

Field Exchange

Emergency Nutrition Network



Scaling up high impact nutrition interventions in Nairobi

Improving inpatient SAM care in India

Scaling up nutrition services in north-eastern Nigeria

Multi-sector nutrition programming in Bangladesh

Contents

1 Editorial

Field Articles

- 2 Scale up of high-impact nutrition interventions in the informal settlements of Nairobi, Kenya
- 9 Institutionalising quality of care in inpatient facilities for the management of severe acute malnutrition in India
- 43 Nutritional response in north-eastern Nigeria: Approaches to increase service availability in Borno and Yobe States
- 54 A multi-sector approach to improve nutrition: Experiences of the Nutrition at the Center project, Bangladesh

News

- 6 Report of the Global Nutrition Cluster side event on Yemen and Sudan
- 6 UNICEF programme guidance on adolescents
- 7 The State of the Humanitarian System 2018 report
- 8 Wasting in South Asia: Consultation on building the evidence base on the policy and programme response

Research

- 13 Snapshots
 - 13 Linear growth following complicated severe malnutrition
 - 13 Use of MUAC by novel community platforms to detect, diagnose and treat severe acute malnutrition
 - 14 Post-discharge follow-up of children treated for severe acute malnutrition
 - 14 Post-discharge morbidities and mortalities among children with severe acute malnutrition who did not undergo nutrition rehabilitation
 - 14 Cash-based intervention and risk of acute malnutrition among children in internally displaced persons camps in Somalia
 - 15 Concurrent wasting and stunting among under-five children in Senegal



A community health volunteer counselling a group of women on appropriate complementary feeding, Nairobi, 2017



Farmers meet to implement their permaculture design skills and exchange labour, Surkhet, Nepal, 2016

- 15 Improving screening for malnourished children at high risk of death
- 16 Risk factors for acutely malnourished infants aged under six months
- 16 Outcomes and risk factors for infants under six months old with severe acute malnutrition in Bangladesh
- 16 Short malnourished children and fat accumulation with food supplementation
- 17 A review of wet nursing experiences, motivations, facilitators and barriers
- 17 Gender dynamics of phone ownership and use in a Fresh Food Voucher scheme in Ethiopia
- 18 Barrier analysis of infant and young child feeding and maternal nutrition behaviours among IDPs in northern and southern Syria
- 21 Micronutrient powder distribution strategies to increase coverage and adherence among children aged six to 23 months as part of an IYCF strategy in Cambodia
- 24 Development of a maternal service package for mothers of children with severe acute malnutrition admitted to nutrition rehabilitation centres in India
- 29 The current state of evidence and thinking on wasting prevention
- 30 Can low-literate community health workers treat severe acute malnutrition? A study of simplified algorithm and tools in South Sudan
- 32 Is there a systematic bias in estimates of programme coverage returned by SQUEAC coverage assessments?
- 36 Infant and young child feeding in emergencies: An analysis of key factors of a strong response
- 37 Higher heights: A greater ambition for maternal and child nutrition in South Asia
- 40 Independent and combined effects of improved WASH and improved complementary feeding on child stunting and anaemia in rural Zimbabwe
- 41 Undersized Indian children: Nutrients-starved or hungry for development?

Evaluation

- 47 Impact evaluation of WASH in nutrition intervention on morbidity and acute malnutrition in Niger
- 51 Nutrition-sensitive outcomes of a permaculture project in Nepal



Dear readers,

This 59th issue of *Field Exchange* covers an interesting range of subjects. Common themes include programme integration, nutrition-sensitive programming and piloting new programme designs. An article by Kassim Lupao and Esther Mogusu describes efforts by Concern Worldwide and UNICEF to scale up and integrate high-impact nutrition interventions (HINI) in health systems in urban Nairobi. While successful in many respects, key challenges have included short-term funding and weak systems into which HINI can be integrated. The authors identify a range of urban-specific challenges and learning.

A second article reports on UNICEF-supported integration of community-based management of acute malnutrition (CMAM) into fixed health facilities in north east Nigeria during a humanitarian crisis. The success of this programme is attributed to strong government leadership and dedicated funding, good communications, use of existing community platforms for community mobilisation, and investment in on-the-job training and supervision. The authors conclude that it is possible to transition from an emergency to a more developmental approach using humanitarian funding and internal UNICEF resources.

An article from CARE Bangladesh describes a sub-district multi-sector approach to addressing malnutrition that uses existing structures to establish community-based multi-sector coordination platforms (committees). These helped coordinate a range of nutrition-specific and nutrition-sensitive activities, including maternal, infant and young child nutrition (MIYCN); water, sanitation and hygiene (WASH); folic acid supplementation; vouchers for health service access; and women's empowerment. The article claims significant impact on prevalence of wasting and stunting based on baseline and end-line comparisons, so it should be interpreted cautiously. Nevertheless, the cost for the approach at US\$1,000 per year per committee seems to suggest a sustainable model.

Field Exchange 59 reports on three other interesting pilot studies. The first is an Action Against Hunger programme in Rajasthan, India, which provides psychosocial counselling for mothers of severely malnourished children, as well as WASH and educative play. An evaluation found that the programme led to early identification of malnourished children, an increase in mean weight gain of children, reduction in defaulter rates and greater post-discharge attendance. Although not expensive, the approach did

WFP/Robina James



Cash based interventions in Somalia

require significant staff capacity building. The findings were not statistically valid, so again cautious interpretation is needed. However, the experience leads the authors to conclude that there is potential to improve severe acute malnutrition treatment outcomes through staff capacity and infrastructure development to support operationalising government guidelines.

A second pilot programme in the Himalayas of Nepal involved building the capacity of farmers to undertake permaculture farming. Although the programme had no explicit nutrition objectives, an evaluation found higher yields and resulting income, as well as increases in dietary diversity. The author concludes that there is strong potential for positive nutrition impact. The final article on integration by Cooperazione Internazionale describes a pilot study in Niger targeting WASH to households and communities of severely malnourished children enrolled in outpatient therapeutic programmes. The study found no impact on programme performance, but some impact on non-response and diarrhoea co-morbidity.

This edition also includes two articles looking at infant and young child feeding (IYCF) and maternal nutrition and health. The first is a barrier analysis conducted among internally displaced persons in camps and urban populations in northern Syria, where IYCF practices have remained poor. The analysis concludes that, in order to make progress on IYCF, better access to maternal nutrition services and IYCF support is needed, as well as integration of IYCF support into other sectors, including reproductive health, food security and agriculture. An article by Vani Sethi, Praveen Kumar and Arjan De Wagt in India reports on the circumstances of mothers of children admitted to four nutrition rehabilitation centres. They found a

quarter of mothers were stunted, 23% were underweight and more than a quarter were overweight/obese. Morbidity was common and family planning was low. These findings catalysed the development of a maternal service package integrated within existing government services. This experience spotlights a missed opportunity to provide services for mothers of malnourished children and the need to engage across the health and reproductive health sectors (including family planning) in service delivery.

These articles reflect the considerable effort, from different corners of the world, to integrate and work with existing systems and services and involve multiple sectors in order to maximise opportunities for impact. Capturing impact in operational settings remains an ongoing challenge, with the need to pay careful attention to the quality of evidence on impact. This continues to be a limiting factor to knowing if we are truly moving in the right direction.

Finally, you will notice that we have a shorter print edition than usual, with fewer articles and snappier research summaries. This reflects our New Year's resolution to deliver a more curated, lighter print edition and make the most of our online facility (www.enonline.net/fex) to share your experiences quickly and widely. Further developments are being planned through 2019 to maximise our impact and effectiveness, informed by our readers and contributors. The editorial team welcomes feedback at any time (please see contacts below).

Happy digested reading,

Jeremy Shoham & Marie McGrath,
Field Exchange Co-editors

Please send feedback to Chloe Angood, *Field Exchange* Sub-editor: chloe@enonline.net

A family living in Mukuru, one of Nairobi's largest slums, Nairobi, 2017



Scale up of high-impact nutrition interventions in the informal settlements of Nairobi, Kenya

By Kassim Lupao and Esther Mogusu



Kassim Lupao is a senior manager for the Nairobi urban health and nutrition programme at Concern Worldwide. He has many years of experience in the

implementation of high-impact nutrition interventions in urban contexts, is a trainer of trainers in nutrition programming, and has helped develop Nairobi county nutrition assessments, strategies and action plans.



Esther Mogusu is the county nutrition coordinator for Nairobi City County. She has over 15 years of experience in implementing nutrition programmes in Kenya at

health facility, sub-county and county levels. She is a mentor and trainer of trainers in nutrition programming.

The funding to support scale up of high-impact nutrition interventions in Nairobi was provided by UNICEF.

Location: *Kenya*

What we know: Scale-up of high-impact nutrition interventions (HINI) is necessary to comprehensively address malnutrition.

What this article adds: In Nairobi county wasting prevalence in urban informal settlements is normal but caseload is high; stunting, micronutrient deficiencies and obesity are also prevalent. Concern Worldwide implemented a five-year programme of support to government to scale up HINI through the health system in Nairobi. Activities included strategic policy development, nutrition assessment and analysis, health worker nutrition capacity development and development of an urban early warning system and emergency nutrition response mechanism. This has contributed to improved coverage of HINIs and acute malnutrition programming and reduced prevalence in stunting, wasting and underweight. Challenges to HINI scale-up include limited and short-term funding, shortfalls in community nutrition capacity, insufficient government budgetary allocation and predominance of private health care. This successful partnership will continue to 2022, prioritising stunting impact. More broadly, new thresholds and ways of working are needed for urban emergency response programming.

Background *Nairobi informal settlements*

Over 60% of the urban population in Nairobi live in informal settlements on 5% of the land (Nairobi Urban Sector Profile, 2006). The poorest urban-dwellers spend up to three quarters of their income on staple foods alone (Oxfam, 2009) and regularly engage in negative coping strategies, such as reducing the number of meals consumed, decreasing food variety and quality, and food scavenging. Residents living in informal settlements are vulnerable to rising prices as they are highly dependent on the market for their food and non-food needs. Informal settlements in Nairobi are characterised by inadequate access to potable water and sanitation facilities, leading to increased risk of waterborne, food-borne and vector-borne diseases such as diarrhoea, cholera, typhoid and malaria. Children under five years old attending informal daycare cen-

tres are particularly vulnerable, due to lack of regulation and staff training and inadequate food and play activities.

Research shows that only 39% of children between six months and two years living in urban slums of Nairobi receive an adequate diet, in terms of both quantity and diversity (Concern Worldwide and Welthungerhilfe, 2009). Deficiencies are common in iron, zinc, vitamin A, vitamin C and protein, and most caregivers do not feed their children appropriately during and after illness (Concern Worldwide, 2014). Although the prevalence of acute malnutrition is relatively low in Nairobi County, at 54,438 cases the burden of acute malnutrition is the second highest in Kenya due to population density (Kenya Food and Nutrition Security Seasonal Assessment, 2018). One in every three children is stunted (SMART survey, 2017) and, in terms of absolute numbers, Nairobi County has the

highest caseload of stunted children in the country at 104,074 children (Kenya Food Security Steering Group, 2018). Substantial levels of overweight/obesity have also been observed, demonstrating the double burden of malnutrition; in Nairobi 43% of women are obese, compared to 25% of women of reproductive age nationally (KNBS, 2009). Childhood obesity is also on the rise, although the problem is much more prevalent among adults at present.

Concern urban nutrition programme

Concern Worldwide has partnered with the government to support scale-up of HINI in Nairobi since 2012. This support has focused on strengthening county government health systems to support the delivery of quality health and nutrition services to children under five years old and pregnant and lactating women (PLW) and improving community-based services through participatory approaches to behaviour change and innovations in emergency nutrition programming, including preparedness. Funded by UNICEF, Concern Worldwide supported implementation of HINI in Nairobi's informal settlements between 2012 and 2017 (US\$2.5 million).

Package of support to scale up HINI

Policy development

Concern Worldwide has played a critical role in supporting Nairobi City County to develop key strategic documents, including the Urban Nutrition Strategy (UNS), the first County Nutrition Action Plan (CNAP) (2013-2017), the County maternal infant and young child nutrition (MIYCN) Social Behaviour Change and Communication Strategy (SBCC), and the County Nutrition Capacity Development Framework. Development of the UNS has been critical in highlighting the unique nutrition challenges in an urban context. As a result, other donors are now showing interest in funding urban nutrition projects,

such as the Korea International Cooperation Agency (KOICA), which is supporting implementation of a nutrition innovations project called 'Lishe Poa' that aims to develop a highly nutritious, affordable and ready-to-eat product that will be promoted in the informal settlements as a replacement for popular but unhealthy street foods. The CNAP guides and costs nutrition interventions in the County and is used as a tool to advocate for government to increase allocation of resources for nutrition services. Such advocacy efforts have been successful; for 2018/2019 the City County of Nairobi has allocated 10 million KES (Kenyan Shillings) to the County Nutrition programme, compared to 2012 when nutrition services were 100% supported by development partners. The Nairobi County MIYCN SBCC strategy was developed to operationalise the MIYCN policy to protect, promote and support optimal maternal, infant and young child feeding practices and improve child survival, and to provide strategic guidance for implementation of focused interventions as outlined in the Advocacy, Communication and Social Mobilization (ACSM) strategy (an advocacy strategy for nutrition interventions in Kenya).

Nutrition assessments and capacity-building

Concern Worldwide has supported the City County of Nairobi by conducting a series of nutrition-related surveys and assessments to provide evidence for decision-making and policy direction. Baseline and endline nutrition programme coverage surveys (2012 and 2018) and SMART surveys (2014 and 2017) were conducted. A nutrition bottleneck analysis and nutrition causal analysis for Nairobi County were carried out in 2017. Health management team members at both county and sub-county levels were trained to conduct coverage and SMART surveys and bottleneck and causal analyses, and were involved in the whole survey process (training of enu-

merators, supervision of data collection, supervision of data entry and analysis, report writing and dissemination of results).

Concern Worldwide also provided technical and financial resources to carry out a nutrition capacity-gap analysis in 2016 for Nairobi County. Health management team members at county and sub-county levels were trained and supported to conduct analysis around the pillars of the health system. Results (summarised in Box 1) were used as a basis for a county nutrition capacity development framework, which prioritised key capacity-building activities (classroom trainings, on the job training and mentoring) for the nutrition workforce, including all health cadres involved in providing nutrition services through to community health volunteers and community health assistants involved in delivering nutrition services at community level. Concern Worldwide supported training of the health management team as trainers in IMAM, MIYCN and the Baby Friendly Community Initiative (BFCl), and in how to provide on-the-job training and mentorship to healthcare workers. The training was then cascaded by the health management team. It is expected that such training will be carried out with government support in future as part of the increased budget allocation to nutrition services. Concern Worldwide also facilitated the development of Nutrition Technical Forums (NTF) at county and sub-county levels that bring together stakeholders implementing both nutrition-specific and nutrition-sensitive interventions in the county. These complement the work of existing multi-sector platforms, which exist to support a range of outcomes, not just nutrition.

Emergency preparedness

Concern Worldwide supported the City County of Nairobi to mitigate and respond quickly to the impacts of slow-onset emergencies by es-

Box 1 Nutrition capacity in the Nairobi County health system: Key findings (2016)

Nutrition service needs in Nairobi county are covered by the County Integrated Development Plan (CIDP) and the County Health Sector Strategic and Investment Plan (CHSIP). Nairobi City County also has a County Nutrition Action Plan (CNAP) that specifies the capacity of the health system to deliver on nutrition.

Coordination of nutrition services occurs through a county and sub-county Nutrition Technical Forum (NTF), which brings together nutrition stakeholders across the county to discuss how the nutrition agenda can be taken forward. A multi-sector platform also exists at county-level that brings together nutrition; water, sanitation and hygiene (WASH); agriculture; social services and education sectors. Challenges described include difficulties in the dissemination and application of key nutrition policy documents, such as the Breast Milk Substitutes (BMS) Act (2012), to health facility and community levels, resulting in poor implementation and enforcement. This highlights the need to strengthen the multi-sector platform.

Private, faith-based and non-governmental organisation (NGO) owned hospitals constitute 78% of Nairobi County's health facilities and provide the bulk of nutrition services in the informal settlements (this is much higher than in rural areas in Kenya, where health services are predominantly government-owned). Most HINIs are offered at health facility level, but very few are offered at community level due to low coverage of community health units and limitations of the nutrition workforce in the community. Many health workers (nutritionists and other cadres) have been trained in national guidelines on the IMAM, MIYCN and the Kenya Medical Supplies Agencies (KEMSA) Logistics Management and Information System (LMIS); however, new skills are not always practiced and training available to the community-level workforce is more limited.

Ten per cent of the county's health budget is allocated to the reproductive, maternal, newborn, child and adolescent health (RMNCH) sub-

programme, within which nutrition is a delivery unit. Around 75% of the RMNCH budget allocation pays for health worker salaries, with little resources allocated to service development.

HINIs described within the CNAP are not adequately financed; therefore the county is heavily reliant on partners for HINI implementation. Equipment to assess nutrition status is available at health-facility level, although not always in adequate supply. Nutrition supplies for managing acute malnutrition and routine medications are available at health facilities, although occasional stockouts are experienced due to debts owed to KEMSA; an overreliance on partners to procure nutrition supplies and commodities persists.

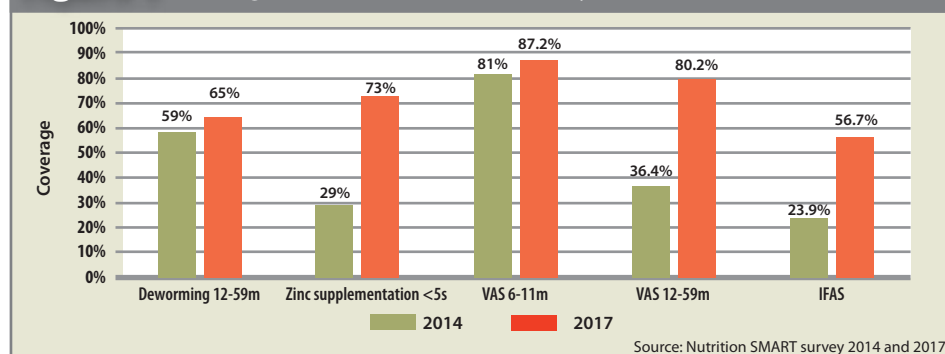
All nutrition-related data collection tools are available at health-facility level, with the exception of the Maternal and Child Health (MCH) handbook.

Table 1 Thresholds for the Urban Early warning and Early Action system

Indicator thresholds	% of HH experiencing shocks	Equivalised monthly income	No. of baskets	% of HH with at least one stable income earner	% of HH with at least one child reporting diarrhoea
Normal	less than 10%	more than 8000	85 or more	more than 30%	less than 15%
Alert	10% -15%	6500-8000	70-85	25% - 30%	15% - 20%
Alarm	15% - 20%	5000-6500	55-70	15% - 25%	20% - 25%
Emergency	20%	lower than 5000	55 or less	less than 15%	more than 25%

HH = households

Figure 1 Coverage of HINI indicators Nairobi County 2014 and 2017



VAS - vitamin A supplementation
IFAS - iron and folic acid supplementation

establishing an Urban Early Warning and Early Action (UEWEA) system. The UEWEA system was born out of the Indicator Development and Surveillance for Urban Emergencies (IDSUE) project that Concern Worldwide successfully piloted for five years in informal settlements of Nairobi. The system is based on five key indicators: percentage of households experiencing shocks; equivalised monthly income; number of food baskets; percentage of households with at least one stable income-earner; and percentage of households with at least one child reporting diarrhoea. The county is being supported by the Kenya Red Cross Society to collect monthly surveillance data from the informal settlements to feed into the UEWEA system, after which results are summarised as ‘normal’, ‘alert’, ‘alarm’ or ‘emergency’. Thresholds for each category were set based on data from the five-year pilot phase (see Table 1). Once the normal threshold is surpassed, the county government mobilises resources to respond to the situation; emergency response actions are mounted when UEWEA indicators indicate an emergency situation, an example of which is provided in Box 2.

Concern Worldwide also supported the county to rollout IMAM surge using a phased approach. IMAM surge aims to build the resilience of the health system to better deliver services for treatment of acute malnutrition over time, particularly during periods of high demand, without undermining the capacity and accountability of government health actors. During the first phase of implementation, 18 health facilities (at county and sub-county levels) were targeted through the training of two county trainer of trainers (TOTs) and 24 sub-county TOTs, who then cascaded training to healthcare workers in the 18 identified health facilities. During implementation of IMAM surge, seven health facilities were able to surpass their normal IMAM surge thresholds and no health facilities hit emergency thresholds, indicating that the health system managed to handle the situation. During surge periods, health facilities notified the health management team members and, depending on the IMAM surge phase, scale-up surge actions were undertaken, such as mass screening of children under the age of five in the health facility catchment areas, repositioning of medical and nu-

trition supplies, and cancelling healthcare workers’ leave. At the county and sub-county levels, health management team members monitored implementation of IMAM surge activities using dashboards that were updated monthly, indicating which health facilities had passed normal thresholds and needed IMAM surge actions.

Nutrition programme coverage and nutrition outcomes

Findings of nutrition SMART surveys conducted in 2014 and 2017 indicate marked improvements in the coverage of all HINI indicators over this period, including deworming of children aged 12-59 months (59.0% to 65.1% versus target of 50%); zinc supplementation for management of diarrhoea among children under five years old (29.0% to 73.0% versus target of 80%); vitamin A supplementation for children aged 6-11 months (81.7% to 87.2%) and children aged 12-59 months (36.4% to 80.2%) (versus target for age 6-59 months of 80%) and iron and folic acid supplementation (IFAS) (23.9% to 56.7% versus target of 80%) (Figure 1). While targets were met for two HINI indicators (deworming and vitamin A supplementation), zinc supplementation for management of diarrhoea among children under five years old fell slightly short of target coverage. Achievement of IFAS for pregnant women improved but fell far below the set target. This was mainly due to supply challenges as IFAS was not included in the essential drug list; however, it is now and going forward all pregnant women will be supplemented as per the schedule.

Coverage of the county’s outpatient therapeutic programme (OTP) improved from 39.2% in 2012 to 53.5% in 2018, while the county’s supplementary feeding programme (SFP) coverage improved from 36.4% in 2012 to 51.5% in 2018 (Figure 2). Results of SMART surveys show that stunting prevalence declined from 36.0% in 2014 to 26.0% in 2017; wasting prevalence reduced from 5.7% in 2014 to 4.6% in 2017; and prevalence of underweight reduced from 13.6% in 2014 to 11.4% in 2017 (see Figure 3).

Aside from some small-scale interventions, such as that of Afya Jijini, which conducted nutrition-related trainings, Concern Worldwide’s programme of health systems strengthening was

Box 2 Case study of county-level response to the Urban Early warning and Early Action (UEWEA) system

A drop in the number of food baskets and a surge in diarrhoea cases were reported to emergency thresholds in three of the sentinel surveillance sites (Korogocho, Mukuru and Kibera) in February 2017, May to June 2017, and November 2017. In response Concern Worldwide liaised with health management team members at both county and sub-county levels to plan and mount the following response activities: mass screening and referral of children with acute malnutrition; distribution of water purification products for treatment of water at both household level and at designated water points; treatment of active

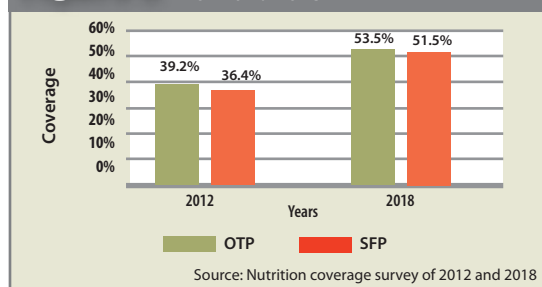
diarrhoea cases with zinc and oral rehydration solution (ORS), including referral of severe cases for further management at the nearby health facilities.

A total of 32,244 children under the age of five was screened; of these 131 were diagnosed with severe acute malnutrition (SAM) and 849 were diagnosed with moderate acute malnutrition (MAM). All were referred for management. Without the UEWEA surveillance system, such children would not have been identified and referred for treatment.

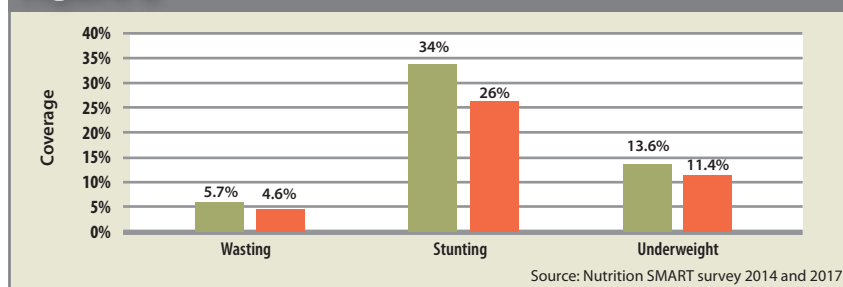


A mother and her eight month old daughter enrolled in the outpatient therapeutic programme supported by Concern, Nairobi, 2017

Peter Cotton

Figure 2 IMAM coverage Nairobi County 2012 and 2018

OTP - outpatient therapeutic care
SFP - supplementary feeding programmes

Figure 3 Nutrition status of children under five years old, Nairobi County 2014 and 2017

the only large-scale, systematic programme over this period to work with the government to identify gaps in the health system and develop a clear plan of response. Improved coverage of nutrition programmes and nutrition outcomes over this period can therefore reasonably be attributed to the government's commitment and dedicated actions to develop health system capacity and scale up key actions and the technical and financial support provided by Concern Worldwide.

Challenges

Limited and short-term funding: Not many donors are familiar with urban contexts and interest in funding urban programmes is low. Donor resources are traditionally channelled to areas with high prevalence of malnutrition, rather than considering caseload. Over the years, Concern Worldwide has received short-term (yearly to two-yearly) funding to support implementation of HINIs in Nairobi County, which hampers scale-up across all health facilities. Inconsistent funding has also led to interruption of HINI services. A case in point is the period between January to July 2016, when the Nairobi urban nutrition programme did not have funding and services were temporarily suspended.

Inadequate budgetary allocation for nutrition by the county government: The nutrition programme in Nairobi has a costed nutrition action plan. However, a large proportion of resources received by the County Department of Health from the national treasury goes towards taking care of recurrent expenditures, with few resources left for development purposes. In addition, due to government bureaucracy, it is difficult for the County Department of Health to access the few resources for development that are available; hence the government relies heavily on partners to implement HINI.

Insufficient nutrition workforce: The County has a total of 130 health facilities implementing HINIs but only 52 nutritionists, out of which 12 are serving in managerial positions at county and sub-county levels. The remaining nutritionists are distributed between county referral hospitals (level-four health facilities) and a few health centres (level-three health facilities). There are no nutritionists working in any of the dispensaries (level-two health facilities) and at the community (level one). This situation has meant other cadres of health workers, especially nurses and clinical officers, have had to take up nutrition roles

while they are already overwhelmed with existing responsibilities.

Low coverage of community health units (CHU): Based on the population in the county, Nairobi should have at least 868 Community Health Units (CHU); however, only 217 exist, of which only 121 are functional (the rest are completely non-functioning), which hampers efforts to create demand for nutrition services at community level. In addition, low coverage of CHUs limits capacity to follow up clients at the community level, which may hamper recovery rates.

Private health care: The majority of health facilities in the urban informal settlements are privately owned, which makes health services expensive for residents when they would otherwise be free for children under five years old and PLW. There is therefore need for public private partnerships (PPP) to ensure access to quality nutrition services, especially in the informal settlements.

Conclusions and recommendations

Scale up of HINI services in the informal settlements of Nairobi through existing government health structures and with technical support from Concern Worldwide resulted in improvement in the nutrition status of children under five years old. There was also a notable improvement in the coverage of OTP and SFP services. This provides evidence that scale-up of HINIs through the strengthening of existing health systems is a viable approach that could be applied to other urban areas. While wasting prevalence is acceptable, absolute numbers are usually very high. This requires a new way of thinking; for example, coming up with urban-specific thresholds (as per the UEWEA) to determine when to mount emergency nutrition interventions.

Heavy dependence on development partners to fund HINI scale-up persists. A review of the key strategic documents, including the UNS and the Kenya Nutrition Action Plan (KNAP), is needed to ensure that they capture the challenges faced by the urban nutrition programme and to direct budgetary allocations towards development to address these.

Scale-up of HINIs in Nairobi continues to face the challenges of limited and short-term funding that is secured based on prevalence rather than caseloads. Continued advocacy is needed with donors to inform and change practice.

Increased advocacy is needed to the government and other key stakeholders to allocate resources for strengthening community-level health and nutrition services, including recruitment of more nutritionists.

Advocacy is also needed to the government to embrace PPPs, whereby the government provides drugs and additional healthcare workers in private healthcare facilities to enable poor residents in the informal settlements to access healthcare services at an affordable rate.

Scale up of HINI services in Nairobi County has continued beyond this first phase, funded by a county government allocation of KES 10 million and by UNICEF (to Concern Worldwide) to support this process up to 2022. Looking ahead, tackling childhood stunting is a high priority for the Nairobi urban nutrition programme, since stunting is the predominant form of malnutrition in the County. Investment in the government's BFCI and promotion of MIYCN practices are priorities to this end.

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Report of the Global Nutrition Cluster side event on Yemen and Sudan



Participants at the GNC three-day annual meeting in Amman, Jordan

A one-day side meeting convened by the Global Nutrition Cluster (GNC) and hosted by the UNICEF Middle East and North Africa (MENA) regional office was held in Amman, Jordan on 21 October 2018 on the occasion of the GNC three-day annual meeting. Emergency Nutrition Network (ENN) supported country teams to develop background papers and presentations and produced the meeting report.

The aims of the side meeting were to discuss the nutrition situation in Sudan, propose immediate actions to support the Government of Sudan (GoS) in a longer-term comprehensive nutrition approach and identify the operational implications of the 'Call to Action' to end malnutrition in Yemen¹, and define the support needed to operationalise the three-year plan. The event brought together 76 participants from Sudan and Yemen, including representatives of government, Nutrition Clusters, the Scaling Up Nutrition (SUN) Movement, United Nations (UN) and non-governmental organisations (NGOs), as well as key donors and GNC partners with an operational presence or interest in the countries.

Representatives from Sudan and Yemen presented an analysis of the nutrition situation in each country, as well as drivers of the current high rates of under-nutrition, a description of existing delivery systems and challenges and proposals for next steps. Similar challenges exist in both countries. Both are highly dependent on humanitarian funding, with limited access to longer-term, flexible funding to strengthen government systems. Both countries have challenges coordinating between humanitarian and development partners and between the

Nutrition Cluster and the SUN Movement. The integration of nutrition-specific interventions into government health systems is also difficult in both Yemen (where many frontline staff receive no regular salary) and Sudan (where supply chain management and procurement services are managed by external partners). In both countries there has been a lack of progress in scaling up multi-sector programmes; data are out of date and not nationally representative (leaving partners working in a data vacuum); and there are difficulties in the coordination of nutrition programming at all levels.

Participants divided into working groups to examine key issues and identify actions. For Yemen, participants divided into three groups – UN, NGO and donor – to focus on the commitments made in the Call to Action and examine what has been tried, what has worked, what hasn't and identify clear next steps. For Sudan, groups were divided into three groups by theme to identify ways to move forward in each area: financing (immediate and longer-term); multi-sector nutrition programming; and coordination. Group feedback to all was followed by plenary discussion.

Conclusions included the need for the humanitarian nutrition community to proactively engage with development actors and vice versa. The GNC and the SUN Movement need to move quickly and clearly to develop guidance on strengthening coordination in both countries. Connections between the SUN Movement Secretariat and GNC in Geneva must be re-established and developed further. Opportunities are needed to include

longer-term objectives and programming within humanitarian response plans (HRPs) in protracted crises; the Cluster should examine the potential for multi-year HRPs and multi-year humanitarian strategies with the inclusion of development indicators. Greater clarity is needed on transition triggers, agreed milestones and indicators for deactivation of clusters in contexts such as Sudan through a comprehensive transition plan that ensures gradual handover to government. Senior UN officials must encourage donors to provide longer-term flexible funding in protracted crises.

Complex contractual arrangements that vary by UN agency frustrate joined-up severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) programming. This challenge is being examined by the agencies; discussion at this meeting reinforces the necessity and urgency to address this. The continuum of care (i.e. prevention preceding treatment) requires much more effort and investment. This must translate into integrated, high-impact nutrition interventions (HINI), strengthened health systems and multi-sector approaches. In general there is a need to improve the narrative so that there is one common approach that spans humanitarian and development objectives for nutrition.

A meeting report, background papers from Yemen and Sudan and presentations are available at: <http://nutritioncluster.net/what-we-do/events/>

¹ Following commitments made at the United Nations Global Assembly (UNGA) in September 2018.

UNICEF programme guidance on adolescents

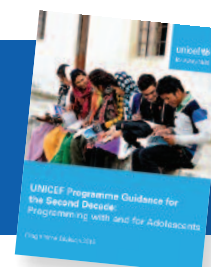
UNICEF has released new guidance that provides an overview of its strategic direction to advance the quality of life of adolescents. The guidance underscores the importance of adequate nutrition for optimal growth and development in adolescent girls and boys. It emphasises the provision of nutrition counselling and services, the promotion of healthy and diversified diets, including fortified

foods, and, where necessary, the use of micronutrient supplements.

The guidance recognises schools as a critical platform to deliver nutrition interventions and improve nutrition literacy, while acknowledging that school-based interventions need to be supported by community-based approaches and other delivery models, especially to reach out-of-school

adolescents. Download the guidance from: <https://bit.ly/2TIhTtm>

To complement this overarching guidance, UNICEF will issue Programme Guidance on Adolescent Nutrition in early 2019 to detail the organisation's approach for the operationalisation of evidence-based interventions to address all forms of malnutrition among adolescent boys and girls.

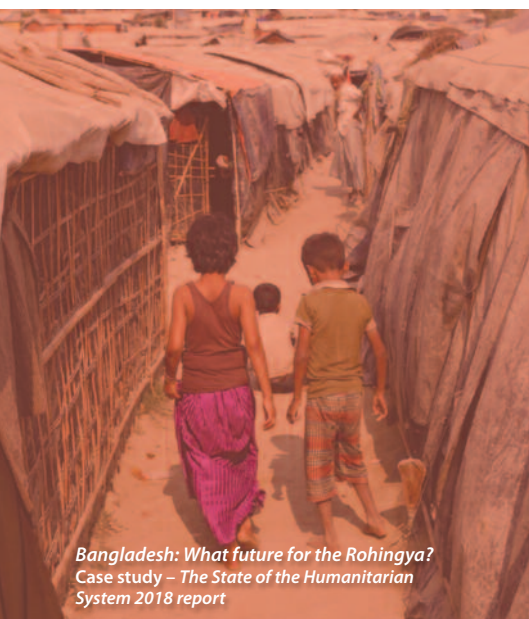


The State of the Humanitarian System 2018 report



The fourth 'State of the Humanitarian System' report¹, covering the three years from 2015 to 2017, is based on a review of over 200 evaluations of humanitarian action, interviews with over 500 people and case studies from five countries (Bangladesh, Kenya, Lebanon, Mali and Yemen). The report outlines humanitarian needs, provides an overview of humanitarian funding and the current size and structure of the humanitarian system, and presents an assessment of the system's performance in addressing humanitarian needs. Findings demonstrate that humanitarian needs continued to increase in this period. An estimated 201 million people required international humanitarian assistance in 2017 alone, the highest number to date. The number of people forcibly displaced by conflict and violence also increased, reaching 68.5 million in 2017.

A small number of complex crises received the majority of funding: half of all international humanitarian assistance went to just four crises (Syria, Yemen, South Sudan and Iraq). There was also a gradual shift in the geographic location of recipients, from sub-Saharan Africa to the Middle East. A small number of donor governments contributed the majority of international humanitarian assistance. Most donor funding went to multilateral agencies, much of which was then passed on as grants to non-governmental organisations (NGOs). Among NGOs, funding was concentrated among large, international organisations; national and local NGOs only received 0.4% of all international humanitarian assistance directly. Money for pooled funds reached a record US\$1.3 billion in 2017, 53% higher than in 2014.



Bangladesh: What future for the Rohingya? Case study – The State of the Humanitarian System 2018 report

Cash transfers also grew to an estimated US\$8 billion in 2016, a 40% increase on 2015.

Coverage: Despite increased funding, the humanitarian system still does not have sufficient resources to cover needs due to growing numbers of people in need and potentially also increased ambition on the part of the humanitarian sector. The 2015-2017 period saw a decline in coverage of humanitarian needs, particularly among internally displaced people (IDPs) outside camps; people and communities hosting refugees; people in situations of conflict where access is challenged; and large numbers of irregular migrants.

Appropriateness: Evidence suggests that the humanitarian system's relevance and appropriateness has improved since 2015. Humanitarian aid comprises a basic package of life-saving assistance, which is seen as relevant in many situations. However, some needs are often not met, including priority protection needs, needs beyond the immediate response 'package' and those of the elderly and people with disabilities. There is evidence that multi-purpose cash grants can go some way to increasing the relevance of aid.

Accountability and participation: There has been limited progress in the accountability and participation of the humanitarian system. The main challenge identified in the 2015 report – that existing feedback mechanisms do not influence decision-making – has not been addressed. While there are number of initiatives and approaches that show potential, they have not yet delivered greater accountability or participation. Many interviewees are concerned that accountability to affected populations (AAP) has become a 'box-ticking exercise'.

Effectiveness: There is evidence of improved effectiveness of the humanitarian system, particularly in terms of meeting immediate life-saving needs in 'natural' disasters, responding to sudden movements of refugees and responding to food insecurity in complex emergencies. The system is still not effective in meeting protection needs overall.

Efficiency: There has been limited progress in efficiency, particularly in terms of non-harmonised reporting and 'pass-through' arrangements of funding. Increased work on early response has prevented inefficient 'peak-of-crisis' responses in some areas and some improvements have been made in joint procurement and supply chains within the United Nations. Increased use of cash has increased efficiency in many areas and there is potential for the 'Grand Bargain' process to address several areas related to efficiency.

Coherence: There has been a decline in the level of coherence of the humanitarian system. The increased integration of humanitarian action into development and stabilisation agendas has made coherence with humanitarian principles more difficult for operational agencies. There is also evidence of declining respect for international humanitarian law (IHL) and laws concerning refugee.

Connectedness: There appears to be improved connectedness in the humanitarian system, facilitated by changes in policy and increased funding, which has led to closer connections between humanitarian and development activities, often in the form of 'resilience' work. There is some evidence that this has been effective at protecting against future shocks where the work has been done with governments, and where it addresses foreseeable 'natural' disasters, but less evidence in other circumstances. Donors are increasingly interested in fragile and refugee-hosting states, 'peace-building' initiatives, and in developing financing in countries experiencing conflict and refugee situations.

Complementarity: There is improved complementarity in the humanitarian system. Relations with the governments of crisis-affected states are improving in many cases, although there is still a tendency to push governments aside in rapid-onset, 'surge' situations. Relations with governments are often more difficult where the state is a party to internal armed conflict in refugee contexts. There has been significant activity at policy level in strengthening the role of national and local NGOs in the international humanitarian system but, to date, this has had limited effect on the ground.

Impact: There is little hard data measuring the impact of humanitarian responses on wide populations or across time. Very few evaluations attempt to assess impact; in part because the short funding cycles of humanitarian action prevent consistent longitudinal research. There is also a lack of baseline data against which to measure progress. Overall, information on impact is scattered and largely anecdotal and does not allow any overall conclusion to be drawn.

The summary and full reports can be accessed from: <https://sohs.alnap.org/>

¹ The State of the Humanitarian System is an independent study that compiles the latest statistics on the size, shape and scope of the humanitarian system and assesses overall performance and progress. Published every three years, it provides a sector-level mapping and assessment of international humanitarian assistance.

Wasting in South Asia: Consultation on building the evidence base on the policy and programme response

A one-day consultation was held in New York on 16 November 2018 to examine the evidence on wasting in South Asia and guide the direction of future collaborative efforts of the No Wasted Lives coalition in the region. The consultation was organised by UNICEF with the following objectives: (1) to share the status of policy and programme action to care for severely wasted children in South Asia; and (2) to identify evidence gaps, research priorities and way forward to build the evidence base to inform the policy and programme response in South Asia. Members of No Wasted Lives and the Council of Research and Technical Advice on Acute Malnutrition (CORTASAM) and researchers and academics were invited to join the consultation. There were 32 participants, including 13 participants who joined the meeting remotely.

In the morning, presentations examined the context of and response to wasting in South Asia, with a specific focus on India, which carries about 80% of the regional wasting burden and where the government is developing national guidelines on the community-based management of acute malnutrition (CMAM). In the afternoon, the participants discussed the implications of the data and evidence presented on the design of policies and programme to prevent and manage severe wasting. The following conclusions were drawn.

First, the South Asia context has several unique characteristics that require further exploration because they may warrant alternative approaches to the care of wasted children. The 'very high' prevalence of wasting (15.9%) in South Asia exceeds all other regions, yet the post-neonatal mortality rate is relatively low. Contrary to countries in other regions, the prevalence of wasting is highest at birth in South Asia, which suggests that poor maternal nutrition is a key driver. A higher proportion of wasted children in South Asia experience wasting for prolonged periods than in sub-Saharan Africa. In India, severely wasted children respond lower and slower to treatment for reasons that are not fully understood. There are also questions concerning the mortality risks of severe wasting and child survival benefits of treatment in South Asian countries, which appear to be lower than in sub-Saharan African countries. Nevertheless, the mortality risks are not low enough to ignore, particularly in the first six months of life, and there are potentially long-term impacts of wasting on cognition and learning.

Second, the draft of India's national CMAM guidelines and the country level adaptations build on the relatively strong community platforms for early case detection, community-based management and referral in India. With these guidelines, the government seeks sustainable solutions that focus on both the prevention and treatment of wasting, including during the first six months of life. The current draft of the guidelines supports the use of weight-for-height (but not mid-upper arm circumference) to identify wasted children and does not promote the use of ready to use therapeutic food to treat severely wasted children, even though these are supported by the World Health Organization (WHO) recommendations. These approaches are likely to be adequate, provided the intervention provides a quality product that complies with WHO specifications, and systems are in place to identify and refer severely wasted children with medical complications for inpatient care. These guidelines provide an opportunity for a learning agenda including the cost-effectiveness of this alternative model of care for severely wasted children.

Third, research in South Asia can contribute to global and regional efforts in optimising and innovating care and treatment approaches for children with severe wasting. Areas of research include identifying effective approaches to prevent and manage wasting in infants aged less than six months; modifications in the quantity,

duration and formulations of ready-to-use therapeutic food (RUTF) use in nutritional rehabilitation; the use of home-based foods or home-augmented foods to treat severe wasting; and transitioning from treatment foods to family diets. This research could facilitate the development of a greater range of treatment options that are tailored to cultural preferences and have the potential for greater coverage, quality and sustainability of care and treatment for severe wasting.

In moving forward, the participants identified the need for a new narrative on wasting in South Asia (and globally) that considers prolonged versus short episodes of severe wasting; that links wasting with stunting; and that frames the functional consequences of wasting on cognition and learning as well as the mortality risks. CORTASAM offered its expertise by supporting further exploration on wasting in South Asia through a sub-working group of the CORTASAM. Potential areas of focus for this working group include: further context-specific refinement and expansion of priority evidence gaps in South Asia that complement the CORTASAM research agenda; the design and/or review of protocols for secondary data analysis and implementation research; and the interpretation and dissemination of research findings.

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Institutionalising quality of care in inpatient facilities for the management of severe acute malnutrition in India

By Meeta Mathur, Naveen Jain, Shivangi Kaushik and Aakanksha Pandey



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Aakanksha Pandey is the State Programme Manager for Action Against Hunger Rajasthan. She has many years of experience working with the government system, providing technical support in the implementation, assessment, planning and monitoring of health and nutrition programmes. She currently supports the government of Rajasthan in the development and implementation of community-based management of acute malnutrition protocols.

The authors would like to thank Naveen Jain and his team at the Medical Health and Family Welfare Department, Government of Rajasthan, Baran District, for their leadership and dedicated collaboration in this programme.



An MTC counsellor engages mothers of SAM children in a massage session, MTC Kelwara, 2017

Location: *India*

What we know: Comprehensive management of children with severe acute malnutrition (SAM), including psychosocial support for the caregiver and child, improves treatment outcomes.

What this article adds: A pilot study by Action Against Hunger (AAH) India was carried out in Baran, a tribal district of Rajasthan, north India, to improve implementation of government SAM guidelines. This involved staff training (n=32) in nine malnutrition treatment centres (MTCs); the appointment and training of counsellors in five MTCs to provide caregiver and SAM children support (one-to-one counselling and group sessions); and improving water, sanitation and hygiene (WASH) and play/education infrastructure facilities in four MTCs. In counsellor-supported MTCs (1,041 children, 2016-18), performance improved in terms of earlier identification by and referral from the community, increase in mean weight gain, reduction in defaulting rates and greater post-discharge attendance at follow-up. The pilot study shows the potential to improve SAM treatment outcomes through staff capacity and infrastructure development to support operationalising government guidelines. Dedicated staff are necessary to deliver adequate psychosocial support and follow-up. Results have been presented to government and discussions are ongoing about the potential for scale-up.

Introduction

In Rajasthan, north India, 20.4% (1,810,670) of children under five years old are wasted and 7.3% (647,936) are severely wasted (National Family Health Survey (NFHS) 3, 2006). Wasting is particularly prevalent in Baran, a largely tribal and one of the poorest districts of Rajasthan. High prevalence of severe acute malnutrition (SAM) led the Government of Rajasthan to develop malnutrition treatment centres (MTCs) in the state, the first of which was set up in Baran in 2006 and now has the highest number of MTCs. In the Integrated Management of Acute Malnutrition (IMAM) programme children with SAM are referred to an MTC for a required inpatient stay of 14 days or more to meet medical and weight-gain discharge

criteria (community-based management for uncomplicated cases is not available). However, most caregivers, especially mothers, find it challenging to be away from home for over two weeks; hence they either refuse to be admitted or leave the centre abruptly against medical advice. Action Against Hunger (AAH) has been working in Baran since 2012, focusing on SAM management by early identification and referral of SAM children to MTCs. Despite efforts by AAH and the government, the proportion of children completing the treatment and rate of follow up post-discharge is low (below 50% for the first follow-up and progressively less for each subsequent follow-up). To address this, AAH carried out a qualitative assessment of MTC services in the district,

Box 1 Key roles and skills of MTC counsellors

To optimise their stay in the MTC, counsellors work with caregivers to understand their challenges from a psychosocial perspective, provide emotional support and empower them to care for their own and their child's nutrition and psychosocial needs. Tribal caregivers travelling long distances to an unfamiliar treatment centre are usually overwhelmed and confused on arrival. MTC counsellors are trained to welcome new admissions, assign them a bed and introduce them to MTC staff and facilities. This helps caregivers settle into the surroundings and establishes trust and confidence in the counsellors. Soon after this, counsellors complete a 'care practices evaluation' with the caregiver, using an adapted checklist of items to identify areas of weakness in caregiving behaviours. Based on this preliminary evaluation, counsellors prepare a plan for priority interventions with the caregiver to seek their acceptance, consent and active participation.

Important skills and personal attributes of MTC counsellors are:

- **Empathy:** ability of the counsellor to comprehend the problems, experiences, thoughts and feelings of caregivers and offer supportive space for expression and self-disclosure that further enhances mutual trust and confidence.
- **Congruence and warmth:** the ability to act in a way that enables caregivers to feel comfortable in the counselling relationship, receive encouragement to interact and attend to child's health needs.
- **Respect:** the ability to be impartial and non-judgmental about tribal caregivers, their family challenges and their social situations, so that mothers feel safe, comfortable and confident.
- **Unconditional positive regard:** acceptance of the caregivers, irrespective of their caste, class and origin; irrespective of caregiver's weaknesses, negativity and unfavourable conditions.
- **Active listening and assistance:** a skill that lets caregivers speak for themselves and identify and accept problems and which empowers them to problem-solve on their own, leading to insight, new learning and sustained behaviour change.

Individually tailored, one-to-one psychosocial support sessions are then organised in response to the plan. MTC counsellors also organise daily group education sessions for mothers on specific topics, repeated every 14 days so that each caregiver receives a complete package of knowledge about maternal care and nutrition during pregnancy; post-natal care and infant-feeding practices; immunisation; sanitation and hygiene practices; cooking demonstrations to improve diet diversity; and the benefits of family planning and related services. These sessions are delivered through games, videos and storytelling via flip charts and caregivers are encouraged to share practical challenges they face and ideas on how these can be tackled.

In addition, MTC counsellors teach caregivers simple relaxation exercises, including yoga and breathing exercises, with the aim of improving the caregiver's mood and helping to reduce mental stress and physical tension and manage their emotions effectively. MTC counsellors also teach mothers to practice daily baby massage to promote a secure mother-child attachment and support the child's physical and psychological recovery and development. Visiting fathers are also involved in massage sessions to promote paternal affection and attachment with the baby. Daily hour-long play sessions are also organised to stimulate physical and cognitive development in admitted children and strengthen the relationship between caregiver and child further.

On discharge MTC counsellors motivate and inform caregivers to complete four follow-up visits (every 15 days) to track post-discharge recovery of the child from SAM. Counsellors inform the AAH community mobiliser responsible for the village the child is from of their discharge and ensure that the child receives a nutritionally balanced food basket within 24 hours to prevent a gap in the provision of a nutrient-rich diet. During each follow-up visit the counsellor revises key messages on maternal and child nutrition with the caregiver, answers any queries they have, provides information to address any specific caregiving challenges and motivates the caregiver on the basis of progress achieved.

which subsequently informed a series of pilot interventions (training, building counselling capacity and infrastructure development) in target MTCs. Experiences and findings, particularly related to the counselling intervention, are shared in this article.

Quality assessment of MTCs

At the end of 2015 a qualitative survey was undertaken to assess perceptions of and barriers to access of MTC services. In-depth interviews were carried out with caregivers and frontline workers, while knowledge and skills of MTC staff and quality of MTC infrastructures were assessed. Key barriers identified were resistance from husbands and family members to mothers and children staying in the MTC, caregivers feeling intimidated by the hospital setting, and caregivers finding it difficult to stay alone at the MTC without their husbands or family members accompanying them. Many caregivers also complained that they feel bored in the MTC as they have nothing to do. These issues were aggravated by inadequate living conditions at the centres and negative behaviour of some MTC staff, which damaged parental trust and perceptions of quality of public health services. Findings were shared with district and state-level officials and possible solutions were discussed.

Quality improvement of MTCs

Based on the assessment findings, a programme of quality improvement was undertaken by AAH, with the full support of the district health administration in Baran, to improve the quality of nine MTCs in the district. A three-pronged programme was devised to improve community demand and the quality of supply services in MTCs. This involved: (1) training of MTC staff in inpatient management of SAM in all nine MTCs; (2) appointing and training of MTC counsellors from local communities in five selected MTCs (those with the highest caseloads and referrals) to provide caregivers with quality care and supportive counselling; and (3) key infrastructure developments in four MTCs where existing infrastructure was particularly poor to improve the living conditions for caregivers and patients and the general environment. Each of these improvements are described in more detail below, particularly the strengthened counselling capacity, where performance was subsequently measured in pilot MTCs.

Technical support to MTCs

Since 2016 AAH Baran has conducted numerous orientation and refresher trainings for staff of all nine MTCs to build their capacity and acquaint them with new developments in SAM management protocols. Trainings are carried out by AAH staff and a highly experienced AAH paediatrician and include an initial three-day classroom training, followed by regular refresher training and ongoing supportive supervision. Information booklets (such as 'Operational Guidelines of Malnutrition Treatment Centres'), SAM management protocols and job



An MTC counsellor engages SAM children in a play session, MTC Baran, 2011



An MTC counsellor engages SAM children in a play session, MTC Baran, 201

aids are provided to participants as reference guides and monitoring tools.

Appointing MTC counsellors

Improvements in maternal-child bonding and interaction are the major intended child development outcomes during MTC admission; however, this aspect of SAM management was absent from the MTCs prior to 2016. Government guidelines recommend the appointment of a counsellor in each MTC, but funding to support this position was not available. To fill this gap, AAH appointed and financed MTC counsellors in five MTCs with a view to advocating for these positions to be filled and paid for by the government in future. Recruited counsellors had prior experience of working with women and children and received extensive training on facility-based management of acute malnutrition, maternal and child care practices, early stimulation methods, psychosocial support, counselling

and communication skills. (See Box 1 for more details on counsellors' skillsets and how they work.) MTC counsellors also provided technical guidance and on-the-job practical supervisory support and monitoring through qualified and experienced AAH technical managers.

Improvements in facility infrastructure

Adequate infrastructure supports staff to carry out SAM management protocols successfully, improves staff motivation and provides a healthy environment for admitted children and their caregivers, which aids recovery from SAM and reinforces demand for and utilisation of services by target communities. The assessment identified the critical missing infrastructure to be provided as follows:

Water, sanitation and hygiene (WASH) infrastructure

WASH facilities are closely linked with the man-

agement of infections and disease. In public health services in India, budgets are largely allocated to treatment rather than preventive services. Shortfalls identified in four MTCs were non-functioning toilets, no wash basins, no access to safe drinking water (in two MTCs), no availability of warm water and no place for washing (and drying) clothes. In these MTCs (and where MTC counsellors were provided), AAH facilitated the development of adequate WASH infrastructure, including repair of toilets, installation of geysers for round-the-clock provision of hot water for medical use and patient care in winter, wash basins with soap dispensers, laundry facilities for caregivers, and repair of water pipes and water purifiers to ensure a regular supply of safe drinking water for parents and children. Sensitisation of MTC staff, beneficiaries and visitors was also undertaken to ensure proper upkeep and maintenance of these services.

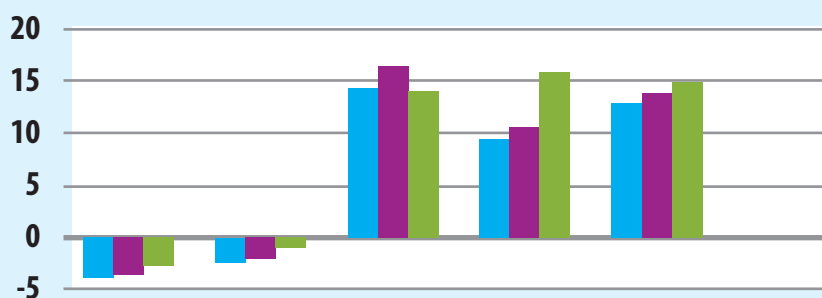
Kitchen utilities

Refrigerators used to store therapeutic milk in each of the MTCs were repaired. At Shahabad MTC caregivers were not offered any food from the facility, which created great distress among caregivers. AAH helped to build a kitchen shed and installed traditional mud stoves to give caregivers a place to cook food of their choice.

Play facilities

The quality improvement intervention aimed to ease the anxiety and stress of hospitalisation on admitted children by making the MTC environment as child-friendly and unthreatening as possible. A play area was designed in each MTC and in hospital wards, equipped with a variety of safe toys and games to support physical stimulation and child development. MTC counsellors support mothers in playing with their children and are taught how to make home-made toys from locally available resources and safe waste materials. Televisions were provided

Figure 1 MTC outcomes 2016 to 2018



	Admission Mean WHZ	Discharge Mean WHZ	Mean LoS	Mean GoW gms/kgs/day	Mean GoW % of body weight	Total LAMA %
2016	-3.9	-2.6	14.6	9.5	13	31%
2017	-3.7	-2.2	16.6	10.7	14	20%
2018	-2.9	-1.1	14.1	16.1	15	9%

WHZ = weight-for-height z-score
LoS = length of stay

LAMA = left against medical advice
GoW = weight gain



Play area with slides developed by AAH, MTC Baran, 2017

to MTCs to show educational videos related to childcare practices and recreation.

Provision of attendant beds

Patient beds are ordinarily shared by their caregiver. However, most children and caregivers are accompanied by the father or another relative. In the absence of residential facilities, the accompanying adult would usually stay for a day, then leave without the child completing treatment, or would also share the patient's bed, leading to overcrowding. In response AAH provided side beds with storage facilities in the MTCs to enable fathers to stay too.

Results

MTC quality care outcomes and impacts

Since their appointment in 2016 MTC counsellors have maintained records of SAM beneficiaries. Training on monitoring was also provided in the four MTCs that did not receive counsellors as part of the general SAM management training, although having a dedicated person to keep records in the MTC counsellors greatly strengthened monitoring activities and the quality of records. Data for five MTCs where counsellors were appointed (Baran, Kishanganj, Relawan, Kelwada and Shahabad) were analysed (see Figure 1). In summary:

- MTC counsellors provided psychosocial support and counselling services to around 33,160 parents and caregivers between 2016 and 2018, including the person accompanying the child for the period of admission and visitors.
- During the project period, 32 MTC personnel, including the MTC in-charge, food demonstrators, cook and auxiliary nurse midwife (ANM)/general nurse midwife (GNM) were trained on protocols on the inpatient management of complicated SAM and nutrition data-monitoring tools. All these staff were continuously provided on-the-job support through AAH-appointed MTC counsellors and the AAH Field Officer.
- Treatment outcomes improved for the 1,041 children treated between 2016 and 2018 in the five counsellor-intervention MTCs. During the two week inpatient treatment of SAM children's anthropometric growth indicators improved significantly:
 - Average mean weight-for-height z-score (WHZ) was higher on admission after the intervention due to earlier identification and referral from the community because of increased confidence in MTC services.
 - Average mean difference in WHZ between admission and discharge dropped by 1.5 SD.
 - Mean weight gain increased by 6.6g/kg/day; i.e. by 2% of average body weight gain recorded between admission and discharge.
 - Reduction by 22% of cases where caregivers left MTCs against medical advice (LAMA), indicating improvement

in caregiver compliance to treatment protocol due to enhanced quality of care. This also ensures the child receives the required treatment, increasing the percentage of recovery and reducing length of recovery.

- Counsellors reported positive outcomes in response to child development support provided to caregivers and children at each facility. This included both caregivers and children engaging and responding positively to baby massage, bathing, play sessions and educational video sessions.
- Improvements in the overall management of MTCs and monitoring were observed.
- Percentage of cases attending all four post-discharge follow-up sessions increased in all MTCs assessed (from 35% to 43% in Baran; 23% to 53% in Kelwada; 19% to 25% in Relawan; 28% to 37% in Shahabad; and 33% to 39% in Kishanghij). This clearly indicates the focus of MTC staff, including the counsellor on post-discharge follow-up. The increase in post-discharge follow-up increases the probability of the child being cured and reduces the recovery period.

Discussion and conclusions

Non-parametric tests were not performed on the data to test their reliability. However, results seem to suggest that improved performance of the services and treatment outcomes found in this pilot can be attributed to the MTC counsellors and the work of other team members (MTC nurses, feeding demonstrators and cleaning staff), infrastructure improvements leading to improvements in WASH, play and education facilities at each centre, and additional capacity-development activities, such as provision of anthropometry equipment and protocols and training for medical staff. Results indicate the value of investing in both human resource capacity and infrastructure of government MTCs to improve service delivery and SAM treatment outcomes.

A formal assessment of non-counsellor MTCs was not undertaken. However, programming experience is that outcomes for non-counsellor MTCs remain less favourable, including follow-ups happening in under 50% of cases. This reflects a strong need to reinforce post-discharge follow-ups and improve length of stay among the caregivers of SAM children admitted at each facility. While ACF has been building the capacities of MTC staff in captivating caregivers during their stay at MTCs, regular staff are already burdened with record-keeping and day-to-day management of SAM cases, making it difficult to effectively and efficiently deliver all components of a comprehensive service. This experience reinforces the necessity of securing staff who can exclusively deliver on family counselling and related follow-up.

The financial investment per facility is not huge and the potential return on investment high. Findings of the study are being used to advocate with the government for the future appointment of counsellors in all MTCs and the upgrading of MTC infrastructure. As the study was carried out in partnership with the government health department, the results have so far been received well.

The results of this pilot programme show that the addition of dedicated SAM staff at facility level, in addition to existing medical and support staff and structured and thoughtful improvements in infrastructural facilities, can significantly enhance facility performance indicators and improve tribal communities' confidence, trust and perceptions of treatment services.

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Mathur, M., Jain, N., Kaushik, S., and Pandey, A. (2019) Institutionalising quality of care in inpatient facilities for the management of severe acute malnutrition in India. Field Exchange issue 59, January 2019. www.enonline.net/fex



Intake interview by an MTC counsellor, MTC Baran, 2016

AAH India



Linear growth following complicated severe malnutrition Research snapshot¹

Children presenting with severe acute malnutrition (SAM) are often also severely stunted. The purpose of this study was to evaluate linear growth and its determinants after medically complicated SAM. A secondary analysis was performed of clinical trial data from HIV-uninfected Kenyan children aged 2–59 months hospitalised with SAM. The outcome of interest was change in height/length-for-age z-score (HAZ) between enrolment and 12 months later. Exposures of interest were demographic, clinical, anthropometric characteristics and illness episodes during follow-up.

Among 1,169 children with HAZ values at month 12 (66% of those in the original trial), median (interquartile range) age 11 (7–17) months

and mean (standard deviation) HAZ -2.87 (1.6) at enrolment, there was no change in mean HAZ between enrolment and month 12: $-0.006Z$ (95% CI -0.07 to $0.05Z$); 262 (23%) children experienced minimal HAZ change (within ± 0.25 HAZ), 472 (40%) lost >0.25 and 435 (37%) gained >0.25 HAZ. After adjusting for regression to the mean, inpatient or outpatient episodes of diarrhoea and inpatient severe pneumonia during follow-up were associated with HAZ loss. Children born prematurely had greater linear growth than their term peers in this study, reaching a similar HAZ to other children after 12 months of follow-up. Not being cared for by the child's biological parent (in this study these children were mostly in the care of children's homes) was also associated with HAZ gain. Increases in mid-upper arm cir-

cumference (MUAC) and weight-for-age (WFA) were associated with HAZ gain and protected against HAZ loss. Increase in weight-for-height (WFH) was not associated with HAZ gain but protected against HAZ loss. No threshold of weight gain preceding linear catch-up growth was observed. The authors conclude that interventions to improve dietary quality and prevent illness over a longer period may provide opportunities to improve linear growth.

¹ Ngari MM, Iversen PO, Thitiri J, et al (2018) Linear growth following complicated severe malnutrition: 1-year follow-up cohort of Kenyan children. *Archives of Disease in Childhood*. Published online first: 28 September 2018. doi: 10.1136/archdischild-2018-315641

Use of MUAC by novel community platforms to detect, diagnose and treat severe acute malnutrition Research snapshot¹

There is growing consensus that making mid-upper arm circumference (MUAC) use more widely accessible among caregivers and community health workers (CHWs) will help decentralise the management of severe acute malnutrition (SAM) and increasing programme coverage, including the management of uncomplicated SAM by CHWs. A systematic review was conducted of published and operational evidence since 2000 describing the use of MUAC for detection and diagnosis of SAM in children aged 6–59 months by caregivers and CHWs, and of management of uncomplicated SAM by CHWs outside of formal healthcare settings. A total of 1,072 records were screened. Of these, 43 were selected for full-text screening and 22 were found to meet the study eligibility criteria. Data were extracted on study design, intervention, control and key findings, and operational lessons were synthesised.

Findings show that caregivers can use MUAC to detect SAM in their children with minimal risk and with many potential benefits in terms of early case detection and coverage. There is also evidence that CHWs can correctly use MUAC for SAM detection and diagnosis and to help provide a high quality of care in the treatment of uncomplicated SAM when training, supervision and motivation are adequate.

Important limitations of the review were the small number of published research studies and their narrow geographic scope, and most de-

scribed intensive, small-scale interventions. Findings are therefore not generalisable to public-sector healthcare systems.

The authors conclude that scaling up the use of MUAC by caregivers and CHWs to detect SAM in household and community settings is a promising step towards improving the coverage of SAM detection, diagnosis and treatment. Further research is needed on scalability, appli-

cability across a wider range of contexts and coverage impact and cost, as well as on the primary use of MUAC for SAM detection.

¹ Bliss J, Lelijveld N, Briend A, Kerac M, Manary M, McGrath M et al (2018) *Use of mid-upper arm circumference by novel community platforms to detect, diagnose, and treat severe acute malnutrition in children: a systematic review*. *Global health science and practice*, 2018. Available at: www.ghspjournal.org/content/early/2018/09/05/GHSP-D-18-00105



Mid-upper arm circumference (MUAC) being measured in Bakasi camp, Borno state

Post-discharge follow-up of children treated for severe acute malnutrition

Research snapshot¹

Severe acute malnutrition (SAM) is a major global health problem affecting some 16.9 million children under five years old. Little is known about what happens to children aged 6–24 months post treatment discharge. To investigate further, a systematic review was carried out on follow-up between six and 24 months after discharge from treatment for SAM in children aged 6–59 months. The literature search was carried out between June and August 2017. Studies were selected if they included children who experienced an episode of SAM, received a therapeutic feeding intervention, were discharged as cured and presented any outcome from follow-up between six

and 24 months later. In total 3,691 articles were retrieved from the search, 55 full-texts were screened and seven met the inclusion criteria. Loss to follow-up, mortality, relapse, morbidity and anthropometry were outcomes reported. Between 0.0% and 45.1% of cohorts were lost to follow-up. Of those discharged as nutritionally cured, mortality ranged from 0.06% to 10.4%, at an average of 12 months post-discharge. Relapse was inconsistently defined, measured and reported, ranging from 0% to 6.3%. Two studies reported improved weight-for-height z-scores, while three studies that reported height-for-age z-scores found either limited or no improvement.

The authors conclude that there is a scarcity of studies that follow up children six to 24 months post-discharge from SAM treatment. The limited data that exists suggest that children may exhibit sustained vulnerability even after achieving nutritional cure, including heightened mortality and morbidity risk and persistent stunting. Prospective cohort studies assessing a wider range of outcomes in children post-SAM treatment are a priority, as are intervention studies exploring how to improve post-SAM outcomes and identify high-risk children.

¹ O'Sullivan NP, Lelijveld N, Rutishauser-Perera A, Kerac M, James P (2018) *Follow-up between 6 and 24 months after discharge from treatment for severe acute malnutrition in children aged 6–59 months: A systematic review*. PLOS ONE 13(8): e0202053. <https://doi.org/10.1371/journal.pone.0202053>

Post-discharge morbidities and mortalities among children with severe acute malnutrition who did not undergo nutrition rehabilitation

Research snapshot¹

A prospective study evaluated post-discharge morbidities among children with severe acute malnutrition (SAM), including diarrhoea and other acute illnesses, who did not undergo the nutrition rehabilitation (NR) phase of SAM management at Dhaka Hospital of International Centre for Diarrhoeal Disease Research, Bangladesh (icDDR,b). NR follows the initial 'stabilisation phase' of World Health Organization (WHO)-recommended SAM treatment and provides energy-dense food to rebuild body tissues and achieve catch-up growth. The probable causes of not undergoing NR were family and other unavoidable commitments. Follow-up was undertaken between May

and August 2014 of 90 children aged 6–59 months of both sexes suffering from SAM with associated morbidities who undertook the stabilisation phase of management but not NR. Three follow-up schedules were planned at two-week intervals (the second at the follow-up unit and the first and third over the phone). During the first follow-up, 37 of 70 (53%) reported various morbidities. Only seven children came for the second follow-up; all required hospitalisation for different morbidities. On third follow-up, 23 of 58 (40%) children reported morbidity. The odds of morbidities were 7.7 times higher (95% CI: 2.33–26.58, $p < 0.0001$) among the children who came from a poor family (monthly income $<$ USD127).

Children with SAM and diarrhoea bypassing NR frequently suffered from different types of morbidities. The authors conclude that NR is an important component of the management of SAM and nutrition programmes in Bangladesh should consider including community-based management of acute malnutrition (CMAM) for the complete management of SAM in young children.

¹ Mondal P, Islam MM, Hossain MI, Huq S, Shahunja KM, Haque Alam MN, Ahmed T (2017) *Post discharge morbidities and mortalities among children with severe acute malnutrition who did not undergo nutrition rehabilitation*. Adv Pediatr Res 4:15. doi:10.12715/apr.2017.4.15

Cash-based intervention and risk of acute malnutrition among children in internally displaced persons camps in Somalia

Research snapshot¹

Cash-based interventions (CBI) have been used in Somalia since 2011, a country with one of the highest prevalences of acute child malnutrition in the world. A non-randomised cluster trial in internally displaced person (IDP) camps in peri-urban Mogadishu was undertaken to understand whether a CBI would reduce acute malnutrition and its risk factors. Ten IDP camps (clusters) were selected for the CBI, comprising a monthly unconditional cash transfer of US\$84 for five months, one-off distribution of non-food item kits and provision of free piped water. Ten adjacent clusters were selected as controls. Primary outcomes were mean child dietary diversity score (CDDS) collected from children aged 6–59 months and their primary carers (155 intervention; 177 control) from randomly selected households (household cohort) and incidence of first episode of acute malnutrition,

defined as mid-upper arm circumference (MUAC) $<$ 12.5cm and/or oedema, collected from an exhaustive sample of children aged 6–59 months (759 intervention; 1,379 control) (child cohort).

In the household cohort, the CBI appeared to increase CDDS by 0.53 (95% CI 0.01; 1.05). In the child cohort, the acute malnutrition incidence rate (cases/100 child-months) was 0.77 (95% CI 0.70; 1.21) and 0.92 (95% CI 0.53; 1.14) in intervention and control arms respectively. The CBI did not appear to reduce the risk of acute malnutrition: unadjusted hazard ratio 0.83 (95% CI 0.48; 1.42) and hazard ratio adjusted for age and sex 0.94 (95% CI 0.51; 1.74). The CBI appeared to increase the monthly household expenditure by US\$29.60 (95% CI 3.51; 55.68), increase household food consumption score (FCS) by 14.8 (95% CI 4.83; 24.8),

and decrease the reduced coping strategies index (RCSI) by 11.6 (95% CI 17.5; 5.96).

The authors conclude that CBI appeared to improve beneficiaries' wealth and food security but did not appear to reduce acute malnutrition risk in IDP camp children. Study limitations were that the trial was not randomised, the household cohort sample size was small, no other anthropometric measurements were taken due to insecurity in the field, and no food market data was available to aid interpretation of results.

¹ Grijalva-Eternod CS, Jelle M, Haghparast-Bidgoli H, Colbourn T, Golden K, King S, et al. (2018) *A cash-based intervention and the risk of acute malnutrition in children aged 6–59 months living in internally displaced persons camps in Mogadishu, Somalia: A non-randomised cluster trial*. PLoS Med 15(10): e1002684. <https://doi.org/10.1371/journal.pmed.1002684>

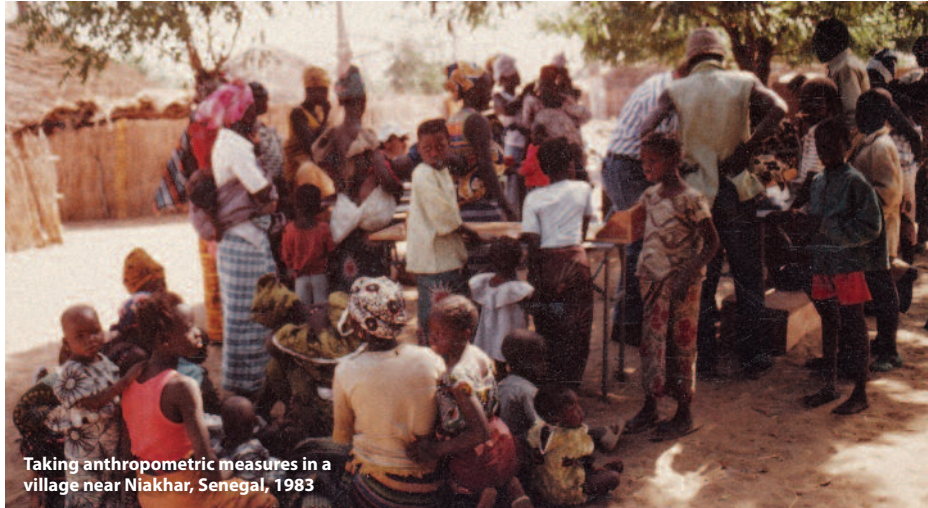
Concurrent wasting and stunting among under-five children in Senegal

Research snapshot¹

The study describes the patterns of concurrent wasting and stunting (WaSt) among children age 6-59 months living in the 1980s in Niakhar, a rural area of Senegal under demographic surveillance. Wasting and stunting were defined by z scores lower than -2 in weight for height (WHZ) and height for age (HAZ) respectively. Both conditions

were found to be highly prevalent; wasting more so before age 30 months, stunting more so after age 30 months. As a result, concurrent WaSt peaked around age 18 months and its prevalence (6.2%) was primarily the product of the two conditions, with an interaction term of 1.57 ($p < 10^{-6}$). The interaction was due to the correlation between both conditions (more stunting if wasted,

more wasting if stunted). Before age 30 months, boys were more likely to be concurrently wasted and stunted than girls (relative risk = 1.61), but the sex difference disappeared after 30 months of age. The excess susceptibility of younger boys could not be explained by muscle mass or fat mass measured by arm or muscle circumference, triceps, or subscapular skinfold. Concurrent WaSt was a strong risk factor for child mortality (the combined effect of WaSt explained some 51% of the total mortality), the effect of which was the product of the independent effect of each component, with no significant interaction. More research is needed on common factors underlying wasting and stunting, the potential increased susceptibility of one to the other (stunted children being more likely to become wasted and wasted children being more likely to become stunted) and potential underlying factors which cause variations by age and sex. Whatever the aetiology of WaSt, the authors argue that the case deserves more attention due to its dramatic impact on child survival.



Taking anthropometric measures in a village near Niakhar, Senegal, 1983

Michel Garenne

¹ Garenne M, Myatt M, Khara T, Dolan C, Briand A. *Concurrent wasting and stunting among under-five children in Niakhar, Senegal.* *Matern Child Nutr.* 2018; e12736. <https://doi.org/10.1111/mcn.12736>

Improving screening for malnourished children at high risk of death

Research snapshot¹

The purpose of this study was to investigate whether children with concurrent wasting and stunting (WaSt) require therapeutic feeding and to better understand whether multiple diagnostic criteria are needed to identify children with a high risk of death and in need of treatment. A community-based cohort study (1983-84, pre-dating community-based management of acute malnutrition) in Niakhar, a rural area of the Fatick region of central Senegal, followed 5,751 children aged 6-59 months living in 30 villages. Each child was visited up to four times at six-month intervals and at each visit anthropometric measurements were taken. Survival was monitored using a demographic surveillance system operating in the study villages. The outcome of interest was death within 183 days (i.e. six months) of anthropometric assessment.

Results showed that the lowest weight-for-age z-score (WAZ) threshold that, in combination with mid-upper arm circumference (MUAC) <11.5mm, detected all deaths associated with severe wasting or concurrent WaSt was WAZ <- 2.8. Performance for detecting deaths was best when only WAZ and MUAC were used. Additional criteria for wasting (weight for height z score (WHZ) <-3) or WaSt (WHZ <- 2.0 and HAZ <- 2.0) did not improve performance. Risk ratios

for near-term death in children identified using WAZ and MUAC suggest that children identified by WAZ <- 2.8 but with MUAC ≥115mm may require lower-intensity treatment than children identified using MUAC <115 mm.

Results show that a combination of MUAC and WAZ detected all near-term deaths associated with severe anthropometric deficits, including concurrent WaSt. Therapeutic feeding programmes (TFPs) may achieve higher impact if both WAZ and MUAC admission criteria are used (MUAC <115mm or WAZ <- 2.8), although more work is required before this can be considered a general recommendation. The authors challenge the current programming approach that distinguishes acute and chronic malnutrition treatment. The analysis should be repeated in different contexts and small-scale field studies should investigate the intensity and duration of treatment required to treat children identified using WAZ and appropriate discharge criteria. Operational research is needed to link growth monitoring/growth monitoring promotion and TFPs.

¹ Myatt M, Khara T, Dolan C, Garenne M and Briand A. (2018) *Improving screening for malnourished children at high risk of death: a study of children aged 6-59 months in rural Senegal.* *Public Health Nutr.* 2018 Dec 3:1-10. doi:10.1017/S136898001800318X.



Taking anthropometric measures in a village near Niakhar, Senegal, 1983

Michel Garenne

Risk factors for acutely malnourished infants aged under six months

Research snapshot¹

Acute malnutrition (wasting) in infants aged under 6 months (< 6m) is often neglected. Worldwide, some 8.5 million infants < 6m are affected, yet recent World Health Organization (WHO) malnutrition guidelines highlight numerous evidence gaps on how to best manage them. To inform future research, policy and programming this study aimed to identify risk factors associated with infant < 6m wasting through a secondary data analysis of nationally representative, cross-sectional Demographic and Health Surveys (DHS) conducted in the last 10 years. Wasted infants < 6m (weight-for-length z-score (WLZ) < -2) were compared to non-wasted infants (WLZ ≥ -2). Simple and adjusted (for infant age, sex, socio-economic

status) logistic regression was used to calculate odds of wasting associated with household-related, maternal-related and infant-related risk factors.

A total of 16,123 infants < 6m were analysed from 20 countries. Results showed that multiple risk factors were statistically associated with wasting. These included: poverty (odds ratio (OR) 1.22 (95% CI 1.01-1.48, p=0.04)); low maternal body mass index (BMI) (adjusted OR (aOR) 1.53(1.29-1.80, p<0.001); small infant size at birth (aOR 1.32(1.10-1.58, p<0.01)); delayed start of breastfeeding (aOR 1.31(1.13-1.51, p<0.001)); infant having had a pre-lacteal feed (aOR 1.34(1.18-1.53, p<0.001)); recent history of diarrhoea (aOR 1.37(1.12-1.67, p<0.01)); and disempowered mother (experiences violence,

does not make decisions about health issues, does not engage with health services such as antenatal care, does not give birth in a health facility). 'Protective' factors associated with significantly decreased odds of infant < 6m wasting included: mother being educated (OR 0.64(0.54-0.76, p<0.001)); mother in work (OR 0.82(0.72-0.94, p<0.01)); infant currently being breastfed (aOR 0.62(0.42-0.91, p=0.02)) and infant having been exclusively breastfed (aOR 0.84(0.73-0.97, p=0.02).

Infant < 6m wasting is a complex, multifactorial problem associated with many risk factors. Many of the risk factors identified in this study are biologically plausible and/or socially important and should therefore be considered when assessing and managing infants < 6m. Although supporting breastfeeding is core to future interventions, this alone is unlikely to be sufficient; strategies should involve multiple sectors beyond just health and nutrition.

¹ pending publication in peer reviewed journal

Outcomes and risk factors for infants under six months old with severe acute malnutrition in Bangladesh

Research snapshot¹

Severe acute malnutrition (SAM) affects around four million infants under six months of age (u6m) worldwide, but evidence underpinning their care is limited and of low quality. The purpose of this study was to identify risk factors for infant u6m SAM and describe the clinical and anthropometric outcomes of treatment with current management strategies to inform future research and policy. A prospective cohort study was undertaken in Barisal district, Bangladesh, among one group of 77 infants u6m with SAM (weight-for-length z-score (WLZ) < -3 and/or bipedal oedema) and a second group of 77 infants u6m without SAM (WLZ ≥ -2 to < +2, no oedema, mid-upper-arm circumference ≥ 125 mm). All were enrolled at four to eight weeks of age and followed up at six months. Infants identified with SAM were referred to existing services (inpatient treatment).

Despite referral, only 13 (17%) reported for inpatient care. At six months, 18 (23%) infants with SAM at the outset still had SAM and three (3.9%) had died. In the non-SAM group, one child developed SAM and none died. The SAM group had significantly more stunting (62% vs. 15%), more severe stunting (40% vs. 0%), and more underweight (68% vs. 7%) compared to the non-SAM Group.

Risk factors associated with infant SAM included non-exclusive breastfeeding at enrolment and at follow-up, age at enrolment, years of maternal education, access to electricity and mother not satisfied with breastfeeding at enrolment. Mothers of the SAM infants were significantly lighter, shorter and had lower MUAC than non-SAM mothers; only MUAC showed a clinically marked as well as statistically significant difference

between the two groups. Maternal mental health was worse in mothers of SAM infants.

The authors conclude that current treatment strategies have limited practical effectiveness. The main reason for this is poor uptake of inpatient referral. World Health Organization recommendations and other intervention strategies in outpatient-focused care for malnourished, clinically stable infants u6m need to be tested. Better case definitions of nutritionally at-risk infants are needed. Breastfeeding support is likely central to future treatment strategies but may be insufficient alone. Maternal factors should be considered when evaluating potentially at-risk infants.

¹ Munirul Islam M, Arafat Y, Connell N, et al. Severe malnutrition in infants aged <6 months—Outcomes and risk factors in Bangladesh: A prospective cohort study. *Matern Child Nutr.* 2019;15:e12642. <https://doi.org/10.1111/mcn.12642>

Short malnourished children and fat accumulation with food supplementation

Research snapshot¹

Supplementary feeding programmes (SFPs) commonly do not measure the mid-upper arm circumference (MUAC) of children whose length is < 67 cm. These shorter children are enrolled in treatment only if they meet weight-for-height z-score (WHZ) criteria, which is less closely linked to risk of mortality and misses children at high risk who would have been identified by MUAC. This is based on expert opinion that the supplementation of shorter children with low MUAC and WHZ ≥ -2 may increase the risk of excessive fat accumulation. The aim of

this study was to assess if shorter children gain more fat than taller children when treated for moderate acute malnutrition (MAM) diagnosed by low MUAC alone.

In this observational study children were included aged 6 to 23 months with a MUAC between 115 and 125 mm and a WHZ score of ≥ -2. Based on length at admission, children were categorised as short if they were < 67 cm and long if ≥ 67 cm. Linear mixed-effects models were used to assess body composition using deuterium dilution and skinfold thickness. After 12

weeks of supplementation there was no difference in change in fat mass index (-0.038 kg/m², 95% confidence interval [CI]: -0.257 to 0.181, P = .74) or fat-free mass index (0.061 kg/m², 95% CI: -0.150 to 0.271, P = .57) in short children versus long children. In absolute terms, the short children gained both less fat-free mass (-230 g, 95% CI: -355 to -106, P < .001) and fat mass (-97 g, 95% CI: -205 to 10, P = .076). There was no difference in changes in absolute subscapular and triceps skinfold thickness and z scores (P > 0.5). Results demonstrate that short children with low MUAC do not gain excessive fat during supplementation. On this basis, the authors recommend that all children ≥ 6 months with low MUAC be included in SFPs, regardless of length.

¹ Fabiansen C, Phelan K.P.Q., Cichon B, et al. Short Malnourished Children and Fat Accumulation With Food Supplementation. *Pediatrics.* 2018;142(3):e20180679

A review of wet nursing experiences, motivations, facilitators and barriers

Research snapshot¹

Wet nursing, the practice of a woman breastfeeding a non-biological child, is recommended in the World Health Organization/UNICEF Global Strategy on Infant and Young Child Feeding (2006) in situations where maternal breastfeeding is not possible. A literature review of open access evidence of medical, social/cultural and religious factors that support or hinder wet nursing was undertaken by Save the Children to understand how this recommendation can be applied.

Results show that wet nursing has been widely practiced since 2000 years BCE and has historically been widely and positively accepted by society, culture and religion, although it has in

some contexts been used as a form of slavery (ancient Rome and the southern United States during the 18th and early 19th centuries). Since 1500, wet nursing has mostly been practiced within close circles of families and friends to ensure child survival. It has declined as a practice with increased use of artificial feeding and marketing by formula manufacturers.

Factors identified in the review that facilitate wet nursing include wide acceptance within society, culture and religion; knowledge of the importance of breastmilk; when wet nurses and mothers/caregivers know each other; availability of milk-sharing websites; appropriate support from health facilities and authorities; access to lactation consultants or nurses equipped to pro-

vide support for wet nursing; and breast-milk screening. Factors identified that hinder wet nursing include availability and promotion of artificial feeding; fear of disease transmission; practical limitations for wet nurses (such as cost of travel); unwillingness to wet nurse outside known relationships; lack of facilities (milk banks; milk storage; pasteurisation); and lack of protocols and support from health authorities.

A significant limiting factor of the review was a paucity of studies or documented experiences on wet nursing in emergencies and low and middle-income countries, and a consequent lack of guidelines on the operationalisation of wet nursing in emergency contexts. This is a critical gap area to address to put global recommendations into practice.

¹ Teshome, S. (2018) *Wet-nursing: A review of wet nursing experiences, motivations and factors that helped or hinder wet nursing*. Save the Children UK <https://www.ennonline.net/wetnursingreview>

Gender dynamics of phone ownership and use in a Fresh Food Voucher scheme in Ethiopia

Research snapshot¹

The World Food Programme (WFP) began its Fresh Food Voucher (FFV) programme in three woredas² in Amhara Region, Ethiopia, in October 2017, to promote consumption of fruits, vegetables and animal-source foods and thereby improve dietary diversity. The programme is based on restricted vouchers that are redeemed through mobile phone payments to fresh-food vendors. Even though a preliminary study suggested otherwise, a few months into the programme beneficiary-monitoring data revealed that some FFV clients did not own a phone or were not accustomed to using one. This led to challenges for some women in redeeming their vouchers at vendors. In response, a study was conducted to understand the dynamics of phone ownership, access to phones and social norms related to phone use and ownership in commu-

nities and households participating in the FFV programme. The study took place in Ayo Meda and Hamaro villages and Dire Roka town in Habru woreda, Amhara Region, in 2018.

A total of 75 women and 10 men were interviewed and 18 focus group discussions held with women's associations, female participants of the FFV programme and their spouses. Results showed that most FFV clients in the two villages, the majority of whom were illiterate or educated to primary level and engaged in farm labour, did not own a phone (72% and 76% of women interviewed in Ayo Meda and Hamaro respectively). A much higher proportion of female participants (64%) owned a phone in urban Dire Roka, where women were more likely to be educated to secondary level and engaged in a broader range of livelihood activities. Most

women who did not own a phone borrowed their spouse's device, while others borrowed phones from friends and family to redeem FFV vouchers. No beneficiaries had missed their FFV entitlement due to the lack of a phone.

Discussion revealed minimal conflict associated with women owning and using mobile phones at community and household levels. Several advantages of providing phones to female FFV clients were identified, including empowerment; increased autonomy and safety; new skills; and access to mobile payment platforms. From WFP's perspective, benefits of female phone ownership include the ability to reach female FFV participants for programme monitoring and to provide health-promotion messages, and the reduced need for WFP monitors at market/distribution points.

Based on these results, WFP will continue with plans to provide phones as part of the FFV scheme, provided that a risk assessment of all programmatic challenges related to the provision of phones to clients (such as protocols for lost and stolen phones) is completed. In addition, male spouses of FFV clients must be engaged; supporting solar/electric charging facilities in FFV villages should be explored; and partnerships should be built with local women's groups and associations in support of the programme.

¹ Akabwai P and Haajij H. (2018) *Fresh food vouchers: gender assessment on phone ownership and utilization*. Available from: <https://www.ennonline.net/resources/genderdynamicsfreshfoodvouchers>

² Woredas (districts) are the third-level administrative divisions of Ethiopia. They are further subdivided into a number of wards (*kebele*) or neighborhood associations, which are the smallest unit of local government in Ethiopia.



WFP Food Voucher Programme, Ethiopia, 2018

WFP/Michael Tweedie



Barrier analysis of infant and young child feeding and maternal nutrition behaviours among IDPs in northern and southern Syria

By Shiromi Michelle Perera



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Shiromi has coordinated and conducted barrier analysis assessments in Sierra Leone, Jordan, Lebanon, Turkey, Afghanistan, South Sudan, Ethiopia and Sudan.

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Location: Syria

What we know: Promoting and supporting optimal infant and young child feeding (IYCF) practices and maternal nutrition are essential interventions in crisis-affected populations.

What this article adds: A barrier analysis regarding several key infant feeding and maternal nutrition practices was commissioned by UNICEF in Syria in 2017. It was born of little success in existing interventions to change prevalent practices. Significant barriers and enabling factors to change were determined among 'doers' and 'non-doers' with regard to exclusive breastfeeding, minimum dietary diversity and an additional meal per day in pregnancy. These included lack of correct knowledge and misconceptions; lack of access to markets and availability of diverse foods; inability to afford food; stress; lack of support from critical family members; and lack of time to prepare meals. Improved access to IYCF and maternal nutrition services are needed, with support for mothers and pregnant women more effectively integrated into other sectors, particularly food security, agriculture, livelihoods and reproductive health. Detailed recommendations are informing current and future programming by Nutrition Cluster partners in specific districts and have wider relevance in Syria. This experience reflects that barrier analysis is possible in an insecure/emergency contexts.

Background

The Syrian crisis continues to be one of the worst humanitarian and protection crises of our time, taking a significant toll on the lives of the Syrian people and impacting all basic needs. Over half of the population has been internally displaced, resulting in many families living in camps, informal settlements and collective centres throughout the country. In 2016 the Whole of Syria (WoS) Nutrition Sector response reached 3.4 million children and pregnant and lactating women (PLW) affected by the crisis with a range of preventative and therapeutic nutrition interventions (WoS, 2016). Included in this were efforts by the Nutrition Cluster and its partners to promote and support optimal infant and young child feeding (IYCF) practices, as well as maternal nutrition, as priority life-saving interventions. Nevertheless, a knowledge,

attitudes and practices (KAP) survey, conducted in February 2017, indicated that the prevalence of certain IYCF behaviours was either low or largely unchanged compared to the results of nutrition surveys carried out before the response. Three IYCF behaviors in need of further investigation were: exclusive breastfeeding (EBF) (30.9%); complementary feeding for minimum dietary diversity (CF-MDD) (57.3%); and eating an extra meal during pregnancy (40.3%). As co-lead of the Nutrition Cluster, UNICEF commissioned a barrier analysis (BA) to determine the reasons behind prevalent IYCF and maternal nutrition practices among internally displaced people (IDP) in camp and urban settings in the Aleppo, Idlib and Dar'a Governorates in order to better tailor partner programme activities. This article summarises findings and recommendations from this first-ever BA on feeding

practices in Syria, conducted in August 2017 in northern and southern Syria.

Methodology

An initial two-day training of trainers (TOT) was conducted in Gaziantep, Turkey, among Nutrition Cluster partner organisations from north and south Syria. The training included content on internationally recognised BA guidelines (Kittle, 2013), questionnaire development and interviewing skills and the use of KoBo, a free, open-source tool for mobile data collection. Training was cascaded to 15 data collectors and two supervisors in the north (Physicians Across Continents and Human Appeal) and 10 data collectors and two supervisors in the south (Syria Relief and Development).

Following this, three cross-sectional surveys were carried out in camp IDP and urban IDP

locations in north and south Syria, chosen according to the presence of operational nutrition programmes and security/accessibility. Purposive samples of 90 Syrian mothers (45 'doers' (those who practice the behaviour) and 45 'non-doers' (those who do not)) were selected for each behavior. Groups included mothers of infants aged 0- <6 months exclusively breastfeeding (or breastfeeding but not exclusively); mothers of children age 6-23 months feeding children meals containing foods from at least four of seven specified food groups per day (or not); and pregnant mothers who consume an extra meal per day during pregnancy (or not).

Mothers were first screened and classified as 'doers' or 'non-doers', after which they were asked questions according to their classification to identify which of the 12 specified determinants of behaviour change acted as barriers to the particular behavior among 'non-doers' and which facilitated its adoption among 'doers'. Data from closed-ended questions were collected with KoBo using mobile devices, which is an uncommon adaptation to the BA approach but worked well in this emergency context. Coding of qualitative responses was achieved through an iterative group process with each team, using various online applications, depending on connectivity. Codes were then tabulated and recorded for analysis in a BA tabulation Excel spreadsheet. Findings were interpreted by the BA team and presented at a results workshop of participating partners, and later with Nutrition Cluster partners to help inform interpretation of results and recommendations.

Results

In total, 551 mothers were interviewed in north (n=271) and south Syria (n=280). The north was stratified into camp IDP and urban IDP locations; specifically, Atmeh Camp in Idlib Governorate, Al'Mara District in Idlib Governorate and Jebel Saman District in Aleppo Governorate. The south was stratified into urban IDP locations in Dar'a Governorate; specifically, Tafas and Hrak Districts. In total, 11 determinants in the north and 5 determinants in the south were found to be significant for EBF; 11 determinants in the north and 8 determinants in the south for CF-MD, and 11 determinants in the north and 9 determinants in the south for an extra meal during pregnancy.

Exclusive breastfeeding

Common barriers experienced by 'non-doers' included maternal stress, perception that the baby is unsatisfied, maternal anemia, physical issues with breastfeeding for the mother (breast problems) and baby (stomach problems, colic, teething) and lack of support from the husband. Mothers and mothers-in-law were described by 'non-doers' as people who disapprove of EBF. Factors that facilitated EBF indicated by 'doers' were knowledge of IYCF, family support, private spaces to breastfeed, access to and consumption of diverse foods by the mother in order to produce milk, and having enough and continuous milk. Barriers identified by 'doers' of particular

relevance were market-access issues and concerns related to breast problems (pain in breasts or inflammation in nipples).

While both 'doer' and 'non-doer' mothers demonstrated adequate knowledge about the positive and negative consequences of EBF, they had several misconceptions, such as thinking that breastfeeding is a "waste of time", the baby is left unsatisfied, breastfeeding changes breast shape and leads to maternal health problems (loss of weight, illness, loss of calcium, loss of immunity) and problems in the family. Additional significant determinants were perceived access ('doers' and 'non-doers' stated it was "somewhat difficult" to get the support needed to EBF); perceived cues for action/reminders ('non-doers' were more likely to say it was "somewhat difficult" to remember to give only breastmilk for the first six months); perceived risk of malnutrition and diarrhoea; perceived severity of malnutrition and diarrhoea; perceived efficacy of EBF ('doer' and 'non-doers' do not fully understand the relationship between EBF and malnutrition/ diarrhoea); divine will ('doers' were more likely to say that Allah may cause malnutrition or diarrhea); and culture ('doers' were more likely to say that there are cultural rules/taboo against EBF).

Minimum dietary diversity (MDD) in complementary feeding

Some of the barriers for 'non-doers' included not enough food preparation time for mothers due to work outside the home, the child not accepting prepared food, the child being sick or having thyroid problems, lack of food diversity

in markets and being unable to afford diverse foods. 'Non-doers' indicated that sisters and aunts disapprove of feeding a diverse diet to children. 'Doers' indicated several facilitating factors, such as support from husband and family members, access to markets, availability of foods in the house, enough time to feed their child, the child loving/wanting food, having electricity to cook food, and receiving advice about complementary feeding. Stated barriers for 'doers' of particular relevance were interference by family members, distance to markets and lack of time due to the mother working outside of the house.

Some lack of knowledge and misconceptions were found, such as mothers perceiving that a diverse diet does not provide immunity and leads to children getting sick from food poisoning or intestinal complications. Additional significant determinants were perceived access ('non-doers' indicated that it was "very difficult" to get food from at least four of the seven food groups), perceived cues for action/reminders ('non-doers' were more likely to say it was "somewhat difficult" to remember to include foods from at least four of the seven food groups during meal preparation), perceived risk of malnutrition, perceived severity ('doers' considered becoming malnourished as only "somewhat serious"), perceived action efficacy ('non-doers' did not fully understand the relationship between a diverse diet and malnutrition), divine will ('non-doers' were more likely to say Allah causes malnutrition) and culture ('doers' were more likely to say there are cultural rules/taboo against feeding their child a diverse diet).



Physicians across Continents

Physicians across Continent data collector interviewing mother for the Barrier Analysis, Northern Syria, 2017

Extra meal during pregnancy

Some of the barriers for ‘non-doers’ included pregnancy-related sickness (vomiting, pressure, stomach pain), markets being far away, lack of money to buy foods, lack of privacy, lack of time to cook food, not receiving food baskets from non-governmental organisations and regular displacement. ‘Non-doers’ indicated that no one would disapprove of eating an extra meal during pregnancy. Facilitators for ‘doers’ included having a supportive husband, availability of food in the house and accessible markets, kitchen ap-

pliances to store and cook food, advice from nutrition workers, provision of an NGO food basket, and the mother having an appetite and not being stressed or sick. Barriers for ‘doers’ of particular relevance included lack of availability of food in the house and the mother being too tired or lacking an appetite to eat an extra meal.

Some lack of knowledge and misconceptions were revealed, with mothers perceiving that an extra meal leads to weight gain, sickness, feeling lazy and increased blood pressure when eating

certain foods. Additional significant determinants were perceived access (‘non-doers’ were more likely to indicate that it was “very difficult” to access what they need to eat an extra meal), perceived cues for action/reminders (‘non-doers’ were more likely to say it was “very difficult” to remember to eat an extra meal), perceived risk the baby will be born too weak and small, perceived severity (‘doers’ and ‘non-doers’ perceived the baby being born too weak and small as “very serious”), perceived action efficacy (‘non-doers’ did not fully understand the relationship between eating an extra meal and giving birth to a healthy baby), divine will (‘non-doers’ were more likely to say that Allah wants them to eat an extra meal) and culture (‘non-doers’ were more likely to say there are cultural rules/taboo against eating an extra meal).

Table 1 Summary of recommendations

Behaviour	Recommendation
General	<ol style="list-style-type: none"> 1. Scale up IYCF and maternal nutrition programming (through existing mother support groups approach and care groups). 2. Continuously assess needs and access to markets and services as each wave of displaced individuals resettle in programme areas to understand evolving needs.
Exclusive breastfeeding	<ol style="list-style-type: none"> 1. Conduct one-to-one counselling, skilled support and educational/support sessions (within health facilities, antenatal and post-natal clinics) to improve knowledge on EBF, address misconceptions and assess and address breastfeeding problems. 2. Refer mothers as needed for nutrition assessment and support (micronutrient supplementation, treatment for anaemia), food distribution and rations and psychosocial support to reduce stress. 3. Scale up community-level breastfeeding support through the integration of IYCF support activities into midwifery and reproductive health services and provision of baby-friendly spaces to give privacy to breastfeeding mothers. 4. Hold discussions with families (husbands, mothers and mothers-in-law) about how to support mothers to breastfeed exclusively. 5. Policy actions: reinforce and advocate for adherence to the International Code of Marketing of Breastmilk Substitutes (given prevalent large-scale distribution of infant formula); develop guidelines for physicians in supporting BF; advocate for the Integrated Management of Childhood Illnesses (IMCI) in all health facilities.
Minimum dietary diversity in complementary feeding	<ol style="list-style-type: none"> 1. In one-to-one counselling and group sessions with mothers, include information on appropriate complementary feeding and dietary diversity, feeding sick children and appropriate WASH practices. 2. Conduct assessment of infrastructure at community and household levels (electricity, food storage, water access, etc). 3. Conduct food security assessments and interventions to determine access, food availability and diversity. 4. Create community or home gardens and establish mobile markets to increase access and availability to diverse foods. 5. Provide cash/vouchers, especially in times of electricity outages, and expand food basket distribution, especially to vulnerable groups (households with infants under two years old and PLW). 6. Provide community-level support through development and sharing of locally appropriate recipes; cooking demonstrations; meal planning and family education sessions on complementary feeding. 7. Educate families during support group sessions, house visits and community outreach on the importance of supporting mothers to feed children a diverse diet. 8. Hold group discussions with aunts and sisters to discuss the benefits of diverse diets and how they can be supportive towards mothers.
Consumption of an extra meal in pregnancy	<ol style="list-style-type: none"> 1. In one-to-one counselling and group sessions with mothers, include information on the importance of an extra meal per day in pregnancy, healthy weight gain, management of pregnancy-related symptoms and addressing cultural myths (such as food allergies, sickness and reactions to eating certain foods in pregnancy). 2. Referral of pregnant mothers, as appropriate, for further nutrition assessment and support, blanket feeding, food distribution and rations and psychosocial support to reduce stress. 3. Provide community-level support by ensuring rapid response to newly displaced mothers; set up mother and child friendly spaces; develop community gardens; establish mobile markets to increase access to fresh fruits and vegetables; establish cash/food voucher programme and income-generating activities for vulnerable families with PLW; and provide information in group education sessions on the importance of eating an extra meal in pregnancy.

Discussion and recommendations

This article reflects that barrier analysis is possible in an insecure/emergency context. It applied KoBo, which is not commonly used with BA, and adapted training and coding methods for remote application. Results show various determinants that create barriers to mothers properly practicing the three assessed behaviours, including lack of correct knowledge and misconceptions; lack of access to markets and availability of diverse foods; inability to afford food; stress; lack of support from critical family members; and lack of time to prepare meals. Results suggest that improved access to IYCF and maternal nutrition services are needed and that support for mothers of infants and young children and PLW must be more effectively integrated into other sectors, particularly food security, agriculture, livelihoods and reproductive health to ensure that the multiple needs of this group are addressed. Recommendations, summarised in Table 1, build on existing programme activities and plans. Although recommendations were tailored to specific districts, they will also likely benefit similar programming locations in northern and southern regions. Following this assessment, the Nutrition Cluster partners held a workshop to begin planning how to move forward with these recommendations. The author developed a social behavior change strategy to aid the Cluster in the design, implementation and monitoring and evaluation of the recommended activities.

The full report can be found at <https://www.enonline.net/resources/barrieranalysisyfcfsyria>

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Micronutrient powder distribution strategies to increase coverage and adherence among children aged six to 23 months as part of an IYCF strategy in Cambodia

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Location: Cambodia

What we know: Micronutrient powder (MNP) distribution improves micronutrient status and reduces anaemia and iron deficiency in children aged six to 23 months.

What this article adds: Helen Keller International (HKI) and the Ministry of Health (MoH) in Cambodia implemented an integrated infant and young child feeding (IYCF)/MNP pilot programme for children aged 6-23 months between 2012 and 2014. Three strategies were used to distribute MNPs and provide MNP and IYCF counselling: community-based volunteers direct to households; collection from health centres (fixed); and a combination of the two (mixed). Results of an endline cross-sectional survey and coverage data (final 11 months) showed significantly higher average coverage for community sites compared to mixed and fixed, and for mixed compared to fixed. Programme adherence and differences in caregiver knowledge were significantly higher for community compared to fixed sites; no significant differences were found between community and mixed. Community-based distribution has the potential to improve coverage of MNP programmes among children age 6 to 23 months in Cambodia: combining community and facility-based distribution may be more feasible and cost-effective.

Background

Micronutrient deficiencies are a major public health challenge in Cambodia. Over half (56%) of children six to 59 months are anaemic, with notably higher prevalence among infants aged nine to 11 months (83%) (National Institute of Statistics, 2014). There are multiple causes of anaemia, including deficiencies in iron and zinc, infection and genetic haemoglobin disorders and, for infants and young children, inadequate dietary intake and poor infant and young child feeding (IYCF) practices (Balarajan et al, 2011). Only 30% of Cambodian children aged six to 23 months receive a minimum acceptable diet and, particularly in rural households, complementary foods tend to lack in quantity, diversity and animal-source foods (National Institute of Statistics, 2014).

Micronutrient powders (MNPs) are a proven home-fortification strategy recommended by the World Health Organization (WHO) to improve micronutrient status and reduce anaemia and iron deficiency in children aged 6 to 23

months (WHO, 2016). The efficacy of large-scale MNP programmes in reducing anaemia in this age group has been clearly demonstrated in various low- and middle-income countries, including Cambodia (WHO, 2016). Despite this, there is a lack of implementation research exploring which distribution strategies are most effective in supporting sustained coverage and adherence to MNPs at scale.

Current global MNP programmes typically use more than one channel of distribution; either facility-based, community-based or market-based (Jefferds et al, 2011). Community-based distribution has been identified as one of the best ways to reach rural populations in resource-limited settings where existing coverage may be chronically low (Micronutrient Forum, 2008). Integrating MNPs into well-established community-based services may provide an increased opportunity for long-term sustainability, a critical component for successful programme scale-up. A recent review of nine global MNP interventions that delivered MNPs at no charge through the

national health sector, found that coverage was generally higher when distribution took place at the community level (Reerink et al, 2017).

Helen Keller International (HKI) worked with the Ministry of Health (MoH) in Cambodia to implement an integrated IYCF/MNP pilot programme among children aged 6-23 months of age between 2012 and 2014, with the goal of reducing anaemia in this age group. This post hoc analysis looks at the different distribution strategies employed and their association with coverage, adherence and knowledge to help identify the most effective methods to improve delivery, coverage and use of MNPs in Cambodia.

Methods

Prior to the programme MNPs were available at health centres (HCs), but household usage was low. In response the programme employed three strategies for distributing MNPs to eligible households: (1) Community-based delivery: village health volunteers distributed MNPs directly to households (five operational districts (ODs)); (2) Fixed-site strategy: households within 10 km of an HC collect MNPs from HC (1 OD); (3) Mixed strategy: Households within 5 km of an HC collect MNP from HC staff and households further than 5 km received MNPs from village health volunteers (VHVs) (1 OD).

Data were used from two sources: an endline cross-sectional survey (n=800), conducted after 20 months of MNP distribution (no data were collected on coverage or adherence at baseline as very few households (3%) had previously used MNP before) and monthly coverage data collected over the final 11 months of MNP distribution. The latter reported on monthly coverage estimates across the seven ODs, each covering approximately 50,000-100,000 people with five to 10 HCs (MoH, 2016).

A box containing 15 sachets of MNPs was provided each month to caregivers, along with

preparation and feeding instructions. Both VHVs and HC staff were trained to provide standardised messages to participating families. A total of 1,770 VHVs and 404 HC staff were trained to distribute and counsel on MNP use and improved IYCF practices. Mass media spots and counselling sessions provided educational messages with an emphasis on WHO-endorsed complementary feeding practices and continued breastfeeding until two years of age and beyond.

The Cambodian National Nutrition Programme (NNP) recommended that all children aged six to 23 months be allocated 15 sachets of MNPs for consumption on a flexible schedule every month. Coverage was defined as the percentage of children aged six to 23 months who received 15 MNP sachets in the last month. Adherence was defined as the percentage of children aged six to 23 months who consumed all 15 sachets during that time period. In January 2015, after the programme ended, the MoH began to recommend a revised dosage of 10 sachets per month per child, so partial adherence was included in this analysis.

Results

Coverage

Table 1 summarises monthly coverage across each of the three distribution strategies over the final 11 months of distribution. Results

showed significantly higher average coverage among the VHV distribution ODs, compared with the mixed distribution OD (73%, 64%; $p < .001$), and compared with the OD using fixed-site distribution (73%, 30%; $p < .001$). There was also significantly higher average coverage among the mixed distribution OD compared with the fixed-site distribution OD (64%, 30%, $p < .001$).

Between January and July 2014 the fixed-site strategy achieved 16% coverage (range: 12-23%; $p = .03$ for difference in coverage between January and July). After observing higher coverage in the VHV and mixed distribution model, the fixed-site strategy changed to a mixed strategy and coverage increased to 55% over the last four months of the programme (range: 37-66%; $p < .001$ for difference in coverage between July and November).

Adherence

Table 2 summarises adherence estimates collected at endline. There was no significant difference in adherence, as measured by consumption of 15 sachets in the past one month, between VHV-distribution ODs and the mixed-site OD (60%, 54%). There were positive differences in adherence between VHV-distribution ODs and the fixed-site OD (60%, 41%; $p = .001$), but no significant differences in adherence between the

mixed-site and fixed-site ODs (54%, 41%).

When measuring the consumption of 10 sachets in the past month, significantly more respondents in the mixed-site OD reported partial adherence, compared with the VHV-site ODs (86%, 70%; $p = .002$) and the fixed-site OD (86%, 57%; $p < .001$). Differences between the VHV site and the fixed site were not significant. After disaggregating the adherence data in the mixed-site OD, it was found that 90% of those who received MNPs from VHVs consumed at least 10 sachets per month, compared to 79% among households who collected MNPs from HCs. However, this finding was not statistically significant because of the small sample size of the mixed-site OD ($n = 100$).

Caregiver knowledge

Table 3 summarises caregiver knowledge of four promoted benefits of MNP for young children at endline across the three distribution approaches. There were significant and positive differences in knowledge of three out of the four promoted benefits between the VHV and fixed sites: promoting optimal growth (76%, 54%; $p < .001$), increasing immunity (35%, 19%; $p = .004$), and preventing iron deficiency (19%, 7%; $p = .01$). However, there was no significant difference in knowledge across respondents receiving either VHV distributed MNPs or the mixed model. The fixed-site group was significantly more likely not to know of any benefits of MNPs compared to the VHV ($p < .001$) and mixed groups ($p = .02$).

Discussion

MNP coverage was considerably higher in target ODs where VHVs were responsible for full or partial distribution, compared to the OD using a fixed-site strategy. Full community-based distribution of MNPs by VHVs showed the highest level of coverage. After the fixed-site strategy changed to a mixed model for the final four months of the programme, coverage rates increased rapidly and significantly. These findings suggest that community-based distribution of MNPs using VHVs is more effective than an absolute fixed-site distribution strategy at increasing coverage.

Many different factors can influence intake adherence to MNPs, such as guidance to caregivers, perceived benefits of the product, side effects, administration frequency and distribution model (de Barros et al, 2016). In target ODs where VHVs were responsible for total or partial distribution, children were significantly more likely to consume 15 or at least 10 sachets of MNP each month compared to those in the fixed-site strategy. Similarly, when examining maternal/caregiver knowledge on the benefits of MNPs, it was found that where VHVs were responsible for total or partial MNP distribution, caregivers demonstrated better knowledge than caregivers who collected MNPs from HCs. Lower rates of adherence and knowledge in the fixed-site OD suggest that VHVs may play a unique role in the community as an effective channel of communication linking households to MNPs.

Table 1 MNP coverage (received 15 MNP sachets in the last month) from monitoring data during the final 11 months of programme implementation

Month (2014)	VHV model		Mixed Site		Fixed Site		P-Value
	Total	Coverage	Total	Coverage	Total	Coverage	
	n	n (%)	n	n (%)	n	n (%)	
Jan*	1753	934(53)	425	251(59)	319	38(12)	
Feb	5478	3978(73)	498	379(76)	373	52(14)	
March	3600	2427(67)	335	248(74)	251	30(12)	
April	3917	2601(66)	364	231(63)	273	63(23)	
May*	1472	938(64)	245	144(59)	184	32(18)	
June*	1400	1059(76)	224	92(41)	168	22(13)	
July	4217	3102(56)	392	224(57)	294	53(18)	
Aug	4765	3617(76)	443	244(55)	332	123(37) ¹	
Sept	3660	2856(78)	341	249(73)	255	138(54)	
Oct	4575	3655(80)	426	268(63)	319	201(63)	
Nov	3557	2852(80)	331	228(69)	248	164(66)	
Total Children	38,394	28,019(73)^{3,a}	4,024	2,558(64)^{4,b}	3,016	916(30)^{5,c}	<0.001²

¹ In August 2014 the fixed site OD changed to a mixed strategy.

² p-value comparing average coverage between the three groups (5% significance level).

³ $p < .001$ comparing differences in coverage between Jan and Nov for the VHV strategy.

⁴ $p = 0.005$ comparing differences in coverage between Jan and Nov for the mixed strategy.

⁵ $p = 0.03$ comparing differences in coverage between Jan and July for the fixed strategy. After changing to a mixed strategy, $p < 0.001$ between July and Nov.

letters (a,b,c): comparisons between each group. Row with different letters indicate statistically significant differences.

* In January, May and June 2014 MNPs were unavailable in three ODs (using the VHV distribution strategy) because of a disrupted supply, so there are no coverage data from those ODs, resulting in smaller sample sizes during those months. For other months, the total number of children that fell within the 6-23 months age range differed, which also resulted in variations in the number of households monitored each month.

Table 2 Adherence to MNP across the three distribution strategies at endline

Outcome	Group	Endline=800 Freq(%)	P-value
Child consumed 15 MNP sachets each month (out of those who used MNPs)			
	VHV	218(60)	a.
	Mixed	49(54)	a, b.
	Fixed	32(41)	b.
Child consumed at least 10 MNP sachets each month (out of those who used MNPs)			
	VHV	252(70)	a.
	Mixed	77(86)	b.
	Fixed	45(57)	a.

p-value indicates differences between groups at endline (unadjusted analyses) letters (a,b): comparisons between each group at endline. Two rows with different letters indicate differences at 5% significance level; rows that share a letter = no statistical significance.

Conclusions

This analysis found that community-based distribution using VHV is more effective at maximising coverage and promoting adherence to MNPs than fixed-site distribution from health centres. Although VHV are trusted community members who have been used for decades by non-governmental organisations (NGOs) and government to implement health interventions, they are not formally recognised as part of the healthcare system of the MoH of Cambodia, nor are they permitted to deliver essential drugs. HKI has observed that VHV operating in areas where NGOs are working tend to be well trained, financially supported, motivated and active. However, when NGOs phase out their support, VHV involvement and engagement often declines.

VHVs need consistent and cohesive centralised support from government to ensure the sustainability of a large-scale MNP programme.

Large-scale MNP distribution depends on the ability of governments to plan and budget effectively and their capacity to distribute product and monitor interventions. With time, countries will shift from external, donor-funded to government-financed programmes, so long-term financing is an important consideration, particularly if MNPs are to be distributed free of charge to the end-user. Although an absolute fixed-site distribution strategy is less burdensome on resources, it can only be expected to reach a portion of the target population (approximately one quarter, based on this analysis). Community-based distribution using VHV will be critical

Table 3 Knowledge of benefits of MNPs among caregivers who had previously used MNPs across the three distribution strategies at endline

Outcome	Group	Endline=800 Freq(%)	P-value
Promoting optimal growth			
	VHV	274(76)	a.
	Mixed	67(74)	a.
	Fixed	43(54)	b.
Increasing immunity			
	VHV	128(35)	a.
	Mixed	24(27)	a, b.
	Fixed	15(19)	b.
Improving children's appetite			
	VHV	82(23)	a.
	Mixed	17(19)	a.
	Fixed	18(23)	a.
Preventing iron deficiency anaemia			
	VHV	68(19)	a.
	Mixed	24(27)	a.
	Fixed	6(7)	b.
Don't know			
	VHV	40(11)	a.
	Mixed	13(14)	a.
	Fixed	23(29)	b.

p-value indicates differences between groups at endline (unadjusted analyses) letters (a,b): comparisons between each group at endline. Two rows with different letters indicate differences at 5% significance level; rows that share a letter = no statistical significance.

(As only one OD employed a fixed-site strategy and only one OD employed the mixed strategy, sample sizes for these two strategies were much lower than in the VHV strategy at endline (fixed n=100; mixed n=100; VHV n=600).

to reach children aged 6 to 23 months in the most vulnerable villages across Cambodia. A mixed strategy of MNP distribution that includes both community-based and facility-based distribution may be a more cost-effective and comprehensive model that can capitalise on existing infrastructure and minimise the risk of overburdening VHV's.

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Mother preparing food for young child with micronutrient powder, Cambodia, 2014

Helen Keller International

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Development of a maternal service package for mothers of children with severe acute malnutrition admitted to nutrition rehabilitation centres in India

By Vani Sethi, Praveen Kumar and Arjan De Wagt



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Location: *India*

What we know: Maternal factors, such as poor nutrition in utero, anaemia and short birth spacing, contribute to undernutrition in children.

What this article adds: The socio-economic, anthropometric, morbidity and biochemical profile of 427 mothers of inpatient children with severe acute malnutrition (SAM) admitted to four nutrition rehabilitation centres (NRCs) in India was assessed. Twenty-five per cent of mothers were low in stature (height <145 cm); 23% were underweight (body mass index (BMI) <18.5 kg/m²); 5% were severely underweight (BMI <16); more than a quarter (27%) were overweight/obese (BMI ≥23 kg/m²); and 71% had moderate or severe anaemia. Of 33 mothers who were also pregnant, 41% had low mid-upper arm circumference (<23 cm). Diarrhoea, urinary tract infection and genital infection were common and use of family planning methods was low (23%). Findings informed the development of a maternal service package integrated within existing government services and according to nutrition/medical risk of mothers. Further research is needed to test the effect of the protocol on maternal nutrition outcomes and its operational feasibility at scale.

Background

In India 8% of children under five years old suffer from severe acute malnutrition (SAM) (NFHS 4, 2015-2016). Underlying causes of SAM in children are directly and indirectly related to maternal factors such as poor nutrition in utero, short birth spacing and household food insecurity. Currently 1,151 functional nutrition rehabilitation centres (NRCs) are set up by the Government of India (GoI) under the Ministry of Health and Family Welfare (MoHFW) to provide inpatient care for children under five years old with SAM with medical complications (~10% of burden of SAM) (MoHFW, 2011). A typical NRC has 10 to 20 beds where mothers/ caregivers stay with admitted children for the duration of treatment (7-14 days) and attend daily

group and individual counselling sessions to prepare them for discharge.

Limited information exists on the nutritional profile of mothers of children with SAM in India. Facility and community-based studies with small sample sizes show that mothers of children with SAM are often underweight (33%-50% of mothers had a body mass index (BMI) <18.5 kg/m² in a study by Bhandari et al, 2016), and anaemic (70%-88% in studies by Rai et al, 2015 and Nagabhushan et al, 2017); however, more research and national protocols are needed to support the effective screening and management of maternal malnutrition (including undernutrition, overweight and obesity) at facility and community levels.

Table 1 Nutritional status of mothers of children with severe acute malnutrition (N=427)

Nutritional Status	Mothers of children with SAM				p-value
	Pregnant mothers with child 0-59m N=33 n (%)	Mothers with child 0-<6m N=102 n (%)	Mothers with child 6 - 59m N=292 n (%)	Pooled N=427 n (%)	
Height <145 cm	7 (21.2)	20 (19.6)	78 (26.9)	105 (24.6)	0.287
Body Mass Index (kg/m²)					
		N=99	N=290	N=389	
<18.5	NA	10 (10.1)	81 (27.9)	91 (23.4)	0.001
<16	NA	4 (4.0)	16 (5.5)	20 (5.1)	0.001
≥ 30	NA	4 (4.0)	12 (4.1)	16 (4.1)	0.004
≥23	NA	36 (36.4)	70 (24.1)	106 (27.2)	0.021
≥25	NA	21 (21.2)	45 (15.5)	66 (17.0)	0.207
Mid Upper Arm Circumference (cm):					
	N=33	N=102	N=291	N=426	
≥23	18 (54.6)	72 (70.6)	161 (55.3)	251 (58.9)	0.003
<23	15 (45.4)	30 (29.4)	130 (44.7)	175 (41.1)	0.024
≥22-<23.0	6(18.2)	16 (15.7)	36 (12.4)	58(13.6)	0.347
≥19 -<22.0	9 (27.3)	11(10.8)	82(28.2)	102 (23.9)	0.002
<19	0	3(2.9)	12(4.1)	15(3.5)	0.448
≥26	7 (21.2)	29 (28.4)	73 (25.1)	109 (25.5)	0.325
≥30	0	6 (5.9)	18 (6.2)	24 (5.6)	0.342
Malnourished by either BMI (<18.5kg/m ²) or MUAC (<23 cm)	15 (45.4)	32 (31.7)	141 (48.2)	188 (44.0)	0.012
Combinations					
<145 cms & BMI < 18.5 kg/m ²	0.0	4 (3.9)	23 (7.8)	27 (6.3)	0.110
<145 cm & MUAC <23 cm	3 (9.0)	9 (8.8)	37 (12.6)	49 (11.4)	0.522
Anaemia					
	N=31	N=88	N=271	N=390	
Any Anaemia	18 (58.1)	88 (100.0)	271(100.0)	377 (96.7)	0.034
Mild	6 (19.4)	23 (26.1)	71 (26.2)	100 (25.6)	
Moderate	11 (35.5)	30 (34.1)	114 (42.1)	155(39.7)	
Severe	1 (3.2)	35 (39.8)	86 (31.7)	122 (31.3)	

NA: Not applicable

*Pregnant women: 10-10.9 g/dl (mild anaemia), 7.0-9.9 g/dl (moderate anaemia) and <7 g/dl (severe anaemia) and for non-pregnant women as 11-11.9 g/dl (mild anaemia), 8.0-10.9 g/dl (moderate anaemia) and <8 g/dl (severe anaemia)

The aim of this study was to bridge this knowledge gap by assessing the nutritional status of mothers of children with SAM admitted to four NRCs in Delhi and Aligarh, Uttar Pradesh, and, based on the results, develop a maternal service package of interventions for mothers to be integrated in routine NRC services.

Methods

The study was conducted in two phases: in phase one the nutritional status of mothers was profiled and in phase two a maternal service package was developed. The first phase was conducted between September 2016 and November 2017 in four NRCs. Three NRCs were located in Delhi (Kalawati Saran Children’s Hospital, Hindu Rao Hospital and Bhagwan Mahavir Hospital) and one in Aligarh (Jawaharlal Nehru Medical College and Hospital of Aligarh Muslim University). In each NRC, once the SAM child had been stabilised, all mothers were invited to enrol in the study and informed consent was obtained. No mothers declined to take part.

Socio-demographic profile was recorded on a pretested proforma. Maternal weight was measured using UNICEF SECA weighing scales (model 874) with at least 100 grams gradation. Height was recorded using UNICEF SECA mi-

crotoise (model 216) with 0.1 cm gradation and mid-upper arm circumference (MUAC) using MUAC tape (procured from UNICEF supply department) with a gradation of 0.1 cm. World Health Organization (WHO) classifications were used to classify short stature and thinness based on BMI and anaemia (WHO, 1995, WHO, 2003, 2011). South Asian classifications of overweight (≥23 kg/m²) and obesity (≥26 kg/m²) (WHO, 2003) were also used. MUAC <23 cm and MUAC <19 cm were used as alternative cut-offs to define malnutrition and SAM respectively (MoHFW, 2017). MUAC ≥30 cm was used to define overweight or obesity (Khadivzadeh, 2002). Venous blood sample was collected from consenting mothers for haemoglobin estimation using Erba Sysmex KX-21 auto-analyser. Descriptive statistics were generated using SPSS version 12.0.

Results are presented for all mothers, in three stratified categories: those who were pregnant and had a SAM child aged 0-59 months (n=33); non-pregnant mothers with a SAM child aged less than six months (n=102); and non-pregnant mothers with a SAM child aged 6-59 months (n=292). Chi-square test was used to compare the nutritional status of mothers between the three groups.

Phase two entailed the development of a maternal service package. A nodal pre-testing centre was identified (Kalawati Saran Children’s Hospital, paediatric ward NRC), a technical expert group formed and GoI/WHO nutrition guidelines reviewed. The findings of phase one were presented to technical experts and GoI officials and a protocol and counselling aids were developed and refined. The final protocol was implemented as part of routine service provision in the NRC by a nutrition counsellor post-graduate nutrition researcher on a sample of 100 mothers over a period of six months (December 2017 to May 2018). During this time changes were continuously made to the algorithm and counselling aids for further contextualisation. The maternal service package was then presented to the GoI.

Results

Phase 1: Profiling the nutritional status of mothers

General characteristics

A total of 427 mothers with a child admitted to an NRC participated in the study: 203 (47.5%) from Kalawati Saran Children’s Hospital, 144 (33.7%) Hindu Rao Hospital, 64 (15%) Jawaharlal Nehru Medical College and 16 (3.8%) Bhagwan Mahavir Hospital. Of the 427 mothers, 102 (24%) had an infant aged 0 to less than 6 months of age; 292 (68%) had a child aged 6 to 59 months; and 33 (8%) were pregnant (as well as having an admitted child of 0-59 months of age). The mean age of mothers was 18.9 years (range: 16-32 years). The majority of mothers were Hindus (65%), unemployed (89%) and had more than four family members (89%). Forty per cent of mothers had never attended school and 23% had studied until higher secondary school. Adoption of family planning methods was low (23%).

Anthropometry

Of the 427 mothers assessed, 25% were low in stature (stunted, height <145 cm) and 44% of mothers were malnourished either by BMI or MUAC. By BMI, 23% were underweight (BMI <18.5kg/m²), which is comparable to the national average of 22.9% (NFHS 4 2015-2016), and 5% were severely underweight (BMI <16 kg/m²). By MUAC, 41% were malnourished (MUAC <23cm) and 3.5% were severely malnourished (MUAC <19cm) (no national data to compare).

Overweight or obesity was documented in 27% (by Asian cut-off, BMI ≥ 23 kg/m²) and 17% (by WHO cut off of ≥25kg/m²), which is slightly lower than the national female average of 20.6% by WHO cut-off (NFHS 4 2015-2016)). Obesity was documented in 13% by Asian cut-off of BMI ≥ 26 kg/m² and 4% by WHO cut-off of ≥30kg/m². According to MUAC ≥30 cm obesity was observed in 6% of mothers.

Anaemia

Haemoglobin concentration was measured in 390 consenting mothers, of whom 377 (97%) were anaemic and 71% were moderately or se-



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verely anaemic. Morbidities such as diarrhoea (15%), urinary tract infection (UTI) and genital infection (20%), chronic cough (12%), Bitot's spot (4%) and fluorosis (1.3%) were common among mothers who were stunted, underweight or overweight/obese. Cases of diarrhoea were higher in mothers who were underweight compared to mothers who were overweight (5% vs 1%) (Table 1).

Phase 2: Development of a maternal service package

The GoI offers a service package to mothers through various antenatal and postnatal care

platforms, targeted at pregnant mothers and those with infants aged 0 to 6 months. These include: i) physical examination (height and weight); ii) laboratory investigation (haemoglobin estimation and oral glucose tolerance test); iii) iron and folic acid (IFA) and calcium supplementation; iv) deworming; and v) counselling (on healthy eating and diet diversity, family planning, micronutrient supplementation, personal hygiene, and food and recipe demonstration). Additionally, there are protocols in place for screening and management of adult severe thinness and severe anaemia which are used in tuberculosis wards and haematology departments.

The protocol developed for this study examined these guidelines in the context of routine services provided in an NRC setting with a view to expanding the appropriate support to all mothers with a SAM child admitted to an NRC. Building on what exists, a protocol was developed whereby mothers are screened using the criteria outlined in Table 2 and classified as: i) not at nutritional risk; ii) at some nutritional risk; or iii) at severe nutritional risk/medical risk. Nutrition interventions for each group were developed as follows:

1. Universal interventions for all mothers not at nutritional risk

i. Hospital diet

As per the Operational Guidelines on Facility Based Management of Children with SAM (MoHFW, 2011) and Janani Shishu Suraksha Karyakaram (JSSK) diet guidelines (MoHFW 2018), the mother or the caregiver staying with the child is provided with food by the NRC, funded by the State Program Implementation Plans (PIPs) approved by the MoHFW.

ii. Micronutrient supplementation and deworming

As per GoI guidelines, IFA and calcium supplements are provided to pregnant mothers from the second trimester onwards to six months post-partum if not already provided elsewhere (one IFA tablet daily (60 mg iron and 500 mcg folic acid) and two calcium tablets (500mg)). As per GoI guidelines, mothers in the second trimester of pregnancy are provided with a

Table 2 Maternal services package for Nutrition Rehabilitation Centres

Assess	Classify	Supplement/Treat/Refer
Ask: • Age • History of illness • Sudden weight loss Measure: • Weight • Height • Check/plot BMI (or MUAC if over 20 weeks pregnant) • Blood pressure Examine: Presence of any symptoms including fever, cough, blood in sputum, increased urinary frequency/ burning during urination, recurrent or prolonged illness, clinical sign of goitre or fluorosis or vitamin A deficiency (night blindness, Bitot's spot), oedema (Grade +,++), for post-partum women Test: • Haemogram • Fasting blood glucose	Not at nutritional risk <i>All of the following:</i> • Age ≥ 20 years • No signs of malnutrition (height ≥150 cm and BMI 18.5-22.9 kg/m2 if not pregnant/ or less than 20 weeks of pregnancy; if over 20 weeks pregnant use MUAC 23-25.9cm) • No anaemia (≥12g/dl non-pregnant and ≥11g/dl for pregnant) • No medical risk	1. Hospital diet as per national guidelines 2. Mother-focused group counselling on 5 thematic areas (30 minutes) 3. Micronutrient supplementation (IFA, calcium) and deworming as appropriate, as per national guidelines 4. If the mother is pregnant or lactating give catch-up diet (F100) 350ml once/day
	At some nutritional risk <i>Any of the following:</i> • Young (age 18-20 years) • Short (height 145-<150 cms) • Thin (BMI 16.0-<18.5 Kg/m2 if not pregnant or less than 20 weeks of pregnancy or MUAC 19-22.9 cm if over 20 weeks pregnant) • Overweight/ pre-obese (23-24.9 kg/m2) if not pregnant or less than 20 weeks pregnant or MUAC 26-30cm if over 20 weeks pregnant) • Mild/moderate anaemia (haemoglobin 7-10.9g/dl (pregnant)/ 8-11.9 g/dl (non-pregnant)) And no medical risk	1-4 (as above) PLUS 5. Bedside individual mother-focused need-based counselling for 15 minutes daily, based on the condition identified (in addition to 15 minutes child-focused bedside counselling) 6. Recipe book and demonstration if mother is underweight and counselling if overweight.
	At severe nutritional risk/medical risk <i>Any of the following:</i> • Mothers breastfeeding infants 0-6 months • Very young (age <18 years) • Very short (height <145 cms) • Severely thin (BMI <16.0kg/m2 if not pregnant or less than 20 weeks pregnant or MUAC <19cm if over 20 weeks pregnant) • Obese (BMI >25kg/m2 if not pregnant or less than 20 weeks pregnant or MUAC >30cm if over 20 weeks pregnant) • Severe anaemia (hemoglobin <8g/dl if not pregnant or <7g/dl if pregnant) • Presence of symptoms/ signs suggesting medical illnesses, including: - Fever with chills ≥3 days - Cough >2 weeks/blood in sputum - Urinary complaints - Recurrent or prolonged illness - Signs of goitre or Vitamin A deficiency or fluorosis - Raised blood pressure or raised fasting blood sugar	1-6 (as above) PLUS 7. Provide catch-up diet (F100) 350ml two times/day if severely thin or breastfeeding infant <6 months and once per day if pregnant (and not severely thin) 8. Therapeutic treatment according to government guidelines of severely anaemic 9. Link for confirmation of medical illness to appropriate ward/unit in hospital and subsequent medical care as per national guidelines 10. Counselling for obesity and recipe book for obese mothers

Table 3 Composition and nutrient content of the recipes developed for food demonstration using local ingredients

Recipe	Recipe	Serving Size	Nutrient composition
Cereal pulse premix	Whole wheat flour - 20g Bengal gram roasted - 50g Milk Powder - 20g Peanut - 40g Jaggery - 25g Sesame seeds - 20g	170g	Energy - 412 Kcal Protein - 17.1g Calcium - 244mg Iron - 5.7mg
Daliya Chikki	Daliya - 10g Peanuts - 60g Sesame seeds - 15g Jaggery - 70g Cooking oil - 3g	140g	Energy - 500 Kcal Protein - 14.2 g Calcium - 216 mg Iron - 5.6 mg
Paushtik Ladoo	Bajra - 10g Besan - 40g Green gram whole - 5g Peanut - 40g Jaggery - 40g Ghee - 24ml	7 ladoos (1 ladoo = 20g)	Energy - 500 Kcal Protein - 14.2 g Calcium - 94 mg Iron - 4.8 mg
Energy-dense biscuit	Whole wheat flour - 30g Bengal gram roasted - 55g Soya granules - 15g Milk Powder - 20g Jaggery - 20g Cooking oil - 20g Sesame seeds - 10g Baking powder - ¼ tsp Salt - a pinch	14 biscuits (1 biscuit - 15g)	Energy - 333 Kcal Protein - 13 g Calcium - 135 mg Iron - 4.1 mg



Mother receiving individual counselling session by the nutrition counsellor, 2018

single oral dose deworming tablet (400 mg of albendazole) if not already provided elsewhere.

iii. Group-based nutrition education and counselling

Child-focused group counselling is provided in most NRCs daily for one hour. In the proposed NRC protocol, daily group counselling is extended by 30 minutes to focus on the mother as well. Group counselling takes place five days per week, covering one of five thematic areas per day (micronutrients and anaemia; diet diversity; personal hygiene and sanitation; breastfeeding, family planning; and non-communicable and communicable diseases, including TB, HIV, malaria, obesity, hypertension and diabetes). During Phase 2, group counselling aids were developed to help staff deliver the counselling (pictorial flip book, game, food plate model, recipe book for underweight and obese and pocket cards for testing their knowledge).¹ Pretesting showed that the counselling aids are easy to carry around the wards and simple to use and understand, with emphasis on important points. They were also found to increase the interest and involvement of the mothers.

2. Additional interventions for mothers at some nutritional risk

In addition to the universal interventions, 15 minutes of individual, mother-focused, bedside counselling is provided for mothers deemed to be at some nutritional risk in addition to the routine 15 minutes of child-focused bedside counselling. Counselling is tailored to the mother's specific nutritional risk. In addition, those mothers identified as having mild or moderate anaemia are provided with a therapeutic dose of oral IFA, as per GoI guidelines.

A recipe book was developed for underweight mothers, which was explained through live demonstration sessions based on four local recipes (see Table 3). Pretesting showed that mothers took a keen interest in these sessions, which were successful in increasing their involvement and practical knowledge.

3. Additional interventions for mothers at severe nutritional risk/medical risk

In addition to universal interventions and those targeted to mothers at some nutritional risk, extra support is provided to mothers deemed to be at severe nutritional or medical risk (see Table 2 for criteria). Several options for an enhanced energy-dense supplement were developed but, after pre-testing with mothers, F-100² was found to be the most feasible as it is already provided to the SAM child after stabilisation (for 'catch-up' growth) and therefore no extra cooking and ingredients were required. F-100 (350ml) is provided once per day to pregnant mothers and twice per day (700ml) to mothers breastfeeding infants under six months of age and severely thin mothers to cover estimated additional energy requirements. Therapeutic treatment is provided to women with severe anaemia as per government guidelines. Many of these mothers also have other signs of underlying illness (such as TB) and are referred to respective wards for treatment.

Obese mothers were provided with counselling on physical exercise and given a recipe book tailored to obesity. Very young mothers were given additional counselling on family planning and very short mothers were counselled on diet and family planning.

Limitations of the study

The present opportunistic study on a reasonable sample size was restricted to anthropometric measurements and anaemia, which precluded use of robust biomarkers of nutritional profile as well as co-morbidities not routinely gathered in NRCs. Furthermore, mothers of children without SAM were not assessed to determine if the maternal anthropometric profile was simply a reflection of all mothers visiting these facilities. This study helped inform the development of a maternal package, using a common-sense approach based on available evidence and feasibility and practicality in the given context. It was not possible to test the effectiveness of the package on nutrition outcomes of mothers.

Discussion

Prevalence of malnutrition was high among mothers of children admitted with complicated SAM; one third of the mothers were malnourished, similar to that found in a multi-centre trial in India (Bhandari et al, 2016). The present study also found a double burden of malnutrition in around one quarter of households, where the child was acutely undernourished and the mother was overweight or obese. Eight per cent of mothers were pregnant and almost half were malnourished, highlighting the need for intervention involving counselling and dietary supplementation as per GoI norms and, looking ahead, to address family planning. This is an important preventive action as a mother being

¹ Counselling aids are available on request from the authors.
² The composition of F-100 is cow's milk/toned dairy milk (treated buffalo milk) 315 ml, sugar 26.2g and vegetable oil 7g, which has 350 Kcal, 10.1 g of protein and 14.7 g of lactose.

stunted, wasted or underweight preconception or during pregnancy predisposes the unborn child to undernutrition (Bhutta, 2013). The pregnant mother's stay in the NRC with their admitted child (and non-pregnant mothers) presents an important opportunity to improve the mother's own nutritional status and that of her future children.

The capacity required to roll out the maternal services package is minimal, given that the programme is operated through existing NRCs, which already have kitchen facilities and adequate human resources for cooking and nutrition counselling. The IFA, calcium supplementation and deworming can be procured from the hospital supply, already funded by the GoI. Ad-

ditional costs will be incurred in the provision of MUAC tapes and in the extension of the time input by existing nutrition counsellors for group and bedside counselling, which we estimate is possible within current capacity.

Conclusion

In conclusion, facility-based centres for treatment of SAM in children present an opportunity to capture the attention of mothers and target support to them for a duration of at least one to two weeks, to address the maternal double burden of malnutrition, anaemia and family planning practices. Co-morbidities are common among mothers who may be stunted and/or underweight or overweight. More research is needed in similar settings to corroborate this

evidence and urgent pilot testing is needed of the proposed service package in NRCs to determine operational feasibility and effectiveness on nutrition outcomes.

Read the maternal malnutrition guideline here: <https://www.enonline.net/resources/maternal-nutritionalcarenrc>

For more information, please email Vani Sethi at vssethi@unicef.org

Sethi, V., Kumar, P. and De Wagt, A. (2019) Development of a maternal service package for mothers of children with severe acute malnutrition admitted to nutrition rehabilitation centres in India. Field Exchange issue 59, January 2019. www.enonline.net/fex

Maternal services package for Nutrition Rehabilitation Centres

ASSESS	ASK	MEASURE	LOOK FOR (clinical examination)	TEST
	<p>Age/History of Illness</p>	<p>Weight Height Check/Plot BMI Mid Upper Arm Circumference</p>	<p>Neck circumference Blood pressure</p>	<ul style="list-style-type: none"> Fever Cough Blood in sputum Increased urinary frequency/burning during urination Recurrent or prolonged illness Neck swelling Any sign of fluorosis or vitamin A deficiency (night blindness, Bitot's spot) Oedema (Grade +,++) for postpartum women
	<p>Hemogram Fasting blood glucose</p>			
CLASSIFY	<p>NOT AT NUTRITIONAL RISK</p> <ul style="list-style-type: none"> 20 years or above Normal height Neither thin nor obese No Anemia/Vitamin A deficiency/Fluorosis No Medical risk 	<p>AT NUTRITIONAL RISK</p> <ul style="list-style-type: none"> Young Short Thin or Overweight Mild/Moderate Anemia/Signs of Vitamin A deficiency/Fluorosis No Medical risk 	<p>AT SEVERE NUTRITIONAL RISK/ MEDICAL RISK</p> <ul style="list-style-type: none"> Severe Thin or Obese Severe Anemia Signs of Vitamin A deficiency/Fluorosis Presence of symptom/sign suggesting medical illnesses 	
SUPPLEMENT/COUNSEL/TREAT	<p>1 Hospital diet as per national guidelines</p> <p>2 Group counseling on 5 thematic areas (30-45 minutes) for healthy maternal diet & lifestyle; and recipe demonstration¹</p> <p>3 Micronutrient supplementation (IFA, Calcium) and deworming as appropriate, as per national guidelines</p>	<p>1 2 3 PLUS</p> <p>4 Bed side individual need-based counseling for the condition identified²</p>	<p>1 2 3 4 PLUS</p> <p>5 Provide Catch-up diet (F100) 350ml two times/day³</p> <p>6 Link for confirmation of medical illness and subsequent medical care as per national guidelines</p>	
<p><small>Age: <math>\geq 20</math> years and Height: <math>\geq 145</math>cm and BMI: <math>\geq 18.5</math> kg/m^{2<sup>2</sup> if not pregnant/for less than 20 weeks of pregnancy and No Anemia: <math>\geq 12</math>g/dl non-pregnant and <math>\geq 10</math>g/dl for pregnant and No medical risk Note: If BMI is not available, then use MUAC <math>\geq 23.5</math> cm and Neck Circumference <math>\geq 34</math>cm.}</small></p> <p><small>Young (Age): <math>< 20</math> years or Short (Height): <math>< 145</math>cm or Thin (BMI): <math>< 18.5</math> kg/m^{2<sup>2</sup> if not pregnant/for less than 20 weeks of pregnancy or Overweight (BMI): <math>\geq 25.25</math> kg/m^{2<sup>2</sup> if not pregnant/for less than 20 weeks of pregnancy or Mild/Moderate Anemia (Hemoglobin): <math>7-10</math>g/dl (PW) & 11g (NFW) No medical risk Note: If BMI is not available, then use MUAC <math>< 23.5</math> cm, not cut for moderate acute malnutrition and neck circumference <math>< 34</math> cm for overweight. If both BMI & Neck circumference are not available, then MUAC <math>< 23.5</math> cm is considered.}}</small></p> <p><small>Severe Thin (BMI): <math>< 16.0</math> kg/m^{2<sup>2</sup> if not pregnant/for less than 20 weeks of pregnancy or Obese (BMI): <math>\geq 25</math> kg/m^{2<sup>2</sup> if not pregnant/for less than 20 weeks of pregnancy or Severe Anemia (Hemoglobin): <math>< 8</math>g/dl (non-pregnant) and <math>< 7</math> g/dl for pregnant or Presence of symptom/sign suggesting medical illnesses Fever with chills <math>\geq 3</math> days Cough > 7 weeks/blood in sputum Any complaint Recurrent or prolonged illness Neck swelling Signs of Vitamin A deficiency or Fluorosis or Kasled blood pressure or Raised fasting blood sugar Note: If BMI is not available, then use MUAC <math>< 19</math>cm cut for severe acute malnutrition and MUAC <math>> 30</math>cm as per risk assessment & 26 cut for obese.}}</small></p> <p><small>¹Corrected weight management of Vitamin A deficiency ²See Clinical Management Guidelines, Emergency Nutrition Case Management and Guidelines for Severe Acute Malnutrition, Personal Hygiene, Infection Control, and Case Management of Severe Acute Malnutrition in Children ³Using 100g sachets, 3 sachets per day</small></p>				

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The current state of evidence and thinking on wasting prevention

Summary of research¹

Background

ENN produced a report, through the MQSUN+ programme, that synthesises existing evidence and stakeholder opinion on what works to prevent wasting. This report is one output of a multi-phase scope of work, commissioned and funded by the UK Department for International Development (DFID) on “adopting a strategic, evidence-based approach to wasting prevention” and follows a briefing paper produced by ENN titled “The aetiology of wasting”². The current report set out to answer the following questions: What do we know about wasting prevention? What is the emerging evidence? What are the evidence gaps and key questions which cannot currently be answered? What new evidence will be available in coming years?

Methodology

A detailed review of the evidence from both published and grey literature and from semi-structured interviews with stakeholders was conducted between December 2017 and February 2018. The prevention of wasting was considered across the main intervention contexts (humanitarian and development, those with low and high levels of wasting/low and high levels of stunting), along a ‘continuum’ of severity (moderate and severe wasting and prevention of relapse). The review looked at the evidence for so-called nutrition-specific and nutrition-sensitive actions.

In total 235 studies and articles from the literature search were included in the review, of which 55 were randomised control trials, 23 were protocols/ongoing studies and 17 were systematic reviews. Fifty-seven grey literature documents were reviewed and 46 experts/key stakeholders were interviewed.

Results

Historically there has been more of a focus on research into the prevention of stunting, while the prevention of wasting has been a more neglected research area. This is largely because the focus on wasting has been on treatment. Encouragingly, the review found that the volume of studies relating to wasting prevention has increased in recent years. However, the evidence base for the prevention of wasting is both mixed and largely inconclusive.

¹ ENN (2018) *The current state of evidence and thinking on wasting prevention: MQSUN+ report*. www.ennonline.net/resources/wastingpreventionreport2018

² ENN (2018) *The aetiology of wasting: MQSUN+ report*. www.ennonline.net/resources/aetiologyofwasting

The interventions with the largest body of evidence include the use of supplementary food products, cash-based interventions, behaviour change to improve infant and young child feeding, and where interventions are combined. There is a lack of research on whether interventions targeted towards women and girls pre-conception and during pregnancy prevent wasting (see box 1 below).

The stakeholders consulted felt confident in stating that acute periods of food insecurity and/or episodes of disease outbreak contribute to wasting, and that well designed early interventions will have a preventive effect in such

contexts. Despite an inconsistent evidence base, a holistic approach based on the UNICEF Conceptual Framework and context-specific causal analysis was advocated, through a range of interventions to tackle both the immediate and underlying drivers of undernutrition. It was felt that this should be complemented by an improved understanding of the epidemiology and aetiology of wasting to better identify and target children at highest risk.

Stakeholder opinion also suggested that much less is known about the prevention of wasting in non-humanitarian contexts or in areas with persistently high levels of wasting. Key gaps in the understanding of the aetiology of wasting were highlighted, including: kwashiorkor/ nutritional oedema; the relationship/overlap between stunting and wasting; differences relating to age and geography; the role of interventions pre-conception; the relationship between maternal nutrition and health status and child nutrition status; the extent to which wasting in infants under six months of age reflects non-nutritional factors (such as low birth weight); and mechanisms behind relapse after successful treatment for wasting. Other gaps included the role of infection and gut microbiota and the longer-term health and development impacts of childhood wasting.

Box 1 Summary of state of evidence by intervention area

Breastfeeding

There is very little evidence of the impact of interventions to promote exclusive and continued breastfeeding on the prevention of wasting. Results are modest or difficult to attribute to an increase in breastfeeding alone.

Complementary feeding

Little evidence of the impact of complementary feeding interventions on preventing wasting was found. Some systematic reviews highlight the benefits, but studies including clear wasting outcomes are lacking.

Micronutrient supplementation

Only small impacts on wasting prevention were observed when using zinc supplements, despite some high-quality systematic reviews and clinical trials in this intervention area.

Nutrition counselling and nutrition education

A number of randomised clinical trials (RCTs) in this intervention area showed positive effects on the prevention of wasting, although many still fail to demonstrate a clear impact.

Deworming

Treating children known to have worm infection may have some nutritional benefits for the individual. However, despite some good quality studies, direct effects on preventing wasting have not been proved.

Maternal education, women's empowerment and gender

Results predominantly from association studies and programme evaluations suggest that women's empowerment interventions and education could have a positive impact on infant feeding and wasting.

Health

Few clear studies consider the relationship

between health interventions and prevention of wasting. Only a few well designed studies found a limited impact on wasting reduction.

Water, sanitation and hygiene (WASH)

There is currently very little evidence as to the direct effect of WASH interventions in the prevention of wasting, with the exception of some studies on sanitation.

Agriculture and other livelihoods

Only limited impacts have been observed, suggesting that more needs to be done to link increased agricultural production with improving child nutritional status. Robust evidence relating to the impact of livelihoods interventions on wasting prevention is also lacking.

General food distribution (GFD)

Although a number of studies have shown an impact of GFD on wasting, it is difficult to attribute this to the intervention alone.

Cash transfers (CTs)

There is a growing body of well designed trials that are demonstrating a strong positive preventive effect of CTs on wasting.

Food supplementation

The highest number of studies was identified in this intervention area and evidence is growing quickly: well designed RCTs and systematic reviews have demonstrated the effect of food supplementation in preventing wasting, but questions around their cost-effectiveness and sustainability remain.

Combinations of interventions

The review found that a combination of interventions may be more effective at preventive wasting than separately implemented interventions, particularly when targeted to the same population.

Many stakeholders observed that there is an absence of a single organisation with an overall leadership role for wasting prevention. The divisions and silos which characterise wasting were also highlighted as a concern.

The review identified numerous ongoing studies in the area of wasting prevention and some which are pending funding. Further evidence is anticipated in the coming years relating both to aetiology/epidemiology of wasting and effectiveness of various nutrition-specific and nutrition-sensitive interventions. Stakeholders stressed the importance of longer-term funding to facilitate research which encompasses the full 1,000 days window and a need for more longitudinal studies, including consideration of where existing data can be used (e.g. retrospective cohort studies). The need to improve the evidence base on drivers and effective approaches to wasting prevention through well designed programme monitoring and evaluation activities was also highlighted and several stakeholders supported the idea of a research prioritisation exercise.

ENN's continued work in this area

ENN is continuing its focus on wasting prevention through the MQSUN+ mechanism by working with a team of experts to carry out a research prioritisation exercise on wasting prevention. This work will conclude in July 2019. Information on how you can participate in the exercise is available here: www.ennonline.net/chnriwastingprevention

ENN also continues to generate research publications and short briefs about the links between wasting and stunting (WaSt). Information about the WaSt project can be found here: www.ennonline.net/ourwork/reviews/wastingstunting

Can low-literate community health workers treat severe acute malnutrition? A study of simplified algorithm and tools in South Sudan

Summary of research¹

By Naoko Kozuki, Casie Tesfai, Annie Zhou and Elburg van Boetzelaer.

The authors would like to acknowledge financial support from the Eleanor Crook Foundation.



Community-based distributor measuring child's MUAC

Introduction

Low access to and coverage of acute malnutrition treatment are persistent challenges due primarily to distance from health services, high opportunity costs to caregivers, insecurity and lack of awareness of the signs and symptoms of malnutrition (Bliss, Njenga, Stoltzfus & Pelletier, 2016; Puett & Guerrero, 2015; Rogers, Myatt, Woodhead, Guerrero & Alvarez, 2015). Community-based delivery has been shown to increase the timely and effective treatment of childhood illnesses in low-resource contexts, such as through the integrated community case management (iCCM) of childhood illness strategy. ICCM equips community health workers (CHW) with training, simplified diagnostics, supervision and an uninterrupted supply of drugs to provide timely treatment for uncomplicated pneumonia, diarrhoea and malaria in the community. Community-based delivery models have also been tested to treat uncomplicated severe acute malnutrition (SAM). Recent studies from Pakistan, Malawi and Mali have shown positive outcomes in SAM treatment delivered by CHWs when compared to standard care at health facilities (Linneman et al, 2007; Puett, Coates, Alderman & Sadler, 2013). However, existing evidence is for literate CHW cadres only.

Recognising the burden of malnutrition to be higher in areas with lower education, income

and healthcare access, the International Rescue Committee (IRC) developed tools and a protocol adapted for low-literate CHWs to treat uncomplicated SAM cases in their communities. A detailed description of the design process is available in Field Exchange Issue 52 (Tesfai, Marron, Kim & Makura, 2016). The five resulting tools were: 1) a patient register, 2) modified mid-upper arm circumference (MUAC) tape, 3) weight scale decal to identify the daily dosage of ready-to-use therapeutic food (RUTF), 4) weekly RUTF dosage calculator, and 5) pictorial counselling cards (Figure 1). Following this, the IRC conducted a feasibility study to assess the ability of low-literate community-based distributors (CBD, the CHW cadre in South Sudan) to adhere to the treatment protocol using these tools. The treatment protocol followed South Sudan national guidelines for treatment of uncomplicated SAM, but MUAC was the only anthropometric tool used for admission, monitoring and discharge, and children were treated until fully recovered. Children were provided RUTF based on weight according to South Sudan national guidelines, but with half sachets rounded up. Treatment outcomes of children included in this study will be available in a future publication.

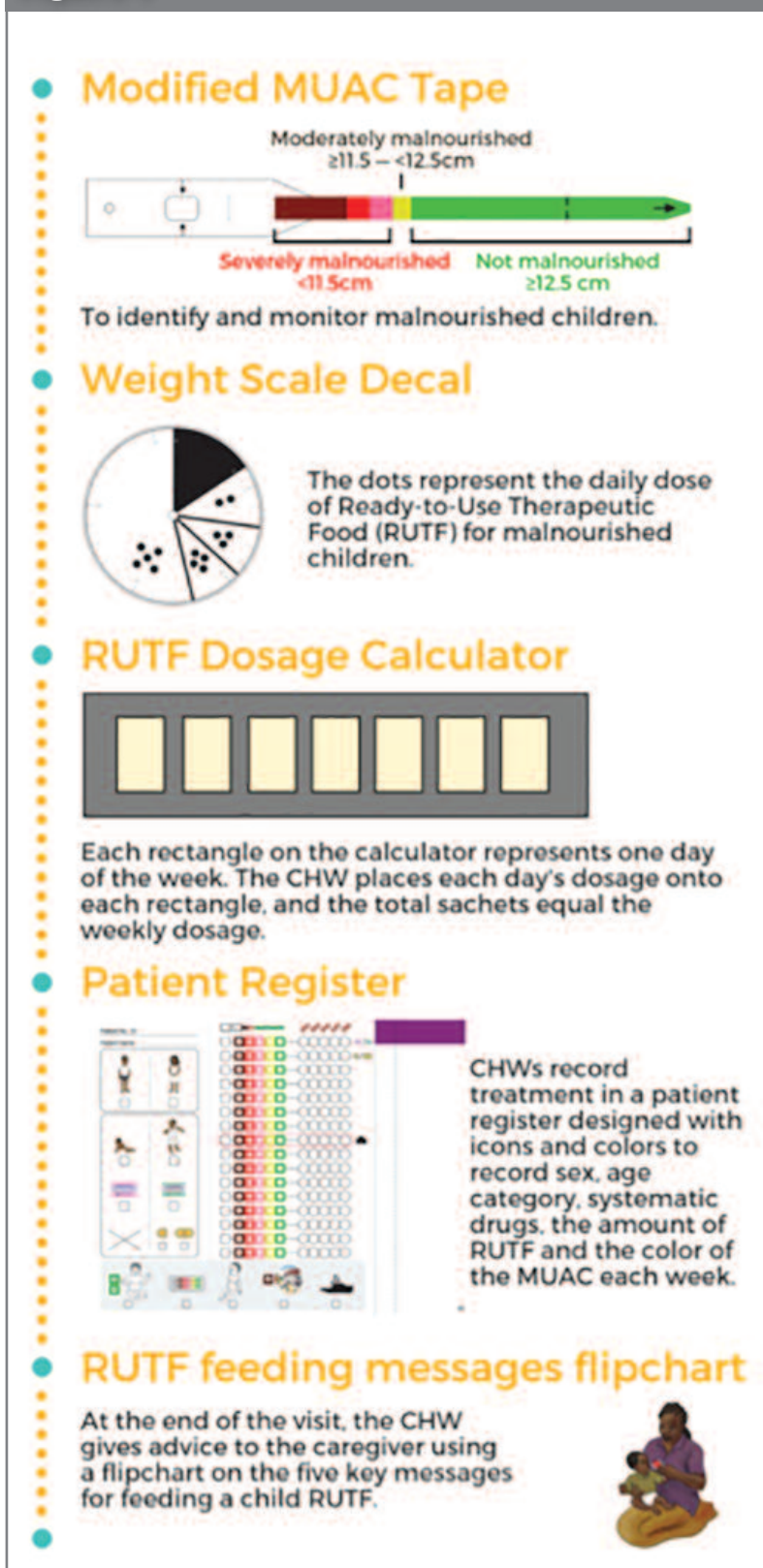
Methods

A mixed-methods feasibility study was conducted to assess adherence of low-literate CBDs to a

simplified SAM treatment protocol, the outcomes of children treated in the community by these CBDs, and the community acceptability of CBDs providing SAM treatment. Sixty CBDs in Aweil South County, Northern Bahr el Ghazal, South Sudan were randomly selected to receive training on the simplified protocol and tools, 57 of whom completed the training. Those who met a pre-determined performance standard on a post-training assessment (n=44) were deployed to treat uncomplicated SAM in their communities. The checklist used to assess the performance is available in Annex 3 of the full report. Between May and September 2017, 320 SAM children were passively identified and enrolled, asked to return for weekly treatment, and followed until they reached a discharge outcome, with children treated to full recovery (two consecutive weeks with MUAC \geq 12.5cm); 308 children had eligible results. CBD performance assessments were conducted during bi-weekly supervisory visits by research staff.

¹ Link to full report here (treatment protocol available on pages 78-80): www.rescue.org/sites/default/files/document/3103/enablingtreatmentofsamincommunityfinalcompressed.pdf. and Van Boetzelaer E, Zhou A, Tesfai C, Kozuki N. Performance of low-literate community health workers treating severe acute malnutrition in South Sudan. *Matern Child Nutr.* Pending publication in early 2019. <https://onlinelibrary.wiley.com/journal/17408709>.

Figure 1 Simplified tools developed by IRC



Results

In a performance assessment immediately after training, 91% of the CBDs passed the predetermined 80% performance score cut-off and 49% of the CBDs had perfect scores. Research officers conducted 141 case management observations during the study period, resulting in a mean score of 89.9% (95% CI: 86.4-96.0%). For each performance assessment completed, the final performance score of the CBD rose by 2.0% (95% CI: 0.3-3.7%). Treatment delivered by CBDs met SPHERE performance indicators, even when looking at treatment outcomes to full recovery. In total 75% of children were discharged as fully recovered, 15% defaulted from treatment, 9% were discharged as non-respondent, and no child was reported to have died under treatment. The median time of treatment to full recovery was eight weeks. All CBDs reported feeling proud of treating children for SAM and some gained respect in the community for this new responsibility. Overall, caregivers trusted CBDs to treat their children, but some caregivers and community leaders also expressed reservations that CBDs were keeping the RUTF for themselves or providing treatment to select children only.

Discussion

The high adherence by CBDs to a simplified treatment protocol in this study and overall local acceptability of this service show promise for deploying CBDs to improve access of acute malnutrition treatment, regardless of their literacy levels, in remote communities. The upfront investment to design tools and protocol suited to the skill set of CHWs in difficult contexts is invaluable in setting frontline health workers up for success and assuring programme effectiveness. In the hard-to-reach areas of fragile contexts with limited healthcare access, there is particular potential for the integration of nutrition treatment into the community-based service delivery model of iCCM to better stem the infection-malnutrition cycle and more effectively reduce the incidence of both.

A challenge experienced in developing a low-literacy protocol was how to monitor whether cases are stationary, regressing or progressing slowly in treatment. To address this, smaller MUAC colour zones were created and a safeguard for referral after four consecutive weeks in one colour zone was put in place. Based on the larger-than-normal proportion of referrals from this study (37%), further exploration is needed to adjust this safeguard.

Conclusion

Proper adaptations of tools and protocols can empower community health worker cadres with no formal education to provide critical lifesaving health services successfully. These results, combined with high recovery rates of the enrolled children, show great potential to increase effective coverage of acute malnutrition treatment in fragile contexts. The IRC is currently leading a consortium of four other non-governmental organisations (Action Against Hunger, Concern Worldwide, Malaria Consortium and Save the Children) to pilot versions of these tools adapted for other contexts to create a greater body of evidence behind CHW-delivery of acute malnutrition treatment.

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Is there a systematic bias in estimates of programme coverage returned by SQUEAC coverage assessments?

By Mark Myatt and Ernest Guevarra



Mark Myatt is a consultant epidemiologist. His areas of expertise include infectious disease, nutrition and survey design. He worked with FANTA, Valid International, the US Centers for Disease Control and Prevention, Tufts University, Action Against Hunger UK, Concern Worldwide and the Coverage

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Ernest Guevarra leads Valid International's coverage assessment and surveys team. He has formal training as a physician and a public health practitioner. Most recently he has worked in Sierra Leone, Niger, Sudan, Ethiopia and Ghana. He is the lead developer of

SQUEAC, SLEAC and S3M coverage assessment methods at Valid International.

Location: *Global*

What we know: Used since 2012, the Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) coverage assessment method employs both qualitative and quantitative methods to identify key barriers to access and estimate coverage of therapeutic feeding programmes (TFP) and, to a lesser extent, supplementary feeding programmes (SFP).

What this article adds: A recent article by Isanaka et al (2018) on SQUEAC implementation in Niger suggests that the analysis required is technically demanding and in part relies on subjective estimates of programme coverage. With typical operational capacities this will cause SQUEAC assessments to systematically overestimate coverage. This article investigates the risk of systematic bias by analysing a database of 304 SQUEAC coverage assessment reports and data from 29 countries (2009-2017). There is a tendency for the 'prior' (an informed guess about programme coverage) to overestimate coverage when the true coverage is low and underestimate coverage when the true coverage is high. There is an equal risk of the prior overestimating and underestimating coverage (i.e. no systematic bias). Problems were detected in 7.3% of the SQUEAC assessments reviewed but this led to coverage estimates with poor precision in only 2.55% of assessments. The use of untrained staff and failure to use SQUEAC processes, methods and tools correctly is likely to increase this risk. The authors conclude there is no evidence of general and systematic overestimation of coverage using SQUEAC and that the risk of the method yielding estimates with poor precision is low. A key lesson from the Isanaka et al (2018) SQUEAC experience is the importance of using both properly trained staff and using SQUEAC processes, methods and tools correctly.

Background

A recent article by Isanaka et al (2018) (summarised in Box 1) identifies a potentially serious problem with coverage estimates made using the semi-quantitative evaluation of access and coverage (SQUEAC) method. Coverage estimates made by SQUEAC rely on condensing data collected from a variety of sources using a range of methods to make an informed guess about the level of coverage a programme is achieving. This informed guess is known as the *prior*. The prior is used to inform the design of a small-sample coverage survey. The prior is also combined with coverage survey data, known as the *likelihood*, to provide an estimate of the coverage that a programme is achieving using a widely accepted statistical technique known as *conjugate*

analysis. A problem with this approach is that a very poorly specified prior can result in a biased estimate of coverage. A prior that is much higher than the true coverage can lead to an upwardly biased estimate of coverage. A prior that is much lower than the true coverage can lead to a downwardly biased estimate of coverage. These situations are known as prior-likelihood conflicts. If a prior-likelihood conflict is detected, the results of the conjugate analysis are discarded and a coverage estimate is made using the survey data alone. This estimate will not be biased but may lack precision (i.e. have a wide 95% credible interval), due to the small sample size used in the coverage survey. The article by Isanaka et al (2018) identifies prior-likelihood conflicts as a weakness of the SQUEAC coverage assessment

method which leads the method to systematically overestimate programme coverage.

The issue of prior-likelihood conflicts is not new. It is covered at some length in the SQUEAC technical reference (Myatt et al, 2012). A formal test for prior-likelihood conflicts has been provided by the **BayesSQUEAC** calculator since 2013 (Myatt, 2013). The specific case of untrained staff producing an unrealistically optimistic and overly strong prior, as reported in the article by Isanaka et al (2018), is presented as a case study in the SQUEAC technical reference. The article by Isanaka et al (2018) confirms the existence of a problem that is frankly admitted, discussed and cautioned against in SQUEAC documentation and training. This should not, however, prevent us from taking this criticism of the SQUEAC method very seriously. It is possible that there is a serious problem with the SQUEAC method which is leading to a general and systematic failure to identify programmes failing to meet coverage standards and leaving many vulnerable children untreated. This issue is investigated in this article.

Method

A database was created from SQUEAC coverage assessment reports and SQUEAC coverage assessment data provided by the Coverage Monitoring Network and VALID International. Reports and data for $n = 304$ SQUEAC coverage assessments from 29 countries undertaken between 2009 and 2017 were available. Only data from SQUEAC coverage assessments which completed a SQUEAC stage III coverage estimation survey ($n = 274$) are included in the analysis reported here.

For each SQUEAC coverage assessment, the mode of the prior was calculated as:

$$\text{prior mode} = \frac{\alpha_{\text{prior}} - 1}{\alpha_{\text{prior}} + \beta_{\text{prior}} - 2}$$

The numerator ($N_{Likelihood}$) and denominator ($D_{Likelihood}$) for the likelihood mode were calculated for the principal coverage estimator (i.e. point, period, or single coverage) reported in the SQUEAC coverage assessment report:

$$likelihood\ mode = \frac{N_{Likelihood}}{D_{Likelihood}}$$

This was the estimator for which the original prior was developed. Testing a prior intended for estimating point coverage for conflict with a likelihood estimate for single coverage would, for example, not be sensible or fair test and almost always result in a prior-likelihood conflict. The analysis followed, therefore, the intentions of the coverage assessment teams.

The relationship between the prior modes and the likelihood modes was explored by calculating, plotting and summarising the difference:

$$prior\ mode - likelihood\ mode$$

and by plotting the prior modes against the likelihood modes.

The strength of the linear association between the prior modes and the likelihood modes was assessed using the Pearson correlation coefficient. Ordinary least squares linear regression was used to determine the slope of the line that best described the relationship between the prior modes and the likelihood modes.

For each SQUEAC coverage assessment, prior-likelihood conflicts were detected using a testing approach. Two-by-two tables were constructed with cells:

$\ \alpha_{prior-1}\ $	$\ \beta_{prior-1}\ $
$N_{Likelihood}$	$D_{Likelihood} \cdot N_{Likelihood}$

and Fisher's exact test of independence calculated for each of the constructed tables. Fisher's exact test was used to avoid issues with small sample sizes and very unequal distribution of data within tables giving rise to small expected numbers, which would be problematic if approximate methods such as the normal (z) test and the chi-squared test were used. A two-sided p -value of $p < 0.05$ was taken as evidence of a prior-likelihood conflict.

The half-width of 95% confidence intervals (E) for the likelihood modes (p) were calculated using the normal approximation and applying a finite population correction (i.e. because severe acute malnutrition is a rare condition) for each SQUEAC coverage assessment for which a prior-likelihood conflict was detected:

$$E = 1.96 \times \sqrt{\left(\frac{p(1-p)}{n}\right)} \times \sqrt{\left(\frac{Population\ Size - D_{Likelihood}}{Population\ Size - 1}\right)}$$

The population size used to calculate the finite population correction (i.e. 600) was calculated assuming an overall population of 100,000

persons with 20% aged between 6 and 59 months and a 3% prevalence of severe acute malnutrition (SAM). These are conservative assumptions. It was not necessary to use the prevalence of moderate acute malnutrition (MAM) to calculate the finite population correction as no prior-likelihood conflicts were found in assessments of supplementary feeding programmes (SFP).

The relative precision achieved using the likelihood data alone was calculated as:

$$relative\ precision = \frac{E}{p}$$

A coverage estimate of 50% (p) with a 95% confidence interval of $\pm 10%$ (E) has relative precision:

$$relative\ precision = \frac{E}{p} = \frac{10\%}{50\%} = 20\%$$

The resulting relative precision was compared to the relative precision that would have been achieved by a standard Expanded Program of Immunisation (EPI) '30 x 7' coverage survey with the same point estimate of the coverage proportion (p), a sample size of $n = 210$ and a survey design effect of 2.0. This relative precision was used as the 'gold standard' for the precision of methods assessing the coverage of child survival programmes. A SQUEAC assessment

was classified as 'failing' if a prior-likelihood conflict was detected and the relative precision of the coverage estimate made using the likelihood data alone was worse than this gold standard.

Results

Table 1 presents a description of the study database. Figure 1 shows the distribution of the differences between the prior modes and likelihood modes. The median difference was -0.97% (IQR = -8.31% ; $+8.39\%$). The differences were normally distributed (Shapiro-Wilk Normality Test $p = 0.6287$) about a central value close to zero (mean = -0.67% , 95% CI = -2.25% ; $+0.90\%$).

Figure 2 shows the scatterplot of prior modes against likelihood modes. Prior modes and likelihood modes were positively associated with each other. Pearson's correlation coefficient was $r = 0.73$ (95% CI = 0.67 ; 0.78). This is very strong evidence ($p < 0.0001$) against the null hypothesis that prior modes and likelihood modes are not associated with each other. The slope of the regression line was $\beta = 0.55$ (95% CI = 0.49 ; 0.61).

Prior-likelihood conflicts were detected in 20 (7.30%) of the 274 SQUEAC assessments. In 10 SQUEAC assessments with prior-likelihood conflicts the prior mode was below the likelihood mode. In 10 SQUEAC assessments with prior-likelihood conflicts the prior mode was above the likelihood mode (see Figure 2). The relative precision of coverage estimates based on likeli-

Box 1 Summary of the article by Isanaka et al. (2018)

The article by Isanaka et al. (2018) published in Population Health Metrics recognises that assessing the coverage of nutrition programs is challenging due to the low prevalence of disease and selective entry criteria. It also recognises that SQUEAC is a "step forward in coverage assessment of therapeutic feeding programs" and can "simultaneously identify barriers to accessing care and estimate program coverage". It notes, however, that "the validity of certain methodological elements has been the subject of debate". The methodological elements in question revolve about the use of a Bayesian conjugate analysis to improve the precision of coverage estimates made using small sample sizes. The concern is not that Bayesian approaches are generally invalid but that the approach is beyond the technical capacity of staff employed by NGOs, UNOs, and ministries of health and that its use in the wrong hands will lead to (worst case) systematic overestimation of coverage and (best case) coverage estimates with very poor precision.

Isanaka et al. (2018) investigate this issue by comparing the results of a SQUEAC coverage assessment performed by untrained persons against a two-stage cluster sample survey with a spatially stratified first stage selecting communities and active and adaptive case-finding in the second stage. The comparison method employed is very similar to the method used by SQUEAC stage III likelihood surveys. The

only difference being that a larger sample size is used. This means that any substantial differences found between the SQUEAC results and the survey results will be due to the untrained staff doing a poor job of specifying the prior used in the Bayesian conjugate analysis.

The article reports that priors produced by untrained staff and by untrained community members led to upwardly biased coverage estimates. Point estimates of coverage made from the likelihood survey data alone were similar to those made from the larger two-stage cluster survey. This means that the problem is with the Bayesian prior produced by untrained staff and untrained community members being too optimistic and too strong (i.e. overly certain). The reported biases were, however, consistently detected using standard SQUEAC diagnostic methods and SQUEAC software (i.e. plots and tests in BayesSQUEAC) for detecting prior-likelihood conflicts. Coverage estimates made using a prior produced by trained staff was in agreement with that made by the two-stage cluster sample.

The authors conclude that SQUEAC is technically demanding and should only be used when the appropriate technical capacity is available. They also question the validity of the methods used by SQUEAC to produce priors when they are used in capacity limited settings.

Table 1 The study database

Item	Description	n
Number of records	Total number of records in the study database	304
Excluded	No stage III : Not required:	17
	No stage III : Suspected patchy coverage	5
	No stage III : Poor security / access	6
	No stage III : Very low SAM prevalence	2
Included	Number of records included in the analysis	274
Coverage type*	Point coverage	199
	Period coverage	70
	Single coverage	5
Assessed programme**	OTP	255
	SFP	19

* Point coverage measures case-finding and recruitment; Period coverage measures case-finding, recruitment and retention but overestimates coverage; Single coverage adjusts period coverage removing bias by including an estimate of the number of recovering cases in the community in the denominator.

** OTP = Outpatient Therapeutic Program treating cases of severe acute malnutrition; SFP = Supplementary Feeding Program treating cases of moderate acute malnutrition.

hood data alone was worse than that which would have been achieved by the EPI-derived gold-standard in seven of the 20 SQUEAC assessments with prior-likelihood conflicts. This means that seven (2.55%) of the 274 SQUEAC assessments were classified as failing due to prior-likelihood conflicts and an inadequate sample size for the likelihood data to estimate coverage with useful precision.

Discussion

The magnitude of Pearson’s correlation coefficient ($r = 0.73$, 95% CI = 0.67; 0.78) might be typified as indicating only a moderately strong association. It is, however, unrealistic to expect a stronger association between informed guesses

(i.e. prior modes) and estimates (i.e. likelihood modes) made using small sample likelihood data. The nature of the prior mode (i.e. an informed guess) and the likelihood mode (i.e. an estimate made using a small sample size subject to considerable sampling variation) makes finding a stronger association between them extremely unlikely.

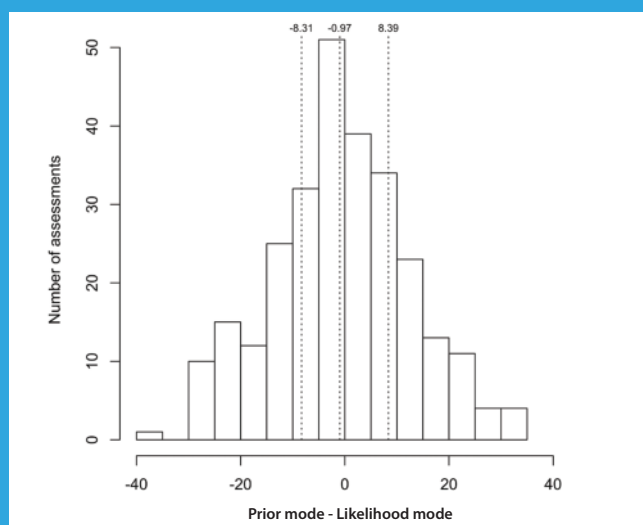
The distribution of differences between the prior mode was symmetrical about a central value. This is not consistent with a systematic bias (in either direction) in prior modes. There is a tendency for the prior to overestimate coverage when true coverage is low and to underestimate coverage when true coverage is high.

Prior-likelihood conflicts followed this pattern. Prior-likelihood conflicts were detected in 7.30% of the 274 SQUEAC assessments but led to coverage estimates with poor precision in only 2.55% of the 274 SQUEAC assessments. Prior-likelihood conflicts in which the prior mode was below the likelihood mode were equally as common as prior-likelihood conflicts in which the prior mode was above the likelihood mode. These findings indicate that there is no general and systematic failure in SQUEAC.

There is an important lesson to be learned from the Isanaka et al (2018) article. The SQUEAC assessment reported in the article was not done well. This is noted in the discussion section of the article. There is no evidence of the use of standard SQUEAC tools and practices such as triangulation by source and method, sampling to redundancy, iteration, the barriers-boosters-questions (BBQ) tool, small studies and surveys, mind-maps, and concept maps. The resolution of conflicting findings by further data collection (iteration) is a key SQUEAC process that was not used. The article states that iteration was not done even when it was indicated. Finding a wide range of candidates for the prior mode, as is reported in the article, should have forced a rethink and further data collection (iteration). The sources for the problematic prior modes were unorthodox. SQUEAC does use caregivers and community members to identify and rank barriers to coverage, but these informants are never tasked with responsibility for building the prior. A weak or non-informative prior should always be used with such a wide range of candidates for the prior mode when time and resources for iteration are not available.

A key but understated finding reported by Isanaka et al (2018) was that the prior developed by trained staff was unproblematic. The lesson

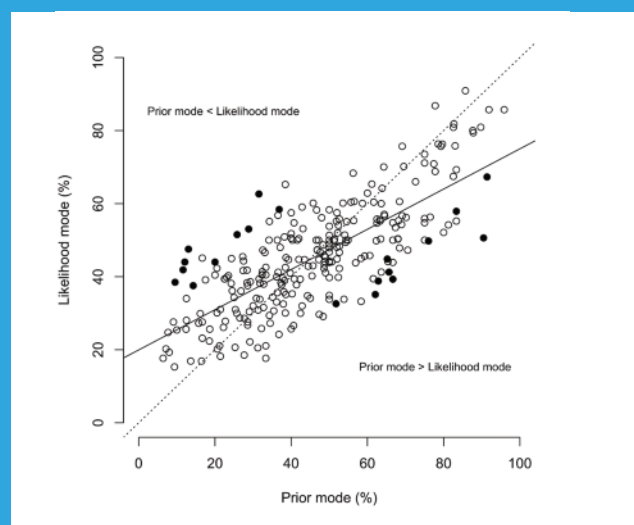
Figure 1 Distribution of the differences between the prior modes and likelihood modes in 274 SQUEAC stage III coverage assessments



Prior and likelihood modes are expressed as percentages.

The dashed vertical lines mark the position of the lower quartile, median, and upper quartile of the differences. Half of all SQUEAC coverage assessments fall between these two lines.

Figure 2 Scatterplot of prior modes against likelihood modes in 274 SQUEAC stage III coverage assessments



The solid line is the ordinary least squares regression line.

The dashed line is the line of equality (i.e. The line on which prior mode = likelihood mode).

Filled circles mark assessments with prior-likelihood conflicts.

to be learned is that you risk bias when you do SQUEAC with untrained staff, use inappropriate sources and do not use key SQUEAC processes, methods and tools.

Conclusion

Prior-likelihood conflicts can and do occur but seldom result in coverage estimates that lack useful precision. They do not lead to a general and systematic overestimation of coverage. The work of Isanaka et al (2018) demonstrates the importance of using trained staff and using SQUEAC processes, methods and tools correctly.

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Postscript

By Sheila Isanaka, Rebecca F. Grais, and Ben G.S. Allen

We thank Mark Myatt and Ernest Gueverra for adding this important work to the ongoing discussion surrounding appropriate coverage methodologies in the management of acute malnutrition. A 2015 review of coverage methodologies highlighted uncertainty in the use of currently recommended methods for coverage assessment and the need for more peer-reviewed evidence to inform global guidance (Epicentre, 2015). We are delighted that our work (Isanaka et al 2018) may have motivated additional consideration of these important issues and hope that stakeholders and policy makers continue to insist on high-quality, evidence-based experience to inform nutrition programming.

The report by Myatt and Gueverra (2019) shows that coverage estimation using the SQUEAC methodology can yield biased estimations in either direction. For the first time, Myatt and Gueverra quantify the magnitude of this bias, showing only a moderate correlation between the prior and likelihood estimates (Pearson correlation coefficient 95% confidence interval: 0.67 to 0.78). This new evidence is consistent with our findings and supports our conclusion that conflicts between prior and likelihood modes are possible and can lead to biased and imprecise coverage estimates. As discussed by Myatt and Gueverra, the risk of such bias is low when trained staff conduct a survey using appropriate SQUEAC methods. Our work sup-

ports this finding, as we similarly show no conflict when an external support team estimated the prior. Our experience, however, goes further than what is possible in the secondary analysis of Myatt and Gueverra to suggest that in resource-limited settings, where sufficient capacity and resources may not be available and the correct methodology may not be faithfully executed, conflict and bias may be more common.

We wholeheartedly agree that coverage assessments should be done using appropriate methods as outlined in the SQUEAC manual (Myatt et al. 2012). Our SQUEAC assessment followed this guidance, including triangulation by source and method, use of the BBQ tool, sampling to redundancy and a small survey. We used booster and barrier weighting by caregivers of severely acutely malnourished (SAM) children as reported in other contexts (Blanárová et al. 2016) as one component in developing the prior mode. The various prior modes in our analyses were combined to simulate different potential scenarios, including situations where external support is not available. This was done for the pedagogic purpose of the study, and as discussed in the paper does not necessarily reflect typical SQUEAC procedures.

We note that the database employed in the analysis of Myatt and Gueverra is likely comprised of surveys conducted by experienced coverage consultants (those provided, for ex-

ample, by the Coverage Monitoring Network or Valid International) and therefore include prior modes developed by dedicated consultants using gold standard methods that may be less likely to conflict. The analyses further include data from supplementary feeding programmes and does not standardise calculations of coverage estimate according to current guidance to use single coverage (Balegamire S, 2015), analytical choices which may influence the extent to which conflicts and bias were detected. Nonetheless, we welcome the new evidence presented by Myatt and Gueverra (2019) as an important step towards better understanding of the implications of using the SQUEAC methodology for valid coverage estimation.

Overall, we look forward to continued evidence-based and peer-reviewed discussion of appropriate coverage methodologies. Several methodologies are available to monitor programme coverage, and the appropriate study design should be selected in consideration of team capacity, resources and reporting requirements. SQUEAC can be a technically demanding method and requires the appropriate capacity to avoid the potential for bias. As both we and Myatt and Gueverra have shown, conflict and biased coverage estimation are possible and should be considered in selecting the appropriate study design and allocating appropriate resources for assessment.

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Infant and young child feeding in emergencies: An analysis of key factors of a strong response

Summary of research¹

Despite the evidence that appropriate and timely support of infant and young child feeding in emergencies (IYCF-E) saves lives, it is rarely prioritised or adequately supported. This study by the Save the Children Technical Rapid Response Team (Tech RRT) explores factors that supported or inhibited a strong IYCF-E response in three emergencies: the El Niño drought in Ethiopia 2015-2016; the earthquake in Nepal in 2015; and the ongoing Syrian crisis.

From 2015 to 2016 Ethiopia experienced its worst drought in 50 years, leaving 10.2 million people in need of emergency assistance by the end of 2015 and 420,000 children under five years old requiring treatment for severe acute malnutrition (SAM) in 2016. During the crisis a total of 1.1 million children aged 0-2 years old and 600,000 pregnant and lactating women (PLW) were targeted with IYCF-E interventions in 142 priority districts. The 2015 earthquake in Nepal led to a large humanitarian effort that reached 3.7 million people in the 14 severely affected districts, including 404,000 children aged six months to five years old and PLW in need of nutrition support. In Syria, by 2017, the ongoing conflict had left 13.6 million people requiring humanitarian assistance, including 4.9 million people trapped in besieged and hard-to-reach areas and an estimated 2.5 million children aged six months to five years and 1.9 million PLW; most infants among them were being fed infant formula, which presented particular challenges. The aim of this study was to identify common factors across these three different contexts that supported, and hindered, good IYCF-E response.

A panel of Save the Children Nutrition in Emergency Technical Advisors determined indicators defining strong IYCF-E programming and potential key underlying factors, drawing from existing indicators, such as Sphere Standards and Global Nutrition Cluster indicators. Secondary data was collected and 13 interviews conducted with key stakeholders from international non-governmental organisations (NGOs) (n=7), local NGOs (n=2), United Nations (UN) agencies (n=1) and the Nutrition Cluster (n=3) in October-November 2016 for Ethiopia, May-June 2017 for Syria and August-September 2017

for Nepal. Data was analysed and a score was attributed to each country based on the strength of the IYCF-E response out of a maximum possible score of 16 (<8 weak; 8-11 medium and >12 strong). Ethiopia scored 9 (medium); Nepal 11 (medium) and Northern Syria 13 (strong)².

The first factor identified as supportive of a good IYCF-E response across the three case studies was the activation of the Nutrition Cluster. In Northern Syria it was only after the Nutrition Cluster was activated that the response grew stronger; before this, nutrition was a working group of the Health Cluster and the IYCF-E response was weak. The second factor identified was the presence of a strong component on IYCF-E as part of the national IYCF strategy pre-crisis, which contributed to the strength and timeliness of the response in Nepal. Third, commitment of government and national and international NGOs to IYCF-E were important drivers, particularly in Nepal, where strong government commitment led to implementation of the International Code of Marketing of Breastmilk Substitutes and other important IYCF-E policies and strategies. In Northern Syria commitment of international NGOs enabled the capacity-building of national NGOs and engendered greater commitment to IYCF-E. Assessment of IYCF practices and needs was also important. This aspect was generally weak in the three case studies, although recent improvement was seen in Syria, which may have helped to strengthen the response. Another critical factor was the presence of pre-crisis IYCF programmes and availability of trained staff, important in the responses in Ethiopia and, in particular, Nepal. However, transition from IYCF to IYCF-E, such as the establishment of mother and baby areas to enable focused support to those affected, was not straightforward in either Ethiopia or Nepal and required advocacy among key stakeholders and capacity-building. Pre-crisis IYCF programmes and the availability of trained staff were weak in Northern Syria, which may partly explain the slow IYCF-E response. Finally, linking IYCF-E to health was also identified as key; in Northern Syria significant funds for the IYCF-E programme were raised by embedding within the health programme.

On the basis of these findings the authors put forward a set of recommendations for future IYCF-E response, described in Box 1.

Box 1 Recommendations for IYCF-E responses

1. Include IYCF-E in pre-crisis IYCF and nutrition policies, strategies and preparedness plans.
2. Conduct IYCF-E assessments so that needs are clearly defined.
3. Activation of the Nutrition Cluster should not depend solely on acute malnutrition prevalence but should also be justifiable on the grounds of IYCF-E.
4. Secure and support IYCF-E champions (such as the Ministry of Health, national and international NGOs and UN agencies) to raise awareness about IYCF-E and advocate for implementation of interventions when needed.
5. Strengthen pre-crisis IYCF interventions and coordinate with pre-crisis IYCF staff and programmes. Consider their views, experience and knowledge and orientate them on interventions and mechanisms specific to emergencies, such as mother-baby areas and Nutrition Cluster coordination, so that they are fully on board when additional IYCF-E activities are developed.
6. Prioritise awareness and capacity-building in IYCF-E by government and humanitarian agencies.
7. Reinforce links between IYCF-E and other sectors, especially health.

See *Operational Guidance on infant and young child feeding in emergencies*, v3, 2018 for more guidance on preparedness and response. <https://www.ennonline.net/operationalguidance-v3-2017>

¹ Technical rapid response team (Tech RRT) (2018). *Infant and young child feeding in emergencies: an analysis of key factors of a strong response*. www.ennonline.net/resource/iycfanalysisstrongresponse

² It should be noted that the score for Northern Syria was attributed based on the IYCF-E response as it was in 2017, which had improved considerably from the beginning of the crisis.

Higher heights: A greater ambition for maternal and child nutrition in South Asia

Summary of research¹

Poor nutrition in early life threatens the growth and development of children, which has a knock-on effect on the sustainable development of nations. This is particularly so in South Asia, where 40% of the world's stunted children (59 million children) and 53% of the world's wasted children (27 million children) live (UNICEF et al, 2018). Although the prevalence of child stunting is falling in the region, the pace of progress is too slow and most countries with available data are not on track to meet stunting reduction targets. The UNICEF Regional Office for South Asia commissioned a series of papers in 2016-2017 to fill knowledge gaps in the current body of evidence on stunting drivers, who is most affected and effective programme approaches. This overview paper summarises the evidence from these analyses and examines the implications for the direction of future advocacy, policy and programme actions.

Child growth and development

Analysis of pooled national survey data from Bangladesh, India, Nepal and Pakistan shows that stunted is concentrated among children of households experiencing multiple forms of deprivation, including poor child diets, low levels of maternal education and household poverty (Kirshna et al, 2018). Large inter-country differences were found in average rates of stunting reduction, from 0.6 percentage points (pp) per year in Pakistan, 1.3 pp in India, 2.9 pp in Bangladesh and 4.1 pp in Nepal. Stunting has declined across all wealth quintiles in all countries, but inequalities among wealth quintiles have persisted and widened in Nepal and Pakistan.

A retrospective case series analysis (Aguayo et al, 2018) examining the effectiveness of Pakistan's community-based management of acute malnutrition (CMAM) programme for severely wasted children (most of whom were aged 6-23 months) found that the programme was effective in achieving high survival (99.6%) and recovery (87.8%) rates. Severely wasted or stunted children had higher death and lower recovery rates compared to other children, suggesting that targeting children age 6-23 months old with multiple anthropometric failure will increase impact.

As child survival improves in South Asia, the developmental consequences of poor nutrition in early life become a more pressing concern

than mortality, particularly given the high number of children with low cognitive and socio-emotional test scores in the region (McCoy et al, 2016). Pooled data from multiple indicator cluster surveys (MICS) in Bangladesh, Bhutan, Nepal and Pakistan found that stunted children were at increased risk of sub-optimal learning/cognition development at three to four years old, but found no association between wasting and learning/cognition development (Kang et al, 2018), suggesting that interventions effective in improving linear growth in the first years of life may improve early childhood development.

Childhood anaemia is also associated with impaired cognitive development and possibly motor development. Studies from Nepal and Pakistan (Harding et al, 2018) and Bhutan (Campbell et al, 2018) show that anaemia is more likely in children with an anaemic mother and in infants (suggesting that mother's anaemia status may affect that of her child), in stunted children in all three countries and children with thin mothers in Pakistan (reflecting the contribution of dietary inadequacy before and during pregnancy and in childhood).

Maternal nutrition and low birth weight (LBW)

South Asia has the highest prevalence of LBW (26%) in the world (Lee et al, 2013), reflecting the poor status of women's nutrition in the region. Goudet et al (2018) estimate that one in 10 South Asian women of reproductive age have low stature (<145 cm), one in five have low body mass index (BMI) (<18.5 kg/m²) and overweight is rising rapidly, all of which are risk factors for child stunting. Pooled national survey data from six South Asian countries (Harding et al, 2018) show that children with reported LBW are significantly more likely to be wasted and severely wasted than non-LBW children and LBW is a predictor of concurrent wasting and stunting. Anaemia in women of reproductive age in Nepal and Pakistan is associated with thinness (BMI <18.5 kg/m²) and children under five years old are more likely to be anaemic if their mother is anaemic. This and the Campbell et al (2018) study in Bhutan show that anaemia is concentrated in the most disadvantaged women, including those from the poorest households in Pakistan, women without schooling in Bhutan, and women lacking sanitation facilities in Bhutan and Nepal. The preva-

lence of anaemia in pregnant women in Bhutan is lower than non-pregnant, an atypical finding suggesting that iron folic acid (IFA) supplementation during antenatal care is effectively protecting pregnant women from anaemia.

A combination of nutrition-specific and nutrition-sensitive actions are needed to address women's low-quality diets, poor access to health, and nutrition services and their causes. A systematic review by Goudet et al (2018) identifies barriers to pregnant women receiving and consuming IFA and calcium supplements at maternal-level (low women's education level and knowledge), household-level (low husband's education level, support from husband and household wealth) and health-facility level (late timing of first antenatal visit and low number of visits). Programme delivery platforms reaching pregnant women with supplements in their homes and communities, combined with information and counselling, can improve access to services and consumption of supplements.

Breastfeeding

Using pooled data from six South Asian countries, Harding et al (2018) find that children were less likely to be wasted if they were breastfed within the first hour of birth, were not given any pre-lacteal foods, and were exclusively breastfed. The rapid fall in the prevalence of wasting during the first few months of life in several South Asian countries suggests that early and exclusive breastfeeding may help infants recover from LBW. Focusing on Bhutan, Campbell et al (2018b) report that children under two years old are less likely to be overweight if they are currently breastfed.

Benedict et al (2018a) identify a steady increase in early initiation of breastfeeding, avoidance of pre-lacteal feeding and exclusive breastfeeding in Bangladesh, India and Nepal over the last 25 years. Despite this, only about half of children in these countries benefit from early initiation of breastfeeding and exclusive breastfeeding, and rates of continued breastfeeding at two years have remained stagnant at

¹ Torlesse H, Aguayo VM. Aiming higher for maternal and child nutrition in South Asia. *MaternChild Nutr.* 2018;14(S4): e12739. <https://doi.org/10.1111/mcn.12739> within: Hall Moran V and Pérez-Escamilla R (eds) and Aguayo VM and Torlesse H (guest eds). Higher heights: a greater ambition for maternal and child nutrition in South Asia. *Maternal and Child Nutrition*, November 2018, Volume 14, Supplement 4.



WFP/Kaiser Haider

A blanket supplementary feeding programme that aims to prevent acute malnutrition in children, Bangladesh

~70%. Progress in Afghanistan and Pakistan has lagged behind other countries, with recent declines in breastfeeding practices in Afghanistan and in the early initiation of breastfeeding and avoidance of pre-lacteal feeding in Pakistan.

Using data from national surveys, Nguyen et al (2018) report that socio-economic inequalities in the early initiation of breastfeeding and exclusive breastfeeding in India narrowed between 2006 and 2016, a significant achievement given the rising economic equalities in the country. Improvements in breastfeeding in lower socio-economic quintiles appear to have been driven by improved access to and use of health and nutrition services by mothers and children.

Multivariate analysis of national survey datasets from South Asia's five largest countries (Benedict et al 2018a and 2018b) reveals that common predictors of delayed initiation of breastfeeding, pre-lacteal feeding and not being exclusively breastfed include infant being born by caesarean section, small size at birth and home delivery (suggesting that these women and infants need more breastfeeding support) and low women's empowerment. A review of 31 studies by Benedict et al (2018b) reports that programmes to support breastfeeding are more likely to be effective if they include multiple interventions (education and counselling, community mobilisation, mass media and newborn health initiatives) in multiple intervention environments (home, community and health facility). Other important factors appear to be intervention coverage, timing relative to the age of the child, frequency, duration and targeting.

Complementary foods and feeding practices

Poor complementary feeding practices are highly prevalent in South Asia (UNICEF, 2016) and often predict stunting and wasting in the first two years of life. The likelihood of stunting is

higher in South Asia in infants aged 6-8 months who are not fed any complementary foods and in children aged 6-23 months whose diets do not meet minimum dietary diversity (MDD) (Kim et al, 2017). Likelihood of wasting in children age 6-23 months is higher if their diets do not meet MDD and of severe wasting if their diets do not meet minimum meal frequency (MMF) (Harding, Aguayo, and Webb, 2018). In India, not meeting MDD is also associated with concurrent wasting and stunting.

A review of South Asia national survey data (2006-2013) found that only 57% of infants aged 6-8 months are fed any complementary foods and, of the diets of children aged 6-23 months, only 48% meet MMF, 33% meet MDD and 21% meet minimum adequacy (sufficient number of meals, food groups, and breastmilk or milk feeds) (Aguayo, 2017). Across all countries, MDD is consistently lower than MMF, indicating that MDD is a greater problem. Considerable variation in feeding practices exists between countries and only Sri Lanka and the Maldives have rates that exceed 50% for all these practices.

Three multivariate analyses of national survey data in Afghanistan, Bangladesh and Nepal (Na et al 2018a, 2018b and 2018c) show that complementary feeding practices are more likely to be sub-optimal among infants (6-11 months), first-born children, children whose mothers are younger or less educated, and in communities with poor access to health and nutrition services. Cultural beliefs continue to be a barrier to recommended feeding practices in Nepal, where the Dalit and minority ethnic and religious castes have poorer complementary feeding practices than other population groups. Wealth quintile is associated with dietary diversity (DD) in Afghanistan, Bangladesh and Bhutan, suggesting availability of affordable nutritious foods is a common barrier to diverse diets in South Asia (Cambell et al, 2018b). Nguyen et al (2018)

show that the equity gaps in complementary feeding practices between socio-economic status quintiles in India narrowed between 2006 and 2016, but practices remain poor across all groups. Paintal and Aguayo (2016) show that harmful feeding practices during childhood illness are a widespread concern in South Asia, in part driven by inadequate and sometimes harmful advice from health workers. Information, education and counselling delivered by a range of well-trained primary healthcare workers and community resource persons can improve the timeliness, frequency, diversity and/or adequacy of complementary feeding, although impact may be limited by lack of availability or affordability of nutritious foods (Aguayo, 2017).

Implications for future advocacy, policy and programme actions

1. The concurrence of child stunting with wasting and anaemia in South Asia requires governments to address all forms of malnutrition in an integrated manner across the life cycle.

In the past there has been a tendency to address different forms of malnutrition in isolation and with varying levels of intensity. However, they often affect the same children and share common risk factors (Khara & Dolan, 2014). Policies and programmes should move away from siloed approaches and realign to address child malnutrition in all its forms.

2. Improving women's and children's diets is central to breaking the inter-generational cycle of malnutrition in South Asia.

Complementary foods and feeding practices in South Asia remain unacceptably poor due to weaker policy on complementary feeding compared to breastfeeding and a lack of clarity in interventions, approaches and coordination between sectors on this issue. Children's diets need much greater attention by all stakeholders concerned and strategies are needed to improve access to nutritious and affordable foods, coupled with communication interventions for behaviour and social change. This series reaffirms the close connection between the nutritional status of a mother and her children and the need to tackle dietary drivers of poor women's nutrition before and during pregnancy.

3. A coordinated, multi-system approach is needed to ensure families have all the inputs they need for children's healthy growth.

Coordination between the food, health, social protection, water, sanitation and hygiene (WASH) and education systems is needed and between different levels of government to combine actions to improve the nutrition status of women and young children.

4. *Deliberate actions are needed to address the disparities and inequalities in child growth and early life.*

Targeted efforts are needed to reach children, mothers and communities at greatest risk of malnutrition. Interventions should focus on children born small; children under two years of age; younger, less experienced mothers; and poorer households. At community level the focus should be on communities with higher levels of anthropometric failure and lower access to maternal and child health and nutrition services, using trained healthcare workers and community volunteers.

5. *Continued attention is needed in all countries to gather, analyse and use data to assess progress and inform decisions.*

This includes the use of routine information systems and periodic surveys to gather data on anthropometric indicators, feeding practices and service coverage. Studies and implementation research are also needed to better understand the context-specific barriers, enablers and pathways to improving access to services and adoption of recommended nutrition behaviours and practices.

Conclusions

The South Asia region bears a disproportionate burden of stunted children who experience worse health, cognition and learning outcomes. These children are concentrated in the most economically disadvantaged households and often experience multiple concurrent forms of nutrition deprivation. More attention is needed to improve the nutritional status of women before and during pregnancy and the diets of infant and young children in the first two years of life, while addressing underlying drivers. A coordinated, multi-system approach and actions to tackle inequalities are needed.



The provision of safe drinking water and sanitation are essential components for increasing the nutritional impact of school meals at Shree Janajyoti Lower Secondary School, Dadeldhura, Nepal

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Independent and combined effects of improved WASH and improved complementary feeding on child stunting and anaemia in rural Zimbabwe

Summary of research¹

Location: *Zimbabwe*

What we know: Stunting and anaemia remain prevalent in children; plausible interventions have shown limited or inconsistent impact.

What this article adds: A cluster-randomised, community-based trial in two rural districts in Zimbabwe (2012–2015) tested the impact of a combined water, sanitation and hygiene (WASH) and infant and young child feeding (complementary feeding counselling and small-quantity, lipid-based nutrient supplement) intervention. Clusters were randomly assigned to standard care, IYCF, WASH, or IYCF plus WASH. Primary outcomes were infant length-for-age z-score (LAZ) and haemoglobin concentrations at 18 months of age. In total 5,280 pregnant women were enrolled and 3,686 children assessed. The IYCF intervention alone reduced the number of stunted children from 35% to 27% and the number of children with anaemia from 13.9% to 10.5%. The WASH intervention (alone or combined with IYCF) had no effect on either primary outcome. Neither intervention reduced the prevalence of diarrhoea at 12 or 18 months. Given the drive to scale up nutrition-WASH interventions to address stunting, greater investment in the WASH sector to identify and deliver more efficacious interventions is urgently needed.

Child stunting reduces survival and impairs neurodevelopment. Offspring of adults who were stunted as children are at increased risk of stunting. Targeted interventions have largely failed to address stunting. Childhood anaemia is also prevalent among children under two years old in Africa and Asia and is a primary cause of cognitive delay. Increasing dietary iron intake only reduces anaemia by 32–62% (SHINE, 2015). The UNICEF framework for undernutrition highlights inadequate dietary intake and disease as the immediate causes of child undernutrition and specifies that a multi-sector approach that addresses both proximal and distal determinants is required. Thus, integration of improved infant diets with improved water, sanitation and hygiene (WASH) is a logical approach, given the role of WASH in reducing morbidity, especially diarrhoea. In this study the independent and combined effects of improved WASH and improved infant and young child feeding (IYCF) on stunting and anaemia were tested in rural Zimbabwe (SHINE trial).

A cluster-randomised, community-based, 2 × 2 factorial trial was carried out in two rural districts in Zimbabwe. Clusters were defined as the catchment area of between one and four village health workers employed by the Zimbabwe Ministry of Health and Child Care. Women were eligible for inclusion if they permanently lived in clusters and were confirmed pregnant. Clusters were randomly assigned (1:1:1:1) to standard of care (52 clusters), IYCF (20 g of a small-quantity lipid-based nutrient supplement

(LNS) per day from age 6 to 18 months plus complementary feeding counselling; 53 clusters), WASH (construction of a ventilated improved pit latrine, provision of two handwashing stations, liquid soap, chlorine, and play space plus hygiene counselling; 53 clusters), or IYCF plus WASH (53 clusters). A constrained randomisation technique was used to achieve balance across the groups for 14 variables related to geography, demography, water access and community-level sanitation coverage. Masking of participants and fieldworkers was not possible. The primary outcomes were infant length-for-age z-score (LAZ) and haemoglobin concentrations at 18 months of age among children born to mothers who were HIV negative during pregnancy. These outcomes were analysed in the intention-to-treat population. The authors estimated the effects of the interventions by comparing the two IYCF groups with the two non-IYCF groups and the two WASH groups with the two non-WASH groups, except for outcomes that had an important statistical interaction between the interventions.

Between 22 November 2012 and 27 March 2015, 5,280 pregnant women were enrolled from 211 clusters. A total of 3,686 children born to HIV-negative mothers were assessed at age 18 months (884 in the standard of care group from 52 clusters, 893 in the IYCF group from 53 clusters, 918 in the WASH group from 53 clusters, and 991 in the IYCF plus WASH group from 51 clusters). In the IYCF intervention groups, the mean LAZ was 0.16 (95% CI 0.08–

0.23) higher and the mean haemoglobin concentration was 2.03 g/L (1.28–2.79) higher than those in the non-IYCF intervention groups. The IYCF intervention reduced the number of stunted children from 620 (35%) of 1,792 to 514 (27%) of 1,879 and the number of children with anaemia from 245 (13.9%) of 1,759 to 193 (10.5%) of 1,845 and significantly increased mean weight-for-age, weight-for-height and head-circumference-for-age Z scores compared with the non-IYCF interventions. The WASH intervention had no effect on either primary outcome. Neither the IYCF nor the WASH intervention reduced the prevalence of diarrhoea at 12 or 18 months of age.

The authors discuss the fact that, consistent with decades of complementary feeding research, the IYCF interventions increased linear growth and haemoglobin concentrations, reduced stunting by 21%, reduced anaemia by 24% and increased head circumference and ponderal growth compared with the non-IYCF interventions. Although the effects of complementary feeding education could not be separated out from those of LNS, formative work shows that both components are important. In contrast, no benefit was detected for the WASH intervention on any

¹ Humphrey, Mbuya, Ntozini, Moulton, et al. (2019). Independent and combined effects of improved water, sanitation, and hygiene, and improved complementary feeding, on child stunting and anaemia in rural Zimbabwe: a cluster-randomised trial. *Lancet Glob Health*. 2019 Jan;7(1):e132-e147. doi: 10.1016/S2214-109X(18)30374-7. [www.thelancet.com/journals/langlo/article/PIIS2214-109X\(18\)30374-7/fulltext](http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(18)30374-7/fulltext)

reported child health outcomes. This finding is inconsistent with a previous review on water chlorination and handwashing promotion, which were estimated to reduce diarrhoea by around 25% (Ejemot-Nwadiaro et al, 2015); most studies in this review had very high intervention doses (daily to weekly contact between behaviour-change promoters and study participants), which was greater than the monthly contact delivered by SHINE. Thus, adherence may not be sufficient to reduce diarrhoea when intervention dose is less frequent than monthly, even when behaviour-change messages are based on extensive formative research, delivered by highly trained workers and accompanied by free provision of soap and chlorine, as in SHINE.

Another important aspect may be that SHINE intervened at the household rather than community level as it was reasoned that young children spend most of their time within their own household. Increased community sanitation coverage, even in sparsely populated areas, may be required to affect growth. Also, although the SHINE WASH intervention considerably reduced geophagia and consumption of chicken faeces by maternal history, it did not prevent these behaviours (27% of WASH mothers still

reported they had observed geophagia at the 12-month visit); more analysis of the data is needed to find out why.

SHINE is the third trial in which a WASH intervention alone or in combination with an IYCF intervention had no effect on linear growth (Luby et al, 2018; Null et al, 2018). Although these findings do not unequivocally prove that an integrated WASH-nutrition approach will never improve linear growth in any context, these trials included over 18,000 children in three diverse settings with prevalent stunting and poor environmental hygiene and infant diets. The authors propose that this may be because faecal ingestion does not reduce environmental enteric dysfunction (EED) (or prevention of EED does not improve linear growth); that WASH interventions used were not sufficiently effective to facilitate linear growth or reduce diarrhoea; or that the trials did not address inter-generational prenatal factors that could potentially be targeted by preconception dietary supplementation of mothers.

There is a large movement to scale up integrated WASH-nutrition interventions for stunting prevention. The SHINE trial provides high-level

evidence that elementary WASH interventions delivered at the household level in rural areas of low-income and middle-income countries are unlikely to reduce stunting and might not reduce diarrhoea, and that implementation of these WASH interventions together with IYCF interventions will not reduce stunting more than implementation of IYCF alone. These findings provide an urgent call for greater investment in the WASH sector to identify and deliver more efficacious interventions.

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Undersized Indian children: Nutrients-starved or hungry for development?

Summary of research¹

Location: *India*

What we know: The WHO Multicentre Growth Reference Study (MGRS) growth curves provide a single international reference for population-level comparison for children under five years of age.

What this article adds: The MGRS charts describe the growth of children under ideal conditions; only 5-10% of Indian children fulfil the WHO MGRS eligibility criteria. The prevalence of undersized children is a proxy for overall socioeconomic development, intergenerational factors, biological and environmental determinants, and nutrition. However, interventions to improve child undersize in India focus on food and nutrients-based interventions, despite limited, unsustainable benefits and some negative consequences. With the exception of water, sanitation and hygiene (WASH), other broader determinants are not actively targeted. Prevalence of stunting and underweight has declined in India (in tandem with overall national development), while wasting remains stagnant; this anthropometric pattern may reflect nutrition transition. Undersize in Indian children reflects wider societal maldevelopment and inequity and a legacy of considerable intergenerational handicap, necessitating a greater catch-up period. Comprehensive (simultaneously addressing all determinants), patient and equitable (prioritising the deprived) development is the key to progress.

Children under five years of age with body dimensions <-2 standard deviations (SD) of World Health Organization (WHO) Multicentre Growth Reference Study (MGRS) charts are defined as undersized. However, the MGRS charts, designed as a global reference (for comparison), are being used as a standard (target to be achieved). This aspiration should be balanced with realistic expectations. The MGRS charts describe the growth

of children who are free from socioeconomic, environmental and biological constraints, and whose care has followed recommended health practices and behaviours associated with healthy outcomes. Thus, MGRS growth curves are expected to provide a single international reference that represents the best description of physiological growth for all children below five years of age; low anthropometric values in MGRS subjects reflect biological variability or additional

unmeasured factors, rather than nutrition compromise. Currently, only 5-10% of Indian children meet the WHO MGRS eligibility criteria. In this context, a recent paper examines how nutrition progress can be achieved in the Indian population.

¹ Sachdev HPS. (2018) Undersized Indian children: nutrients-starved or hungry for development? *Proc Indian Natn Sci Acad* 84 No. 4 December 2018 pp. 867-875.

Considering the stringent MGRS eligibility criteria, the prevalence of undersized children at population level is a crude but convenient proxy for a blend of overall socioeconomic development and intergenerational constraint of maternal undersize. Nutrient deficits, particularly in individuals, may comprise only one contributing factor, yet food and nutrient subsidies or supplementation are typical and often the only strategies used to address population undersize. While there are certain benefits in disaster and famine situations, only some nutrient or food-based interventions, including those during pregnancy, are evidenced to increase anthropometric indices or do so modestly (0.1-0.25 SD or 5%-10% deficit), with unsustainable gains. Undesirable consequences include complacency among stakeholders that everything possible is being done; diversion of public finances and attention from other crucial unattended determinants of undersize; dependence by the beneficiaries on public welfare; and risk of contributing to non-communicable diseases through long-term, food-based supplementation.

Other potential determinants of undersize include water, sanitation and hygiene (WASH); nutrition counselling; maternal characteristics;

curative and preventive health care; maternal, household and community resources; literacy; income; women empowerment; safety nets; and genes. These are seldom visualised or actively targeted for improving undersize, although efforts have begun to integrate WASH interventions. Attempts to accelerate the pace of progress must consider inequity (the greater the proportion of the population that is deprived, the higher the burden and slower the improvement); comprehensive interventions; using 'windows of opportunity' (such as the first 1,000 days and adolescence); sustainability of interventions, ideally over generations; baselines (populations starting at lower levels will take longer to reach targets); and intergenerational handicap (only a limited improvement is possible within one generation).

In tandem with overall national development, time trends show a gradual decline in the incidence of undersize in children; this trend has hastened in the past decade, even among the underprivileged. This is supported by intergenerational comparison, over the past 30 years, of anthropometric data of children and their parents in the New Delhi Birth Cohort subjects from middle socioeconomic status who were not re-

cipients of food subsidies (Sinha et al, 2017). In comparison to their parents, children were considerably taller (0-5 years 0.99 SD; 5-10 years 1.17 SD) and heavier (0-5 years 0.77 SD; 5-10 years 1.52 SD), while only those aged 5-10 years were broader (had a higher BMI; 1.03 SD). The steady decline in the prevalence of stunting and underweight, with stagnant wasting levels, is observed in neighbouring countries too and appears unrelated to specific determinants. The underlying and proximate factors related to stunting and wasting are similar. A steady improvement in stunting and underweight with stagnant wasting levels is therefore unlikely to be related to non-improvement of specific determinants like food or nutrients, but is probably a reflection of biological thinness (thin-fat infant phenotype) of Indian populations (Yajnik et al, 2003), or the pattern of anthropometric change in stunted populations undergoing nutrition transition. In children under five years old, increase in length (or height) and breadth are two distinct biological processes, which generally do not occur simultaneously. Thus, rapid and simultaneous declines in both stunting and wasting prevalence, as perceived in the Sustainable Development Goals, appear challenging, if not impossible, to achieve.

Politicians, policy makers, other stakeholders and the lay public must realise that there is no magic solution to eliminate undersize in children, which reflects wider societal maldevelopment and inequity. Focusing solely on nutrients and one or two additional determinants (for example, WASH interventions) will yield slow and disappointing results. Irrespective of the benefits on body size, every ingredient of the development process deserves to be in place in its own right; for example, purchasing power; access to education, healthcare, water supply and sanitation services; and nutritional security. A seemingly unclear agenda can be more clearly structured by uniting two to three key indicators each from the above key domains to monitor progress and fine-tune interventions.

The author concludes that undersized Indian children have a legacy of considerable intergenerational handicap, necessitating a greater catch-up period even under the best circumstances. We therefore need to be patient and practical. There has been a gradual improvement, which has sped up in the past decade. A predominant focus on nutrients-based solutions will fail to accelerate progress. Comprehensive and equitable development is the key to success.

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ICDS centers where nutrition, hygiene and health care education is provided in Banswara, Rajasthan.

By Sanjay Kumar Das, Dr Sule Meleh, Dr Umar Chiroma, Bulti Assaye and Maureen L Gallagher



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Counselling caregivers on optimal IYCF practices, Borno State, Nigeria, 2018

Nutritional response in north-eastern Nigeria: Approaches to increase service availability in Borno and Yobe States

Location: *Nigeria*

What we know: Six years of armed conflict in north-eastern Nigeria have resulted in mass displacement, severe food insecurity and undernutrition, and have destroyed livelihoods and further weakened fragile health systems.

What this article adds: In 2010 UNICEF supported integration of community-based management of acute malnutrition (CMAM) services (SAM treatment) into 75% of fixed health facilities in north-eastern Nigeria. In 2015 infant and young child feeding (IYCF) support and multiple-micronutrient powder (MNP) were added. Government has led scale-up of this integrated package; the number of centres has increased fourfold and the number of children treated has increased fivefold (2013-17). UNICEF has focused on supporting state government to meet immediate needs of severely malnourished children while strengthening the government health system. A minimum nutritional services package was finalised in early 2017. Multiple delivery platforms have been used (fixed health centres, IDP camp nutrition centres, community outreach, mobile services) and community nutrition mobilisers have increased coverage, including in insecure areas. UNICEF has provided financial and technical support, including supervision and monitoring, barrier analysis to poor performing sites, and context-specific supply chain management with roles defined for multiple stakeholders. Financing sources for scale-up have been mixed; some government, some UNICEF-dependent (especially in high humanitarian need states). There has been some success and ongoing advocacy to transition from emergency to development funding sources. Key elements that enabled SAM scale up were strong government leadership with UNICEF support; good communication (especially use of WhatsApp groups); use of existing community platforms for community mobilization; and investment in on-the-job training and supportive supervision.

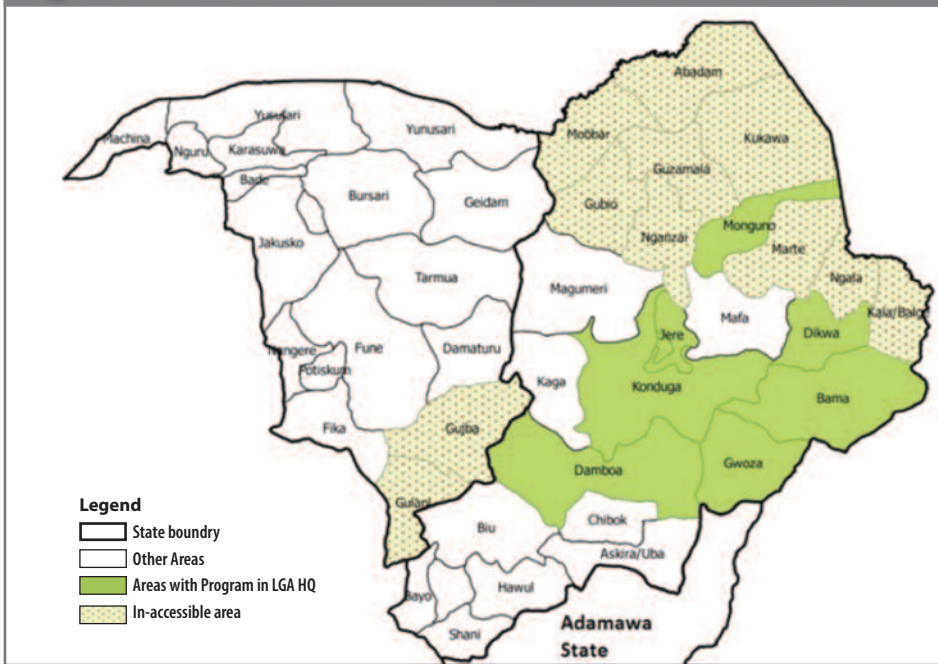
Background

Before the conflict the situation in Borno and Yobe States was already fragile, with high levels of poverty, underdevelopment, unemployment and inequality. Six years of armed conflict and clashes between government and non-state armed groups (NSAGs) has resulted in millions of people displaced, thousands of lives lost and livelihoods destroyed in north-

eastern Nigeria. The prolonged crisis had led to a deterioration in health and other basic services, resulting in increased severe food insecurity and undernutrition. Outbreaks of diseases such as measles, cholera and diarrhoea had also been reported in the area, further aggravating the situation.

More than half of internally displaced persons (IDPs) in north-east Nigeria fled their

Figure 1 Maps of Borno and Yobe state indicating availability of nutrition programme in LGA headquarters and inaccessible area in 2016



homes in 2014 and 2015 after NSAGs seized control of a territory covering more than 30,000 square kilometres, committing grave human rights abuses against local populations. A government-led military campaign subsequently saw the government regain control of the area. In 2016 the Nigerian security forces recaptured the main towns and villages of several local government areas (LGAs) and exposed the humanitarian needs of civilians there. Over 250,000 people living in secure ‘satellite’ camps at LGA capitals (including Bama, Dikwa, Monguno and Damboa) were reported in need of emergency assistance. Given the onset of the lean season and rainy season between May and September, the near-term outlook was also grim for the 180,000 food-insecure people in Maiduguri’s outer perimeter and 120,000 Maiduguri camp residents.

Since 2016 there has been improvement in the access of such communities to life-saving assistance; out of a total 27 LGAs in Borno State, 25 are currently accessible, compared to limited access to 22 LGAs in 2016 (see Figure

1). However, humanitarian access in conflict-affected areas continues to be constrained by restrictions on the movement of aid workers and civilians, especially in Borno State and to some extent Yobe State, as well as ongoing violence and a challenging physical environment (particularly during the rainy season). Borno State clearly remains the epicentre of the humanitarian crisis, with dozens of conflict incidents reported each month. In the crisis affecting north-east Nigeria, nine out of ten displaced persons come from Borno and the State also hosts the majority (78%) of IDPs.

Nutrition situation

The Cadre Harmonisé (CH) analysis¹ of March 2018 indicates that an estimated 3.7 million people required emergency assistance between March and May 2018, with 3.9 million being reported as food-insecure. For the projected period of June to August 2018, these figures were expected to increase to about 5.3 million people in the absence of resilience-driven interventions and humanitarian assistance. Only

30% of health facilities are functional in Borno State, where malaria is endemic and cholera and other diseases affect the population regularly and are often life-threatening.

An estimated 943,000 children under five years old across Borno and Yobe States are acutely malnourished; 440,000 with severe acute malnutrition (SAM) and 503,000 with moderate acute malnutrition (MAM). Around 230,000 pregnant and lactating women (PLW) are estimated to be acutely malnourished. The nutrition situation in Borno and Yobe States declined rapidly due to the crisis in 2015, peaked in 2017 and has stabilised in 2018, with some exceptions in hard-to-reach areas (mainly in Damasak, Gubio, Kukawa and northern Yobe). Recent nutrition surveillance (by UNICEF, in collaboration with the National Bureau of Statistics (NBS)) revealed GAM and SAM rates of 6.4% and 1.2% in Borno and 12.0% and 1.3% in Yobe respectively.

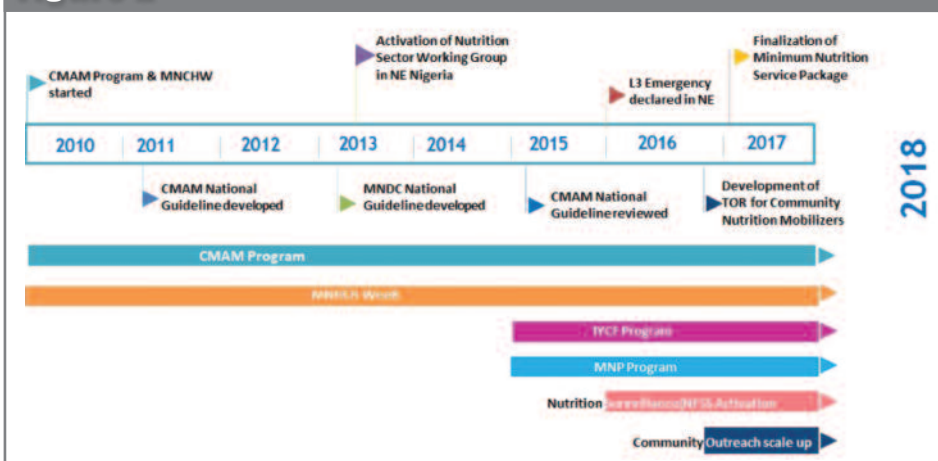
Nutrition response scale-up: A combined approach

The nutrition response in north-eastern Nigeria has been driven by the strong political will and leadership of the Ministry of Health (MoH). While public services and institutions have been overstretched, and in some cases destroyed in affected areas, services have continued to function where possible. The emergency nutrition response has been integrated into the existing system, with active participation of key pre-existing stakeholders and therefore provides an example of humanitarian development programming in response to crisis.

UNICEF initiated support to community-based management of acute malnutrition (CMAM) programming in the north-east in 2010 for identification and treatment of children with SAM². SAM management was integrated in about 75% of fixed health facilities (FHF) and UNICEF provided training and onsite coaching to enhance the capacity of government health workers and supplied ready-to-use therapeutic food (RUTF) and basic equipment for identification and treatment of SAM children. Infant and young child feeding (IYCF) support and multiple micro-nutrient powder (MNP) supplementation activities were initiated in 2015 after the crisis began. These were integrated into service delivery platforms in health facilities already delivering SAM treatment.

The push to scale up CMAM provision began in 2015 (as described in Figure 2), when the number of fixed health facilities (FHF) delivering services increased by almost 30%. Scale-up was mainly focused on SAM children (admission

Figure 2 Timeline of major nutrition-related activities in north-eastern Nigeria



¹ The Cadre Harmonisé is the equivalent of the Integrated Phase Classification (IPC) approach used in West Africa.

² UNICEF started to use extended criteria (MUAC<125mm) in August 2017 to admit MAM children in outpatient therapeutic programmes and provided seven sachets of RUTF for one week in some hotspot areas as the nutrition situation was critical, based on nutrition surveillance findings. This has been stopped from 1 April 2018. World Food Programme is doing a blanket supplementary feeding programme (BSFP) for children aged 6-23 months and targeted supplementary feeding program (TSFP) for children aged 24-59 months in some areas.

Box 1 Approaches implemented by partners to increase availability of nutritional services

Fixed health facilities (FHF): FHFs are part of the government routine health system in host communities before the crisis. Nutrition services are integrated into FHFs as a component of the primary healthcare package. UNICEF has supported state government to integrate nutrition services (SAM treatment, IYCF support and MNPs) into primary healthcare services in 312 FHFs in Borno and Yobe States.

IDP camp facilities: These are set up temporarily in IDP camps to provide basic health and nutrition services to IDPs after they have arrived in a safe and secure location. IDP camp facilities were first established in 2015 in response to increased numbers of IDPs and the subsequent set-up of the first IDP camp in Borno State. UNICEF has set up 14 nutrition service sites in IDP camps for the provision of integrated nutrition services. UNICEF mobilised health workers displaced to IDP camps to work in the health/nutrition clinics, since they were still paid by government, and offered financial top-ups to motivate them to continue their work.

Community outreach: A community outreach team comprises two skilled people (one CMAM provider and one nutrition screener) for the

identification and treatment of SAM children in densely populated areas, mainly in host communities. These teams were launched to reduce overcrowding in FHFs and provide daily nutrition services. Community outreach started in central Borno LGAs (Maiduguri metropolitan city (MMC), Jere, Konduga and Mafa) in 2016 to address the increased IDP influx and increased demand in services. UNICEF, in collaboration with state government, has set up 35 outreach sites from which community outreach teams operate.

Mobile teams: A mobile nutrition team comprises three skilled nutrition personnel (a CMAM provider, a nutrition counsellor and a nutrition screener/recorder). The team moves from one location to another to cover between three and five locations each week for the provision of integrated nutrition services in settlements/ communities far away (>3 km) from FHFs. This approach started in August 2017 to increase the availability of nutrition services in remote communities. UNICEF, in collaboration with state government, has so far deployed 49 mobile nutrition teams, often to newly accessible areas where government infrastructures are completely damaged.

based on MUAC <115mm or oedema, discharge MUAC > 125 mm and no oedema), as reflected in the national CMAM guideline that centred on SAM management. Between 2013 and 2017 the number of sites delivering CMAM increased fourfold (from 109 in 2013 to 461 in 2017) and the number of children admitted for SAM treatment increased by over fivefold (from 30,288 in 2013 to 181,170 in 2017) (see Figure 3). At the end of 2017 partners in the Nutrition Sector started to work towards a minimum nutritional services package, which was finalised at the beginning of 2017. This established the premise that all health facilities' delivery services had to include a minimum package of CMAM, IYCF and MNP services (the latter provided to children aged 6-23 months not affected by SAM or MAM). This significantly increased the coverage of IYCF and MNP services (see Figure 4). The process was led by the Nutrition Sector, with UNICEF participating in the development of an integrated nutrition training package and data tools for health workers and community nutrition mobilisers (CNMs).

The integrated nutrition package approach was placed at the core of the scale-up strategy to increase availability of and access to nutrition services throughout Borno and Yobe States. This was achieved through the use of multiple platforms to deliver the minimum nutrition services package, as summarised in Box 1. Efforts were made by sector partners to strengthen the community-based aspects of the programme through the recruitment and use of CNMs, employed to increase community mobilisation and demand for services (Box 2). In the context of conflict and insecurity, this approach has led to the timely identification and treatment of SAM children, promotion of IYCF practices and appropriate use of MNP at household level. Working with local NGOs to provide CNMs has been beneficial, given their good community network and access at community level with limited security challenges. The new strategy achieved impressive results in terms of increased number of units delivering CMAM services and increased admissions (as illustrated in Figure 2).

Supervision and monitoring

To address challenges of monitoring in areas of difficult access, UNICEF has a contract with a local institution to deploy skilled personnel to be based at LGA level. Considering the security situation, working through the local institution, personnel can move frequently to and within the LGA. The UNICEF Nutrition section deployed 31 senior nutrition LGA facilitators to provide close monitoring and onsite coaching to nutrition staff at LGA and service delivery site level. They support coordination of nutrition activities at LGA level and provision of onsite coaching to nutrition service providers, as well as collection and compilation of nutrition activity reports together with local government nutrition focal persons. This initiative has been vital to improve quality of services, avoid stock-out issues and strengthen timely reporting.

Box 2 Community Nutrition Mobilisers (CNM)

CNMs are identified from the local community to strengthen the community mobilisation and sensitisation component of the nutrition programme. Duties include: active house-to-house nutrition screening of all children under five years old (700 to 1,000 children per CNM) and identification and referral of SAM children (ten days per month); follow up SAM children to ensure completion of treatment and appropriate use of RUTF and MNPs (four days per month); formation and facilitation of mother support groups (MSGs) for the protection, promotion and support of IYCF practices (five days per month); and one-to-one support for mothers with breastfeeding problems (three days per month). CNMs refer malnourished children (aged 6-23 months) or MAM children who are not receiving supplementary food for MNP, while

SAM children are referred to receive appropriate treatment (RUTF and routine medicine). CNMs are paid and are guided by a terms of reference (TOR) defined and agreed by sector partners. UNICEF has partnered with three local non-governmental organisations (NGOs) to strengthen community mobilisation activities and ensure timely payment of CNMs. Local partner NGOs provide coaching to and supportive supervision of CNMs through 121 ward-level nutrition supervisors (local NGO staff). Supervisors conduct monthly review meetings between CNMs and FHF nutrition staff to collect monthly reports from CNMs, provide feedback on data quality, discuss challenges and lessons learned, provide monthly incentives to CNMs and plan community mobilisation activities for the subsequent month.

Figure 3 Trends in SAM admissions and scale-up of CMAM service delivery units (SDUs) in Borno and Yobe States 2013-2017

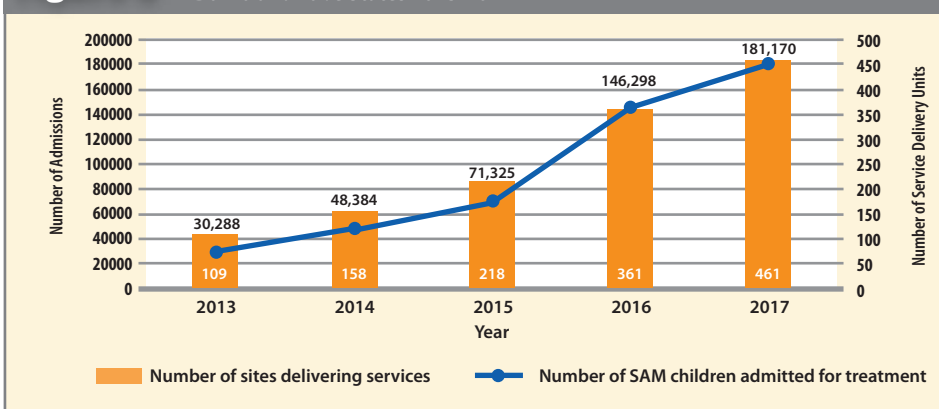
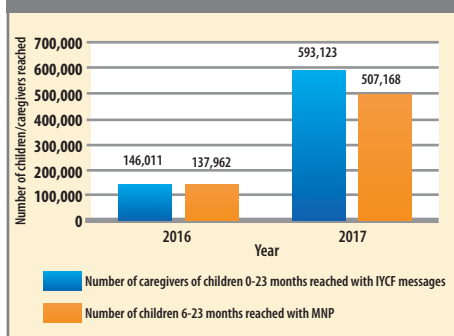


Figure 4 Beneficiaries reached with IYCF support and MNP supplementation in 2016 and 2017



WhatsApp groups for nutrition were created for communication and regular reporting using mobile coverage from neighbouring countries; coverage of networks within Nigeria was poor. As most of the LGA teams were new to the integrated nutrition response, the platform was also used to discuss technical issues arising in the field and provide remote technical support. In the beginning of 2017 achievement of nutrition indicators was very low relative to the humanitarian response plan (HRP) target; for example, admission of SAM children reached only 24.4% of target by end of May 2018. The total state target was divided for each LGA and target/achievement ratios were monitored monthly to identify areas with poor achievements and explore the reasons. Those LGAs and FHF's were prioritised to strengthen community mobilisation activities and proper reporting and address related challenges for better programme outcomes. This analysis sensitised the team and encouraged them to take adequate action to ensure all children under five years old are screened on a monthly basis and SAM children are admitted to a nutrition programme.

Supply chain management

Given the multiple stakeholders involved in the nutrition programme, and to overcome access difficulties, a context-specific supply management approach was used to mitigate any stock-outs at SDUs. Responsibilities of the different stakeholders were clearly defined, as follows:

- **UNICEF:** Responsible for supply provision of outpatient therapeutic programme (OTP) sites of newly liberated areas and south Borno. The UNICEF nutrition staff work with LGA nutrition facilitators to compile RUTF and MNP requirements for the logistics team, who supply to SDUs every two weeks.
- **State government central Borno:** Responsible for supply provision in FHF's and OTP sites in some LGAs in central Borno (MMC, Jere, Konduga and Mafa) due to state government access in these areas. The State Nutrition Officer (SNO) compiles RUTF and MNP requirements from each LGA, which are reviewed by UNICEF and then supplied by UNICEF Maiduguri logistics team to the government central medical store (CMS), from where they are sent to FHF's bi-weekly and outreach OTP

sites weekly. Transport costs are covered by UNICEF.

- **International NGOs in Borno:** RUTE, R75, F100³, MNP and ReSoMal⁴ requirements (and quarterly forecasted requirements) are sent monthly to UNICEF Maiduguri office by INGOs with programme cooperation agreements (PCAs) with UNICEF. Once requests are reviewed and released, INGO partners collect supplies from UNICEF Maiduguri warehouse and deliver to the OTP sites they support.
- **Yobe:** Yobe state primary healthcare management board (YPHCMB) forecasts quarterly supply requirements and UNICEF delivers to CMS. INGOs submit requests for RUTF and MNP with their monthly nutrition programme report to the state nutrition officer, who releases supplies from CMS for delivery by INGOs to SDUs. UNICEF and the SNO visit sites periodically for monitoring. For UNICEF-supported sites, the LAG nutrition focal person collates monthly SDU requirements and shares with the SNO, who arranges delivery in collaboration with UNICEF.

The humanitarian-development nexus

UNICEF's role in scale-up of services has focused on supporting state government to meet the immediate needs of severely malnourished children while strengthening the government health system. Strong advocacy is carried out with the government to ensure that the provision of nutrition services to the state population continues to be the responsibility of state government. The strong leadership shown by the government and continuous support to governance systems ensures that services are sustainable in the long term.

The support and funding of scale-up of nutritional services is mixed. In some areas it is funded by donors, while in others UNICEF internal funding was used for scale-up where the situation was critical and humanitarian assistance needs very high. In Borno and Yobe, government has not allocated any funds for RUTF as most of their funding is spent on security and safety arrangements; in other states, government has directly procured RUTF supplies. Financing for scale-up has been effected through state government by recruitment of additional staff and capacity building; their payment and operationalisation has been undertaken by state government with guidance and support of UNICEF. There is ongoing advocacy to allocate 1% of the consolidated revenue fund (CRF) for basic healthcare provision fund (BHCPF) as part of Appropriation Act, 2018; nutrition is part of the BHCPF. Some states have already allocated funds, but in Borno and Yobe advocacy has started now through the state committee on food and nutrition (SCFN) in transitioning from an emergency to a development approach.

Community systems are also core to the nexus as the humanitarian response works through CNMs, who are selected from their communities

and who are key players in the prevention and treatment of undernutrition. Working through MSGs also strengthens social networks as well as enhancing mothers' understanding of malnutrition.

Lessons learned and conclusions

The programme demonstrates that it is possible to increase access to treatment of SAM and other nutritional interventions in emergency-affected areas with strong government leadership and UNICEF playing a supportive role in meeting the immediate needs of SAM children whilst strengthening the government health system. Other key elements included the formation and utilisation of existing community platforms (identification of CNMs and MSGs), which was vital for the timely detection and treatment of SAM children and to improve programme coverage. Re-engaging displaced health workers has contributed to the observed achievement in scaling up the response programme and improved quality of SAM treatment services and has provided state governments with a cohort of qualified personnel who can be integrated into the health system to ensure programme sustainability during the transition period.

The effective coordination of partners and detailed gap analysis by the sector helped to identify gap areas for scale-up. This process played a vital role in the rapid expansion of the programme. Subsequent periodic data analysis and feedback helped to identify and address ongoing gaps and issues in a timely way. A context-specific service delivery approach and supply chain management helped to address stock-out issues and create effective programming. The use of WhatsApp allowed for timely reporting and communication, even in areas with poor network coverage.

Investing in strengthening on-the-job training, supportive supervision and feedback has the potential to improve the quality of treatment services. Although the programme overall has met the minimum SPHERE standard (cure rate 87.2%; defaulter rate 9.6%; death rate 0.6%; and non-responder rate 2.6%), maintaining the quality of the programme across all sites while scaling up remains a problem. Disaggregated data reveal variations in quality across the different geographic areas.

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³ F-100 and F-75 (also known as Formula 100 and Formula 75) are therapeutic milk products designed to treat severe malnutrition.

⁴ ReSoMal is used for the preparation of an oral rehydration solution used exclusively to treat severe acute malnutrition. It must be used under medical supervision in therapeutic feeding centres.

Das, S.K., Meleh, S., Chiroma, U., Assaye, B and Gallagher, M.L. (2019) Nutritional response in north-eastern Nigeria: Approaches to increase service availability in Borno and Yobe States. Field Exchange issue 59, January 2019. www.ennonline.net/fex

Beneficiaries of the WASH in Nutrition kit, Kandadji, Tillabéry, Niger, 2017

Impact evaluation of WASH in nutrition intervention on morbidity and acute malnutrition in Niger

By Saïdou Tamboura, Dr Moussa Issa Lende and Lucia Pantella



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Location: Niger

What we know: There is increasing drive to integrate nutrition and water, sanitation and hygiene (WASH) interventions, including those targeted at malnourished children.

What this article adds: An evaluation was carried out of a year-long integrated water, sanitation and hygiene (WASH) in nutrition (WiN) programme in Tillabery, Niger in 2017 by Cooperazione Internazionale (COOPI). WASH facilities were improved in 11 outpatient therapeutic centres (OTPs) and one stabilisation centre providing acute malnutrition management services; 1470 WiN kits were provided to households of all children with severe acute malnutrition (SAM) to support personal hygiene, water treatment and water storage until 30 days after discharge; and WASH education sessions were provided in the same villages. Results showed no difference in OTP performance indicators between intervention and control areas with the exception of the non-response rate in intervention sites (4 to 2%). Improvements in hygiene practices and significantly lower diarrhea co-morbidity were found in intervention households receiving WiN kits and community awareness sessions compared to controls. Co-morbidity (diarrhoea) was prevalent in all sites. In this context, scale up of WiN activities, strengthened diarrhoea treatment and village level water treatment, are warranted.

Background

Malnutrition is a chronic public health problem throughout Niger. Results of a 2016 SMART survey show a global acute malnutrition (GAM) rate of 9.3% and a severe acute malnutrition (SAM) rate of 1.9% for the Tillabery region. For a population of 322,381 people, Tillabery has 32 health centres with outpatient therapeutic programmes (OTPs) with one primary healthcare facility per 10,074 people (compared to Sphere standards recommendations of 1/10,000), one District Hospital for the whole population (Sphere standards recommend 1/250,000), a doctor ratio of 1/40,297 (compared to World Health Organization (WHO) recommendations of 1/10,000), a nurse ratio of 1/8,059 (WHO recommends 1/5,000) and a midwife ratio of 1/22,605 (WHO recommends 1/5,000).

Cooperazione Internazionale (COOPI) has been working in Niger since 2012 to respond to the humanitarian needs of people affected by crisis, conflict and displacement. COOPI has operated a programme to improve the management of SAM in Tillabery since 2012 in partnership with European Civil Protection and Humanitarian Aid Operations (ECHO), World Food Programme (WFP) and the Food and Agriculture Organization (FAO). Technical support has been provided to improve OTP and stabilisation centre (SC) performance indicators and quality of care in OTPs. Since 2015 the programme has focused particularly on community mobilisation to raise awareness of malnutrition within the community and strengthen prevention and early detection, with the support of families, in particular mothers. GAM rates have not significantly reduced in Tillabery since this time, however, achievements worthy of note include good and stable OTP and SC performance indicators; improved quality of care in OTPs; increased community participation; involvement of local communities in growth monitoring activities and heightened awareness of community leaders on the extent of the problem of malnutrition and their increased commitment to act.



WASH in Nutrition (WiN) intervention

Overview

Since 2017 COOPI has integrated WASH into its nutrition programme through the WASH in Nut (WiN) strategy¹. In 2016 COOPI conducted an assessment in 32 health centres, which showed that none of the surveyed facilities respected the 12 standards

¹ Regional, Central and West Africa Group WiN Strategy. www.susana.org/_resources/documents/default/3-2297-7-1438183632.pdf

Figure 1 Composition of the Wash in Nutrition (WiN) kits

Admission	During treatment			Discharge		
 1 JERRYCAN per household	Drinking water source (well, borehold)			Drinking water source (well, borehold)		
	Number of household	AQUATAB	SOAP	Number of household	AQUATAB	SOAP
	2	14	1	2	56	5
	3	21	2	3	84	8
	4	28	3	4	112	10
	5	35	3	5	140	13
	6	42	4	6	168	15
7	49	4	7	196	17	
 1 Bucket, 1 Cup and 1 fabric for filter	Turbid water source (river, pond, lake)			Turbid water source (river, pond, lake)		
	Number of household	PUR	SOAP	Number of household	PUR	SOAP
	2	14	1	2	56	5
	3	21	2	3	84	8
	4	28	3	4	112	10
	5	35	3	5	140	13
	6	42	4	6	168	15
7	49	4	7	196	17	



Sensitizations of beneficiaries in use of aquatab kit, health facility of Bonseeybangou, Tillabéry, Niger, 2018

set by the WiN strategy. Hand washing devices (water point, soap, disinfectant) were absent in the majority of the surveyed facilities. As a result, COOPI decided to strengthen the WASH component both at facility and community level. At facility level, WASH facilities were improved. At community level, a WiN kit was provided to all SAM children admitted to the community based management of acute malnutrition (CMAM) programme in 11 health centres in areas facing

recurrent drinking water supply problems during the rainy season, as well as to all children treated as inpatients at the District SC.

Targeted health areas (Assani, BosseyBangou, Guru, Kandaji, Kofonou, Kurani, Mari, Sawani, Sona, Theim and Wissili) were selected in collaboration with the Regional Directorate of Hydraulic and Sanitation of Tillabery. The households of targeted children received the WiNkit to support personal hygiene, water treatment and water storage for the entire family for the whole duration of SAM treatment plus 30 days after discharge. Depending on the type of water consumed, two kits were distributed: SAM children living in communities with access to river water (cloudy surface water) received a kit consisting of ‘pur’ (a powdered mixture to treat contaminated water), a cup, a permeable fabric and soap; SAM children living in communities with access to water from boreholes or

wells received ‘aquatab’, jerry cans and soap (Figure 1). The quantity of pur, aquatab and soap distributed was calculated according to number of household members.

Full kits were distributed to the caregiver on admission and at each weekly follow-up post-discharge the family received soap and either pur or aquatab. On the final follow-up the family received a one-month supply of soap and either pur or aquatab. Consumables (soap, pur and aquatab) were provided by UNICEF and equipment (bucket, cup and jerry can) were provided by COOPI. In 2018, following a post-distribution survey (results below), COOPI also added a kettle to the kits.

Each village from which a child was admitted to the programme received awareness raising sessions on hygiene and sanitation practices, starting the week following the child's admission. Sessions were run by community mobilisers and aimed to raise awareness among household heads and the wider community on the importance of hygiene and water quality for the treatment of SAM, the prevention of certain diseases (including diarrhoea) and to discourage the sale of kit items on local markets. Mobile teams also used village visits to determine the chlorine load and drinking water pH for the household of each beneficiary. In total 70 households were sensitised once a week for at least four weeks in 288 villages. MUAC-trained mothers (6,000 in total) were also used to reinforce positive WASH messages within their villages.

Post distribution monitoring

A post-distribution monitoring survey (PDM) was conducted from 8 to 15 February 2018 on a representative sample of beneficiary households randomly selected to evaluate the impact of sensitisation activities on hygiene practices and use of WiN kits. Indicators assessed included carrying out hand washing in the critical moments of the day, the correct treatment and storage of water. The PDM also included a beneficiary satisfaction survey concerning the content of the kit and hygiene education sessions and sought to identify mechanisms for sustainability of the project using local means.

Table 1 Residual chlorine present in water in beneficiary households

Number of households	Residual chlorine*
181	0.5 mg/l
5	1 mg /l
3	1.5 mg /l
2	2 mg/l

* World Health Organization standards specify that residual chlorine should be between 0,5 and 1 mg/l

Table 2 Indicators of malnutrition management in health centres in 2015-2017

CMAM Indicators	Interventions		Controls		P. value
	Effectives (n)	Percentage (%)	Effectives (n)	Percentage (%)	
2015 indicators					
Cure rate	1132	96	1158	97	> 0,05
Death rate	2	0	1	0	> 0,05
Default rate	22	2	15	1	> 0,05
Non-responding rate	26	2	19	2	> 0,05
Referral rate	398	25	269	18	< 0.001
2016 indicators					
Cure rate	765	92	1189	97	> 0,05
Death rate	3	0	3	0	> 0,05
Default rate	23	3	29	2	> 0,05
Non-responding rate	37	4	5	0	> 0,05
Referral rate	314	27	289	19	< 0.001
2017 indicators					
Cure rate	726	91	795	92	> 0,05
Death rate	5	1	3	0	> 0,05
Default rate	51	6	63	7	> 0,05
Non-responding rate	17	2	5	1	> 0,05
Referral rate	342	30	187	18	< 0.001

Figure 2 Diseases associated with SAM in intervention and control households

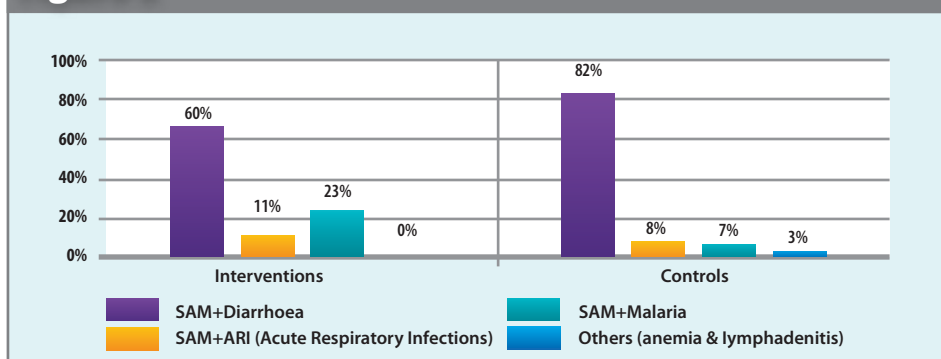


Table 3 Assessment of diarrhoea in intervention and control households

Assessment of diarrhoea in households	Interventions		Controls		P. value
	Effectives (n)	Percentage (%)	Effectives (n)	Percentage (%)	
Diarrhoea	36	38	46	59	<0.001
No diarrhoea	55	57	30	38	<0.001
Do not know	5	5	2	3	> 0,05

Table 4 Drinking water

Water		Interventions		Controls		P. value
		Effectives (n)	Percentage (%)	Effectives (n)	Percentage (%)	
Unfit for human consumption	No treatment	11	11	56	72	<0.001
	Filtering cloth	7	7	5	6	<0.001
	Let rest	2	2	1	1	>0.05
Drinking water	Filtering cloth & aquatab/pur	11	11	1	1	<0.001
	Aquatab	33	34	9	12	<0.001
	Pur	34	35	6	8	<0.001

The results of the PDM showed that, during the first year of implementation, 1470 WiN kits were distributed through the 11 OTPs and one SC against the 1833 expected (80.2%). By the end of the first year all health centres were meeting WASH standards due to the installation of 28 handwashing points and routine treatment of water used for the ‘appetite’ test. The satisfaction survey showed that all beneficiaries surveyed (n=1098) were satisfied with their kits and that households had used them. Household handwashing practices also improved due to the availability of soap.

The quality of drinking water within households was satisfactory, with chlorine levels in the recommended range in 95% of beneficiary households (Table 1) and pH levels ranging from 6.8 to 7.2 (within the WHO standard range of 6.5 and 9) for 92% of households.

Evaluation of the WiN intervention

Impact of the WiN programme on SAM treatment was evaluated after one year in 2017 in terms of the performance criteria of targeted OTPs (average length of stay, relapse rate and defaulting rate); morbidity and prevalence of

diarrheal diseases in SAM children; and hygiene and sanitation knowledge, practices and attitudes in health centres, beneficiary households and non-beneficiary households. The purpose of the evaluation was to contribute knowledge to improve implementation of WiN activities in the health centres and at community level and to learn lessons and make recommendations for future COOPI nutrition-sensitive interventions.

The sample size was calculated using the software ENA 2011 for SMART using SAM prevalence in Tillabery region of 1.9%, precision of 5%, a cluster effect of 1.5, the proportion of children under five years old as 18% (by Regional Directorate of Public Health (RDPH of Niger), average household size of five and non-respondent rate of 3%. The total size of the sample to be surveyed was 88 mothers of SAM children out of 180 households drawn by ENA software. As this is a case control study in 22 health areas, the number of children and households to be surveyed was multiplied by two to 176 children in 360 households (half in 11 intervention areas and half in 11 control areas). The selection of health centres and health workers to be surveyed was based on exhaustive sam-

pling. The selection of health centres from which mothers of SAM children were selected in the intervention and control areas was determined by a random draw. Data processing and analysis was carried out using SPSS 21, Excel and Word software.

Results

SAM management performance indicators

The results of the impact evaluation showed that all performance indicators exceeded the minimum standards set by the national protocol both in intervention and control areas. This good performance could be explained by the technical support provided by COOPI since 2012 to build the capacity of health workers in OTPs across control and intervention areas. Results show no difference in performance indicators between intervention and control areas with the exception of the non-response rate, which reduced from 4% (n=37) to 2% (n=17) from 2016 to 2017 in intervention health centres (Table 2).

In addition, there was a significant difference in referral rates between intervention and control areas. Since 2015 referral activities have been strengthened in the intervention areas through the scaling up of the MUAC mother strategy, through which volunteer mothers are trained in the detection of SAM children and their referral to the health centers. Since 2015 more than 6,000 mothers in 400 villages (60% of whom are located in the intervention areas) have been trained and equipped with a MUAC bracelet; this has led a positive impact in performance indicators, with increased programme coverage (from 52.3% in 2015 to 59.9% of 2017), especially in the interventions areas.

Morbidities in SAM children

The evaluation of morbidities among SAM children in both intervention and control households showed that 28% suffered only from SAM, while 78% of children suffered from SAM associated with other diseases; 22% of acutely malnourished children had diarrhoea. Diarrhoea associated with SAM was more prevalent among children in the control health centres (82%) than in intervention health centres (66%) (p<0.02) (Figure 2). Diarrhoea affected girls more than boys in control households (58%) and intervention households (54%).

At the household level 59% of children in control households had diarrhoea during the two weeks preceding the survey, compared to 38% of children in intervention households, revealing a statistically significant difference (P <0.001) (Table 3). This result could be explained by the reaching of minimum WASH standards in intervention households due to the presence of WiN kits and by the effectiveness of community education and participation of mothers in project implementation. The main treatment for diarrhoea in both intervention and control households is based on the combination of oral rehydration solution (ORS) and zinc, disseminated by health centres.

Figure 3 Use of latrines

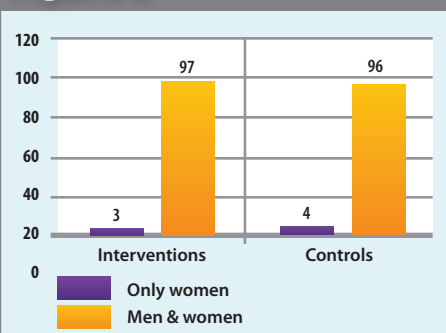


Figure 4 Source of drinking water

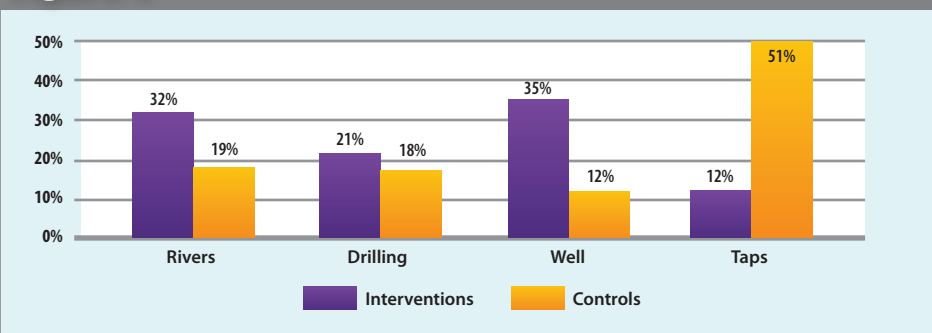


Table 5 Household handwashing

Hand wash	Interventions		Controls		P. value
	Effectives (n)	Percentage (%)	Effectives (n)	Percentage (%)	
With soap	90	92	61	78	> 0,05
Without soap	7	7	12	15	> 0,05
Other (ash)	1	1	5	6	> 0,05

WASH practices

The survey revealed that 80% of households in intervention areas had treated drinking water with aquatab or pure, compared to 21% of households in control areas (Table 4). Ninety-seven percent of women and men in households in the intervention area compared to 96% of women and men in control households used latrines (no significant difference).

There are 12 UNICEF WASH standards applicable to health centres, each of which was evaluated. All intervention health centres achieved the minimum standards set by the UNICEF WiN strategy; 100% of patients and staff had access to a clean water point and handwashing device and each health centre had a waste management system and an improved latrine.

Regarding the main sources of drinking water, intervention households mainly used well (35%), rivers (32%) and drilling (21%), and only 12% used water from taps. In the control households, the main source of water was taps (51%), followed by rivers (19%), drilling (18%) and wells (12%). This result confirms that the interventions areas were selected among those communities which have faced more recurrent drinking water supply problems, especially during the rainy season.

With respect to handwashing, 36% of intervention households used a handwashing device with soap or disinfectant compared to 12% of control households. Results showed that 94% of intervention households had knowledge about the key moments of hand washing compared to 82% of control households. The majority of intervention households washed hands at the ideal time (before and after meals) (60%), compared to 44% in control households. Reasons given for washing hands in 31% of intervention households were the prevention of faecal peril, diarrhoea and parasites and to clean hands. The reasons

given for hand washing in 32% of control households concerned the prevention of parasites.

Ninety-two percent of mothers in intervention households versus 78% mothers in control used soap for hand washing. In control areas in cases where soap was not used, ash was commonly used to wash hands instead. The quality of hand washing differed significantly between intervention and control households (p <0.05). This could be the result of availability of soap provided throughout the project as well as awareness sessions on good hygiene practices at health centres and in the community.

Concerning household sanitation, latrines were used more in control households (71%) compared to intervention households (37%). Sixty-one per cent of mothers in intervention households compared to 55% of mothers in control used the latrines twice daily (no significant difference). Eighty-six per cent of intervention households kept the latrine clean compared to 72% of control households. The good availability of latrines in control areas was an initial advantage for many households; however results show that this was not synonymous with good sanitation practices in the same households. This reflects the need to accompany access to latrines with hygiene and sanitation education to improve their use.

Study limitations

CMAM performance indicators (such as default rates and non-response rates) may have been influenced not only by the WiN activities by other external factors. For example, the referral rate in the intervention zones may have been affected by other community activities, such as the mothers MUAC approach which has been particularly promoted in these zones.

The PDM was conducted by COOPI project staff, which may have induced a bias in benefi-

ciary responses. Conversely the analysis of the data was conducted by an external consultant.

The results of this study reflect the impact of WiN activities after one year of implementation. The WiN strategy should be systematically integrated into nutrition programmes in order to have long lasting results in intervention communities.

Conclusion and recommendations

The evaluation of the WiN project indicates no difference in performance indicators between intervention health centres with improved WASH facilities and control health centres, but significant, positive impact on the non-response rate of acutely malnourished children in intervention compared to controls. Results at household level show significant improvements in hygiene practices and significantly lower diarrhoea co-morbidity in households receiving WiN kits and community education compared to controls. This suggests that in order to reduce morbidity and mortality rates related to diarrhoea, scale up of WiN activities is warranted both at community and household levels. Distribution of the WiN kits should be accompanied by behaviour change communication activities, particularly around prevention of disease through improved hygiene, treatment of water before consumption and use of household latrines.

Future WiN strategies should include the strengthening of health worker skills to treat diarrhoea and to promote and disseminate WiN awareness messages, for example during vaccination campaigns, to help its prevention. Further collaboration between government ministries relating to nutrition and WASH at all levels is also needed in order to carry out joint interventions, such as the creation of water treatment sites in villages with high prevalence of SAM. All activities should be supported by effective monitoring mechanisms in order to understand the effectiveness of interventions and guide future programming.

Tamboura, S., IssaLende, M. and Pantella, L. (2019) Impact evaluation of WASH in nutrition intervention on morbidity and acute malnutrition in Niger. Field Exchange issue 59, January 2019. www.enonline.net/fex

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This study was commissioned by Himalayan Permaculture Centre. The author would like to thank Bhuwan Khadga, Director of the HPC, and the HPC team in Nepal for their assistance throughout the implementation of the study. Thanks also go to Renu Shakya, research assistant and translator, and Chris Evans, HPC Technical Advisor, who supported the planning and follow-up to the study.

Nutrition-sensitive outcomes of a permaculture project in Nepal

Focus group discussion with women during the evaluation, Surkhet, Nepal, 2018

Location: Nepal

What we know: Guidance is available for the design of nutrition-sensitive agriculture projects but few have demonstrated nutrition impact.

What this article adds: The Himalayan Permaculture Centre (HPC) is a grassroots project that builds the capacity of farmers to implement permaculture farming techniques with integrated food security, health, education and livelihoods activities. Explicit nutrition objectives are not included. An evaluation of the HPC was carried out in April 2018 through focus group discussions and individual interviews with HPC staff and beneficiaries. Respondents reported uptake of a range of improved farming techniques and livelihoods activities that have diversified agricultural systems, led to improved yields, increased household income, improved water, sanitation and hygiene practices, and reduced women's workload (leaving more time for household hygiene, child care and appropriate infant and young child feeding). Households reported improved dietary diversity. There is strong potential for the HPC to impact on nutrition positively. Lessons learnt from other nutrition-sensitive programmes can be applied to HPC to help increase nutrition impact, such as integrating behaviour change communication. Women's participation in the programme, access to markets and nutrition and health education are key areas now being addressed.

Background

The nutrition situation is improving in Nepal but remains a serious public health problem. The latest data shows that 36% of children under five years old are chronically malnourished, a substantial reduction from 57% in 1996 (Ministry of Health Nepal and New Era 2017). The Himalayan Permaculture Centre (HPC) is a grassroots, non-governmental organisation set up in 2010 by trained farmers from Surkhet district in mid-west Nepal that aims to build sustainable agriculture and resilient domestic food and energy security through rural development programmes. It builds on experience gained over the past 30 years in training and implementation of permaculture design and practice in remote and challenging environments in Nepal.

The HPC works with 850 households in two rural districts in the west of Nepal, Humla and Surkhet, with an annual budget of approximately £84 (12,800 Nepalese rupees) per household. The HPC is nearing the end of its 'Building Livelihoods for Household and Community Re-

silience' (BLHCR) project (2015-2018), through which work is organised around five areas: food security, health, education, livelihoods and capacity-building. A range of over 45 techniques is used to increase and diversify farm productivity; reduce cost of domestic activities (in terms of time, labour and money); improve health through better nutrition, hygiene and reduced work load; use and recycle local resources; and protect the environment. The four main components of the project are: i) demonstration of techniques, ii) training of communities, iii) provision of resources, and iv) research on techniques and approaches. Activities are supported in the communities through capacity-building by HPC technicians and 'Barefoot Permaculture Consultants' (BC)

– farmers who have been selected by communities for their leadership, technical knowledge and successful application of techniques.

The HPC is a multi-sector programme with activities and planned outcomes that cross the disciplines of agriculture, livelihoods, health and the environment, among others. While improvements in nutrition are not mentioned explicitly in the objectives, many elements are in place to support adequate food and nutrition security (FNS) and the HPC offers a good case study to show the potential for permaculture to support FNS.

The case study here is not an evaluation of the BLHCR project, but a longer-term assessment of the ongoing work of HPC in Surkhet, where HPC works with 265 households. The study was commissioned by HPC as impact assessments have not been carried out to date and there is interest in improving activities for nutrition impact. The study aims to assess the potential of the HPC to improve nutrition and to identify longer-term research and evaluation plans for the HPC and other similar multi-sector programmes.

Methods

An initial literature review and guidance from peers supported development of participatory research tools. Question guides were developed for focus group discussions (FGDs) and key informant interviews. Field research was conducted over a period of three weeks in April 2018 in Surkhet. FGDs were carried out with female members of farmers' groups (n=7), male members of groups (n=6) and an adult literacy group (n=1). Individual interviews were carried out with two HPC staff members, six BCs, one teacher, two women farmers and two local health workers. Findings were presented at a workshop of HPC

Permaculture may be defined as "The conscious design and maintenance of agriculturally productive systems which have the diversity, stability and resilience of natural ecosystems. It is the harmonious integration of the landscape with people, providing their food, energy, shelter and other material and non-material needs in a sustainable way." Geoff Lawton, Permaculture Consultant, Designer and Teacher

technicians and BCs and a theory of change was developed. A final workshop with HPC was used to discuss recommendations and next steps.

Findings

Coverage and participation in training

Training is open to all members of farmers' groups in the HPC villages. Participation in training is skewed towards men, with 39% of eligible men and 28% of eligible women attending technical training between November 2017 and April 2018. There is a perception that health and nutrition training is geared towards women and livelihood and agriculture training is geared towards men. The majority of BCs are male, despite efforts to recruit and maintain women.

Adoption of new techniques

Respondents reported many new techniques that they had implemented as a result of the HPC, including fruit nursery, beekeeping, cash crops, composting, tree planting, covering food, house cleaning and many others. New crops mentioned in particular were plums, pears, peaches, kiwis, almonds, oranges, mulberries, figs, bananas, fodder trees, green leafy vegetables, garlic, onions, tomatoes and cash crops. HPC six-monthly reports (available from www.himalayanpermaculture.com/reports/) give more detail on the techniques adopted in each six-monthly period.

Building of resilience and productive agriculture systems

Challenges to farming highlighted were drought, pests, lack of market access and reduced rural labour due to migration. The HPC has met these challenges by introducing diverse, perennial agriculture systems with a rich mix of species in agro-forestry systems using a range of propagation techniques. Improved livestock breeds have been introduced, while stocks have been reduced to allow natural forest regeneration of hillsides and reduce labour demands. Composting and water systems are managed to support increased production. A system of rice intensification (SRI) has been introduced that requires less labour, seeds and weeding; those using SRI reported increases in yields (although there is no data available to verify this). Increased yields were also reported for corn wheat and buckwheat due to succession planting, water provision and new techniques such as intercropping. A wide range of fruits and vegetables has also been added that are faster growing with greater yields.

Improved livelihoods

Livelihood improvement is a key aim of the HPC in order to stem outward migration and address poverty. HPC supports livelihoods through micro-credit schemes, beekeeping, vegetable seed production, cotton growing and processing, developing mills, growing and processing herbs and cash crops (with weaving and processing of fruit and vegetables under development). Access to markets, particularly for perishable foods, was a limitation cited by communities in this research; activities to address this are planned by the HPC.

Income expenditure

Respondents reported increased household income due to HPC livelihood activities, such as sale of

cash crops, honey, fruit and vegetables, fodder plants and seedlings, and money saved; for example, due to less need to purchase goods now produced at home, such as fruit and vegetables and sugar (due to honey production). Respondents reported spending additional income on school fees, soap, clothes, medicine, stationary, festivals and foods (salt, sugar, pulses, oil, rice and noodles), some of which may have direct and indirect, short and long-term nutrition-related benefits (soap on improved hygiene, for example).

Diets

Most FGD participants reported increased consumption of fruits, vegetables and pulses since joining the HPC. For some households consumption of animal milk has fallen due to labour shortage for livestock rearing; however, the mitigation measures put in place (such as fodder supply, improved breeds and improved water supply) appear to have minimised this effect. Persistent challenges for nutrition include loss of nutrients from over-cooking vegetables and over-processing rice, which are ingrained habits, and the tendency to use additional household income to purchase processed foods to replace traditional, healthier foods. Cooking demonstrations, food processing, food combining and use of sarbotum pito (a locally developed complementary food) are strategies that HPC has used to address these problems, although widespread use of bought processed foods was reported by respondents and HPC staff. There is little data on local malnutrition prevalence to compare with national data; however, respondents remarked that health and nutrition had improved. Data is needed to verify these reports.

Gender empowerment

HPC activities appear to have been effective in reducing the time and drudgery of women's work; for example, through the application of special technologies such as energy-efficient stoves. Respondents also reported time saved through improved sustainability of natural systems (improved water systems, soil fertility and reforestation and growing fodder trees close to the homestead); an impact not widely recognised in the debates on women's time and nutrition. Female respondents reported having more time to spend caring for children, attending to household cleanliness and hygiene, preparing special meals for children, engaging in income-generating activities or social enterprises and attending meetings/socialising. Women's energy expenditure on heavy agricultural work and fetching water and fodder is also reduced, which impacts on energy requirements.

Nutrition and health promotion

HPC nutrition and health-promotion activities include nutrition training, cooking demonstrations and health fairs. The farmers' manual includes a chapter on diet and nutrition, where nutritional properties of foods are described and guidance is given on food processing, production of sarbotum pito and care of the sick or malnourished child. Hygiene practices are also well covered in the training curriculum. Shortcomings are the absence of sufficient guidance on breastfeeding practices and absence of targeting of nutrition and health training to women

during the first 1,000 days. Several women reported that they had received health and nutrition training on topics such as infant and young child feeding (IYCF) and news menus, although for some the training was between two and four years ago. Women also appreciated training they had received on plant propagation, fruit tree planting, salt lick for livestock, energy-efficient stoves and household hygiene practices.

Maternal care during the first 1,000 days

Adequate maternal and child care is critical to the prevention of malnutrition; the global recommendations are for pregnant women to consume a healthy diet with adequate intake of energy, protein, vitamins and minerals to meet maternal and foetal needs (WHO, 2016). HPC may contribute to improved maternal care by increasing the availability of nutritious foods and reducing women's workload. Responses from some women indicate a positive impact; for example, "I consume fish, meat, milk and curd during pregnancy. After giving birth I rest for four months at home. During that time I can feed my child four or five times per day. When I have to return to the fields this is reduced?". However, respondents from another village reveal no culture of reducing workload or special attention to a woman's diet during pregnancy. It is not clear why there are differences between villages. A prevailing serious problem with anaemia among women was reported, caused by excessive bleeding (due to inappropriate use of contraceptives) and poor diet.

IYCF practices

Older women reported that IYCF practices have improved greatly since the start of HPC due to time-saving activities and the greater availability of diverse foods, which are important for IYCF. However, the health professionals interviewed estimate that half of women do not exclusively breastfeed to six months and use breastmilk substitutes (BMS) such as buffalo milk, sarbotum pito and family foods. FGDs confirm this and revealed challenges to exclusive breastfeeding for the first six months, including perceived lack of milk, lack of time, close birth-spacing and early marriage. The uptake of sarbotum pito appears to be mixed, with some mothers relying solely on family foods (rice, dhal and vegetables) even when ingredients for and time to prepare sarbotum pito, a valuable complementary food, are available.

Improved water and sanitation and hygiene practices

The HPC has introduced many hygiene-promotion activities and easy-to-implement technologies to help improve food safety and hygiene practices. The provision of piped water to households and sanitation is a key benefit for health. Time saved by women due to HPC-introduced practices has resulted in more time for light domestic work, with reported benefits for house cleanliness and washing clothes. Sanitation has also been supported by the HPC. Toilets (either composting or traditional) are now widely available.

Informed by the findings, a theory of change (ToC) was developed for outcomes of the HPC

combination of interventions (Figure 1). The ToC shows clearly how the different HPC approaches interact and converge to build potential for improved nutrition. Women's time is saved through a combination of activities, including technologies, environmental improvement and supply of basic services such as water and animal fodder. Food systems are diversified through agroforestry, natural resource management and fruit and vegetable gardens. Income can be used to improve nutrition or for purchase of highly processed foods that are not nutrition-enhancing. Nutrition and health education can be used to modify this effect.

Limitations

Other projects were being undertaken in the same locations, so not all reported benefits can necessarily be attributed to a HPC. Baseline data and a comparison survey would help to assess attribution. It is possible that respondents over-emphasised the benefits of the project; FGDs were limited to community members without HPC staff present to mitigate against this risk.

Recommendations

The strength of the HPC is the integration of its different activities for multiple purposes. This is inherent in permaculture designs which work to address the multiple challenges and needs of communities. The following specific recommendations for HPC were formulated on the basis of the review:

1. Create a specific objective and budget-line for nutrition in future projects to help prioritise and manage nutrition-related activities.
2. Collaborate with a research organisation to implement systematic, regular data collection across sectors, including baseline data in new villages.
3. Collect data against nutrition-specific indicators; e.g. dietary diversity score and sample household weekly food consumption

record collected in different seasons.

4. Improve women's participation and recruitment and retention of female technical staff and BCs by broadening selection criteria from farming techniques and providing child creche facility and children's meals during training sessions.
5. Promote nutrition training that emphasises the importance of home processing and cooking to men as well as women and include HPC staff, technicians and BCs. Target special training on IYCF and maternal care to pregnant and lactating women. Training materials on IYCF practices need updating, particularly the section on breastfeeding.
6. Facilitate a training of trainers (TOT) for technicians and BCs in health and nutrition and build the capacity of health workers to support training delivery.
7. Develop a marketplace for nutrient-dense foods identified as inadequate in the local diet.
8. Provide training and support on people-centred topics for BCs, technicians and community members, such as time management, personal empowerment, confidence-building, report writing, public speaking and planning.

The HPC made several changes in the six months following the review as a result of these recommendations. The selection criteria for technicians and BCs has been broadened to include women with gender-related training (such as training in women's health and gender advocacy), and older women have been recruited with broad experience and who are no longer responsible for young children. Creches and children's meals have been introduced during training sessions to enable women to attend. Some men have now received basic training in nutrition and health topics and plans are in place to offer IYCF and maternal care practices training to pregnant women, increase training on home processing

and cooking, and offer 'people and permaculture' skills training. A part-time nurse has been recruited to assist with health and nutrition training in Humla district and HPC has now developed and delivered a women's health TOT for the first time for nine women and nine men in Humla.

A research project has also since been carried out to test the nutritional quality of rice grown using the system for rice intensification versus traditional rice (data have not been yet analysed). Indicators have been developed to monitor all aspects of HPC and a research concept has been written; funding is currently being sought.

Conclusions

Nutrition has not been strongly emphasised in the HPC approach; nevertheless many of the activities have strong potential to impact on nutrition positively. Some of the lessons learnt from other nutrition-sensitive programmes have been drawn into guidelines that can be applied to HPC to help increase nutrition impact. For example, it is widely acknowledged that agriculture programmes are more likely to show positive impact on nutrition where behaviour change communication for nutrition is included (FAO 2013).

Using the permaculture design, integrated systems that cross traditionally separate sectors can be used to build health and nutrition of communities in a socially, economically and environmentally sustainable way. With the multifaceted challenges faced by rural Nepalese communities, a truly multisectoral programme approach is essential and HPC offers a model for similar contexts.

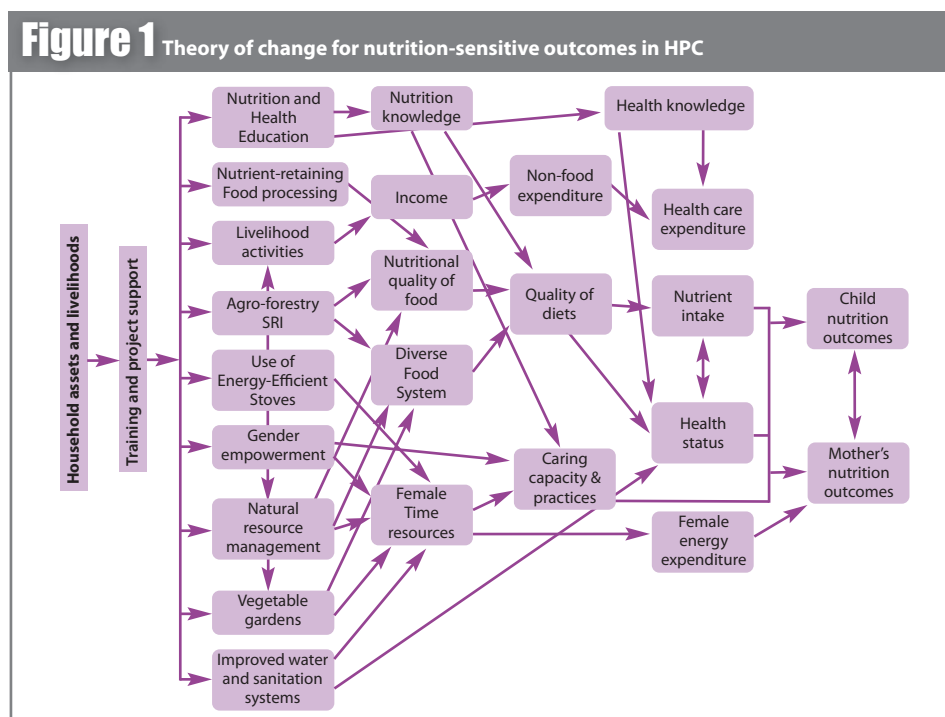
HPC staff and BCs are already working as ambassadors for permaculture. The work carried out by BCs in the 2015 earthquake response (where farmers from the HPC went to help earthquake victims) is evidence of the value of HPC's work. After the earthquake the BCs were deployed to eastern districts of Nepal to help rebuild communities using permaculture designs and techniques. Further opportunities for this type of outreach to expand the reach of permaculture in Nepal would be valuable. The sustainability of HPC relates to low costs and the capacity that has been built for control of the project by local people.

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A multi-sector approach to improve nutrition: Experiences of the Nutrition at the Center project, Bangladesh

By Jahangir Hossain, Nazneen Rahman, Mohammad Hafijul Islam, Md Hasanuzzaman, Khrist Roy and Dlorah Jenkins



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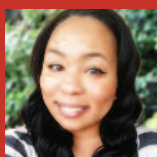
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Khrist Roy has 26 years of programme design, monitoring and evaluation experience in the health and development sectors, focusing on maternal, newborn, child and adolescent health, and nutrition. He is currently a Technical Advisor for CARE USA's Food and Nutrition Security unit.



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CARE Bangladesh



A woman who received ANC services and counselling support, Pangaon Village, Derai sub-district, Bangladesh, 2015

Location: *Bangladesh, Sunamgonj district*

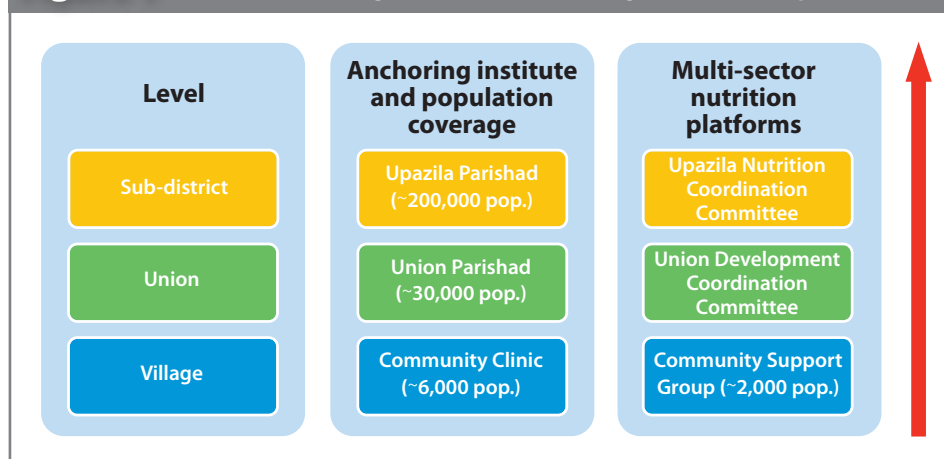
What we know: A multi-sector approach is required to address the multifaceted challenges of undernutrition; however, much remains unknown around process and methodologies related to multi-sector activities, as well as how such activities translate into actions on the ground.

What this article adds: Through the Nutrition at the Center project (N@C), CARE Bangladesh tested a sub-district, multi-sector approach to address malnutrition. One key strategy was to use existing structures and resources to establish a model of community-based, multi-sector coordination platforms to support nutrition-sensitive and nutrition-specific interventions. As such, N@C brought together actors from the public and private sectors, non-governmental organisations and local government at multiple sub-district levels. Results from the endline survey indicate that this multi-sector approach was effective in driving substantial improvements in nutrition outcomes.

Background

In Bangladesh 36% of children aged under five years old are stunted (NIPORT, 2015). The burden of stunting is greatest in the Sylhet region, where the prevalence of under-five stunting is 49.6% (NIPORT, 2015). The Government of Bangladesh (GoB) has committed to achieving the Sustainable Development Goal of ending all forms of malnutrition by 2030; this commitment is made explicit in the country's National Plan of Action for Nutrition (NPAN). Given this political will and the heavy burden of malnutrition in Bangladesh, CARE Bangladesh has set its sights on implementing solid, evidence-based programming in the country to improve maternal and child nutrition. To this end, from 2013-2017, the Nutrition at the Center (N@C) project was implemented. This is an innovative project with a two-fold strategy: (1) to integrate nutrition within the existing community health system; and (2) to strengthen multi-sector coordination around nutrition, with the overall aim of reducing stunting in children aged 0-23 months in project areas by 9%.

The GoB and development partners working in the country have committed to tackling the issue of malnutrition and to doing so via strengthened multi-sector coordination. A multi-sector approach to nutrition is defined in this context by coordinated action among multiple related

Figure 1 Structure and coverage of nutrition coordinating committees and platforms

national government departments, along with local governments and non-governmental organisations (NGOs), to address both direct and underlying causes of malnutrition. Implementation of a multi-sector nutrition programme is context-specific and dependent on what programmes and resources are already in place. The following examples illustrate multi-sector coordination under N@C:

- Maternal and infant and young child feeding nutrition (MIYCN) education was integrated into existing platforms, such as women's empowerment groups;
- Water, sanitation and hygiene (WASH) education was included as part of infant and young child feeding (IYCF) counselling;
- The health department launched school handwashing campaigns to complement school-based iron and folic acid (IFA) distribution programmes; and
- The Women's Affairs department provided vouchers to allow poor pregnant and lactating women (PLW) to access health and nutrition services.

Taken altogether, a multi-sector approach allows us to address malnutrition from multiple angles and levels of causation. However, there is a lack of operational knowledge of how to facilitate multi-sector coordination processes, particularly at sub-district levels. Through N@C, CARE Bangladesh therefore sought to facilitate and evaluate methodologies and processes to operationalise multi-sector coordination from sub-district to village levels and integrate nutrition into community health systems. This article describes the strategies, results and lessons learned from these efforts.

Nutrition at Center (N@C) project

The project was established in the Derai and Bishwambarpur sub-districts of the Sunamgonj district of Sylhet and ran from May 2013 to December 2017, with funding from the Sall Family Foundation and CARE USA. Derai and Bishwambarpur were selected as the project sites due to their high concentration of poor and marginalised populations and their remote location, leading them to be two of the most un-

derlined and low performing sub-districts in Bangladesh. The area is also vulnerable to regular flash flooding and the land is waterlogged for half the year, making it unsuitable for growing crops. There were also opportunities in these locations to work with other livelihood and health initiatives and the GoB encouraged partners to work in such remote communities to devise sustainable solutions using existing resources. N@C was designed in consultation with the GoB, civil society organisations and United Nations and other development partners working in the country.

The project aimed to integrate nutrition into the existing community health system in the programme areas in order to support effective MIYCN. To this end, CARE trained 244 (nearly all) government frontline health workers (FLWs) in the project area and their first and second line supervisors on optimal IYCF practices. Training on supportive supervision, mentoring and monitoring (SSMM) was also provided for government first and second-line health and family planning supervisors to build their capacity to effectively mentor and monitor the performance of FLWs. Supervisors were introduced to the concept of mentoring (or coaching) and offered competency-based mentoring training and post-training follow-up to help integrate their newly acquired skills into routine supervision.

Prior to the programme, there was no growth monitoring and promotion (GMP) training in community clinics in the area, primarily due to logistical problems and a lack of skilled healthcare providers. N@C therefore advocated with the Institute of Public Health and Nutrition (IPHN) to ensure supplies to support GMP, and in addition arranged a one-day refresher training on GMP for community health care providers (CHCPs) based at community clinics (the lowest primary healthcare structure in Bangladesh). Breastfeeding corners were established at 42 community clinics with the help of managers from the Ministry of Health and Family Welfare (MoHFW) to create space for CHCPs, family welfare assistants and health assistants to counsel mothers on breastfeeding techniques and MIYCN and to provide privacy for mothers.

The second strand of the programme aimed to facilitate sub-district multi-sector coordination platforms using existing committees within the government system at community, union and sub-district levels (figure 1). CARE facilitated a participatory process to develop terms of reference (TOR) for each of the committees, built the capacity of committee members through awareness and training sessions, and provided on-the-job support to make the committees functional and effective. While committees improved their effectiveness specifically around nutrition, the skills and principles gained through the trainings can also be applied to other priority programming. Additionally, bi-directional (upward and downward) linkages between the coordination committees were established.

Village level: Community Support Groups

The Community Clinic (CC) is a government-mandated structure at the village level. Each CC is supported by three Community Support Groups (CSGs) that are responsible for the promotion of services offered by the clinic to communities in its catchment area. Each CSG comprises approximately 17 representatives per 2,000 community members and includes members of adolescent/youth groups, women's groups, mother-in-law groups, men's groups, clubs and agricultural groups and businesses. CSG members identify PLW and children under the age of two in their communities and refer them for utilisation of relevant services, such as antenatal care (ANC), postnatal care (PNC), immunisations and GMP. Members then follow up with referred families through household visits to ensure compliance with the advice received at the clinic visit.

N@C mobilised 126 CSGs to promote nutrition and multi-sector activities. Frontline health and family planning workers held sessions to train 2,142 CSG members to build their capacity in nutrition counselling, referrals, linking families with both nutrition-specific and nutrition-sensitive services as needed, and strengthening coordination and accountability among service providers. Coverage of services and supplies have improved in the area in recent years due to increased political commitment; thus the community clinics are well positioned to handle referrals.

As part of the capacity-building process, N@C organised training for CSG members on developing action plans, engaging community groups and structures and committing to nutrition-sensitive and/or nutrition-specific activities. On completion of the training CSGs met monthly to discuss successes and challenges and make pragmatic nutrition action plans. The project facilitator worked with GoB supervisors and staff to provide continued support to the CSGs and facilitate social mapping and implementation of the nutrition action plans.

Women were proactively encouraged to participate in coordinating committees of the CSGs. As a result, of the 219 CSG members who joined

the Union Parishad standing committee, almost half were women. Furthermore, 22 of 24 Nutrition Focal Points (those responsible for overseeing and coordinating a school's health and nutrition activities) are women.

Union level: Union Development Coordination Committees

The Union Council (UC) is the elected body in rural areas, mainly responsible for leading and coordinating rural development. The Union Development Coordination Committee (UDCC) coordinates all development and service-related Union activities and is comprised of elected chairman-members, extension workers of department line ministries and NGO representatives. Rather than creating a new coordination platform at Union level to promote a nutrition agenda, N@C worked with 14 UDCCs, encouraging them to add nutrition as a priority to their standing agenda, increase budget allocation to nutrition activities, and develop multi-sector annual nutrition action plans based on local resources and in line with the ministries' operational plans. Nutrition plans included both nutrition-sensitive and nutrition-specific activities covering health and nutrition; education; WASH; agriculture and livestock; women's and children's affairs; and social safety net activities. Activities included distribution of IFA supplements to PLW and adolescent girls; sanitary napkin distribution for adolescent girls; tiffin box (lunch box) distribution for school children; tubewell and sanitary latrine installations; and distribution of fertilizer, seeds and agricultural equipment. Of the 14 UDCCs, N@C supported budget preparation for six to ensure allocation for nutrition-related activities.

Through the UDCCs, N@C facilitated evidence-based local planning, recording and reporting within community health systems and

the development of effective coordination, best use of local resources, and performance monitoring in terms of improved nutrition within the catchment populations. For example, members of the UDCC now work together to review data on services provided by government health service providers and NGOs to avoid duplication of efforts and to develop a shared report on health and nutrition for the Union.

Sub-district level: Upazila Nutrition Coordination Committee

Two Upazila Nutrition Coordination Committees (UNCCs) were established (one in each sub-district) under the leadership of the *Upazila Parishad* (sub-district) elected chairman. The UNCC is the key vehicle at the sub-district level for the strengthening of multi-sector engagement for improved nutrition. In project areas, the UNCCs successfully engaged key actors from the health, family planning, agriculture, women's affairs, livestock, WASH and education sectors to improve service delivery and provide monitoring support for nutrition-sensitive and nutrition-specific interventions. Broader civil society engagement was ensured through the active participation of major development agencies operating in the *upazila* and, most importantly, the voice of the community was heard through the active participation of community members. Additionally, with the support of the UNCCs, budget allocations for nutrition activities increased in the Union Parishad and departments related to livestock, education and agriculture. The two UNCCs established by N@C are still in operation and the platform is included in the GoB NPAN-2, with plans for replication in all sub-districts nationwide.

Service coverage and beneficiaries

Table 1 shows the number of training sessions

and participants/beneficiaries for select N@C activities between 2013 and 2017.

Baseline and endline survey methodology

In March 2014 a baseline survey was administered to assess nutritional status and influencing factors in Derai and Bishwambarpur (intervention sub-districts) and Itna and Nikli (control sub-districts). The survey evaluated household socioeconomic status, food security, maternal and child anthropometrics, and household WASH conditions. The results of the baseline survey were used to establish benchmarks to measure performance of the N@C; specifically in terms of maternal and child nutritional outcomes.

The survey was based on a representative sample of non-pregnant women aged 15-49 years who had lived in the sub-district for at least six months and who had a biological child age 0-35 months living with her. Sample size was calculated based on the sample required to determine a 9% decrease in stunting (n=1,998 women and their children aged 0-35 months). If more than one eligible child resided in a selected household, one child was randomly selected for anthropometric measurement. Women and children with any known or suspected chronic or congenital disease were not eligible for inclusion.

A two-stage probability proportional-to-size procedure was employed with sub-district units as the primary sampling units (PSU). The secondary sampling units (SSU) were the households within the selected sub-districts with eligible women and children.

On arrival in each sampled area a community meeting was held (prearranged by CARE Bangladesh) to inform community members of the purpose of the data collection and encourage cooperation. Starting from a prominent point at the centre of a union/village, data collectors visited each household contiguously, interviewing one eligible woman. Where multiple eligible women were present, one of them was randomly selected for interview. If there were no eligible women in the household, data collectors proceeded to the next household. This procedure continued until the required number of mothers and children were surveyed.

Height/length and weight of children age 0-35 months and mothers were measured using appropriate equipment. Blood samples were also taken from every third/fourth child age 6-23 months and their non-pregnant mothers (the results of which are still being analysed and will be presented in future). All data were collected using ODK-based platforms for data collection and uploaded to a central server. TAB and programmes with necessary training were provided by CARE.

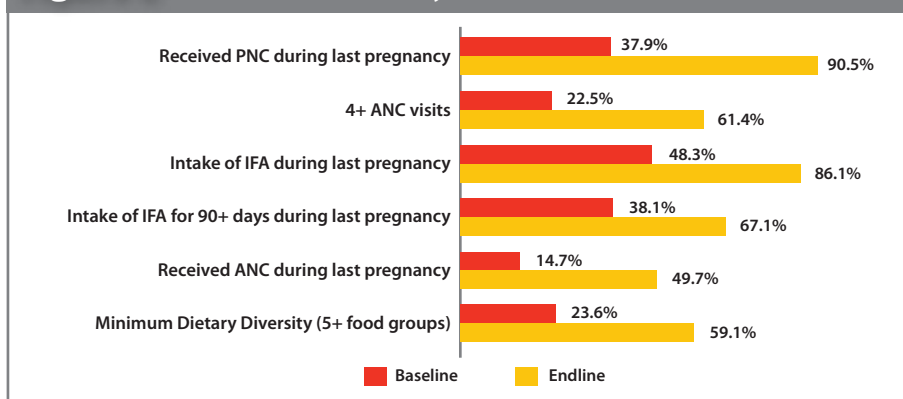
Identical sampling and survey procedures were followed for the endline survey, administered from March to April 2018. For the endline, 1,809 mothers and their children aged 0-35 months were surveyed.

Table 1 Coverage of N@C activities and numbers of beneficiaries

Service/activity	Total	Participants/ Beneficiaries	
Stakeholder training			
MIYCN training (union to district level)	34 sessions	671 (target 671)	
GMP training	–	50 (target 50)	
SSMM training	–	39 (target 41)	
Community Support Group training			
Training for community support group members on leadership, management, and nutrition	35 sessions	672 (target 630)	
Community and school-based activities			
Complementary feeding and cooking demonstrations	1,171	11,091	
Mother & child gatherings at community clinics	1,407	18,336	
Adolescent girls receiving IFA from school-based programme	–	5,218	
School-based health education sessions	451	6,485	
Community handwashing demonstrations	119	2,452	
Services for PLW			
	2015 (#)	2016 (#)	2017 (#)
Counselling sessions for pregnant women	43,978	45,686	54,436
Counselling sessions for lactating women	101,970	110,271	116,200
ANC services	21,101	33,232	46,978
Pregnant women provided with IFA	30,850	27,654*	34,472
Lactating women provided with IFA	13,488	9,440*	13,479

* Decline in IFA distribution from 2015 to 2016 was due to low supply at service centres. This was corrected the following year and IFA distribution to PLW increased again in 2017.

Figure 2 Baseline and endline survey results: Maternal health and nutrition



ANC = antenatal clinic IFA = iron and folic acid PNC = postnatal care

Figure 3 Baseline and endline survey results: IYCF practice

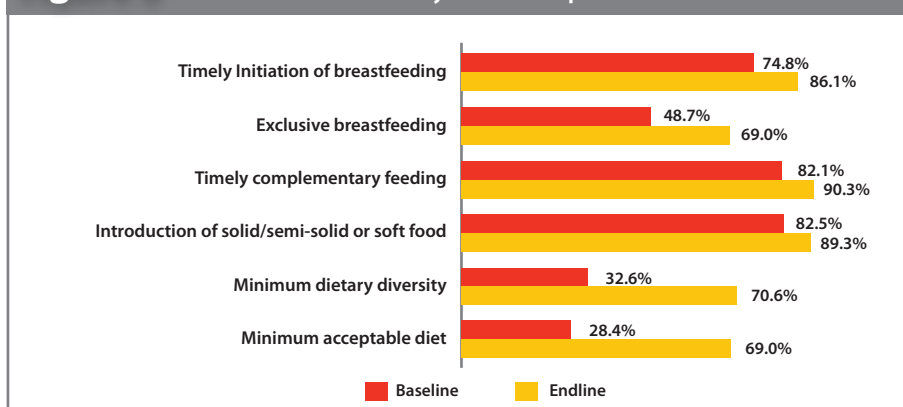
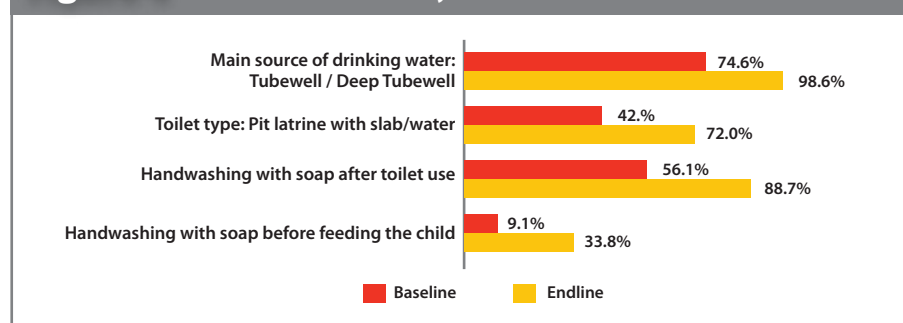


Figure 4 Baseline and endline survey results: WASH



Results

Preliminary results comparing baseline and endline data indicate some improvements in terms of maternal and child nutrition, IYCF practices, WASH and women’s empowerment in the N@C intervention area. Further analysis of changes in the intervention versus the control area is required (forthcoming) to determine with more certainty the extent to which these changes are attributable to N@C interventions.

Maternal health and nutrition

As shown in Figure 2, 59.1% of women in N@C areas met the standards for minimum dietary diversity¹ in the endline survey, an increase from 23.6% at baseline. In N@C project areas, 90.5% of women had at least one ANC visit, compared to only 37.9% at baseline. The percentage of women who had at least four ANC visits also increased from 22.5% at baseline to 61.4% at endline. Iron folic acid (IFA) intake during last pregnancy rose from 48.3% to 86.1% in the N@C project areas. IFA intake for at least 90 days (the recommended minimum) also increased, from 38.1% to 67.1%. The percentage of women who received postnatal care increased substantially, from 14.7% at baseline to 49.7%.

The majority of infants (86.1%) in the N@C project areas were put to the breast within an hour of birth (74.8% baseline) (see Figure 4). The prevalence of exclusive breastfeeding rose from 48.7% to 69.0% in the N@C intervention area. Timely complementary feeding rose from 82.1% to 90.3%. Minimum dietary diversity and minimum acceptable diet increased substantially, from 32.6% to 70.6%, and from 28.4% to 69.0% respectively.

WASH

Figure 5 presents baseline and endline survey results for select WASH indicators. In the intervention area, most households had an improved water source (i.e., tubewell), which increased from 74.6% at baseline to 98.6% at endline. The proportion of households with an improved toilet facility also increased from 42.0% to 72.0%. In terms of hygiene practices, the percentage of mothers who reported that they washed their hands after using the toilet increased from 56.1% to 88.7%. However, not all hygiene practices were well adhered to: only about one third (33.8%) of mothers responded that they washed their hands with soap before feeding their child; an increase from only 9% at baseline.

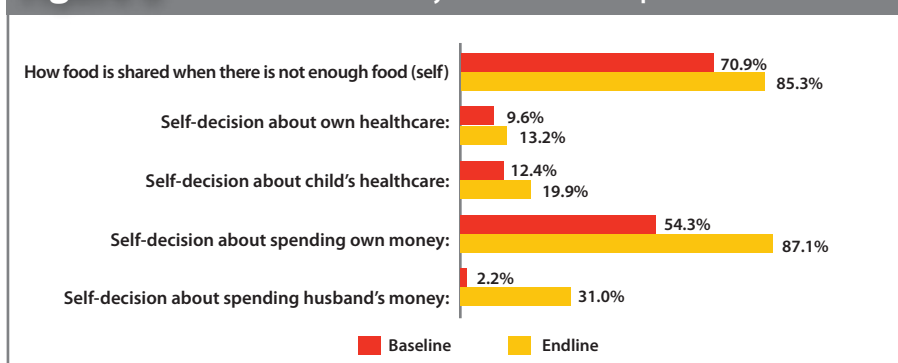
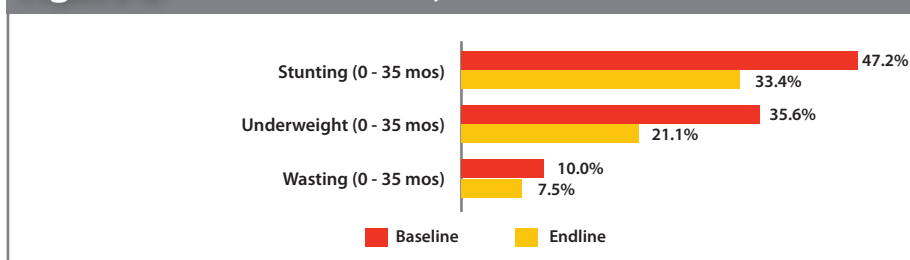
Women’s Empowerment

To assess women’s empowerment, the survey collected information from women who answered that they are the primary decision-maker for the given topic. (see Figure 6). In general, the percentage of women who are the primary decision-makers generally increased. Involvement in economic decision-making increased from 54.3% to 87.1%. Most women are the primary decision-maker in terms of deciding how food is distributed within the household in times of scarcity (85.3%). There was a small increase, from a low baseline, in women’s decision making



A CSG member educates pregnant and lactating women on the importance of taking iron and folic acid, Soromangal village of Derai sub-district, Bangladesh, 2017

¹ Women’s Dietary Diversity is a proxy for food security; minimum dietary diversity is defined as having eaten food from five or more food groups (out of nine food groups) in the 24 hours preceding the survey.

Figure 5 Baseline and endline survey results: Women's Empowerment**Figure 6** Baseline and endline survey results: Children's nutritional status

around her own health care (13.2%) and that of her child (19.9%). Various platforms, such as CSG meetings and mother/child gatherings at community clinics, were mobilised to implement activities around women's empowerment, with a focus on increasing women's role in household decision-making as well as promoting men's involvement in support maternal and child nutrition. This particular result pertaining to self-determination around health care indicates that further understanding needed around how to best empower women to make decisions around their own health and that of their children.

Impact: Children's nutritional status

Results of the endline survey indicate a reduction in stunting of just over 13 percentage points, although the prevalence of stunting among children in the N@C project area remains high at 33.4%. Underweight prevalence among children aged 0-35 months decreased

from 35.6% to 21.1%, while wasting also decreased from 10% to 7.5%. Results for the anaemia analysis are forthcoming.

Lessons learned

Learnings from phase one suggest that developing competency in mentoring is an ongoing process.

- Specific TOR and guidelines are essential to clarify the structures and roles of multi-sector coordination committees
- Identification and implementation of feasible and evidence-based actions encourage multi-sector committee members to add ambitious actions over time.
- Regular progress-sharing and recognition are important to sustain the motivation of multi-sector committee members and hold them accountable for achieving nutrition goals.
- Keep national-level policymakers informed and engaged by facilitating

field visits to observe the processes and achievements of sub-district multi-sector coordination committees.

- Improvements in nutrition outcomes can be achieved through strengthening union and village-level platforms along with district and sub-district-level multi-sector platforms.
- Special attention and specific efforts are required to maintain the quality of activities as the multi-sector nutrition coordination platforms are scaled up throughout the country in coming years.

In Phase 2 CARE envisions building a sustainable system of support that allows supervisors to improve their technical skills and expertise on different MIYCN issues and to provide more mentoring to FLWs. Phase 2 is currently underway as the Collective Impact for Nutrition (CI4N) initiative. Through CI4N, CARE is collaborating with members of SUN to support the Bangladesh National Nutrition Council (BNCC) in operationalising multi-sector nutrition approaches in all 64 districts of Bangladesh.

Dissemination and learning for national scale up

The results of N@C in Bangladesh have been shared through a national-level dissemination workshop. CARE also facilitated multiple field visits for GoB high officials, donors and civil society organisations, including members of the Civil Society Alliance for Scaling Up Nutrition (CSA for SUN), to allow these important stakeholders to observe the multi-sector approaches on the ground in the Sunamgonj district. As a result, policy makers have begun to prioritise and incorporate multi-sector nutrition committees in the country's second National Plan of Action for Nutrition (NPAN-2).

Conclusion

The Government of Bangladesh has institutionalised multi-sector coordinating committees at different levels, incorporating these platforms in the NPAN-2. However, the benefits of multi-sector nutrition committees can be only achieved through effective and sustainable implementation. To this end, CARE Bangladesh offers operational guidelines that are built on our experience in effectively facilitating these sub-district platforms. Furthermore, at just US\$1000 per year, facilitating the sub-district coordinating committees is financially sustainable. In order to make these multi-sector committees fully functional and effective, initial external facilitation supports add critical value that should be considered by government and development partners in nutrition programming in Bangladesh.

For more information, please contact Jahangir Hossain at Jahangir.hossain@care.org



Members of the development, health, and nutrition communities attend a sharing event where CARE presented on the N@C multi-sectoral approach to nutrition, Dhaka, Bangladesh, 2018

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Participants of the Global Nutrition Cluster annual meeting in Amman, Jordan, October 2018

Round table discussion at the Global Nutrition Cluster annual meeting in Amman, Jordan, October 2018



Participants of the Global Nutrition Cluster annual meeting in Amman, Jordan, October 2018



IYCF-E training for the Nutrition Technical Working Group in Gaza, Occupied Palestinian Territory (oPt), supported by Save the Children, UNICEF, WFP and the Nutrition Technical Working Group partners



Meeting on 15th November 2018 in Niger for the development of Niger's first national nutrition plan
<https://www.ennonline.net/mediahub/blog/nigersmultisectoralnutritionplan>



Martha Mwangome (KEMRI/Wellcome Trust Research Programme, Kenya) at the International Symposium on Understanding the Double Burden of Malnutrition for Effective Interventions, IAEA, Vienna, 10th December 2018



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Front cover

Women participating in the national programme for nutrition support to education (MDM) scheme, Odisha, Gajapati, India, 2014; WFP/Aditya Arya



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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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