic data to assess anaemia, rather than collecting samples first-hand with a haemocue.

What would you do differently?

The panel was asked to reflect further on their research, what they might have done differently and what advice they would give to others when approaching research in crisis environments.

Karine acknowledged that they probably wouldn't have conducted an RCT if they had

known all the challenges in advance. This is a difficult study design in any context, but extremely so in insecure situations. Anticipating some of the potential obstacles and preparing a 'plan B' for the study design might have enabled them to adapt the design according to the contextual factors and constraints.

Mary noted that if they had increased the sample size of their study, they could have compared the three different groups in terms of growth of children and other outcomes. Their study was narrowly focused on one outcome, but with additional funds it could have furnished further interesting data on nutrition.

Oleg noted that when conducting surveys, the concern is often non-response and achieving sample size. It is important to try to anticipate these things from the start. For example, for the challenge of absenteeism, it is useful to consider which days of the week are market days, which hours people are working in the field and when are the peak agricultural working seasons to establish when people will be at home. Refusals are high in Ukraine, so this factor could be anticipated in that context and the survey design adapted accordingly. One way to assess the situation prior to embarking on a survey is to conduct a rapid test in advance; for example, call 50 to 100 people on the list and work out the non-response rate, or pre-test the survey instruments in the field to find out how many people refuse to participate. There are two types of bias of concern in surveys: measurement and selection. Measurement bias is often a manifestation of team quality and can be addressed early through supervision if one team is identifying more malnutrition than others. Where there is selection bias, it should be recognised and qualified in the text of the report. However, care should be taken not to exaggerate the relevance of bias. For example, wealth quintiles may not display huge differences in wasting; the data of the 'middle-ground' (e.g. clinic visitors) are useful and often reasonably representative.

Conclusion

All three presenters spoke about challenges faced when conducting research in unpredictable environments. A commonality between these reflections is the necessity of thorough preparedness, including scenario-building in advance to try to anticipate as many challenges and risks as possible. While some of these can be predicted (such as the high non-response rate/refusal to participate characteristic of populations in Ukraine and the absenteeism related to seasonal events or labour schedules), not all challenges can be foreseen, as was the case in the Ebola outbreak in Sierra Leone and staff evacuation due to insecurity in Nepal. Study designs therefore require flexibility to adapt where necessary and feasible, a 'plan B' if possible and researchers need to maintain regular communication with donors/funders and stakeholders of the study, including the communities in which they are operating. This will facilitate anticipation and adaptation to ensure that useful and quality results can be obtained.

Death of children with SAM diagnosed by WHZ or MUAC: Who are we missing?

Summary of presentation¹

By Michael H. Golden and Emmanuel Grellety



Michael Golden is a retired professor of medicine with 45 years' experience of studying all aspects of malnutrition.



Emmanuel Grellety has spent his whole working life with humanitarian organisations in many roles. He is now an epidemiologist working with Epicentre and is completing his PhD.

We would like to thank Action Against Hunger for the opportunity to present this extended abstract to the R4NUT conference, to the editors of ENN and the reviewers of our submitted papers for very helpful comments on initial submissions, and to the agencies that provided patient data for our empirical study.

Location: *Global*

What we know: Both weight-for-height z-score (WHZ) and mid-upper arm circumference (MUAC) are recommended to identify severely malnourished children for treatment. MUAC has distinct advantages for community-level screening; however several countries have gone further to instigate MUAC-only admissions for treatment.

What this article adds: A recent review examined the consequences of excluding children with severe acute malnutrition (SAM) identified using WHZ from admission to treatment programmes. Analysis of individual data from 14,935 children admitted to a range of treatment programmes over 22 years and a literature review examined case fatality rates (CFR) with different indicators and caseload. Simpson's paradox (mathematical coupling) results in reversal of significance that affects interpretation of the relative mortality rates of WHZ and MUAC. The analysis suggests that children with SAM identified by WHZ <math><-3Z</math> and admitted for treatment have as high a risk of death as children in treatment with MUAC <math><115\text{mm}</math>. Review of 21 datasets that compared WHZ and MUAC mortality rates show problems with interpretation of the reported CFRs; inconsistencies greatly limit analysis, comparability and interpretation. Caseload is a more important determinant of the number of SAM-related child deaths than the relative CFR to give SAM-attributable deaths. Where most of the children are identified as SAM using WHZ rather than MUAC, it is estimated that fewer than half of all SAM-related deaths will be identified using a MUAC-only programme. Strong advocacy for the use of MUAC to maximise coverage of treatment programmes has developed into MUAC-only programmes that are inadequately evidenced on the consequences of excluding WHZ cases. Urgent research is needed to develop simple methods to identify children with low WHZ at community level.

Introduction

About 19 million children are estimated to have severe wasting, of whom about half to one million die each year (Black et al, 2013). These estimates were made using only weight-for-height z-score (WHZ) as the diagnostic criterion. As deaths related to a low mid-upper arm circumference (MUAC) were not taken into consideration, the actual number of deaths is much higher. This is because, of all the children with severe acute malnutrition (SAM), only about 16.5 per cent have both a WHZ (<math><-3Z</math>) and a MUAC (<math><115\text{mm}</math>) below the World Health Organization (WHO) defined criteria for SAM; the remainder have SAM by either WHZ (45 per cent) or MUAC (39 per cent), but not both criteria (Grellety and Golden, 2016); the degree of overlap varies greatly by context. Based on these figures, a MUAC-only programme would identify 55 per cent of all SAM children and a WHZ-only programme 61 per cent. Although the risks of death may differ from place to place and time to time, the actual number of SAM related deaths depends on the relative number of children fulfilling each criterion in the community, as well as the case fatality rates (CFR); that is, both the relative caseloads and mortality risks combine to give the total number of deaths occurring due to SAM.

Because of its simplicity, ease of use and cheapness, absolute MUAC has been readily taken up to screen for children with SAM in the community. WHO guidelines recommend the use of MUAC (and examination for bilateral pitting oedema) in children 6-59 months of age at community level for early identification and referral of children with

SAM for full assessment at a treatment centre (admission is then by MUAC or WHZ). However, many agencies and several national governments (e.g. Nigeria, South Sudan, Bangladesh) have gone further and ceased attempting to identify and treat any children with SAM diagnosed by WHZ. They have based this upon repeated advocacy for MUAC-only programmes, justified by its simplicity, and reports purporting to show a universally higher mortality risk for SAM identified by MUAC (SAM-muac) than SAM identified by WHZ (SAM-whz). The latter is based largely upon statistical comparison of ROC curves and the conclusion that children with SAM diagnosed by WHZ, but not by MUAC, are at lower risk of death (en-net, 2015a; en-net, 2015b; Briend et al, 2016). Our serious concerns regarding the consequences of excluding SAM-whz children from admission to treatment programmes prompted this review, where we examine the relative mortality rates from a large number of SAM children; appraise the literature with consideration of the statistics and methods used; and analyse the numbers of deaths likely to be missed if a MUAC-only policy were to be universally adopted.

Methods

We obtained individual data from 14,935 children treated in inpatient facilities (IPF), 45,364 treated in outpatient treatment programmes (OTP) and 16,588 patients initially admitted to supplementary feeding programmes (SFPs) as moderately malnourished but who, with the change

¹ Presentation at the ACF Research for Nutrition Conference, Pavillon de L'Eau, 13th November, 2017. A video of the presentation can be found here: https://youtu.be/yIWjGG_S5YU

in diagnostic cut-off points and standards, would now be reclassified as SAM. WHO 2006 criteria and the presence or absence of oedema were used to divide the children into seven groups, depending upon the various combinations of diagnostic criteria (see footnote to Table 1 for explanation of six groups, plus kwashiorkor not shown). We conducted an exhaustive search of the literature to identify reports of children diagnosed by WHZ or MUAC with the respective mortality rates. The papers were reviewed. We analysed the effect of caseload using published prevalence data and CFRs derived from our empirical data, the literature data and theoretical simulations.

Results

Empirical data

Table 1 shows the CFR of all the patients with SAM by diagnostic category. The CFR was higher for those with marasmic SAM admitted with only a low WHZ than for those with only a low MUAC. The children who had both diagnostic criteria had a significantly higher CFR. When the children fulfilling both criteria are included in each of the diagnostic groups, the relative CFR of children admitted by WHZ vs MUAC is reversed, so that it now appears that MUAC-associated mortality is higher than with WHZ. This is an example of Simpson's paradox (see illustration in Table 2), caused in this case by mathematical coupling (Tu et al, Archie Jr, 1981). Oedematous children

who had a low WHZ had a much higher CFR than those with a low MUAC; all CFRs were higher for SAM children with oedema than without oedema. Although the relative mortality was not quite reversed when the children with both anthropometric deficits were considered, the difference was considerably ameliorated.

When all the children's data are considered together, WHZ-related death rate was higher than MUAC-related deaths; those who had both deficits had about twice the CFR as those with a single anthropometric deficit. When those with both a low WHZ and a low MUAC were included in the WHZ and MUAC data, the relative CFR is reversed. This demonstrates that inclusion of children with both deficits into both the WHZ and the MUAC group results in erroneous interpretation of the relative mortality rates.

Literature review

We retrieved 21 datasets that compared WHZ and MUAC mortality rates. Table 3 shows the problems with the interpretation of the reported CFRs. Statistically, to get reliable results, the expected deaths in each group should be at least five. The reports marked in *brown* had insufficient deaths to make analyses of individual studies reliable. Most of the "brown" studies had many more children fulfilling the "both" category; as shown with the empirical data this also makes

the analyses reported by the authors subject to mathematical coupling and are thus unreliable. The reports marked in *pink* each suffer from the same criticism by including individual children with both SAM by WHZ and MUAC criteria into the MUAC and WHZ groups; the analyses are therefore flawed. Children fulfilling both criteria would be identified with all screening strategies and not excluded from treatment. The papers marked in *blue* included oedematous children in the analysis; as oedema greatly increases the mortality risk, this confounding further increases the unreliability of the reports. The *purple* columns indicate the papers which used obsolete standards. This affects the CFR because more stringent criteria include more severely affected children in the cohort resulting in a higher CFR; less stringent criteria have the opposite effect, so that a lower CFR is expected when less severely affected children are considered to have SAM.

Figure 1 shows how the criteria used for WHZ have changed. For example, where Centers for Disease Control and Prevention (CDC) 2000 criteria² are used, one expects a lower CFR than if WHO criteria are used. Similarly, where a MUAC cut-off of <110mm is used instead of the WHO recommended criterion of <115mm, a higher CFR is expected. There are three reports that use the same data.

² https://www.cdc.gov/growthcharts/cdc_charts.htm

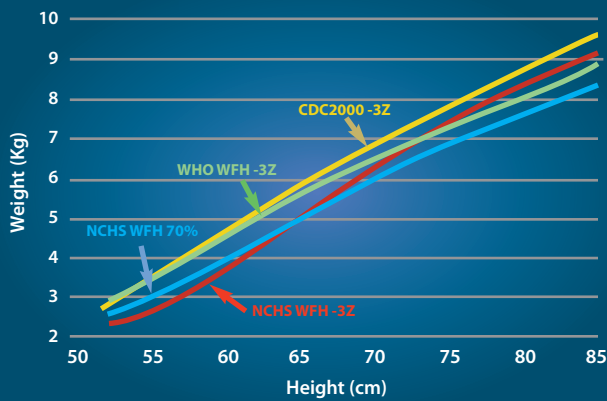
Sub-groups	Total #	Dead #	CFR %	Comparisons	p
MUAC v WHZ without oedema					
M-muac	7,191	56	0.78	muac v whz	0.000
M-whz	16,530	332	2.01	muac v both	0.000
M-both	40,307	2,000	4.96	whz v both	0.000
M-All-muac	47,498	2,056	4.33	$\chi^2=3.01$	0.083
M-All-whz	56,837	2,332	4.1		
MUAC v WHZ with oedema					
K-muac	1,669	118	7.07	muac v whz	0.000
K-whz	1,088	169	15.53	muac v both	0.000
K-both	4,217	576	13.66	whz v both	0.411
K-All-muac	5,886	694	11.79	$\chi^2=9.75$	0.002
K-All-whz	5,305	745	14.04		
MUAC v WHZ with and without oedema					
M+K-muac	8,860	174	1.96	muac v whz	0.000
M+K-whz	17,618	501	2.84	muac v both	0.000
M+K-both	44,524	2,576	5.79	whz v both	00.000
M+K - All-muac	53,384	2,750	5.15	$\chi^2=2.16$	0.141
M+K - All-whz	62,142	3,077	4.95		

WHZ refers to children with WHZ <-3Z and MUAC >115mm, MUAC refers to children with WHZ >-3Z and MUAC <115mm. "Both" refers to children with both a MUAC <115mm and WHZ <-3Z. The prefix "M" denotes marasmic children; prefix "K" denotes oedematous malnutrition (marasmic kwashiorkor). "M+K" indicates children with either marasmus or oedema. The prefix "All" indicates all the children who would be diagnosed with a MUAC-only programme; thus, "All-muac" is defined as M-muac + M-both (or K-muac + K-both) and "All-whz" is defined as M-whz + M-both (or K-whz + K-both).

	Total #	dead #	CFR %	CFR X/Y	X deaths %	Y deaths %
Scenario A						
X	500	0	0.0			
Y	1500	30	0.2	0.0		
Both X & Y	500	30	0.6			
Total	2,500	60	2.4			
All-X	1,000	30	0.3		50	
All-Y	2,000	60	0.3	1.0		100
Scenario B						
X	500	6	1.2			
Y	1500	30	0.2	0.6		
Both X & Y	500	30	0.6			
Total	2,500	66	2.6			
All-X	1,000	36	3.6		55	
All-Y	2,000	60	0.3	1.2		91
Scenario C						
X	500	10	0.2			
Y	1500	30	0.2	1.0		
Both X & Y	500	30	0.6			
Total	2,500	70	2.8			
All-X	1,000	40	0.4		57	
All-Y	2,000	60	0.3	1.3		86

Two variables, X and Y, are shown with various CFRs and caseloads. When subjects with both deficits are added to X and Y, the apparent CFR of X is ameliorated (A), reversed (B), or inappropriately shown to be superior (C); despite this, the total numbers of deaths that will be identified if X is used as the diagnostic parameter is always much less than with Y. Mathematical coupling always occurs where "one variable directly or indirectly contains the whole or part of another, and the two variables are analysed using standard statistical techniques." (Archie Jr, 1981)

Figure 1 The cut-off points for weight-for-height using different reference criteria



A child's MUAC is measured in a nutritional centre in Kalonda, Kasai Region, DRC, 2017

Report 16 has data for deaths with MUAC <115mm and National Center for Health Statistics (NCHS) criteria which shows a much higher CFR with WHZ; in report 17 the MUAC criterion has been reduced to the more stringent MUAC <110mm and the less stringent CDC 2000 criteria for WHZ, resulting in a reversal of the interpretation of the data so that MUAC now appears to have a much higher mortality rate. Report nine used WHO criteria and there is a non-significant higher mortality in the

WHZ group. Reports that do not use the current standards cannot be appropriately interpreted and can give a biased impression when applied for identification of children by WHO standards.

The green columns did not include children in the usual age range. Two of the studies had extremely short average observation periods (<4 days), which raises the question of verification bias and confounding by acute illness unrelated to malnutrition (e.g. convulsions).

The papers are sufficiently problematic that they cannot be used to guide policy decisions. Statistical analysis is limited as outlined and most have included oedematous children, have too few events, used obsolete standards or had a combination of these defects, which makes them individually inadequate evidence on which to promote MUAC-only programmes. The results are in broad agreement with the empirical data. It is concluded that children with SAM by MUAC-

Table 3 An overview of the literature comparing WHZ and MUAC SAM deaths

No	Dataset		dead	dead	dead	both	kwash	diag	diag	Age	time	MUAC	WHZ	Both	MUAC:WHZ
			MUAC	WHZ	Both	incl	incl	MUAC (mm)	WHZ			CFR	CFR	CFR	χ ²
			#	#	#							%	%	%	p
1	Aguayo 2015	IPF	2	3	27							0.23	0.23	0.70	ns
2	Grellety 2012	com	2	3	8					6-23		1.20	1.69	4.30	ns
3	Grellety 2015	OTP	1	13	26							4.76	0.87	3.72	ns
4	Isanaka 2015	OTP	4	3	6							0.43	0.57	0.64	ns
5	Lowlaavar 2016	IPF	0	11	10						3 d	0.00	6.43	16.95	ns
6	LaCourse 2014	IPF	4	2	1			<110	<70% NCHS		ng	5.88	6.90	6.25	ns
7	Berkley 2005	IPF					incl		<-3 NCHS	12-59	ng	10.94	10.11	25.36	ns
8	Chiabi 2017	IPF	3	1	18		incl				ng	14.29	4.35	29.03	ns
9	Olofin 2016	com					ng				ng	13.25	15.50	37.50	ns
10	Sachdeva 2016	IPF					incl				3.7 d	20.00	7.89	18.06	0.011
11	Burza 2016	com				both	ng					5.54	8.81		0
12	Morgeni 2011	IPF				both	incl				ng	16.83	8.90		0.024
13	Sylla 2015	IPF				both	ng			0-60	ng	7.74	23.26		0.014
14	Vella 1990	com				both	incl		<-3 NCHS	0-60	ng	18.18	8.82		ns
15	Dramaix 1993	IPF+Com				both	incl		<70%NCHS	0-60		33.06	20.22		ns
16	Garenne 1987	com				both	incl		<-3 NCHS	1-60		8.30	16.98		ns
17	Garenne 2009	com				both	incl	<110	CDC2000	1-60		21.50	12.42		ns
18	Garenne 2009	com				both	incl	<110	CDC2000	1-60		6.61	6.10		ns
19	Van Den Broeck 1993	com	6	3		both	incl	<-4 SD	<-3 NCHS	0-60		1.00	2.00		ns
20	Savadogo 2007	IPF				both		Tertile	<-3 NCHS	0->35		24.50	18.03		0.031
21	Girum 2017	IPF				both	incl		<70% ng	ng	13 d	14.80	20.00		ns

References are available on request from the authors. Brown = <5 expected events; pink = both MUAC and WHZ included; blue = oedematous malnutrition included; purple = obsolete standards; green = not 6-59 months age range; orange = low observation period; CFR = case fatality rate; ng = not given; IPF = inpatient facility; com = community; OTP = outpatient therapeutic programme

Table 4 Proportion of total SAM deaths identified with a MUAC-only programme with various CFRs

	Data			Theoretical			Empirical	Literature reports	
	A	B	C	All	1-6	7-10			
	CFR S-muac %	5	10	10	0.78	0.63	12.88		
	CFR S-whz %	10	10	5	2.01	0.94	10.09		
	CFR S-Both %	15	20	15	4.96	1.35	26.77		
Country	% Caseload								
	muac	whz	both						
Senegal	6	88	7	13	18	26	17	13	22
Philippines	12	82	6	16	23	34	20	17	28
Gambia	8	81	10	19	26	37	26	20	32
Kenya	13	78	9	20	28	40	25	21	34
Togo	30	64	6	27	40	55	29	31	46
Mauritania	27	61	11	33	45	59	38	36	51
Mali	24	62	15	35	46	60	42	37	53
India	16	62	21	39	49	61	49	40	55
Benin	26	59	15	38	49	62	44	40	55
Sudan	20	60	20	40	50	63	49	41	57
Burkina Faso	23	58	18	40	51	63	48	42	57
Cameroon	26	57	17	40	51	64	47	42	57
Somalia	31	55	14	40	52	66	46	43	58
South Sudan	27	55	18	42	53	66	50	44	60
Chad	26	51	22	48	58	70	56	49	64
Eritrea	45	45	10	45	59	72	48	52	67
Bangladesh	44	45	11	46	59	73	49	50	65
Nigeria	32	48	19	48	59	72	55	56	70
Niger	26	50	25	50	60	72	59	59	73
Ethiopia	41	43	15	50	63	75	56	54	68
Nepal	37	43	21	53	65	76	60	50	65
Myanmar	37	40	23	57	68	78	64	66	78
Zimbabwe	47	37	16	56	68	79	61	62	76
Liberia	47	36	17	58	70	80	63	49	65
Pakistan	45	35	20	60	71	81	66	61	75
DRC	58	31	11	60	73	83	62	60	74
Tanzania	45	33	23	63	73	83	69	64	77
Guinea	57	28	15	64	75	85	68	68	80
CAR	59	27	13	64	76	85	67	68	80
Haiti	63	26	11	65	77	86	67	71	82
Afghanistan	53	27	20	68	78	86	72	69	81
Angola	56	26	17	68	78	86	71	71	82
Madagascar	54	27	20	68	78	86	73	71	82
Uganda	65	23	12	68	79	88	70	73	84
Burundi	59	24	16	69	79	87	72	72	83
Rwanda	52	25	23	71	80	87	76	72	83
Ivory Coast	63	23	14	70	80	88	72	74	85
Sierra Leone	51	24	25	72	81	88	77	73	84
Zambia	76	17	7	74	84	91	74	79	87
Tajikistan	68	18	14	75	84	91	77	78	87
Malawi	75	16	9	75	85	91	76	79	88
Mozambique	53	17	30	81	87	92	85	82	90

Table 5 Estimation of the possible global deaths from SAM that would be missed using a MUAC-only programme

All-WHZ deaths	Total deaths	WHZ only	MUAC only	Both criteria	MUAC-only % missed	WHZ-only % missed
500,000	756,000	286,000	256,000	214,000	37.7	33.9
1,000,000	1,513,000	571,000	512,000	429,000	33.7	33.8

All-WHZ is the range of global deaths estimated in the Lancet series based on analysis of the numbers of children with SAM by WHZ <-3Z. To this is added the MUAC-only deaths based on the ratios found in Grellety and Golden (2016), using an equal mortality risk for WHZ <-3Z and MUAC <115mm and twice the mortality risk for children with both deficits.

alone and WHZ-alone have about the same mortality risk and that children with both deficits have approximately double the risk. The risks – low MUAC, low WHZ and oedema - appear to be additive; they are not proxies for the same defect. Children with a WHZ <-3Z cannot be described as healthy or less at risk of death than children with a MUAC <115mm.

Effect of caseload

If there are 100 children with SAM by WHZ with a CFR of 10 per cent and 50 children with SAM by MUAC with a CFR of 20 per cent then, even though the CFR of the MUAC children is double the WHZ CFR, children from each group will have ten SAM-related deaths. As the relative caseload varies widely from country to country, it is a more important determinant of the number of SAM-related child deaths than the relative CFR. We have taken the relative caseloads from Grellety and Golden (2016) and estimated the proportion of all SAM deaths that would be identified and admitted to a MUAC-only programme. We examine the effect of various estimates of CFR for children with a WHZ <-3Z and MUAC <115mm, using 1) theoretical consideration where the CFR is half, the same or double that of the alternative diagnosis and those with both deficits having the sum of the CFRs; and 2) the CFRs derived from the empirical data and the published reports. The results are shown in Table 4. The most likely scenario is given in theoretical simulation B, where the two defects have the same CFR and those with both defects have double the risk of death.

In the countries where most of the children are identified as SAM using WHZ rather than MUAC, most estimates indicate that fewer than half of all SAM-related deaths will be identified in children admitted using a MUAC-only programme, and in most countries only 75 per cent of deaths will be potentially averted if WHZ ceases to be used to identify SAM children.

Discussion

Our analysis shows that children with SAM identified by WHZ <-3Z and admitted for treatment are at high risk of death; at least as high as those with a low MUAC. In our opinion, the most pressing research needed is to develop simple methods to identify children with a low WHZ in the community, so that these children can be screened and treated. Some innovative methods, based upon photographic technology, are on the horizon and need to be properly funded. At the moment, these children are being neglected and do not feature in MUAC-related statistics such as 'coverage' surveys. To deny that these children are in need of treatment is unethical and in many countries, MUAC-only programmes should not be implemented.

How have we got to this position? It appears to be due to several factors. First, failure to appreciate the effects of mathematical coupling and other confounders that are often severe enough to create a reversal of significance (Tu et al, 2008) – so called Simpson's, Lord's and reversal paradoxes – that result in erroneous conclusions. Second, an exclusive focus on the relative risk of death without consideration of caseload; the relative CFR is not as important as the absolute or relative numbers of SAM deaths. Third, the strong advocacy for the use of MUAC to maximise coverage of treatment programmes has developed into MUAC-only programmes, despite little evidence on the consequences of not admitting low WHZ in different contexts; and lastly, perhaps, due to confirmation bias (Kahneman, 2011; Haselton et al, 2009).

If we assume that there is about an equal mortality for WHZ and MUAC-diagnosed SAM, and that those with both deficits have twice the mortality, then it is possible to estimate the numbers of SAM-related deaths that would be missed globally

if MUAC-only programmes were to be implemented universally. The results are shown in Table 5. Such a policy would result in between 300,000 and 600,000 SAM deaths occurring in children each year who have no possibility of being treated. This is a very large number of children and suggests that much more analysis should be undertaken in each context before recommending MUAC-only policies.

This in no way should be construed as an attack on the widespread use of MUAC as an independent diagnostic criterion and its merits in enabling screening and increasing treatment coverage at community level; our review reflects that it does not capture a considerable caseload of children who are at risk in different contexts. It is an absolute research priority to develop simple methods of identifying those children at equally high risk who are currently omitted from MUAC-only programmes.

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This is an extended abstract of three papers under peer review, where the details are described in full. When these papers are published they will be again highlighted in Field Exchange.

Postscript

In reviewing this article, the ENN editors posed several questions to Mike and Emmanuel to help our interpretation and understanding of the analysis. Both have kindly agreed to share their feedback. Our questions related to: representativeness of the empirical data analysed regarding extrapolation of risks of SAM-associated deaths identified by different indicators in the community at large; historical evolution of programme effectiveness with improvements in programming over the period during which the data were collected; and impact of admission criteria on the profile of children captured in the dataset (eds).

We have found an ascertainment bias in all the patient studies, including our own, and most of the community cohorts. This is demonstrated by the relative number of children with both MUAC and WHZ deficits (which we call SAM-both) in the subjects analysed and in representative community surveys. Children with SAM-both are more severely malnourished than most of those in the community, but often dominate patient cohorts; hence in-patient and community cohorts are different. We separated SAM-muac and SAM-whz from SAM-both to ameliorate or remove this bias. By eliminating the SAM-both children from the comparison, it is likely that SAM-muac and SAM-whz are much more representative of the situation in the community than would have been the case if we had simply taken all SAM cases together. Because of this we had to eliminate the majority of the children to have a fair comparison of the relative mortality rates. This also removes any bias from the mix of admissions to each facility (i.e. if they were mainly diagnosed by MUAC or WHZ) and makes this consideration irrelevant to the analysis and results. Oedematous children also have to be analysed as a separate group as this is a major confounder.

It is often tacitly assumed that SAM in the community is a fixed reference with which the patients should then be compared, but this is not the case. SAM in the community changes quite markedly with season, food security, economy, violence, epidemics, etc. If the whole community is deteriorating, then the SAM cases that are admitted will be in a worse state and vice versa.

The question we asked is not whether the children directly reflect SAM in the community, but whether children with different degrees of severity of SAM who are diagnosed with either SAM-muac or SAM-whz have a different mortality risk. We were not attempting to compare SAM children with non-SAM children, as many studies have done, but only to compare SAM-muac with SAM-whz; these are quite different questions and require a different study design. Each child with SAM-both could, of course, be counted as both SAM-muac and as SAM-whz – to get a fair comparison of the difference in mortality between the two criteria, they cannot be compared with themselves and appear in both groups being compared!

There are other biases inherent in all such studies. To address the co-morbidity bias, we separated the children into those treated in IPFs, OTPs and SFCs on the basis that the severity and co-morbidity would be IPF > OTP > SFC. We then looked to see if the risk of death with SAM-whz vs SAM-muac was different in the groups with different degrees of co-morbidity. Of course, the case fatality rates were much higher in the IPF than SFC (and SFC may be the same as the community), but the risk of death was not different between those with SAM-whz and SAM-muac in the three modes of treatment; if anything, it was higher in the SAM-whz. The children in each individual facility/programme of course got the same treatment – it was not different in the SAM-whz and the SAM-muac children, so that this could not account for any difference in mortality risk. Comparison of the IPF, OTP and SFC children

also addresses any difference due to the ways of identification of the SAM children and any selection bias that this causes. But there remain potential co-morbidity biases remain when illness affects predominantly different age groups; for example, birth weight, congenital abnormality, HIV and TB are other obvious confounders. Again, this is likely to be different in the three modes of treatment, but the extent of any difference by mode of treatment and their effect on the analysis is not known.

The biggest problem is perhaps verification bias. We do not know how many of the defaulting children died. This is a particular problem with OTP and SFC since the reported death rate is always a minimum death rate as absent children could be alive or dead. Defaulting, transfer of sick children, lost records, lost to follow-up, missing variables, measurement errors, etc. affect all the studies – including the community studies – and need to be taken into account when judging the reliability of the data. We looked to see if there was a difference in degree of this lost data between SAM-muac and SAM-whz. There were minor differences that were inconsistent between SAM-muac and SAM-whz, but not in our opinion sufficient to bias the comparison of mortality from children with MUAC <115mm and WHZ <-3Z. Adding the defaulters to our data does not make a difference to the results that SAM-whz has, in our datasets, a higher mortality risk than SAM-muac. When we used various mortality risks (with SAM-muac either more or less than SAM-whz mortality) with community-based ratios of SAM-muac to SAM-whz with SAM-both factored in, we find a large percentage of deaths would occur in children excluded from treatment using a MUAC-only programme, so any bias in our empirical data does not alter this conclusion.

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Impact evaluation of the Lebanon multipurpose cash assistance programme

Summary of evaluation¹



A child living in the Adams Informal Tented Settlement in Bar Alias, Bekaa Valley, Lebanon, 2017

Location: *Lebanon*

What we know: Cash assistance is increasingly used in humanitarian response to complement in-kind assistance.

What this article adds: Multipurpose cash assistance (MCA) was used in Lebanon to support 20,000 refugee households in 2015, facilitated by the Lebanon Cash Consortium (LCC). This study evaluated the impact of MCA at a six-month midline on measures of food security, health, hygiene and housing by comparing households that received cash versus similar households that did not. Findings showed that total monthly expenditures were on average 21 per cent higher in beneficiary compared to non-beneficiary households (32 per cent higher on foods). LCC beneficiaries resorted less frequently to borrowing food or sending household members to eat elsewhere to meet consumption needs and were less reliant on debt for paying rent. Overall, LCC beneficiaries were found to be four times happier than non-beneficiaries, felt eight times more secure and had five times the sense of trust in the host community. Beneficiaries were, however, under greater stress over financial issues (possibly due to a sense of precariousness and dependency on cash aid). The authors conclude that, in the absence of more durable alternatives for displaced Syrians, the LCC MCA continues to be a necessary and appropriate aid modality to help refugees meet their basic needs according to their household's priorities.

Introduction

Over one million Syrians now live in Lebanon as refugees due to the crisis in Syria. Multipurpose cash assistance (MCA) has been used extensively in the Lebanese context to meet refugees' basic needs, ranging from food, shelter, health and hygiene, and other items according to their spending priorities. The Lebanon Cash Consortium (LCC) brings together six international non-governmental organisations (NGOs), including Save the Children (consortium lead), the International Rescue Committee (monitoring, evaluation and research lead), Solidarités International, CARE, ACTED, and World Vision International. The mandate of the consortium is to provide MCA to economically vulnerable Syrian households, whose eligibility is determined based on the inter-agency proxy means test (PMT) score that seeks to measure economic vulnerability. During 2015, 20,000 households had been assisted with MCA out of 25,000 that were found eligible. The remaining 5,000 were not enrolled in the MCA programme,

reportedly due to lack of funding. This study aimed to measure the impact of the MCA delivered by LCC at a six-month midline of assistance on several proxies of physical and material wellbeing, encompassing food security, health, hygiene and housing.

Methodology

The study used a quasi-experimental design – regression discontinuity design (RDD) – to compare indicators of the physical and material wellbeing of households that received cash assistance versus households who did not. The RDD can establish the causal effect of an intervention without having to randomise those who will receive cash assistance or not, which is considered unethical in humanitarian programmes. In this RDD study, the intervention and control households were chosen in proximity of the PMT cut-off point. Hence, they are supposedly similar from a socio-economic and demographic perspective, as if randomly chosen; the only assumed difference is in the receipt of cash assistance. The

study compared a group of 247 recipient and 261 non-recipient households. Most households (76 per cent recipient and 77 per cent non-recipient) were male-headed, with an average age of 39 years old. Households in the two groups were very similar, except that non-recipient households possessed a greater variety of basic household assets, were smaller in size and received a lower amount of cash assistance from sources other than the LCC.

Findings

Overall, findings show that LCC cash aid increases refugees' consumption of living essentials, including food and gas for cooking. Their total monthly expenditures, which includes food, water, health, hygiene and other consumables, are on average 21 per cent higher than those of non-beneficiaries. In particular, LCC beneficiaries spend around 32 per cent more on food and 12 per cent more on gas for cooking compared to non-beneficiary households. Regarding food, LCC beneficiaries have a higher intake of dairy products and lower engagement in several coping strategies related to a previous lack of money to buy food. They resort less frequently to borrowing food and to sending household members to eat elsewhere to meet food needs.

LCC beneficiaries are also better off because they are less reliant on debt for paying their rent. Non-beneficiary households are 1.8 times more likely than beneficiary households to borrow money to rent the place where they live.

LCC cash transfers make households' economies 'healthier'; in fact, recipients are more likely to count on work as their main source of income, as opposed to negative and unsustainable coping strategies, such as debt, remittances, gifts and sale of assets or food.

Overall, LCC beneficiaries were found to be four times happier than non-beneficiaries due to being able to meet their household's basic needs. However, they are also under greater stress due to financial issues, which may be a consequence

¹ Lebanon Cash Consortium (LCC) Impact Evaluation of the Multipurpose Cash Assistance Programme, January 26, 2016.

of the sense of precariousness and dependency on cash aid and awareness that assistance may be discontinued. From a social cohesion perspective, LCC beneficiaries feel eight times more secure compared to non-beneficiaries. In addition, LCC cash assistance appears to increase their sense of trust in the community hosting them fivefold.

The central question of this study was: did the LCC MCA programme help recipients in achieving higher levels of physical and material wellbeing? The study findings show multiple positive outcomes of the programme, which is consistent with other randomised control trial and RDD studies on MCA; this supports the generalisation of these

findings. On the other hand, the size of the effect cannot be generalised beyond this PMT bandwidth, or for other amounts of MCA.

The authors cite two major methodological limitations of this study. Information collected at baseline and midline was self-reported, hence of limited accuracy and reliability. In addition, the two groups were not entirely similar, which violates a core RDD assumption; although the analysis addressed this issue, some degree of bias should be expected.

The authors conclude that, in the absence of more durable alternatives for Syrians in displacement (such as access to income-generation

opportunities) and despite the variety in assistance, the LCC MCA continues to be a necessary and appropriate aid modality for helping refugees in meeting their basic needs, in accordance with households' priorities. In fact, MCA is particularly effective in addressing access barriers in situations where markets are functioning and products are more 'elastic' to demand increase, such as food items. In markets characterised by availability issues, MCA alone is not effective. Specific interventions are needed which are aimed at strengthening services and expanding delivery capacity and outreach in order not to create disparities in the status of affected peoples.

Impact evaluation of a DFID programme to accelerate improved nutrition for the extreme poor in Bangladesh

Summary of evaluation¹



Location: *Bangladesh*

What we know: There is little evidence of the impact of integrated livelihoods and nutrition programmes.

What this article adds: An evaluation measured the nutrition impact of adding a nutrition-specific intervention, focusing on infant and young child feeding (IYCF) behaviour change communication (BCC); micronutrient supplementation; and deworming via community nutrition workers (CNWs), into three existing livelihoods programmes among the extreme poor in Bangladesh (2013-2015). Quantitative and qualitative baseline and endline data were used to compare livelihoods plus nutrition (L+N) and livelihoods-only (L) interventions. There was limited impact of L+N on mother/caregiver knowledge of and attitudes towards IYCF, but large and significant positive change in knowledge of and attitudes towards iron consumption and supplementation. There were no significant impacts on breastfeeding practices, child dietary diversity, meal frequency or consumption of food from animal sources, but some significant positive impact on complementary feeding practices and significant positive change in consumption of iron-rich and iron-fortified foods. No impact was found on child nutritional status (measured by height-for-age z-score and weight-for-height z-score). Impact may be improved in future through greater intensity and adaptability of CNW counselling (focusing on context-specific problem solving), multiple channels of BCC and empowerment of mothers to have greater control over their time and practices.

Background

Although child undernutrition in Bangladesh has fallen over the last two decades, its prevalence remains high, affecting around one third of infants aged two and under, with the highest burden in extremely poor households concentrated in remote and climate-vulnerable parts of the country. Sub-optimal infant and young child feeding practices (IYCF) have been identified as a key driver for undernutrition in this age group. The UK Department for International Development (DFID) aimed to improve nutrition outcomes for young children, pregnant and lactating women (PLW) and adolescent girls through

the integration of nutrition-specific interventions into three existing livelihoods programmes for extremely poor households in Bangladesh (described in Box 1). There is currently little research that directly assesses the impact of integrated livelihoods and nutrition programmes compared to livelihoods support alone. To help fill this gap, DFID commissioned a mixed-method evaluation to assess the impact of all three integrated programmes on nutritional status.

All three programmes introduced a set of complementary, nutrition-specific interventions from 2013 to 2015 targeting all PLW, adolescent

girls and children under five years of age. Components delivered via community nutrition workers (CNWs) were behaviour change communication (BCC) during monthly household visits and community-level discussions; micronutrient supplementation (micronutrient powders for children aged 7-23 months and iron and folic acid (IFA) supplements for PLW and adolescent girls); and deworming (for children age 12 to 60 months and adolescent girls).

Methods

The evaluation used quantitative and qualitative methods to assess the impact of the combined nutrition-specific and livelihoods interventions (L+N) across the three programmes on knowledge and practices of mothers and caregivers and the nutritional status of children under two years old, compared to existing livelihoods interventions with no nutrition component (L only) (describing the nutrition intervention as 'N' and no intervention as 'control'). The quantitative evaluation was undertaken at baseline (2013) and endline (2015) and qualitative evaluations were carried out at the beginning of 2014 and end of 2015.

Results

Mother's knowledge and attitudes and IYCF

The impact of L+N on caregiver IYCF knowledge and attitude was limited, except for iron, where there was a large and highly statistically significant positive change in knowledge of and attitudes to iron consumption and iron supplementation (about 8-9 percentage point increases in CLP

¹ Nisbett N, Longhurst R, Barnett I, Feruglio F, Gordon J, Hodinott J et al. (2016) *MQSUN Report: Impact evaluation of the DFID Programme to accelerate improved nutrition for the extreme poor in Bangladesh: Final Report.*

Box 1 Description of the three DFID-supported livelihoods programmes

Chars² Livelihood Programme (CLP) aims to improve the livelihoods and food security of extremely poor and vulnerable char dwellers through infrastructure improvement, transfer of productive assets (cows and goats) and short-term social protection (cash stipends). The CLP delivered assets to approximately 312,000 people between 2010 and 2016.

Economic Empowerment of the Poorest (EEP) Concern supports one million extremely poor people in rural and urban areas via non-governmental organisations (NGOs) through input support and technology transfer for livelihoods (including guidance on cropping, livestock, fishing, bamboo working, small business and tailoring); capacity-building (through self-help groups, community-based organisations (CBOs) and links with local government); support for innovation; and links to markets and/or value chains.

Urban Partnership for Poverty Reduction (UPPR) aims to improve the livelihoods of three million extremely poor people living in urban areas through creation of community development committees (CDCs), which then propose their choice of livelihood support from a package of interventions (such as habitat and settlement improvement, improving incomes and assets, support for urban food production, small business management, support for education, community banking and enhancing social development and protection).

and EEP Concern). Regarding appropriate breastfeeding and complementary feeding practices, there was modest scope for improvement since maternal knowledge was already relatively high for both groups at the outset. There was a lack of awareness of the dangers of not following recommended practices and the importance of following optimal IYCF practices in special circumstances (such as after a caesarean section).

Nutrition practices

There were no significant impacts on breastfeeding practices in any of the three programmes, although in UPPR there were borderline significant positive effects on exclusive breastfeeding and predominant breastfeeding. In EEP Concern, where introduction of water and other liquids before the age of six months was most common, adding the N interventions caused a significant reduction in these practices (reducing giving water and other liquids to infants under six months old by 11 percentage points and 12 percentage points respectively).

L+N resulted in significant positive behaviour change in iron intake; across the CLP and UPPR programmes there were significant increases in the consumption of iron-rich and iron-fortified foods (13 percentage points and 12 percentage points respectively) and a borderline significant increase of 12 percentage points in EEP Concern.

None of the programmes had significant impacts on dietary diversity (DD) of the child, meal frequency, or consumption of food from animal sources.

Barriers to behaviour change included lack of financial resources, lack of time to prepare recommended foods, fear of food wastage, household taste and wider social food preferences, limited influence of mothers on household decision-making, and deeply rooted, context-specific IYCF beliefs. In terms of women's status, results showed that the nutrition component did not have an additional impact on women's involvement in spending decisions within the household over and above the livelihoods component (discussed below). However, qualitative data suggests that including mothers-in-law (the main decision-makers in child feeding and food choices) in nutrition counselling may have had some positive impact on decisions made about child feeding care practices.

Overall, results suggest that investing more in the CNWs does have the potential to achieve greater improvements in certain individual behaviours. However, practices only changed when there was no requirement for significant investment of new time or resources by mothers and other caregivers.

Child nutritional status

The core measure of child nutritional status used was height-for-age z-score (HAZ), on the assumption that large changes in IYCF practices over a prolonged period or in a mother's diet during pregnancy could reduce levels of stunting. This was an ambitious goal over a two-year period. The endline survey included children aged 6-24 months, all of whom would have been exposed to the N interventions throughout their critical first 1,000 days (including prenatally for most). Results showed no significant impact on HAZ, weight-for-height z-score (WHZ), stunting prevalence or wasting prevalence. It is not known if mother's knowledge and use of iron supplements had any impact on child iron status, as this was not measured. This may be explained by the infrequent contact with CNWs, with little time during visits to discuss important nutrition messages, particularly for complementary feeding.

Given the importance of complementary feeding and the inclusion of animal-source foods in the diet for linear growth, it is not surprising that there were no significant impacts on anthropometry via this pathway. There was also limited evidence for alternative potential pathways for anthropometry impacts via, for example, reductions in open defecation.

Awareness of undernutrition improved among beneficiaries in the L+N programmes, with people being more conscious of the signs and ill effects of undernutrition; however, undernutrition was still perceived as 'normal' and preventing and addressing it did not become a priority for poor households.

Impact of the livelihoods interventions

Only qualitative data were available for CLP and EEP Concern programmes due to a lack of appropriate control groups. The overall perceived benefits of participating in these two programmes

(L versus no intervention) were substantial, although perceived direct economic benefits were relatively small in some cases. Additional income was used to improve overall living standards and pay off debts. In the UPPR programme it was difficult to attribute changes to the programme itself, as households also received a wide range of benefits from other NGOs. Some UPPR-beneficiary households described how they used programme support to transform their assets, diversify their income and improve their overall economic wellbeing. Others used UPPR grants to start a business or renovate their house but did not report experiencing any long-term economic improvements.

Quantitative results in the UPPR programme showed no significant impacts on either household DD or mothers' BMI in either L or L+N. There were also no meaningful impacts on practices related to breastfeeding or the introduction of other liquids and solids and the L components alone had no impact on complementary feeding. On access to sanitary latrines, there were no statistically significant impacts from either L or L+N. In terms of women's status, there was no significant impact from L-only or L+N on the proportion of mothers reporting that they participate either solely or jointly in decision-making on household expenditure (including on food and health), and no significant impact on the proportion of mothers reporting that they now controlled funds needed to purchase items themselves. There was, however, a small but statistically significant increase in women having a voice in decisions regarding where they could go alone. There were no significant impacts on anthropometric outcomes from L or L+N interventions. In the UPPR programme it appears that L+N households could not readily act on the advice they had been given by CNWs, because they did not have the funds or resources to do so.

Conclusion and recommendations

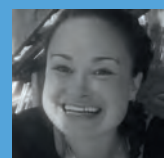
Results of the evaluation are sobering due to the lack of improvement in child anthropometry and the sparse improvements in IYCF knowledge and practices. However, the results give a clear picture of the barriers and enablers to successful progress along the impact pathway, which may inform future design and implementation.

The authors recommend greater intensity and adaptability of CNW practice to deliver real change (including a focus on context-appropriate problem solving), multiple channels of BCC and, to ensure that the most beneficial IYCF practices are adopted, a revised L+N intervention that simultaneously delivers this improved BCC, alongside measures to empower mothers (including greater control over their time and practices and changes in wider community norms and beliefs around IYCF and mothers' control).

² "Chars", which are home to over five million people in Bangladesh, are riverine sand and silt landmasses that are highly vulnerable to sudden and forceful flooding as well as erosion and loss of land, which makes living in them hazardous and insecure.

How do low-cost, home-grown school-feeding programmes work? Lessons learned from Malawi

By Devon Jaffe-Urell, Bernard Chigaya, Alexander Mwangonde, Victor Kadzinje, Paul Nguluwe, Edward Joy and Helen Moestue



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Learners at Mpata primary school eating porridge during break time, 2017

Save the Children Malawi

Location: *Malawi*

What we know: School meal provision is a common mechanism to try to reduce malnutrition rates in children while improve school attendance rates.

What this article adds: In collaboration with Malawi's Ministry of Education, Science and Technology and Ministry of Agriculture, Save the Children has piloted a home-grown school-feeding programme in primary schools in southern Malawi since 2015. Currently operational in 17 schools, a community garden provides crops that are prepared by mothers/volunteers and managed by head teachers/parent committees. A small qualitative study perceived costs and benefits of the approach, as well as the feasibility, acceptability and potential sustainability of the programme. The intervention was well received; key informants/focus groups reported positive impacts on child hunger and school attendance when meals were available. However, general food insecurity and drought negatively affected garden outputs and school attendance. Operational challenges that impacted delivery included challenges securing land for gardens, delayed seeds supply, inadequate cooking/feeding equipment, inconsistent training of school committees and poor nutritional quality of school meals. Availability of maize porridge varied in practice (ranging from approximately six weeks to three months rather than all year round) and placed considerable demands on mothers to prepare. Wider learning by Save the Children is underway with other experienced partners in Malawi to examine the feasibility, acceptability and potential sustainability of this approach.

Context

Malawi has one of the highest rates of chronic malnutrition in the world, ranking 73 out of 104 countries on the Global Hunger Index, with 37 per cent of children aged six to 59 months moderately or severely stunted. The Government of Malawi has recently emphasised school meal provision as an important mechanism for both reducing malnutrition rates in children and improving school attendance rates. In particular, home-grown school-feeding programmes (HGSF), which utilise locally produced and purchased foods to

link agricultural production with school meal provision, simultaneously support several of Malawi's national targets for nutrition, food security, education and child development.

School-feeding programmes are currently implemented in Malawi across all regions, with the World Food Programme (WFP) and GIZ as the most prominent actors in the HGSF approach. Growing evidence in country suggests that school-feeding programmes can reduce the prevalence of both stunting and underweight in primary school children, while im-

proving school attendance rates across all grades and reducing food insecurity. However, recent climatic shocks across Malawi, most notably drought conditions, have dramatically affected agricultural production; as a result, 6.7 million people across the country required humanitarian assistance in 2016-17. Effective methods must be identified to mitigate the effects of these shocks and build the resilience of the poorest Malawians to withstand inevitable climatic shocks in future.

The Home-Grown School Feeding programme

History

The Government of Malawi has emphasised the provision of school meals to learners, particularly via approaches that ensure local community participation in the production, delivery and preparation of school meals. In 2009, the Ministry of Education, Science and Technology (MoEST) – along with the Ministries of Health (MoH) and Agriculture (MoA) – established the Department of School Health and Nutrition (DSHN). The ministries also launched a joint National School Health and Nutrition Strategic Plan and guidelines for its implementation through to 2018.

Recently, the Government of Malawi coordinated and integrated various social support programmes through the new Malawi National Social Support Programme II (MNSSP II), which includes the school meals programme. As the custodian of School Health and Nutrition (SHN) policy, the MoEST oversees all HGFS activities, while the MoA and MoH provide technical expertise on farming and nutrition, respectively. As a member of the SHN National Technical Working Group, Save the Children (SC) has collaborated on the development of the MNSSP II; guidelines around best practices are currently under development. At the district level, SC has been collaborating with the DSHN and other departments since beginning its wider sponsorship-funded SHN programming in Zomba in 2008.

Initially introduced in 13 primary schools in Zomba District in 2013/14 and as part of an integrated SHN programme, SC's HGFS approach has now been scaled up to operate in 17 schools, benefiting approximately 8,600 children. In collaboration with the three ministries, SC aims to continue scaling up the HGFS programme within its impact area. SC and the ministries will then explore the potential of advocating for the scale-up of HGFS in schools nationwide.

Programme approach

SC works directly with school personnel responsible for management of the HGFS programme – namely the head teacher of each school and parent/teacher committees – to provide financial assistance on training, supervision and monitoring. Garden inputs are provided by the MoA; inputs typically include maize seeds to provide the staple porridge, plus either soya or pigeon pea seeds to bolster the meals' nutritional profile.

The programme centres on a community garden located on or around each school's campus. Fertile land is identified by the schools themselves and is either rented from or donated by local communities. Under the oversight of head teachers, delegated school staff and parent/teacher committees, crops are grown and harvested communally, stored until the lean season, and finally prepared as the mid-day meal for students by community volunteers. Of note, student participation in the management of school gardens varies by school; some schools utilise the gardens as a staging ground for lessons and practical sessions on agriculture and health, while others do not.

Study methodology

In collaboration with the London School of Hygiene and Tropical Medicine (LSHTM), SC undertook a small qualitative study in 2017 to explore the perceived costs and benefits of the approach, its feasibility, acceptability and potential sustainability. This sponsorship-funded study was undertaken to contribute to SC's efforts to build evidence on effective programming for children. Nine of the 17 pilot schools were selected to participate in the study through a mix of purposive and random sampling to ensure representation of all seven districts across Zomba. Study participants included male and female students, community and parent committee members engaged in the programme and head teachers. In total, nine focus group discussions and nine key informant interviews were conducted across all sample schools. Additionally, observations were made at each school to assess garden location and size, and kitchen, latrine and crop storage facilities. Interviews were also conducted with local experts in HGFS, including representatives from the government and non-governmental organisation sectors. Thematic analysis was performed to identify key themes; results have been shared and validated with partners at district and national level.

Findings

Although the primary objective of the study was an analysis of beneficiaries' perspectives on the HGFS programme, school visits included

qualitative data collection through observations and direct conversations with head teachers. As summarised in Table 1, operational activities at the sample schools varied. Of the nine schools assessed, three had gardens located on campus, while five rented land from local communities and one received community land by donation. Identifying viable land for a garden is the responsibility of school staff and parent/teacher committees; however, beneficiaries cited land issues as a key challenge of the programme as new land often had to be identified each year due to community politics and land scarcity resulting from overpopulation in the region. Notably, liaising with community chiefs was identified as a critical component of the programme's sustainability in order to garner buy-in and generate community support.

Inputs from the MoA, distributed via SC, included fertiliser and maize seeds, the quantity of which was determined by school size. For instance, a school of approximately 800 students received a one-time delivery of 100kg of fertiliser and 10kg of maize seeds. Pigeon peas or soya seeds were also included in farm inputs; the type of supplemental crop varied by year, based on the Ministry's selection.

Crop outputs

Although inputs were generally quite uniform across sample schools, crop output generated by the school gardens varied widely and were hugely affected by the droughts and floods of recent years. Outputs from the 2016-17 harvest averaged 23 bags of maize per school, ranging from three to 49 bags. During the 2015-2016 season characterised by drought, outputs ranged from just one to seven bags of maize per school. Production from the supplemental seeds was minimal, with five of nine schools harvesting one to two bags of either pigeon peas or soya. As such, school meals generated by the HGFS programme consisted of maize-based porridge supplemented with peas or soya for these five schools only.

Meal provision

Insufficient garden outputs resulted in fewer meals provided than projected, cited as a critical challenge

Table 1 Summary of the HGFS programme funded by Save the Children in Southern Malawi

Theme	Sub-theme	Details
Duration	13 pilot schools	3 years in HGFS programme
	4 additional schools	1 year in HGFS programme
Location	Southern Malawi	7 zones across Zomba District
Inputs	Seeds	Provided annually by MoA during growing season
	Fertiliser	
Outputs	Meals per week	Averaged 3 times per week for 3 months during lean season Averaged 3 times per week for 3 months during lean season
	Meal content	
		Maize porridge only at 4 out of 9 schools Maize porridge + soya/pigeon pea supplement at 5 out of 9 schools
Beneficiaries	Student enrolment	8,012 students at time of data collection

of the HGSP programme by most beneficiaries interviewed. Although meals were provided during the lean season in an effort to lessen critical food insecurity among communities in the region, schools were able to provide meals for a maximum of four months per year and a minimum of just one week. Outside the HGSP programme, no meals were provided at any of the sample schools. Issues related to school committee organisation and management of the programme contributed to the challenge of consistent meal distribution, as did school capacity for operating the programme throughout the year. Garden management and meal preparation are performed by community volunteers, the majority of whom are women. A recent government mandate to serve all school meals prior to the first class of the day exacerbated the time burden associated with the programme as volunteers had to neglect home duties in order to arrive on campus early in the morning to prepare the porridge.

Training

To bolster school capacity and community ownership of the HGSP programme, SC aimed to provide annual training for each school on operations, garden management and meal preparation techniques. Based on self-report, some respondents had never received training, while others were trained more than once a year. However, several challenges were noted here: firstly, some recipients may have confused SC learning/observational visits with provision of training; secondly, trainings did not always target all committee members at a given school due to funding constraints; and thirdly, turnover among committee members meant replacements tended to miss the annual training. Given the high turnover of school staff and committee members in charge of the programme, more frequent trainings were cited by beneficiaries as an area for improvement. Furthermore, trainings were noted to be lacking in proper hygiene practices, modern agricultural techniques to help sustain drought conditions and porridge preparation in mass quantity.

Kitchens

By programme design, schools erected kitchens on their own; however, only four of the nine

sample schools had an established kitchen area at the time of evaluation. Committee members and students contributed kitchenware items to the programme, including pots and cups. Students identified this as a key challenge as bringing cups from home was not possible for many; others experienced negative reactions from parents when cups were lost, broken or stolen.

Programme successes

Increased school attendance/reduced absenteeism

Overall, the HGSP programme was received positively by beneficiaries and other stakeholders alike. Most participants cited increased school enrolment as the primary success of the HGSP programme, noting enhanced student performance as a benefit of efforts to reduce hunger. Head teachers universally noted improved absenteeism following implementation of the programme, with attendance rates fluctuating in accordance with meal provision. Introduction of the HGSP approach generated enthusiasm among community members, primarily due to its impact on school attendance. Several members of various parent/teacher committees noted longer-term results of the programme; as one PTA leader stated, “We were very excited to hear that the school feeding programme was being introduced here. This helped us draw back the children who went into early marriages, to bring them back to school.”

That said, absenteeism was seen by informants to increase in line with at-home food insecurity, thereby reducing positive impacts associated with the HGSP programme. During the 2015-16 drought, lower crop yields were experienced at both home and school gardens. Beneficiaries noted reduced attendance rates during this time as students felt too hungry to attend school or sought jobs as far reaching as Mozambique and South Africa. Evidently, the positive effect on absenteeism was conditional upon a minimum degree of food security in the beneficiary households. Nonetheless, the provision of school meals was often cited as playing a role in reducing food insecurity at home by ensuring that one meal was consumed outside the household. Limited parental contribution to the programme

and reliance on food aid were also highlighted as key consequences of volatile weather patterns.

Community sensitisation

Of nine key informant interviews with head teachers, six cited community sensitisation as a method of improving knowledge of and participation in the programme. Direct engagement of village chiefs in the programme was noted as a key driver of the programme's success. These findings are supported by other studies conducted across sub-Saharan Africa by the World Food Programme (WFP), the Partnership for Child Development and others; sensitisation campaigns to support community involvement and development have supported HGSP interventions as a tool in transitioning to nationally-owned school-feeding programmes. Building community-level capacity has been recognised as critical to strengthening community ownership, which sustainably improves HGSP service provision.

Programme challenges

Study participants cited two key weaknesses of the current approach: insufficient farm inputs, namely seeds, resulting in reduced garden outputs (i.e. maize production), and poor nutritional quality of school meals. Related to this, unstable weather patterns were noted by beneficiaries and experts alike as an external threat to the programme's success. Parent and committee members felt that their inadequate knowledge base regarding more sustainable, modern agricultural practices inhibited their ability to manage and operate the programme to its full potential. Furthermore, consistent and reliable access to land on which to operate school gardens was cited as a major challenge and clear barrier to the sustainability of the programme.

On a broader scale, differing priorities of the three government ministries involved in the programme created a challenge for the coordination of HGSP implementation. The MoA is inclined to serve the general community rather than a specific focus on schools; in contrast, the MoEST's mandate is directed towards improving education outcomes over health.

Insufficient farm inputs

The untimely delivery of farm inputs in sync with the growing season was routinely cited as a barrier to community participation in the programme, further reducing the potential for expected production. Specifically, head teachers and committee members at six of nine schools experienced delays in the delivery of seeds and/or fertiliser; late delivery coincided with the onset of the rainy season, which subsequently damaged crops. SC's role in programme implementation was limited to mobilisation of schools and communities to initiate and manage the programme, with farm inputs selected and provided by the MoA. However, beneficiaries' negative experience of the quantity, diversity and timing of input delivery was attributed to SC, not to the government. This knowledge gap points to insufficient training of beneficiaries or deficiencies in programme implementation since, per design, the HGSP approach is intended



A head teacher at Milola primary school admires a maize crop in the school garden, 2017

to be community-owned and managed. Thus, receipt of farm inputs – primarily maize seeds in this case – is critical to the functionality and longevity of the programme.

Insufficient land

Challenges in acquiring and sustaining sufficient land for gardens was referenced by beneficiaries at all nine schools. Per programme design, gardens are intended to be located on campus; however, six of nine schools currently rent land from local communities. Barriers to successful garden management and production included theft of seedlings and crops, change in rental agreements and distance from school and community. As highlighted by a member of the MoEST, acquisition of permanent land is a key challenge: “In Zomba to be specific, there are issues to do with land for the schools. At times, they identify a piece of land this year where they can pay and rent, and the next year the owner says, ‘No, I would like to do whatever I want with this land; go find another piece.’”

Time burden

School staff and committees alike noted the time burden associated with managing and operating the HGFSF programme. In particular, female community volunteers tasked with preparing the daily porridge were challenged by managing the time required at school with their own tasks at home. Although notably supportive of the programme, some volunteers interviewed highlighted the time associated with managing food preparation as a critical challenge. For instance, insufficient kitchen pots and utensils required volunteers to take turns preparing porridge as stocks were not enough to feed a full student population.

Poor nutritional quality of school meals

Most beneficiaries found the maize-based porridge provided to be of poor nutritional quality; many interviewed felt that improving the programme’s impact would require more nutrient-rich meals. School committee members cited

lack of training as a barrier to the provision of more nutritious meals: “Those who prepare the porridge ... need to be trained on how to make a hygienic and nutritious porridge.”

Lessons learned

SC’s HGFSF approach is a low-cost model with the potential to be a sustainable method of reducing food insecurity and improving educational outcomes. While no cost analysis has been conducted to date, key financial and opportunity costs include training for SC, volunteers’ time for communities, and seeds and fertiliser for government (the latter is already included in the national budget).

However, as detailed, several operational challenges were identified. Based on the findings outlined here, considerations for scale-up or future programmes include the need for more frequent trainings to educate communities on programme management and execution, provide nutrition education and enhance local-level stakeholder collaboration. Efforts to improve nutritional quality of porridge should also be considered, which should inform farm inputs selected for distribution to school gardens. In addition, the number of farm inputs should match enrolment and be delivered in time with the planting/harvest cycle. At a strategic level, successful programme implementation and scale-up require enhanced and streamlined collaboration among partners – including government ministries – from the planning stage.

Going forward, a task force comprising all partners will be established to determine next steps for the HGFSF programme, including potential adaptations of the current approach to strengthen nutrition education, utilise more diverse seeds selection as farm inputs and, potentially, a narrower focus on schools with the most capacity to adopt the programme. As SC awaits feedback from the Government, concrete plans for future research are not yet underway; however, a larger quantitative study is

necessary to assess the nutritional impact of the programme.

Criteria for success

As an agriculture-based, community-led programme, the HGFSF approach is reliant on certain conditions to be successful. As unpacked by this study and experienced by other organisations engaged in HGFSF approaches in the Malawi context – principally GIZ – these criteria include:

- School access to land for garden and adequate water source, both for irrigation and drinking;
- Engaged head teacher, school staff and community members, including community chiefs;
- Integration into existing national strategies and social protection systems addressing hunger and malnutrition; and
- Ability to complement existing basic health interventions, including sanitation facilities and hygiene approaches.

Conclusion

These findings illustrate that SC’s HGFSF approach is well received by beneficiaries and can reduce absenteeism in primary schools. This low-cost, community-based approach is potentially replicable and sustainable. However, continuation and scale-up of the intervention may be inhibited by poor coordination among stakeholders, insufficient capacity of some communities to manage the programme and the impact of volatile weather patterns on crop production. SC is continuing to examine the evidence generated by this study and reaching out to partners and other experienced organisations – including WFP and GIZ – to share and learn from best practices. Addressing these challenges will be critical to the acceptability, sustainability and expansion of the HGFSF programme across Zomba and elsewhere in Malawi.

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Save the Children Malawi



Learners receive porridge at Namalombe primary school, 2017



World Vision Somalia

Health systems strengthening in fragile contexts: A partnership model in South West State, Somalia

By Kevin Paul Mackey and Sirya Ezekiel Kiptum



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Location: Somalia

What we know: Delivery of health services by the Ministry of Health (MoH) in Somalia is heavily dependent on international and local non-governmental organisations and United Nations agencies.

What this article adds: In 2015 World Vision (WV), funded by Global Affairs Canada, implemented a new, two-year model of partnership for the delivery of health and nutrition services directly through the MoH for South West State (SWS). This focused on strengthening human resources for health; health financing and resource mobilisation; governance and leadership (management); supplies of medical products; and quality service delivery. A WV/MoH-SWS memorandum of understanding (MoU) guided the process and government capacity, categorised within a WV partnership framework. A task force oversaw developments. The single-donor pilot project created 54 new staff positions in the MoH-SWS; this has grown to 233 staff with multiple donors and expanded facility/health post/mobile clinic coverage. Key success factors included building community trust in government-led services, strengthened medical supplies management, development of a capacity-development plan with regular mentoring and follow-up that included financial systems and controls, and support to the regional health service. The MoH has demonstrated significant progress and signs of leadership through this support; external resources and capacity are still needed to meet health and nutrition needs. Emergency, short-term funding continues to dominate; longer-term (development) funding streams are needed to sustain health systems strengthening in fragile contexts.

Background

Since the collapse of the Siad Barre-led government over 25 years ago, the health sector in Somalia has faced almost total collapse. Thus, health services are delivered predominantly through local non-governmental organisations (LNGOs), supported by international non-governmental organisations (INGOs) and United Nations (UN) agencies, with the Ministry of Health (MoH) providing leadership and strategic direction to local health facilities. However, the MoH is very weak in most states/districts in Somalia and non-existent in Al Shabaab-controlled areas due to lack of access.

Since 2006 World Vision (WV) has supported the development of the National Tuberculosis Programme (NTP), helping it deliver on its mandate to develop policy and monitor tuberculosis programming in Somaliland, Puntland and southern Somalia. Drawing on lessons learned from such capacity-development efforts with government entities and other civil society actors, WV expanded the scope of its partnering efforts in 2011, putting in place policies and operational structures and developing methodologies to deepen engagement with LNGO partners in southern Somalia. The emerging governance environment created opportunities to leverage this experience to modify the existing LNGO partnering approach to work with the nascent MoH for South West State (SWS). In May 2015 WV, with the support of the humanitarian fund of Global Affairs Canada (GAC), undertook a one-year pilot of a new model of partnership for the delivery of health and nutrition services directly through the MoH – the first time this approach had been used in the state. Funding from the GAC was then renewed annually, based on performance. The partnership focused on strength-

ening the following pillars of the health system: human resource for health; health financing and resource mobilisation; governance and leadership (management); supplies of medical products; and quality service delivery. This article describes the model of partnership, noting key lessons learned in the process.

Partnering process

WV's previous partnering experience showed that concentrating only on sector-specific capacity-building was not sufficient to develop competent, professional organisations. Rather, a holistic approach is required to professionalise all levels of an institution. WV's approach to partnership aims to tailor specific capacity-building plans to the strengths and weaknesses of implementing partners. It is not a 'one-size-fits-all approach', but an interactive, flexible process that relies on field-based expatriate technical staff developing mentoring relationships with partners and heavy emphasis on 'on-the-job' experiential learning. The emphasis on delivering non-specified health services ensures that the partnership is practical and flexible, modifying project designs/budgets to address emergent challenges that arise.

WV approached the MoH-SWS about establishing a memorandum of understanding (MoU) that would guide a partnership process for strengthened health service delivery. The nascent MoH-SWS was labelled "emergent" as per the WV partner categorisation system¹ as it lacked systems and processes. Emergent status meant that the MoH-SWS was only allowed to directly manage a small quantity of financial resources. However, emergent status also ensured close

¹ The development stages of WV partnerships are categorised as: (1) embryonic; (2) emerging or nascent; (3) growing; (4) well developed; (5) mature.



MUAC Screening for Malnutrition (SAM) cases, Somalia, 2017

technical support would be provided to increase capacity across a range of skillsets, including financial, administrative and human resource management. At the time the MoH-SWS had only three staff: the Minister of Health, the Deputy Minister of Health and the Director General of Health. WV and MoH-SWS co-created the MoU, drawing on MoUs WV had with other state entities in Somalia. The MoU delineated the different roles and responsibilities in key areas of partnership, including: financial support; supplies provision (pharmaceuticals and medical equipment); recruitment of staff (human resource for health); and technical support (capacity development).

Building trust

After 25 years of civil conflict, communities were not accustomed to the government undertaking health service provision and were suspicious of the capacity of the state to provide unbiased health services. WV brokered meetings between community management committees and the MoH-SWS to help foster mutual trust. The initial meetings were tense; however, as transparent processes were negotiated for the allocation of duties and resources, the facility-level management committees warmed to the idea of the state as a viable actor in the provision of health services.

Human resources

The pilot project created 54 new staff positions within the MoH-SWS with two-year funding under the GAC grant via WV Somalia (one-year pilot funding plus one-year scale-up). WV introduced the MoH-SWS management to key standards and norms, encouraging the use of World Health Organization (WHO) recommendations, current UNICEF practices and the Essential Package of Health Services (EPHS) guidelines as a means of developing an aligned health and nutrition management structure. Once staffing structures were finalised, incentive rates for skilled, semi-skilled and non-skilled facility-level staff members were agreed². WV, MoH-SWS and the facility-level health committee 'task forces' (tasked with overseeing development within their local area) agreed to a management structure, respectful of the local management committees' desire to take an active role in the day-to-day running of the facility. The community management committee leadership role was fur-

ther recognised by allowing the committee to forward applications from qualified community members, who were immediately shortlisted for the recruitment process. It was agreed that non-skilled staff members were to be recruited directly by the local facility-level health committee task force, while skilled and semi-skilled staff would be recruited through a rigorous and transparent process. Non-skilled staff categories included guards, community health workers (CHWs) and mobilisers and cleaners. The negotiated arrangement promoted buy-in from suspicious community management committees, who were fearful of losing control of their community asset, and ensured that the most important roles – mainly the skilled and semi-skilled staff members – would be recruited through a competitive recruitment process.

With the advice of key government officials and guidance from the WV Human Resource Department, the team defined a recruitment process. The Governor of Bay Region and District Commissioner of Baidoa were enlisted to help manage community expectations and offer advice on how to create a transparent process which was acceptable to the community. Skilled and semi-skilled employment was rare; thus competition for such positions was high and pressure on MoH-SWS government officials from other powerful community stakeholders to favour candidates was strongly felt. Over 436 applications were received for the 54 positions.

As well as supporting recruitment, WV developed a payroll system and payment mechanism by which facility-level staff members received a direct transfer from WV either to their personal account or directly to them through mobile money transfer at the end of each month, following accurate submission of timesheets by the MoH-SWS. Developing these shared processes helped to mentor the MoH-SWS on the importance of accounting for staff working hours, promoting both upwards accountability to donors and downwards accountability to the community management task force committees.

Facilities, supplies and equipment

The MoH-SWS was encouraged to adopt WHO minimum standards for the supply of maternal child health (MCH) facilities, including a list of standard supplies and drugs. WV took re-

sponsibility for procurement of the medical supplies and equipment for the project to ensure all drugs were procured from certified suppliers. The MoH should work with the certified suppliers to ensure quality of drugs procured and prevent substandard counterfeit drugs. Standard operating procedures (SOPs) were established to deal with requisitions, reorder levels and relevant documentation and accountability on consumption/utilisation of consumables. WV technical staff also provided training to the new-hire facility-level MoH-SWS staff members on the utilisation of medical equipment.

Health and nutrition technical support

WV and the MoH-SWS agreed on a capacity-development plan anchored in regular structured workshops followed by close mentoring and on-the-job training. Although many of the new-hire staff members had previous health sector experience, gaps became apparent and tailored capacity development to tackle areas of weakness was developed for specific facilities and teams. One example was the Core Infection Prevention and Control (IPC) standards, which was a new concept for many staff. A formal workshop was held in which the process was outlined and staff members were trained on facility-level procedures. The training was so well received that teams immediately requested an autoclave to sterilise delivery equipment to reduce cross-infection. Savings were reallocated within the project to purchase the equipment to support staff members' desire to improve practice at the facility level. Staff were encouraged that trainings and their follow-up request could result in actions by the MoH-SWS to improve the quality of their work. This helped enhance the perception of the MoH-SWS as a responsive management mechanism. Technical trainings were provided on integrated management of childhood illness (IMCI), integrated community case management (iCCM), communicable disease management, basic emergency obstetric and neonatal care (BEmONC), integrated management of acute malnutrition (IMAM), health facility commodity supply and supportive supervision. The MoH-SWS Director General and WV's Health and Nutrition Technical Specialist, along with other senior staff, provided technical support to the field-based teams, including regular joint supportive supervision, during which clinic staff were supported in identifying solutions to the gaps, needs and challenges. Particular challenges identified were the lack of supplies of therapeutic foods, sharing of therapeutic foods due to lack of food at home, poor access to hard-to-reach villages and nutrition services, and general access and insecurity challenges.

Finance, administration and supply chain technical support

Prior to the pilot project the MoH-SWS had very little experience in internal financial controls and even less in developing accountability mech-

² Incentive rates varied per cadre and qualification: CHWs \$50, cleaners and guards \$200, auxiliary nurses and nutrition assistants \$300, qualified nurses and midwives \$480, PHC supervisor \$600 (all monthly).

anisms. WV's Finance and Support Service Manager provided hands-on support to co-create payroll and procurement documentation and procedures with the MoH-SWS. Sample formats for purchase requisition forms, local purchase orders, goods received notes and request letters were provided to MoH-SWS to help staff develop their own documentation. Guidance was provided on how to develop simple contracts for vehicle hire and develop and manage logbooks, and create labour distribution reports and timesheets for newly hired facility-level staff members.

The mentorship approach used for finance and support services in the pilot was viewed as a great success. It was not only a powerful risk management mechanism, allowing expatriate staff members to quickly identify capacity gaps, but the trust built through close association allowed field-level teams to co-create solutions. For example, after the first quarter of the pilot phase, it became apparent that the three-person MoH could not manage the level of technical rigor and attention to detail required to meet stringent financial accountability standards. In response, budget was reallocated to fund the position of Administration Officer in the MoH-SWS, creating a dedicated focal point to deal with all administrative and financial issues and someone whom WV's technical specialist could mentor and support. The inclusion of the Administration Officer enhanced the capacity of the MoH-SWS to manage donor resources, thereby increasing the amount of financial resources directly managed by the Ministry (detailed financial information is not available from the Ministry). MoH-SWS professionalism improved and financial systems were established that were aligned with international accounting practices.

Support to regional health structure

While the initial phase focused on support for facility-level implementation, it became apparent that the district health system needed to be strengthened to support all health actors in Baidoa district. Experience during the pilot phase

identified that the District Medical Officer for Health role was too wide-ranging, covering issues of health and nutrition and water, sanitation and hygiene (WASH), and was not able to provide adequate support to primary healthcare facilities and outreach teams. After reviewing the provisional district structure, WV and MoH-SWS agreed to allocate funding to support a new Primary Health Care (PHC) Supervisor role. PHC Supervisors monitor and provide training at facility level to MCH staff members. In addition, a gap in information management was identified. While the MoH had terms of references (ToRs) for information management roles, these roles were vacant due to lack of funds. In response, budget allocation was made (from the GAC fund, via WV Somalia) and staff were recruited. These new positions decreased the workload of the Director General, allowing him to address other more strategic issues related to the management of the MoH. At facility level, Team Leaders were assigned additional core responsibilities, including decision-making on activity planning, resupply, reorders, mobile airtime purchase and referral of patients.

Expanded partnership

The initial one-year partnership with MoH-SWS has since been scaled up (also with GAC funding, as well as resources from the Office for United States Disaster Assistance (OFDA) in year two) from two health facilities, two mobiles teams and 54 new staff to eight health facilities, 26 internally displaced persons (IDP) camp-level health posts and four mobile clinics providing basic health and nutrition services to IDP, returnees and host community members. A total of 233 MoH staff are now employed across the state, a dramatic increase from the initial three in 2015. GAC funds are channelled to the MoH via WV Somalia to pay salaries each month, based on timesheets submitted. In addition, MoH and WV leveraged this partnership to scale up and respond to recent acute water diarrhoea/cholera response. District rapid response teams (RRTs) were deployed to respond quickly to rumours, investigate and mount an

aggressive cholera response, providing curative services, referral of severe cases to the cholera treatment centres/cholera treatment units and community mobilisation – and with good results, as cholera was contained in most SWS areas. Following the initial partnership with WV, MoH-SWS has used the MoU format to sign partnership agreements with four other LINGOs and other INGOs have leveraged the strengthened MoH-SWS to achieve their emergency response objectives, especially in inaccessible areas.

Conclusion and the way forward

To build a sustainable health sector, government, NGOs and private actors must have the resources and capacity to fulfill their respective roles. Our long-term vision is of an agile, robust MoH taking a leading role, supported by partners. To build this capacity, WV employs a holistic approach, focusing not only on the technical capacity of sector entities to deliver, but also on their governance and management capability. Through this partnership, MoH-SWS gained practical experience managing health facilities, was exposed to international best practice and strengthened its capacity to professionally monitor other health actors, enhancing quality control for the health system. A recent WV capacity assessment resulted in the partnership with the MoH being categorised as 'growing'; the hope is that in a few years the partnership will reach 'maturity'. The MoH now chairs the cluster meetings, demonstrating good leadership. Much of the success of the past two years can be attributed to the recruitment process, which helped build the credibility of the MoH-SWS and resulted in qualified and experienced staff being recruited to the MCH facilities and mobile teams.

Finally, the partnership approach created conditions in which trust can be fostered between the community and the state. For the state-building project to be a success in Somalia, state institutions must have know-how and be perceived as credible in the eyes of the communities to which they are accountable to exercise their mandates effectively. This approach has not only succeeded in bringing much-needed health services to vulnerable communities but has bolstered the reputation of the state as a credible, representative actor in the provision of basic services. The Government of Somalia still has very limited resources, which are mainly used to support security, so external actors will have a role to play for some time; however, due to this pilot and scale-up, other actors are now willing to fund the MoH directly (including Save the Children International, the International Organization on Migration, Italian Cooperation and UNICEF). Funding avenues in Somalia remain dependent on short-term (nine to 12 months) and emergency responses; further advocacy to donors that provide longer (development) funding streams with interest in health systems strengthening in fragile contexts, like SWS institutions, is required.

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SWS Health Management Team, 2017

World Vision Somalia

Agency profile



**ELEANOR CROOK
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WFP/Kabir Dhanji

The *Field Exchange* editors conducted an interview with William Moore, Executive Director of The Eleanor Crook Foundation (ECF), for this issue's agency profile slot.

William has been with the Foundation for three and a half years. Before he joined ECF, he worked for the Millennium Campaign in the run-up to the launch of the Sustainable Development Goals (SDGs). Perhaps it isn't surprising that William is serving as ECF's Executive Director (ED), given that his grandmother is Eleanor Crook. The story of William's appointment goes something like this.

Just before Christmas 2014, he got a call from his grandmother saying that ECF had just had a pleasant surprise from their finance department: they had US\$1 million to give away before year's end. She wanted to use it to help improve nutrition among Syrian refugees and wondered if William knew which organisations were doing the most effective humanitarian work in response to the Syrian crisis. This US\$1 million donation was a turning point for ECF: it was suddenly clear that they were no longer a small, family foundation giving out modest grants, mostly in the form of unrestricted gifts, to a circle of entities they already knew.

On the back of this experience, Eleanor and William talked about new systems that needed to be put in place to strengthen their grant-making process and to begin monitoring and evaluating the now much larger grants that Eleanor's Foundation was making. William was asked to come on board at this point to help put this new infrastructure in. Fast forward a few years and ECF now has team members based in North Carolina and Washington, with a newly appointed Technical Director based in the UK.

Eleanor set up the Foundation in 1997. It always had a focus on global hunger issues, which

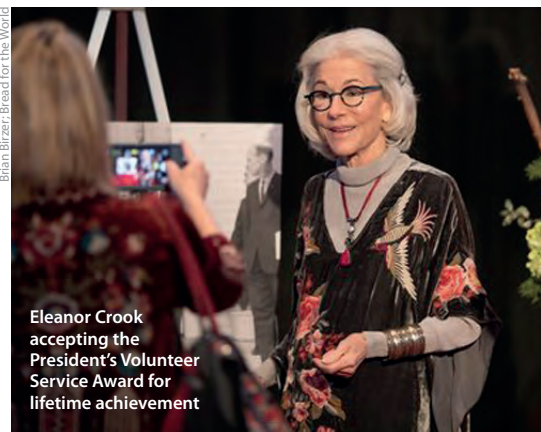
had been her concern since the 1980s, volunteering for the Church World Service and other international non-governmental organisations (NGOs); her first exposure to famine was the 1984 Ethiopia famine. Her husband had also spent time in Ethiopia during one of the famines. Eleanor was particularly angry seeing mothers unable to feed their infants and powerless to stop them dying. This anger translated into a passion to do something about global hunger.

When William joined the Foundation, he came with a specific vision. He believed that ECF needed a targeted focus and to take "smart risks", filling obvious gaps by investing in areas that governments and business are unable or unwilling to invest in. His experience working in the SDG community meant he was aware that the nutrition sector needed more investment. Given hunger was an issue close to Eleanor's heart, he knew that nutrition was going to be a good fit. At the same time, ECF was "no Gates" in terms of size and therefore needed to define a clear area of investment focus.

After a lengthy period of consultation with various actors in the nutrition community, William/ECF arrived at a strategy and approach which they hoped would enable them to become a leader in the sector. ECF wants a dual focus on nutrition research and nutrition advocacy, as these seem to be the areas where investment is most needed. In many respects, advocacy and research are two sides of the same coin. Good advocacy needs to be rooted in real evidence but at the same time rigorous evidence won't necessarily be 'picked up' by decision-makers. There are many examples of promising interventions not being adopted. You need advocacy and, as part of that, creative approaches to dissemination and financing.

The Foundation's endowment and disbursements have been on a rapid growth trajectory in recent years and Eleanor intends to provide

Brian Blitzer/Bread for the World



Eleanor Crook accepting the President's Volunteer Service Award for lifetime achievement

the organisation's endowment with the resources it needs to operate in perpetuity. Global nutrition is now ECF's sole focus. Overseeing all the project portfolios are William, two nutritionists with considerable research and implementation experience, a former Obama appointee at the United States Agency for International Development (USAID), a recent graduate from the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin, and a Senior Advocacy Advisor who runs a prominent consulting firm based in Washington, DC.

ECF has a clear research strategy and approach, partnering with NGOs and universities to conduct implementation research through its RISE (Research, Innovate, Scale, Establish) for Nutrition grant programme. It funds rigorous implementation research to identify solutions to current implementation challenges on the ground using existing delivery mechanisms that can impact nutrition at scale. This involves testing discrete improvements to existing programmes.

One example is research through International Rescue Committee (IRC) in South Sudan, which is testing a new, simplified set of tools and algorithm for diagnosing and treating uncomplicated



Low-literacy toolkits to treat SAM

Annie Zhou/International Rescue Committee

severe acute malnutrition at community level that is suitable for low-literacy community health workers (CHWs). The approach needs to work within a weakly supported health system where there is little CHW training. The first study appears to be very successful (early experiences featured in a 2016 *Field Exchange* article) and has therefore progressed to a phase 2 ECF investment, involving piloting in three additional countries through four implementing partners. The objective of this phase is to ensure that the approach is generalisable in multiple contexts.

The South Sudan work is typical of the ECF research approach. It starts with a three to four-year research project with a budget of approximately US\$1.2-1.5 million to test the concept and to see if it can work in one setting. If phase 1 has been successful, the next step (phase 2) is to test it in several other settings, with the oversight of new strategic partners. If successful in multiple contexts, phase 3 will involve advocacy and collaborative financing for scale-up. ECF is uniquely positioned due to its strong relationships with government and other private funders.

Several other research projects are currently in phase 1. In Uganda, Food for the Hungry is conducting a study looking at the linkages between maternal depression and child stunting and testing the effectiveness of an interpersonal therapy group (IPT-G) approach to depression treatment through weekly group therapy. Horrifying experiences that mothers have faced emerge here but, encouragingly, testing this approach has reduced the prevalence of depression in low-income settings. The hypothesis is that, by reducing depression, mothers will have improved functionality and improved infant and young child feeding practices.

ECF is also funding two randomised control trials (RCTs) in Tanzania. Helen Keller International (HKI) is examining the impact and cost effectiveness of interpersonal messaging, SMS messaging and a combination of the two on health and nutrition. This multi-armed study involves public-private partnership and uses an interpersonal messaging approach that Tanzania is currently in the process of scaling up nationally. A second RCT in Tanzania working with Project Concern International (PCI) is examining new

models for encouraging more male engagement and investment in child health and its impact on nutrition and early child development.

Evidence generated from this portfolio of research will drive a targeted advocacy agenda (phase 3); ECF is moving towards phase 3 for the community-based diagnosis and treatment tool tested by IRC, working closely with USAID, the UK Department for International Development (DFID), No Wasted Lives (NWL) and IRC.

ECF has a Foundation Request for Applications (RFA) to guide applications from potential grantees (invitation-only application process). This sets out the ECF approach to research and emphasises strong monitoring and evaluation, multi-sector approaches to improve nutrition and the need to think about scale at every phase of programme design. The organisation is also developing specific theories and frameworks on scale-up and sustainability. This work should be out later this year.

William has strong views about sustainability of interventions. He is critical of the international development sector for not addressing this issue properly and singles out donors, believing they need to step up and drive change. He argues that they should be able to do this not only by evaluating success based on surveys on the last day of programming – the typical approach – but by also building in follow-up several years after implementation (which gives a more accurate picture); William is of the firm conviction that many post hoc evaluations of current nutrition programming would not make great reading.

With regard to how funders are discussing ways to work together; he believes the implementation community do a better job of coordination and alignment than the funding community. In reality it is quite difficult to co-fund, since the incentives are simply not there. His experience is that, when there is disagreement or misalignment, the immediate solution seems to be for funders to go their separate ways. Having said that, there are successful efforts: ECF is currently working closely with Gates, Hilton, Child Relief International (CRI), Vitol, Open Road Alliance and other funders.

He singles out NWL as a great example of how funding could/should be arranged. The consortium is set up to drive research on wasting and the best ways to scale up effective programming and policy. As well as attracting new funders, it has real promise in getting bilateral donors to open their global health envelopes to small sets of relevant interventions.

We had an interesting exchange about some of the tensions between funders and grantees. ECF, in common with some other funders, likes to “get its hands dirty” and see projects close up; however this can be threatening to some implementing partners. It can be a delicate dance where, as a funder, one has to respect partner wishes. It is a never-ending process of building strong relationships and cultivating trust. It is important that organisations can hear criticism but, at the same time, “tell us we may be wrong”. The personalities of those overseeing projects can be critical here. This reflects why ECF seeks “kindred spirits” when it comes to support.

William is also concerned about the so-called advocacy and research nexus and how, in his view, there is a profound disconnect between the two communities. As he moves between the two worlds in ECF, he finds that they rarely talk about the same things, even though they are working on the same issues.

As with all agency profile interviews, we asked William how he would characterise ECF and what makes it different from other foundations. His comments are best summarised by saying ECF is a ‘family’ foundation with a tight focus on filling targeted gaps and identifying practical solutions. He also points out that ECF is relatively flexible and can issue grants with less bureaucratic hurdles than many larger donors. Quite often, it provides seed funding up front to get initiatives off the ground.

We finished off the interview by asking William what he thinks may have changed over the last 20 years in the nutrition world. His first thought is that there wasn’t as much of a nutrition ‘sector’ 20 years ago as there is now, with far more coordination and alignment. His second thought is that there is a rather insular perspective among many nutrition staff and agencies and there is a need for a more multi-sector vision. (He recounts a conversation he recently had with someone in the agriculture sector who said that the nutrition crowd are a bit annoying and act like a secret cult of the holy grail.)

William would like to extend the challenge to the *Field Exchange* readership that Jessica Fanzo laid down at the recent Global Nutrition Report meeting. It goes something like this: “At some point this year, I challenge you as a nutritionist to attend at least one gathering where you are the only nutrition person in the room. Ask other sectors not what they can do for nutrition, but rather what can nutrition do to help your sector”.

A succinct call to action to end a refreshing and engaging discussion.

People in aid

Share pictures of you reading wherever you are in the world - we will tweet them and a selection will be published in the print edition. Send to chloe@enonline.net



Antoine Marius-le Prince

Participants of the ACF Research for Nutrition Conference, Pavillon de LiEau, 13th November, 2017



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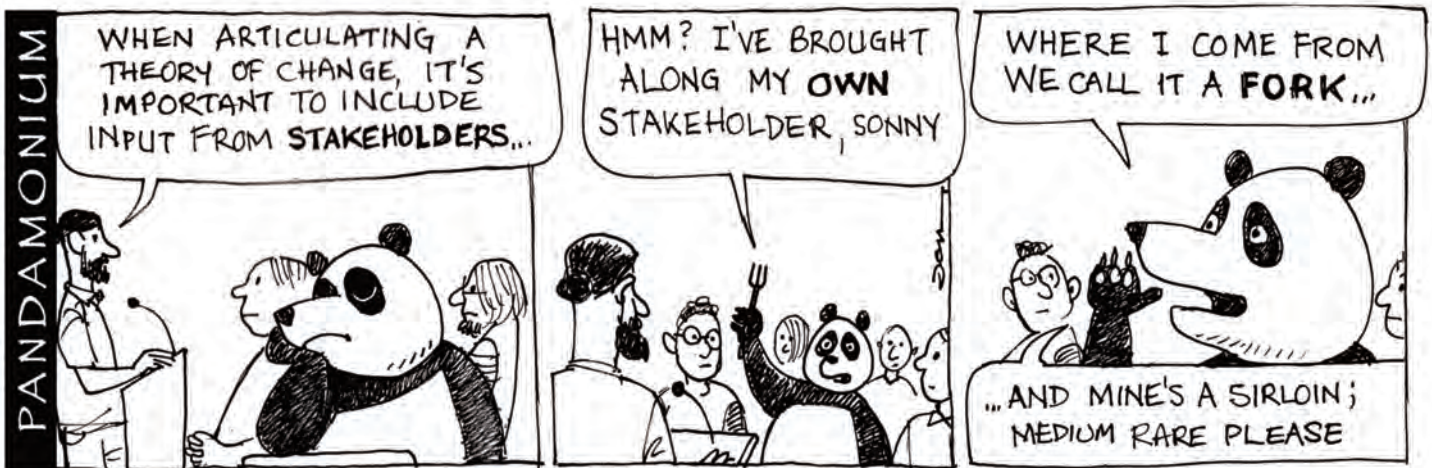


Participants of the ACF Research for Nutrition Conference, Pavillon de LiEau, 13th November, 2017

Antoine Marius de Prince



Antoine Marius de Prince



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Front cover

Children playing games together at a Save the Children supported preschool in Zomba District, Malawi, 2017; Jonathan Hyams/Save the Children

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About ENN

ENN is a UK registered charity, international in reach, focused on supporting populations at high risk of malnutrition. ENN aims to enhance the effectiveness of nutrition policy and programming by improving knowledge, stimulating learning, building evidence, and providing support and encouragement to practitioners and decision-makers involved in nutrition and related interventions.

ENN is both a core team of experienced and academically able nutritionists and a wider network of nutrition practitioners, academics and decision-makers who share their knowledge and experience and use ENN's products to inform policies, guidance and programmes in the contexts where they work.

ENN implements activities according to three major workstreams:

Workstream 1: Experience sharing, knowledge management and learning. This includes ENN's core products: *Nutrition Exchange* and *en-net*, as well as embedded knowledge management within two key global nutrition fora (the Scaling Up Nutrition Movement (SUN) and the Global Nutrition Cluster (GNC)).

Workstream 2: Information and evidence on under-researched nutrition issues. This comprises ENN's research and review work on filling gaps in the evidence base for improved nutrition policy and programming.

Workstream 3: Discussion, cooperation and agreement. This includes a range of activities for discussing and building agreement and consensus on key nutrition issues. It includes ENN's participation in and hosting of meetings, its activities as facilitator of the IFE Core Group and its participation in the development of training materials and guidance, including normative guidance.

ENNs activities are governed by a five year strategy (2016-2020), visit www.ennonline.net

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