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Field Exchange

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Emergency Nutrition Network

75th Edition

Discussing challenging issues, in challenging times

Contents

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A mother feeding her child with therapeutic milk through a nasogastric tube at the Unguwa Uku inpatient feeding centre. Nigeria, 2024

Editorial

A mother-to-mother support group meeting shares breastfeeding and complementary feeding practices. Sudan, 2024

Dear readers,

A warm welcome to the 75th issue of *Field Exchange*! As we publish this issue, we are very aware of the broader environment of sudden, devastating funding cuts. We extend our sincere sympathies to those of you personally and professionally affected. A commentary piece by **Sessions et al (page 4)** reflects on the implications of these cuts. It also summarises some of the opportunities arising from this 'wake-up call' to rethink aid models, reflected in recent articles by various actors.

Closely related is a timely views piece by **Lartey et al (page 6)**, conceived before the funding cuts were announced but now more relevant than ever. In this article, six nutrition experts from diverse settings reflect on two key questions: 1) What single action could most positively impact malnutrition? and 2) What bottleneck/major constraint would you remove for the provision of good preventative and treatment for malnutrition? Their responses underscore the need for political will to prioritise nutrition, sustained financing, food system reform, and empowerment of women through education, alongside access to diverse, culturally appropriate diets.

We also include two views pieces exploring issues strongly linked to child undernutrition – one emerging, the other long-standing but often under-recognised. Firstly, **Jannat et al (page 9)** delve into the growing field of the gut microbiome and its crucial role in child health and development. Increasing evidence suggests that interventions targeting the gut microbiome may have a role to play in the management of undernutrition in young children. The authors explain key concepts such as the microbiome, probiotics, prebiotics, and microbiome-directed foods and examine their potential role in addressing undernutrition.

Secondly, **Hewison et al (page 11)** provide a welcome refresher to us all of the critical links between tuberculosis (TB) and undernutrition, given the vicious cycle between malnutrition and infection. The authors highlight the challenges of diagnosis, treatment, and prevention of TB among children, particularly in humanitarian and resource-limited contexts. They discuss the opportunities arising from the recently updated World Health Organization recommendations to positively impact the management of TB among undernourished children. These include simplified diagnostic pathways and household food support for TB patients' contacts.

Action is urgently needed to improve adolescent nutrition in low- and middle-income countries. Recent evidence questions the possibility of linear catch-up growth during adolescence, so there is a need to understand the wider benefits of nutrition interventions for this age group. **Strout et al (page 14)** take a novel approach and consider the wider impact of adolescent nutrition interventions on wellbeing outcomes. Their review finds some evidence of positive impacts on cognitive function, bone health, school attendance, physical activity, behaviour, and morbidity status, while further research is needed to identify key outcomes and optimal interventions.

Several articles explore innovative ways of working to improve nutrition practices and outcomes during the first 1,000 days. In Myanmar, **Kumar Das et al (page 23)** describe how the 2024 Nutrition Promotion Month campaign adapted to the challenges of conflict, insecurity, and natural disasters. Innovative strategies integrating digital technology were used, leveraging the rise in social media use within the country. Fostering partnerships and engaging diverse stakeholders ensured buy-in and smooth implementation, while involving prominent figures and technical experts strengthened trust, amplifying the campaign's reach. Authors recommend future campaigns should continue to build on digital platforms while exploring innovative community-based interventions to reach the most vulnerable populations.

Bhattacharjee at al (page 26) describe how leveraging existing government-led interventions with additional activities can create synergies to improve complementary feeding practices in Odisha state, India. Building on lessons learned in four pilot districts, the project was scaled up to cover the entire state. Key approaches adopted for a more sustainable model included integration with existing government schemes, strong government stewardship, and increased budgetary allocations for nutrition.

Shaikh et al (page 29) describe the benefits of an integrated package of specialised nutritious foods, local diet promotion, and social and behaviour change communication during the first 1,000 days in Badakhshan province, Afghanistan. Results suggest a significant impact on reducing stunting and corresponding improvements in reported infant and young child feeding practices, adding to the growing body of evidence supporting integrated approaches in fragile contexts.

Also reporting from Afghanistan, **Bongassie et al (page 32)** describe how mass MUAC (mid-upper arm circumference) screening can be an effective tool for assessing nutritional needs, monitoring coverage, and identifying and referring cases in resource-limited and complex settings.

Turning to the issue of relapse of acute malnutrition following recovery, evidence to date shows large variations in both relapse rates and risk factors for relapse across different contexts. We publish two original articles echoing these findings. **Bollemeijer et al (page 33)** conducted a retrospective unmatched case-control study to look at potential risk factors for severe acute malnutrition (SAM) relapse in Sudan. Findings highlighted the protective role of individual counselling and continued breastfeeding in this context. The impact of other factors on relapse, such as agricultural land access and suboptimal care-seeking behaviour, need further exploration. **Luc et al (page 35)** examined the impact of providing a nutrient-rich, locally produced supplementary food in preventing relapse post SAM treatment. The article also offers new evidence on the clustering of relapse in specific communities, suggesting the importance of risk factors related to livelihood systems and community-level influences. This seems to concur with the findings of **King et al (page 38)** from their multi-country analysis that few household-level factors were associated with relapse.

Finally for our original articles, **Austin et al (page 17)** describe the community outreach intervention for children with disabilities that they piloted in Harare, Zimbabwe. While the intervention had the potential to successfully address some of the children's most immediate needs, additional holistic support is required to ensure long-term wellbeing.

We also feature our usual array of research snapshots and report summaries, so please check these out!

Finally in this issue of *Field Exchange*, it is with great sadness that we mark the departure of Marie McGrath from ENN. Marie has played a leading role in the vision and values of *Field Exchange* over the 20 odd years she has worked as subeditor/editor. She will be sorely missed. In her honour, we feature **a summary (page 5)** of a podcast she took part in that touches on Marie's immense contribution to the success of *Field Exchange*. We wish her all the very best in her new adventures.

At the same time, we welcome Astrid Klomp to the team as the new *Field Exchange* content coordinator. Great to have Astrid on board!

Happy reading,

Anne, Astrid, Natalie, and Phil

Terminology explainer

In Field Exchange the terms *wasting, acute malnutrition, and wasting and nutritional oedema* will be used interchangeably. The choice of terminology is led by our authors and what is most commonly used in their context. This is to be further aligned with the *WHO guideline on the prevention and management of wasting and nutritional oedema (acute malnutrition) in infants and children under 5 years* (2023), where both terms are also used.

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We have more details on submitting an article for *Field Exchange* on our website **http://www.ennonline.net/fex/writeforus**

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Commentary: Reflecting on the current foreign aid climate

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The recent abrupt cessation of United States Agency for International Development (USAID) operations has sent shockwaves through the global nutrition community. These changes have left millions of the world's most vulnerable without essential nutrition services, disrupted early warning and monitoring systems, and forced many people out of work. First and foremost, we want to share our heartfelt sympathies to our readers who have been personally affected by these cuts, as well as to the organisations, communities, and individuals whose lives have been impacted. Coming on top of the USAID cuts, other governments have also decided to reduce their aid funding. At ENN, we too are grappling with these changes and are seeking the best ways to support our network at this crucial time. We believe in using our platform to amplify the voices of those affected, highlight the far-reaching consequences, and explore how the global aid system can evolve to better meet the needs of those it serves.

The full impact of these cuts will take time to unfold, but some devastating consequences are already clear. A recent journal article by Lindsey Locks and colleagues details some of the impacts, including the termination of lifesaving nutrition programmes through the cuts to the distribution of Ready to Use Therapeutic Foods (RUTF) in Sudan, Nigeria, and Somalia; the halting of emergency food aid deliveries, leaving 500,000 metric tons of food standing at ports; the suspension of data collection systems crucial for tracking malnutrition trends and responding to food crises; and the shutdown of USAID's flagship programme, Feed the Future. The Standing Together for Nutrition Consortium have estimated that 2.3 million young children globally are at risk of losing access to lifesaving treatment for severe acute malnutrition (SAM) as a result of the cuts. Without treatment, up to 60% of children with SAM may die. An article by Vijay Balakrishnan further reports on millions of women and girls denied essential care. The situation is evolving rapidly: the urgency of prioritising life-saving gaps is undeniable and reflected by a nutrition community endeavouring to retain treatment services for the most vulnerable malnourished children. Tom Fletcher, the UN Emergency Relief Coordinator, in his message to the humanitarian community emphasises our defining mission to save lives by providing the best crisis response possible with the resources we have. At the same time, he proposes "urgent work to reform and reimagine how we work; and shift power to our humanitarian leaders in country, and the people we serve".

In line with Tom's message, and perhaps given the luxury of an organisation not on the ground directly implementing, we have found pause for thought in a number of recent blogs and articles. These are reminding us that amidst these challenges lies an opportunity to reimagine and rebuild global nutrition systems in ways that are more resilient, self-sufficient, and equitable. Our respected nutrition peer, Peter Hailey, has published a series of blogs on LinkedIn that call for stakeholders to move beyond individual and organisational interests, creating spaces for unified action to prevent further fragmentation of the global humanitarian system. Ben Phillips' blog hails this as the time to set out a hopeful vision about what we will build together next. Similar perspectives are noted by Cristian Montengro and Sebastian Fonseca, who envision a global health landscape not centred around the US or other foreign donors but diverse and regionally empowered. Catherine Kyobutungi, alongside other African health experts, has described the moment as a wake-up call, urging national governments to invest in self-sustaining health and nutrition systems rather than relying on a flawed development aid model driven by geopolitical interests. She, together with Ebere Okereke and Seye Abimbola in their BMJ editorial, call on African governments and civil society to insist that donors invest in underlying health systems, and in local research institutions, and in turn that global health researchers ensure their work serves local needs instead of the priorities of foreign governments and audiences.

In calling for a different design, several common themes emerge across these commentaries:

1. **Opportunities for true localisation:** Localisation has long been a buzzword but now is the time to genuinely put it into practice, placing power, resources, and decision making with local actors while developing more efficient and self-sufficient approaches. National governments have the opportunity now to foster greater accountability in national health and nutrition strategies, support national institutions and nutrition societies conducting relevant research, and prioritise long-term, context-tailored sustainable solutions over short-term donor-dependent projects, and invest more domestic funding. Similarly, there is an opportunity to promote direct funding mechanisms for national institutions, reducing subcontracting layers and ensuring more funds reach frontline services. Importantly, we can shift from one-size-fits-all approaches to locally led solutions aligning with local diets, agricultural systems, and cultural practices, using indigenous foods and traditional knowledge to effectively address malnutrition.
2. **Promoting regional collaborations:** With reduced US and UK influence, there is a unique opportunity for regional cooperation to drive nutrition agendas forward. Entities like the African Union, ECOWAS, the Federation of African Nutrition Societies, ASEAN groups, and other South-South collaborations can play a stronger role in shaping policies and nutrition priorities and developing regional funding mechanisms. Additionally, sharing best practices across countries can support in developing tailored, culturally and contextually appropriate solutions.
3. **Diversifying funding:** To safeguard against the volatility of international aid, it is crucial to diversify funding. While the nutrition community has been rightly cautious of private sector financing (given conflicts of interest and violations of the International Code of Breastmilk Substitutes), strategic partnerships with private sector and philanthropic organisations could fill critical funding gaps. As Lawrence Haddad reflects, businesses will not engage unless there is a strong business case for nutrition (Ewing-Chow, 2025). Now is the time to build one.
4. **Embracing innovative solutions:** The current crisis demands embracing innovation in health service delivery, taking the lead of national research institutions. Utilising digital health technologies, community-based interventions, and alternative models of care can enhance the reach and efficiency of nutrition programmes. Opportunities to explore the links between different forms of nutrition problems need to be prioritised and we need to invest in preventative activities to ensure that no child becomes malnourished in the first place. By embracing these innovations, we can strengthen the resilience and effectiveness of nutrition interventions on a global scale.

The concepts outlined above are not new but will be challenging to implement with the abruptness of USAID's shutdown, the immediate funding hole this leaves, and the planned reductions from other donors. In the chasm between what has been and what can be, critical services are disrupted and malnourished children, vulnerable adolescents, and women, girls, and communities are left without nutrition support, risking their wellbeing and lives.

Our only option now is to rethink aid models. The future of global nutrition must be locally led, with regional collaborations and diversified funding. In the short term, reduced funding will mean fewer opportunities to connect with critical colleagues; however, collective sharing of experiences, ideas, and action will be essential in creating better aid models. To this end, ENN offers up our platforms to facilitate conversations, share experiences, and push for solutions. For example, see our **en-net announcements page** where we have opened a question to share experiences and solutions. The road ahead is uncertain but by working together, learning from one another, and rethinking how we do things, there is hope for a more resilient and equitable nutrition system.

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A journey through *Field Exchange*: Marie McGrath's reflections on over two decades of learning and impact

In her 22 years with *Field Exchange*, few individuals have contributed as significantly to its evolution as Marie. As she bids farewell to ENN and *Field Exchange*, she shared her reflections on a remarkable career that began as a sub-editor, grew through many highs and lows, and left enduring lessons for the publication's future. Here we summarise the conversation with Marie, which you can hear in our accompanying podcast.

Marie's journey with *Field Exchange* began in an unexpected manner. While writing an **article (McGrath 2000)** on the challenges of conducting research during the Kosovo crisis, she caught the attention of then-editor Jeremy Shoham. Impressed by her work, which required little editing, Jeremy offered her the opportunity to try her hand at sub-editing. Marie took the chance and never looked back. In 2002, when she was appointed co-editor and under Jeremy's mentorship, she refined her editorial skills through a 'learning-by-doing' approach.

As a sub-editor and editor, she relished the art of storytelling, always keen to listen, learn, and document the experiences of nutrition practitioners. Marie found joy in helping authors craft accessible and engaging narratives. "Some people think they have nothing to contribute, but in reality, they hold invaluable knowledge," she remarks. One of the aspects of *Field Exchange* that Marie valued most was its ability to foster openness about both successes and failures. "The real learning happens when people are honest about what went wrong as well as what went right," she says. She recalls how some of the most impactful articles were those that candidly discussed programme failures and adaptations: "It's a difficult thing to navigate putting pen to paper. Fair dues to those who were brave enough to write about their struggles. It's where the true learning happens."

Marie recalls a particularly memorable special issue focusing on **government approaches to scaling up** (*Field Exchange* Issue 43) community-based management of acute malnutrition. Co-hosted with Ethiopia's Ministry of Health, this edition captured real-time perspectives from governments grappling with the issue, bringing Field Exchange to life.

Of course, the journey was not without its challenges. Tight deadlines, encouraging transparency, and navigating sector-wide debates were just a few. Issue 60 on **continuum of care in acute malnutrition management** (Issue 60) even sparked debate by questioning UN agencies' respective responsibilities. It stirred some controversy but ultimately led to meaningful discussions. "We're not here to undermine the system," Marie clarifies: "We're here as constructive allies, highlighting gaps so they can be addressed."

Her parting advice is simple yet profound: "Never underestimate the value of your learning. If something helped you, it will help someone else too."

Marie's legacy at *Field Exchange* is one of fostering connection, knowledge sharing, and fearless learning. As she moves on to new adventures, her impact will continue to resonate within the pages of *Field Exchange* – and in the minds of the countless professionals it has supported over the years.

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en-net is a free and open online community forum where nutrition practitioners can access prompt technical advice for challenges they are facing.

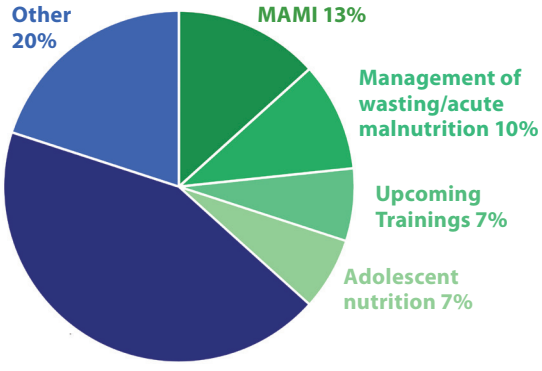
Do you have a question related to nutrition or something you've read in this edition in Field Exchange? Why not post a question or start a conversation on en-net?

Look out for the en-net logo throughout this issue for articles the editors would love you to share your thoughts on.

Join a conversation on en-net.org

What's trending?

In the last three months (January to March 2025) there were 30 posts on en-net. The technical area with the greatest number of posts was the management of small and nutritionally at-risk infants and their months mothers (MAMI) forum. There were also questions posted in the management of wasting and adolescent nutrition forums.



What's new?

Our new and improved en-net platform has been re-designed to ensure it is user friendly and accessible to nutrition practitioners across the globe.

Check out this short video to learn how to use en-net and make the most of its functions. Learn how to sign-up, change your notification preferences, view questions and responses, ask your own questions, and more.

https://www.ennonline.net/multimedia/en/how-use-en-net

Sign up on en-net.org

A mother with her child, who has recovered from acute malnutrition, at a community health centre in central Mali.

Shifting perspectives: Views of experts on changes most needed in global nutrition

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Ayoub Al Jawaldeh
Nutrition Advisor, World Health Organization (WHO), Eastern Mediterranean Region

Hana Bekele
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What we know:

The statement that nutrition is both a *marker* of development (a way of tracking development) and also a *maker* of development (a foundation of development) holds true today. Alan Berg's work was among the first to recognise this, and in today's climate it is more important than ever that we prioritise preventing and effectively treating malnutrition.

What this adds:

The article provides local and regional views on the key priorities and actions needed to tackle the multifaceted challenges of malnutrition. It challenges us to pause and reflect on the changes most needed in global nutrition, now more important than ever with a seismic shift happening in funding from major donors.

Join a conversation on en-net.org

In September 2023, an article was published in *World Nutrition* following the celebration of Alan Berg's 90th birthday and 50th anniversary of the publication of his seminal book The Nutrition Factor. Berg's work has been lauded as achieving a revolution in how malnutrition is perceived and addressed in the context of national development. In preparation for an event honouring his achievements, Berg was asked what his message would be today if he was to write a sequel. Berg decided to gather insights from his so called 'nutrition engineer' friends. The article *'Shifting Mindset: Views of seasoned experts on changes most needed now in global nutrition work'*, authored by Ted Greiner, summarised the views of 11 experts in public health nutrition specialising in low-income settings (Greiner, 2023).

Box 1 **Alan Berg's questions**

Q1. If you were the all-powerful queen or king of nutrition and could push a button for one thing to happen that would have the greatest positive impact on nutrition, what button would you push?

Q2. What is the best-proven nutrition intervention that we already know works, but has not come anywhere near fulfilling its potential?

Q3. What is the major constraint today to our seeing more nutrition interventions on a consequential scale? And how to overcome it?

Greiner, in his own response to Berg's first question (Box 1) replied: *"without access to both local 'nutrition engineers' and local government resources, the kind of broad and long-term work needed to really solve public health nutrition problems cannot be mobilised and countries are stuck mainly with the kind of externally guided and financed 'pilot projects' that most bilateral and other donors often make believe provide the needed solutions"*. ENN was inspired by the article, and particularly by Greiner's point on local nutrition engineers.

ENN's work is guided by the priorities of those working in challenging contexts worldwide. Therefore, we decided to shift the perspective and complement Greiner's article with insights from experts, from and working in a range of different low- and middle-income countries. Approaching experts within our networks (academia, government, and non-government organisations), we aimed to broadly match organisation profiles with those in Greiner's article. We merged Berg's original questions into two and adjusted them to ensure that the focus remained on local-level challenges and realities. Respondents were encouraged to explain their rationale and identify where and for whom the impact would be greatest. They were given the choice to respond in writing or via a short remote interview. The views of these six experts are shared in this article.

Q1. If you were an all-powerful leader and could push a button for one thing to happen that would have the greatest positive impact on malnutrition, what button would you push?

Renuka Jayatissa

"I would push the button to ensure **access to culturally acceptable, nutrient-dense foods at affordable prices**. This will supplement staple foods and provide a more diverse diet, which will help prevent malnutrition. Many people currently consume cheaper, calorie-dense foods because nutrient-dense options are not affordable. The greatest impact will be seen in Africa and Asia, where stunting and wasting rates are very high, and where economic downturns, climate change, and political instability worsen access over time. Children under five and pregnant women will benefit the most, which will also minimise intergenerational effects."

Ayoub Al Jawaldeh

"Focusing on **food systems** would be the top priority because both overnutrition and undernutrition are linked with the food system. The food supply chain starting from production, to storage, processing, and utilisation is linked to the nature of the food we are eating. For example, in the Middle East, one of the main causes of obesity is high consumption of simple carbohydrates coming from refined sugar, white bread (with low extraction rate), and rice; most often subsidised by governments. Reducing simple carbohydrates and processed foods could be top priority to control obesity and even malnutrition. It is all linked to the food system."

Juan Cobeñas

"I would push the button that can change values, beliefs, and attitudes in the minds and hearts of leaders who have the power of taking decisions that shape the world."

"I think of senior government officials, but also of each doctor in a primary care room, each professional in charge of a displaced persons or refugee camp, each authority in a faraway village of a low-income country. In summary, each person who has the power to decide how and to whom resources are allocated. This change would imprint in them the deep belief that all people are equal in dignity and have equal right to life.

I am a person with disability and high support needs. I was at risk of death because of malnutrition despite being in a favourable environment. Through my lived experience I am aware of the importance of equity, and the importance of having access to quality care. Changing beliefs and attitudes, for example providing training to parents and caregivers on correct feeding practices for a child with a feeding difficulty, can enable that child to thrive. The attitude of health professionals and officials responsible for budgets, policies, and actions in the setting in which each child is born determine the difference between life and death."

Khawaja Masuood Ahmed

"The button I would push for my country [Pakistan] would be **finances or the budget allocation for nutrition interventions.** In 2011, there was a constitutional amendment and health was devolved to the provinces. Although the federal ministry was reconstituted again in 2013, financing remained with the provinces. Despite acknowledging that nutrition is one of the major issues in health and that, without addressing malnutrition, other health indicators will not improve, provinces were reluctant to allocate resources, especially to primary healthcare and nutrition.

In 2018, we were directed by the Prime Minister to develop a large-scale nutrition programme covering a third of the country with the highest burden of stunting and wasting at that time. The resources that were required were almost USD 2 billion and this was one of our commitments at the Nutrition for Growth Summit in Tokyo. Despite budget approval in 2021, and in 2022, and 2023… we have not been able to meet that pledge. So, if I was in a decision-making position, I would allocate the resources and initiate that [stunting reduction] programme for Pakistan".

Anna Lartey

"I see a tap with malnutrition flowing out of it. We need to get to a point where we turn off the tap and reduce the number of malnourished children. A lot of effort is going into treatment. What I think we need to turn off that tap is **female education**. That is the button I would press. A Ghanian educationist once said, "If you educate a man, you educate an individual. If you educate a woman, you educate a whole nation". I don't know what led him to say this, but it's true. When you educate a woman, you do so many things for her. You empower her. Give her agency. She is independent. She is more confident, and she will take the right decisions because her objective is to ensure that her children grow well. If I was in a position to do something, I would ensure that every female is given education to the highest level that their abilities and capabilities will permit. Education can help take women out of poverty and turn off the malnutrition tap."

Hana Bekele

"I would choose to implement **universal access to nutrition education and resources**. This initiative would ensure that individuals across all demographics have the knowledge and means to make informed dietary choices. Nutrition education empowers individuals, providing them with the information necessary to understand their dietary needs. It can be tailored to meet specific regional needs while maintaining core education principles to sustain healthy practices over time. Leveraging mobile technology for disseminating information can reach remote areas where traditional educational resources may be limited."

Q2. If you could remove one major constraint/ bottleneck to the provision of comprehensive services and systems that prevent and effectively treat malnutrition, what would this be?

Juan

"I believe that the bottleneck of the current situation of hunger and malnutrition that af-

A grandmother feeds her grand daughter, at the family's home in O Rochang village. Cambodia

Children display locally grown vegetables in Rajasthan. India

fects millions of children would be to **comply with the 16th Sustainable Development Goal: Peace, Justice, and Strong Institutions**. Without peace and stability, children's rights cannot be realised: there cannot be access to vital social and health services, equitable justice systems, safe water and food, and other forms of protecting children from violence and other degrading treatments. Childhood malnutrition is the cruellest degree of social injustice and, although the causes are many and complex, I believe that peaceful and inclusive societies, with effective, accountable, and inclusive institutions at all levels, would set the basic cornerstone to put an end to malnutrition."

Anna

"If I could sweep one thing away, although it is not easy, I would say it has to be government **apathy**. A lot of the systems that we have are not working. For example, we had vitamin A supplementation happening for several years. We got to a point where the donors have done what they could, and it was time for government to take over. For two to three years nothing happened. Why? The government says: "We have no money". But money is being spent on other things. You see, I think that if the government is committed to make a change so that malnutrition levels drop, they can do it. It is a matter of prioritising. If we can remove that apathy, and invest in the nutrition of children, it would help us. After all, the children today are the future leaders tomorrow."

Masuood

"I won't say there is one bottleneck that would be enough to be removed to push forward the nutrition agenda, but, yes, in my opinion very **strong advocacy and communication** is required at all levels to change the thinking and perception about preventive care, whether it is malnutrition or preventable diseases. What we need is proactivity (…as was seen with the COVID-19 response in Pakistan) and a collective push by all, including civil society, opinion makers, academia, healthcare providers, and policymakers towards nutrition programming. Politicians should change their mindset from short-term visible gains to long-term developmental progress. The launching pad is available (excellent strategies, regulations, plans, for example). What we need now is the resource allocation and implementation if we want to improve malnutrition and make any dent in stunting statistics."

Hana

"One major bottleneck stands out for me: that is, **financial barriers to accessing adequate nutrition**. Financial barriers encompass a range of issues including the high cost of nutritious foods, lack of affordable healthcare services, and inadequate funding for public health initiatives aimed at combating malnutrition. These barriers disproportionately affect low-income populations who may already be facing food insecurity or limited access to healthcare resources. Establishing clear targets for domestic expenditure based on the specific burden of malnutrition would mean governments can drive progress and accountability."

Renuka

"I would focus on **weak health systems and inadequate healthcare personnel in vulnerable areas**. With a weak health system, malnourished individuals are not detected early and do not receive timely treatment. Additionally, the numbers are often under-reported, and interventions are delayed due to inefficiencies in the healthcare system. There may be poor record-keeping and lack of coordination between different sectors due to system gaps. By removing these bottlenecks, malnutrition can be detected and treated early. The coverage of services will be improved to reach the most vulnerable populations in rural and remote areas. Health professionals can improve the nutrition literacy of communities and provide effective counselling, thus empowering communities."

Ayoub

"We need to **rethink how we interpret and use data to assess nutrition situations and target interventions**. We must put the data on the screen, break it down, and look at the geographic distribution. For example, with anaemia why are technical teams still pushing for prevalence of anaemia as a whole, rather than going for in-depth analysis of mild, moderate, and severe anaemia cut-offs? If I was a policymaker and my team came to me with the data, which shows 70% prevalence of anaemia and I've been doing supplementation for 20-30 years, I'd ask the bigger question about the slow change of this figure and look more in detail at [changes in] the level of severity of cases to determine the right intervention. There is no need for blanket distribution in all cases as there is a financial implication, and compliance is a challenge. Mild anaemia should be targeted through preventative mechanisms. In settings with limited resources in particular, we must focus on moderate and severe cases through targeted interventions. We need to look at the data we are collecting. We have been talking about anaemia for over 30 years, and we are not achieving the global target in most in most low- and middle-income countries."

Reflections

Although we couldn't have imagined it when we started working on this article, recent global events are illustrating the power of pressing a single button, in this case the suspension of foreign aid from the United States. We don't know what the full impact will be on malnutrition globally as the shocks radiate across communities, organisations, and governments. However, undoubtedly it will be acutely felt by the most vulnerable and disadvantaged households in fragile contexts. Amidst the turmoil, we are seeing reflections on what needs to change and improve going forward. The nutrition experts we spoke to here highlight the need to reform food systems and prioritise prevention, ensuring access to culturally accessible diversified foods and empowering women through education. Echoing Greiner's article, the need for political will to prioritise nutrition was highlighted alongside the importance of sustained financing. This is clearly more important than ever.

"The fact that the whole developing world depends largely on ONE country to meet development needs is a failure of governments. It shows how vulnerable governments are. You either toe the line or no support for you. What is happening should make governments in low- and middle-income countries sit up. These are tough times: they should find alternative financing sources, including local sources, and break loose of this control."

A reflection from Anna Lartey

Was the 'stop work order' the shock needed to finally shift perspectives, to reform an unfit financing system and prioritise decolonisation and localisation? What is clear is that networked, collective effort, grounded in the wisdom of local nutrition engineers, is needed to forge a new way forward and ensure the nutritional status of the most vulnerable in our global society is protected.

ENN would love to hear from our readers: what button would you push? Share your thoughts on en-net.

For more information, please contact Lucy Lafferty at **lucy.lafferty@ennonline.net**

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Home made 'Dahi', a fermented milk product

Gut-healthy diets: A promising pathway to enhancing child nutrition

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What we know:

The gut microbiome plays a crucial role in child health and development. Increasing evidence suggests that interventions targeting the gut microbiome may have a role to play in the management of undernutrition in young children.

What this adds:

This article explains key concepts such as the microbiome, probiotics, prebiotics, and microbiome-directed foods. It considers the current evidence linking microbiome-directed foods with child nutrition outcomes.

Undernutrition is influenced by multiple potential drivers, including food insecurity, exposure to pathogens, and impaired intestinal function caused by inflammation and a reduced absorptive surface area, a condition known as environmental enteropathy. Therefore, merely increasing access to food may not adequately address the underlying causes of undernutrition. Nutritional supplementation is thought to correct only about 10% of stunting-related growth deficits (Amadi et al, 2021). Interventions targeting water quality, sanitation, handwashing, and nutrition have shown limited effects on improving diarrhoea and child growth, indicating that other biological pathways may be overlooked (Luby et al, 2018).

How does the microbiome affect child nutritional status?

Increasing evidence suggests that the microbiome is deeply involved in regulating weight, shaping and modulating the immune system and maintaining overall bodily homeostasis. The microbiome refers to the community of trillions of microorganisms, including bacteria, viruses, fungi, and other microbes, that live in and on our bodies, particularly in the gut. These microorganisms play a crucial role in human health and are involved in many essential bodily functions.

The microbiome plays a crucial role in child health and growth by influencing key aspects of immune function, nutrient absorption, and overall development. The gut microbiome helps break down complex carbohydrates, fibres, and other substances that the body cannot digest on its own, turning them into simpler compounds that can be absorbed. It helps regulate the immune system, teaching the body to distinguish between harmful pathogens and harmless molecules, thus preventing infections. The beneficial bacteria in the gut microbiome act as a protective barrier by competing with harmful bacteria and viruses, limiting their ability to colonise the gut. Some gut bacteria produce essential vitamins, such as vitamin K and certain B vitamins, which are important for energy production.

The human microbiome is influenced by a range of factors, including genetics, age, sex, and environmental elements such as geographic location, mode of birth, medications, and lifestyle (Fontaine et al, 2023). Numerous studies have shown that early life events, particularly nutrition, are crucial for the initial establishment and development of the gut microbiome through the first 1,000 days of life (Robertson et al, 2019).

Imbalances in the microbiome, known as dysbiosis, have been linked to malnutrition and stunted growth, particularly in resource-poor settings (Littlejohn & Finlay, 2021). Promoting a healthy microbiome through a diverse diet, especially with breastmilk, fibre-rich foods, fruits, vegetables, and fermented foods, can positively impact a child's overall health, growth, and long-term wellbeing (Robertson et al, 2019).

There is some evidence that improving gut microbiome health can reduce the risk of a child becoming stunted or wasted, as well as support recovery from such conditions, by reducing the risk of infections and improving the absorption of nutrients in the gut. This will be discussed in later sections.

What are microbiome-directed foods?

There is ongoing research to explore the use of certain foods to improve the gut microbiome in children, as a strategy to prevent and treat undernutrition. Microbiome-directed foods are foods that are specifically targeted toward improving gut health and can contain different components to improve the microbiome, such as probiotics, prebiotics, synbiotics, and postbiotics. One of the best sources of many of these components are fermented foods.

Probiotics

Probiotics are live beneficial bacteria or yeasts that may provide health benefits when consumed in adequate amounts. They can help to restore the microbiome after disturbances (such as antibiotics or illness) and enhance microbial diversity. Probiotics can compete with harmful bacteria for resources and space, enhance digestion, support the immune system, and improve gut barrier function. Probiotics can be added to foods like yoghurt or kefir and can be consumed as supplements.

Prebiotics

Prebiotics are indigestible fibres or substances that act as nourishment for beneficial gut bacteria, stimulating their growth and activity. They can increase the diversity and functionality of the gut microbiome by providing nourishment for beneficial microbes, leading to enhanced digestion and immune response. Prebiotics are available in foods like garlic, onions, leeks, asparagus, bananas, and whole grains.

Synbiotics

Synbiotics combine the effects of both probiotics and prebiotics to maximise beneficial changes in the microbiome. Probiotics are introduced into the gut, and prebiotics ensure their growth and colonisation. This synergistic approach can lead to a more stable and lasting improvement in microbial diversity and activity compared to using probiotics or prebiotics alone. Certain dietary supplements and fortified foods combine probiotics with prebiotics, such as fibres like inulin or fructooligosaccharides.

Postbiotics

Postbiotics are bioactive compounds produced when probiotic bacteria breakdown prebiotic fibres, such as short-chain fatty acids, enzymes, peptides, and polysaccharides. While they are not live microorganisms, postbiotics exert beneficial effects on the microbiome by supporting gut barrier integrity, reducing inflammation, and modulating immune responses. They can be especially helpful for individuals who are unable to tolerate live probiotics but still want to benefit from their metabolic activity.

Fermented foods

These are foods that undergo a fermentation process where natural bacteria or yeasts break

down sugars and starches, leading to the production of beneficial microbes. Fermented foods are a natural source of probiotics that can enhance the diversity and population of beneficial bacteria in the gut. Fermentation produces not only live microbes but also bioactive compounds (postbiotics), further supporting digestive health and microbial balance. Fermentation can also increase the bioavailability of nutrients like iron, zinc, and B vitamins, which are essential for growth, and break down anti-nutrients (such as phytates) that often block nutrient absorption. Yoghurt, kefir, kombucha, miso, tempeh, kimchi, sauerkraut, and pickles are some popular fermented food items.

How can microbiome-directed foods improve child nutrition outcomes?

It has been suggested that interventions that aim to improve the gut microbiome may have the potential to prevent and treat undernutrition in children. The following sections explore the current evidence base and highlight research gaps.

Microbiome-directed food interventions to manage diarrhoea and prevent undernutrition

Evidence suggests that microbiome-directed foods can improve children's nutritional status through various pathways, including reducing infections like diarrhoea, enhancing nutrient absorption, boosting immunity, and lowering pathogenic bacterial load. However, few studies have directly examined these effects or their association with growth outcomes across diverse populations. A meta-analysis by Kambale et al (2021) evaluated the effectiveness of probiotics and synbiotics in managing diarrhoea among undernourished children. They found that treatments using probiotics or synbiotics both significantly reduced the duration of diarrhoea, and the length of hospital stays. Reducing the length and severity of diarrhoea incidents could serve to reduce growth faltering and reduce the risk of wasting.

Providing probiotics, prebiotics, synbiotics, and fermented foods within complementary food interventions is another way that microbiome-directed foods could help prevent stunting and wasting in children. The theory behind this is that the period immediately after the first six months of breastfeeding, when the microbiome is still 'immature', is when the gut is most readily colonised. Whether it is colonised by either 'good' or 'bad' bacteria could dictate the trajectory of childhood growth. Several systematic reviews found promising evidence of the benefits of probiotics during complementary feeding on child growth, especially in undernourished contexts (Onubi et al, 2015; Heuven et al, 2021). However, the authors do highlight the limited evidence due to the small number and high heterogeneity of studies, and the need for larger, well-designed trials.

One intervention trial in Bangladesh that provided yoghurt as a complementary food to infants at risk of growth faltering demonstrated potential to support child growth and also explored some of the pragmatic requirements for implementing and scaling up such interventions (Jannat et al, 2023).

In summary, while there is some evidence supporting the role of microbiome-directed foods in the management of diarrhoea and the prevention of undernutrition in children, the evidence remains mixed, and more research is needed to understand the nuance of what makes some microbiome-directed food interventions effective and others not.

Microbiome-directed food interventions to treat undernutrition

A landmark randomised controlled trial in Bangladesh provided a microbiome-directed complementary food (MDCF-2) to children aged 12-18 months (n=123) with moderate acute malnutrition (MAM) (Chen et al, 2021). The control group received a ready-to-use supplementary food (RUSF). Despite containing 43 fewer calories per 50g daily dose than the RUSF, MDCF-2 significantly improved weight gain over the three-month duration of the study. Consequently, the trial had to be stopped early because it was no longer ethical not to provide the new intervention to the control group.

A two-year follow-up of the 2021 Bangladesh study (summarised on page 40) found that children who had received the microbiome-directed complementary food were significantly less stunted than the control group (Mostafa et al, 2024). They also had higher levels of gut bacteria and plasma proteins associated with growth and development.

The same formulation has also been studied in treating children with MAM who are recovering from severe acute malnutrition (SAM) and found similar benefits as the original study (Hartman et al, 2024). The improvement in weight-for-length z-scores was significantly higher in children treated with MDCF-2 compared to the RUSF control, and there was an increase in the plasma levels of proteins associated with musculoskeletal and central nervous system development.

Microbiome-directed ready-to-use therapeutic foods (RUTF) have not yet been extensively trialled as a treatment for children with SAM. A trial in Malawi involving 795 children with SAM (the ProNUT study), comparing RUTF with and without added probiotics and prebiotics. There was no significant difference in nutritional cure rates between the two groups (Kerac et al, 2009). Another trial involving 400 children with SAM in the Democratic Republic of Congo (the PruSAM study) found that RUTF with probiotics led to earlier nutritional recovery, with 59.4% of the probiotic group recovering by week 6 compared to 31.3% in the placebo group. However, by week 12 the nutritional recovery rates were similar between both groups (Kambale et al, 2023).

These mixed findings suggest that further research is needed to explore the potential of microbiome-directed interventions to support recovery from SAM. There is also more research needed in other regions, age groups, and living environments, to see if the positive results achieved for children with MAM in Bangladesh are replicable elsewhere.

Current challenges and evidence gaps

The evidence for microbiome-directed food interventions remains inconclusive, and considerably more research is needed before these approaches can be recommended as strategies to prevent or treat child undernutrition. So far, research has been limited to certain regions of the world and there is a need for more evidence in diverse populations. Microbiome-directed foods must be locally produced and culturally acceptable; ensuring that these foods align with local culinary practices is crucial for their acceptance and widespread use. Additionally, assessing the cost-effectiveness of these interventions is essential for scalability.

Microbiome-directed foods also face regulatory hurdles, such as authorisation for production and classification, which may complicate the development and distribution of these products. Clear guidelines on permissible health claims and regulatory pathways will be crucial to ensuring that these interventions are safely and widely available to the populations that need them most.

The transfer of the microbiome from mother to child during birth and breastfeeding underscores the need to focus on maternal health. Improving the gut health of mothers not only benefits the child at birth but also modulates long-term child health outcomes (Forgie et al, 2020). Maternal nutrition and microbiome-directed interventions should be recognised as essential components of child health strategies. Further research and large-scale trials in this area could contribute to greater success in improving child nutrition.

Finally, more effective diagnostic tools are needed to assess the impact of these microbiome-directed interventions. There is currently no standard method for defining a 'healthy' gut microbiome. Indicators like the 'relative microbiota maturity index' and 'microbiota-for-age z-score' (MAZ) could be valuable in standardising assessment of microbiome interventions (Subramanian et al, 2014). Further data are required to link these indicators with undernutrition outcomes across different regions.

Conclusion

The body of evidence supporting microbiome-related strategies is growing, highlighting their potential to improve child health and nutritional status. However, more robust evidence is needed to scale these interventions effectively. Rigorous intervention trials are needed and should include diverse populations, such as those from different geographical regions, age groups, and nutritional statuses, as well as mothers, to generate more comprehensive and conclusive evidence. Microbiome-related strategies, such as therapeutic foods, probiotics, and fermented foods, go beyond simply providing calories and nutrients; they aim to restore a healthy balance of gut microorganisms, which play a vital role in digestion, immune function, and the availability of nutrients. Incorporating these approaches into nutrition programming could improve children's gut health, helping them to better absorb nutrients and build stronger immune systems, which are vital for overall growth and development. In low- and middle-income countries, where recurrent infections, environmental enteropathy, and poor sanitation contribute to malnutrition, micro-

biome-focused interventions could be particularly impactful. With increased research and policy support, these approaches could lead to more effective and sustainable solutions for combating child malnutrition worldwide.

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Opportunities to improve undernutrition and tuberculosis management in paediatric care

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An MSF Nurse feeding a child on admission in the inpatient feeding centre in Unguwa Uku. Nigeria 2024

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What we know:

Tuberculosis (TB) and undernutrition are strongly linked. Undernutrition increases the risk of developing TB and poor outcomes from TB, while TB can both cause and worsen undernutrition. Diagnosis, treatment, and prevention of TB among children can be challenging, particularly in humanitarian and resource-limited contexts.

What this adds:

Recently updated World Health Organization (WHO) recommendations offer opportunities to positively impact the management of TB among undernourished children. One of the main additions is the use of a decision tree to be able to diagnose children with TB in humanitarian and resource-limited contexts, even in the absence of conventional diagnostic tools. Improvements in preventative TB treatment for children and food assistance for household contacts of TB patients are other promising developments.

TB is the biggest infectious disease killer globally, causing over 1 million deaths annually. TB is caused by bacteria spread through the air when an infected person coughs or sneezes. It most often affects the lungs (pulmonary TB) but can affect any part of the body (extrapulmonary TB). In 2023, 10.8 million people fell ill with TB worldwide. Of the estimated 1.3 million affected children aged under 15 years old, 45% are never diagnosed. Around 96% of the estimated TB-related deaths are among these children, who have never accessed TB treatment. Most people infected by TB bacteria never develop the disease, but those with a compromised immune system have increased risk. Thus, since adequate nutrition is needed for a strong immune system, poor nutritional status is one of the major TB determinants, with over 1 million cases of TB each year attributed to undernutrition (WHO, 2024a; Dodd et al, 2017).

Undernutrition is not only a factor leading to the development of TB disease after infection but is also a significant consequence of TB. Young children are inherently more vulnerable as their immune systems are still developing, are at more risk of undernutrition, and can become ill more easily. When they fall ill they also become more severely unwell and more frequently die from illness.

Despite the large global burden of TB, there has been chronic under-investment in research and development for tools dedicated specifically to children and humanitarian and resource-limited settings. In particular, lack of prioritisation has resulted in inadequate tools for early detection, timely treatment, and effective prevention of TB in this vulnerable population.

Recent and upcoming recommendations from WHO present an opportunity to address

some of the challenges and improve upon the status quo. These are discussed further below. New recommendations for nutrition and TB are expected to be released in 2025. In addition, the 2023 WHO guideline on the prevention and management of wasting and nutritional oedema includes recommendations for children with co-morbidities such as TB (WHO, 2023).

As a medical humanitarian organisation, MSF, also known as Doctors without Borders, frequently encounters children with TB and undernutrition, and the associated challenges. This inspired MSF to develop the TACTiC (Test Avoid Cure TB in Children) project, a multi-country project to improve the management of TB in MSF projects and beyond. The project has three pillars: 1) implementation of the various WHO recommendations; 2) operational research on the effectiveness, feasibility, and acceptability of the recommendations; and 3) advocacy for the implementation of currently available tools, as well as for more research and development into better adapted tools for the management of TB in children.

Drawing on our experience within the TACTiC project, in this article we describe challenges in the management of TB in children with undernutrition and steps toward improvement.

Challenges in tackling TB among children affected by undernutrition

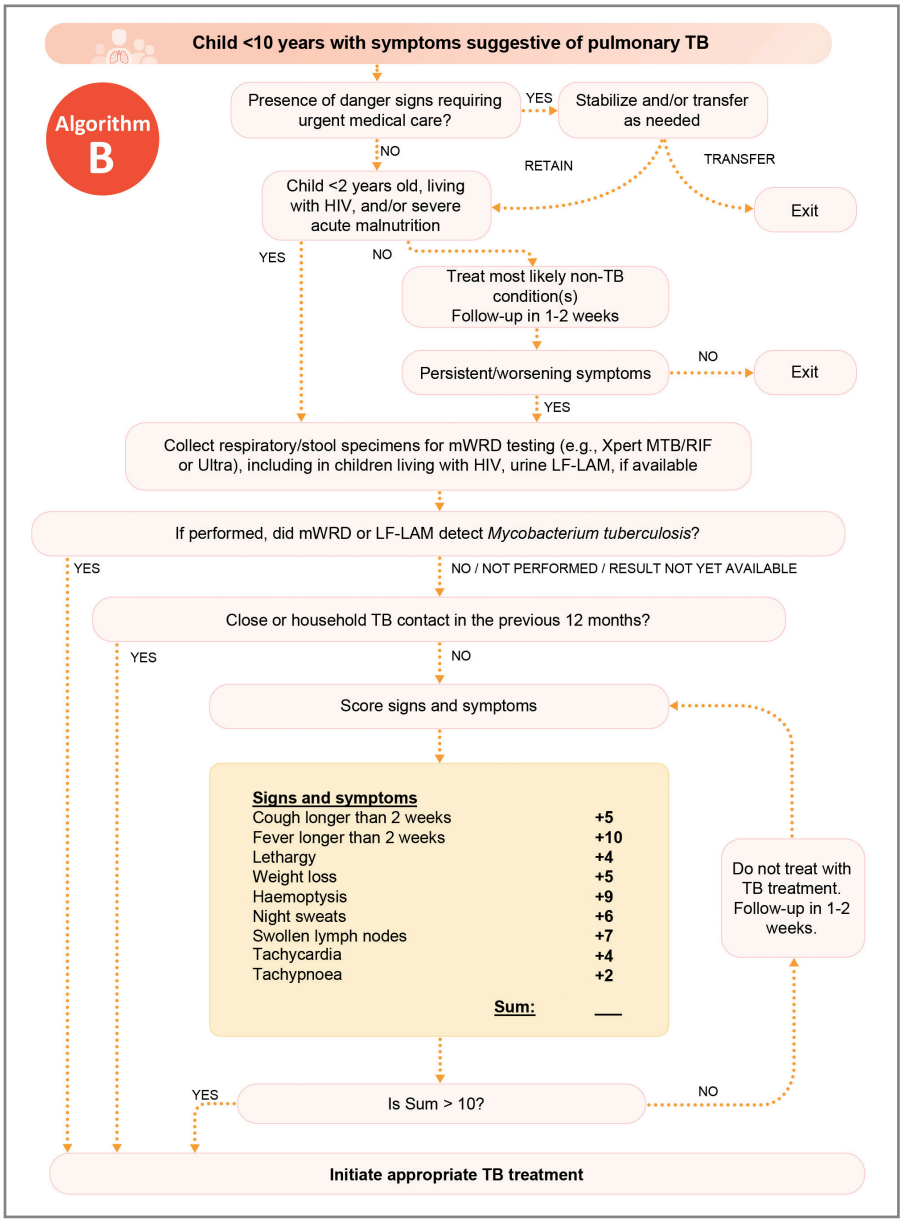
Difficulties in diagnosis

Weight loss or failure to gain weight are classic symptoms of TB. One would therefore expect that it would be simple to screen all children with undernutrition to rule out TB as a cause. Diagnosing TB in children can, however, be very challenging. A contributing factor is the lack of tests adapted to children. Children develop TB disease with a very low number of Mycobacterium tuberculosis (M.tb), the bacteria causing TB. Current microbial tests are not sensitive enough to pick up the low number of M.tb that is causing illness. Preliminary results from MSF studies show that less than 10% of children diagnosed with TB have a positive test. Furthermore, current tests usually rely on sputum (spit) samples. Sputum is difficult to collect from children, especially the youngest ones, as it requires coughing up sputum from their lungs, following instructions that children might struggle with.

Children are also more frequently affected by extra-pulmonary TB, such as bone TB or TB meningitis. Collecting samples from the affected area for testing is even more challenging. Furthermore, symptoms resemble those of many other diseases, adding to the diagnostic challenges. Clinicians must therefore rely primarily on clinical observations and a high-level awareness of TB as a potential diagnosis, complemented by microbial testing and radiology, to decide on treatment.

Overcoming these challenges is particularly urgent for children that are undernourished or younger than two years old who, along with children living with HIV, are at highest risk of death from TB and where delays in diagnosis are often deadly (Vonasek et al, 2022).

Figure 1 WHO's algorithm B (page 74, WHO 2022b) for children <10 years of age for settings without X-ray



Algorithm A (not depicted) is for settings with chest X-ray. 'mWRD' and 'LF-LAM' are different laboratory tests.

Lack of integrated programming

At a programmatic level, the vertical nature (addressing specific diseases in standalone programmes) of TB and nutrition programmes pose a barrier to an integrated approach (Patel & Detjen, 2017). These programmes often run in parallel, with independent sources of funding and coordination, as well as disease-specific objectives and priorities. Most children affected by undernutrition and TB present for care through nutrition programmes, which have little capacity to screen, test, or treat TB cases. Access to space, medicine, appropriately trained staff, and infrastructure such as X-ray and laboratory capacity to conduct bacteriological testing for TB are particularly constrained in humanitarian and resource-limited contexts. In crises, emergency interventions around access to food, water, shelter, and outbreak management are prioritised, leaving little capacity to identify and treat TB among children with undernutrition.

Stigma

Stigma surrounding TB and misconceptions about undernutrition can also result in inadequate recognition of symptoms, as well as delays in diagnosis and treatment of TB in this vulnerable group.

Steps for improving the management of children with undernutrition and TB

Informed by new evidence, in 2022 WHO issued new recommendations that offer an opportunity to make a real positive impact on TB management amongst children suffering from undernutrition (WHO, 2022a). Several recommendations stand out in their potential to revolutionise the approach to care for this vulnerable demographic.

Use of treatment decision algorithms

Firstly, WHO recommends the use of treatment decision algorithms (Figure 1) to facilitate clinical decision making and rapid initiation of TB treatment for children aged under 10

years with pulmonary TB. There are two algorithms, one for use where chest X-ray is available and one where it is not (Figure 1). A key feature of the algorithms is the fast-tracking of treatment initiation for children with highest risk of mortality, including those presenting with severe wasting as well as children aged under two years and those living with HIV. The algorithms include a scoring system that uses clinical signs and symptoms, and X-ray findings if available, to decide on treatment initiation. Although laboratory testing for TB is encouraged, even if testing is unavailable or a negative result is obtained this does not hinder starting treatment based on clinical symptoms alone. The algorithms are also designed to encourage repeated assessment when indicated. WHO made an interim recommendation on the use of these algorithms (WHO, 2022b). MSF is among the organisations answering the WHO call for operational research documenting their use in real-life settings.

Data from MSF projects implementing the WHO-recommended treatment decision algorithms in therapeutic feeding programmes have shown a 1.5- to five-fold increase in the number of children with severe wasting diagnosed with TB. Preliminary results from an ongoing MSF study on implementation of the algorithms in five African countries show that up to 80% of children diagnosed with TB are diagnosed via the algorithm's clinical score rather than laboratory test results. This applies whether using the algorithm with or without chest X-ray.

These results emphasise the importance of clinical decision making when deciding whether to treat children for TB. They also illustrate how the algorithms facilitate the decision to treat TB in undernourished children, even without access to X-ray or laboratory testing, or in the case of negative results (which can be expected in children with wasting).

Reducing the duration of TB preventive treatment

WHO recommends a short three-month treatment to prevent the development of TB disease among children who are likely to have been infected by TB by living in the same household as a person affected by TB disease. This preventive treatment can reduce the number of children developing TB disease. The short duration and the availability of new child-appropriate drug formulations for all ages should have an important impact on their scale-up (WHO, 2024b).

Food assistance for household contacts of TB

In 2024, WHO convened a Guideline Development Group to review available data on TB and undernutrition. The updated version of WHO's 2013 recommendations on TB and nutrition (WHO, 2013) is expected in early 2025. Data from the RATIONS trial in India found that food assistance to all household contacts of a TB case reduced the number of people in the household who developed TB disease (Bhargava et al, 2023).

Integrated protocols, guidance, and decision making

To effectively manage paediatric TB and undernutrition, collaboration between nutrition and TB services is essential. This can be facilitated by the harmonisation of guidance documents, in particular the inclusion of TB treatment decision algorithms in national guidelines for the management of wasting. Clear guidelines that dictate the appropriate contexts and circumstances for utilising treatment decision algorithms will ensure a streamlined diagnostic process rather than additional workload. This includes creating pre-screening questionnaires and decision trees tailored for busy healthcare environments, enabling healthcare workers to more efficiently identify at-risk children and refer or initiate TB treatment when indicated.

In the long term, integration of TB and nutrition services into national health programmes will ensure that management of both TB and undernutrition in children is aligned with broader health goals. Advocacy aimed at making TB a priority within national health agendas is critical for mobilising the resources and attention necessary for comprehensive care.

Improving capacity of healthcare workers

Increasing the clinical capacity of healthcare workers in general paediatric care as well as the clinical overlap between TB and undernutrition is crucial for improving diagnostic accuracy. Capacity-building initiatives can empower frontline health workers to navigate the various illnesses that affect vulnerable young children and to acquire the competencies to recognise the often-subtle signs of TB in malnourished children.

Community engagement and awareness

Community engagement plays a vital role in reshaping perceptions around TB and undernutrition, and enhancing TB awareness within communities can reduce stigma and promote early healthcare-seeking behaviour among families. Hearing from communities on how to best tailor TB services to their needs can also contribute to improved treatment experiences and results.

Utilising peer support groups and community health workers can facilitate education and support for families grappling with the compounded challenges of TB and undernutrition. Empowering families with knowledge about the risks and symptoms of TB can lead to timely interventions and increased adherence to treatment, including preventive treatment.

Improved monitoring and evaluation

Implementing effective strategies requires ongoing monitoring and evaluation to assess the impact of integrated care interventions on health and nutrition outcomes for children with TB and undernutrition. Continuous feedback loops integrating children and their families, healthcare workers, and policymakers will enable all stakeholders to refine their approaches based on real-time data, enhancing both programme efficacy and responsive resource allocation.

Data collection on paediatric TB cases in undernourished populations should be prioritised, allowing for a better understanding of the epidemiological trends and disease burden. By leveraging technology such as digital health tools, stakeholders can streamline reporting processes and enhance data accessibility, promoting a culture of transparency and accountability.

Conclusions

TB affects children with undernutrition disproportionally, especially children with severe wasting where the risk of death is high. The best tools currently at our disposal to detect and manage TB among undernourished children are the WHO treatment decision algorithms combined with the vigilance and skills of healthcare workers. Investment in research and development is needed for the elaboration of better diagnostic tools, adapted to the needs of children with TB. Implementation of household food assistance and providing preventive TB treatment to children who are household contacts of TB cases have the potential to substantially reduce the incidence of TB disease in this vulnerable group.

Integration of nutrition and TB services into national health frameworks is key. As is engaging communities and addressing supply, logistical, and human resource challenges in ways that could increase the number of undernourished children diagnosed and treated for TB. This could improve timely treatment and so ultimately reduce mortality in this vulnerable group. Nowhere is this more needed than in humanitarian and resource-limited contexts.

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WHO (2023) WHO guideline on the prevention and management of wasting and nutritional oedema (acute malnutrition) in infants and children under 5 years

WHO (2024a) Global Tuberculosis Report 2024

WHO (2024b) WHO consolidated guidelines on tuberculosis: Module 1: Prevention: Tuberculosis preventive treatment

Adolescents outside their school in Oromia Region. Ethiopia

Beyond catch-up growth: A wellbeing approach to assessing adolescent nutrition interventions

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What we know:

Action is urgently needed to improve adolescent nutrition in low- and middle-income countries (LMICs). Recent evidence questions the possibility of linear catch-up growth during adolescence, so there is a need to understand the wider benefits of nutrition interventions for this age group.

What this adds:

This review was novel in that it considered the impact of adolescent nutrition interventions on wellbeing outcomes. Some evidence of positive impacts on cognitive function, bone health, school attendance, physical activity, behaviour, and morbidity status were identified. Further research is needed to identify key outcomes and optimal interventions for adolescent health and development across contexts.

The world is home to approximately 1.2 billion adolescents (aged 10-19 years), 90% of whom live in LMICs. This age group face critical nutrition challenges that affect not only growth but cognitive development, school achievement, and long-term health, as well as the health of future generations (Norris et al, 2022).

Adolescence is considered a 'second window of opportunity' for catch-up (or recovery) in linear growth, after the first 1,000 days from conception through the first two years of life (Prentice et al, 2013). However, recent evidence questions whether catch-up growth during adolescence is possible, due to unclear definitions of normal versus rapid growth and challenges in distinguishing between growth spurts and catch-up growth (Leroy et al, 2020). The 2021 *Lancet Series* on adolescent nutrition suggested catch-up growth may occur during early adolescence, but only in the context of significantly improved socio-economic conditions (Norris et al, 2022).

This somewhat bleak outlook on the plausibility of catch-up growth during adolescence may have considerable implications for nutrition advocacy and programming for this age-group, for which investment is already lacking (Hargreaves et al, 2021). There is a need to focus on the broader benefits of nutrition interventions *beyond* linear growth, including health, development, and wellbeing (Martorell et al, 2017).

This review explores the impacts of nutrition interventions during adolescence on wellbeing outcomes beyond anthropometry and micronutrient status, in LMICs.

Methodology

This review was conducted as part of a master's thesis, designed as a systematic review, and subsequently adapted to fit the style and format of Field Exchange. Some aspects of the systematic review process (such as detailed data extraction, quality appraisal, and data synthesis) are not included due to space constraints. Similarly, it has not been possible to cite every study included in the review. Further details about the methodology, including a comprehensive list of studies and findings, are available upon request from the corresponding author.

The review was guided by an existing framework, which identified five domains for adolescent wellbeing (Ross et al, 2020). The authors adapted this framework to illustrate the hypothesised pathways (Figure 1) through which nutrition interventions influence wellbeing outcomes (yellow circles) within the five wellbeing domains (blue circles).

Systematic search strategy

We conducted a systematic search of three electronic databases on the Ovid Interface: MEDLINE(R), Embase, and Global Health. The search was last updated on 10 January 2022. We also searched reference lists of relevant papers and reviews and accessed articles recommended by experts. Our search strategy covered four key concepts: (1) children and adolescents aged 10-19 years, (2) nutrition interventions, (3) wellbeing outcomes, and (4) LMICs. The wellbeing outcomes were informed by the five domains of an existing adolescent wellbeing framework and supported by our hypothesised pathways to impact (Figure 1).

Inclusion and exclusion criteria

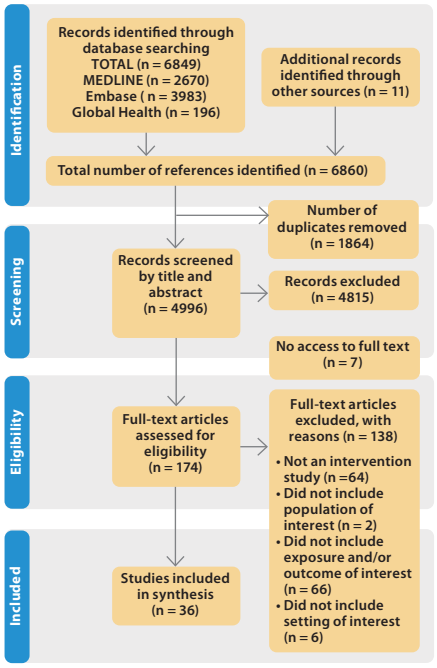
Our inclusion criteria, using the 'PICO' framework, were as follows: Studies with a **population** of adolescents aged 10-19 years (based on the World Health Organization definition) including males and females. Studies with a wider age range were included if most participants were aged 10-19 years. All types of nutrition **interventions** in any setting (for example, schools, community, healthcare). Studies with a **comparison** group (such as a less intensive nutrition intervention) and those with no comparison group. Studies reporting **outcomes** from any of the five domains of wellbeing (Ross et al, 2020). Only studies conducted in LMICs. Study designs included any experimental or quasi-experimental evaluative design.

We excluded grey literature, conference abstracts, reviews, theses, and dissertations. We also excluded studies published before 1990 and studies not available in the English language.

Titles and abstracts were screened by one reviewer, and full texts by two reviewers. Data were extracted using a standardised form. The quality of eligible studies was assessed using the National Institute for Health and Care Ex-

Figure 1 Conceptual framework linking nutrition interventions to adolescent wellbeing outcomes

Figure 2 PRISMA study flow diagram



cellence quantitative study checklist tool (NICE, 2015). Results were presented as a narrative synthesis. This study was assessed by the Research Governance and Integrity Office at the London School of Hygiene and Tropical Medicine and deemed not to require ethical approval.

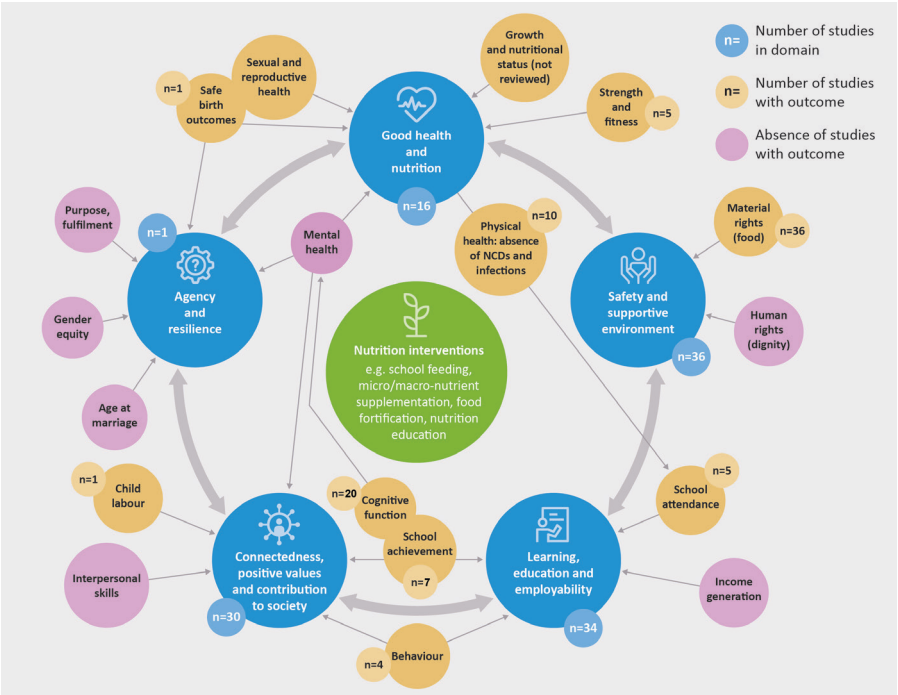
The searches identified 4,996 titles and abstracts: 174 full texts were assessed for eligibility, resulting in 36 included studies (Figure 2). Most studies were graded as having 'average' or 'good' internal and external validity, though some lacked blinding and allocation concealment, affecting their quality grades.

Key findings

Regional characteristics

The included studies were conducted across LMICs, with 34% in South Asia, 23% in East Asia and the Pacific, 17% in East and Southern Africa, and smaller proportions in Latin America, the Middle East, and West Africa. The regional concentration in Asia and the absence of significant evidence from Latin America and Africa highlight gaps in our understanding of intervention impacts, particularly for adolescents in non-school settings.

Figure 3 Outcomes assessed in intervention studies



Key domains and outcomes of interest

For each wellbeing domain, the key outcomes and number of studies are summarised in Figure 3. Some studies appear in more than one domain. Most studies focused on two wellbeing domains: (1) learning, education, and employability; and (2) connectedness, positive values, and contribution to society. All interventions could be considered to contribute to the domain of 'safety and supportive environment' since they support the right to food, thereby enabling improved dietary practices (quantity, quality, and/or diversity). Evidence was lacking for many outcomes across the wellbeing framework, such as adolescent physical and mental health, interpersonal skills, employability, equity, maternal birth outcomes, and purpose/fulfilment.

Interventions

The interventions of interest included micronutrient supplementation, provision of fortified foods, animal-source meals or snacks, and non-animal/non-fortified meals or snacks. Most interventions (94%) were school based, and 29% targeted adolescents aged 10-19 years, with a focus on girls. There was a scarcity of evidence exploring the impacts of other nutrition intervention modalities on wellbeing outcomes, including nutrition education and counselling, social and behaviour change and communication, and agricultural programmes. Intervention durations ranged from six weeks to over two years, with longer interventions (10 months or more) often showing greater impact. Fifteen percent (2/13 studies) of shorter interventions (six months or less) showed no impact.

Micronutrient supplementation

All micronutrient supplementation interventions included in this review (7/7 studies) showed posi-

tive effects on one or more outcomes. Four studies demonstrated positive impacts on cognitive function with daily or twice-weekly iron and folic acid supplementation compared to weekly supplementation. Additional outcomes included improved school attendance (vitamin A), bone health (calcium), taste acuity (zinc), and reduced preeclampsia risk (calcium) (one study per outcome).

Fortified food and beverage interventions

Fortified foods, including multiple micronutrient-fortified biscuits, beverages, and milk, had positive effects on cognitive function in 75% of studies (6/8 studies). Other positive impacts included improved self-reported infection status (one study), school behaviour (one study), bone density and accretion (three studies), and physical fitness (one study). In regard to school achievement, fewer interventions had an impact: fortified biscuits (one study), eggs (one study), and unfortified porridge flour (one study) showed no effect, while chewable vitamins and high-protein/high-micronutrient snacks had positive effects (one study).

Animal-source food interventions

All interventions that provided meat as part of a meal or snack (nine studies) had positive impacts on cognitive function (one study), midarm muscle area (one study), behaviour (one study), physical activity (one study), morbidity status (one study), and school attendance (one study). Breakfast interventions that included milk, also improved cognitive function and behaviour (three studies).

Non-animal-source food interventions

Non-animal-source food interventions (seven studies), such as snacks (unspecified) and porridge, showed mixed outcomes. Positive impacts were observed in school attendance (one study), enrolment (one study), immune function, morbidity (two studies), and reduced child labour (one study), but mixed effects were seen in school achievement and cognitive function (two studies).

Discussion

Despite the breadth of wellbeing outcomes included in our search strategy, we found a limited range of evidence. The available literature suggested that micronutrient supplementation, fortified foods, and other meals or snacks had beneficial effects on most of the adolescent wellbeing outcomes investigated. The positive impact of school meals/snacks on attendance, and in some cases on enrolment and dropout rates, was consistent regardless of food quality.

The concept of health and wellbeing was challenging to define in the search terms, as these concepts encompass a wide variety of domains and interpretations across studies. To address this, the search strategy was informed by established frameworks for adolescent health and wellbeing, ensuring consistency and alignment with current definitions in the field.

While evidence remains limited, these findings underscore the importance of adolescent nutrition interventions, beyond the focus on catch-up growth. This review suggests that the frequency and duration of interventions, along with the quality of the school environment, may significantly impact their effectiveness. Many studies lacked details on implementation fidelity, which could have improved assessments of effectiveness. The overall lack of evidence for this age group also made it difficult to define key aspects of nutrition interventions, such as micronutrient content, meal content and quantity, delivery methods, and duration.

The lack of standardisation across outcomes impedes efforts to synthesise evidence (such as through meta-analyses) and compare interventions, methods, and contexts. Simple, low-cost, standardised measures of adolescent health and wellbeing are needed to better assess the impacts of nutrition interventions. A new toolkit for assessing health, growth, physical function, and cognitive development in middle childhood (5-14 years) is being piloted in Zimbabwe (Piper et al, 2021). The 'SAHARAN toolbox' measures cognitive processing, motor skills, physical fitness, and body composition, alongside caregiver questionnaires on nurturing and schooling. A similar standardised toolkit for adolescents could greatly improve the evidence base. The conceptual framework from this review (Figures 1 and 3) could be used to develop such a toolkit and fill existing gaps in metrics.

The review found evidence that school feeding programmes targeting younger children have positive impacts on school attendance, cognitive function, and growth (Wang et al, 2020), but they highlight a gap in evidence for the benefits of school feeding in secondary schools. Targeting older adolescents has the potential to improve health and wellbeing outcomes beyond linear growth. Further research and pilot programming is warranted.

Approximately 11% of births occur in adolescent girls aged 15-19 years, and pregnancy-related complications are a leading cause of death in this age group (Sama et al, 2017). Yet there were few studies considering the impacts of nutrition interventions for pregnant adolescents on maternal outcomes. Studies that provide nutrition supplements to pregnant women and girls in LMICs are relatively common, but few disaggregate by age and almost all focus on maternal weight gain, micronutrient status, and infant outcomes (Lassi et al, 2017). Studies looking to reduce adolescent perinatal mortality and birth complications have tended to focus on delaying pregnancy (Christiansen et al, 2013).

Lastly, this review highlighted the lack of evidence from multisectoral nutrition interventions on adolescent health and wellbeing. An ongoing trial in Tanzania is addressing this gap by evaluating a school-based multisectoral intervention for adolescents aged 14-17 years. The intervention includes school gardens, meals, agriculture, nutrition, and hygiene education, with outcomes such as school performance, anthropometry, and anaemia status (Wang et al, 2022). Similarly, an agriculture programme in Malawi for adolescent girls demonstrated positive impacts on dietary diversity and school attendance through training and leadership development (Botha et al, 2021). Further research is needed to identify key outcomes and optimal interventions for adolescent health and development across contexts.

Conclusion

Adolescents make up over a third of the world's population, yet they continue to be sidelined in research, programme development, and policy. This review's findings suggest that adolescent nutrition interventions can have positive impacts on broader adolescent health and wellbeing outcomes beyond catch-up growth. Key evidence gaps identified opportunities for future research, programmatic focus, and policy development. Further efforts are needed to target older adolescents, including those in secondary schools and non-school settings, and pregnant adolescents. Broader implications for policy and programme implementers include the potential for multisectoral approaches to optimise outcomes for adolescents.

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Original Article

Thriving Together: Improved nutritional outcomes in children with disabilities in Zimbabwe

Programme participant registration, Mufakose, Harare. Zimbabwe

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What we know:

Children with disabilities face a high risk of undernutrition, with complex needs that make sustained recovery more challenging. In Zimbabwe, no specific interventions currently exist to address the unique needs of children with disabilities.

What this adds:

A community outreach intervention can successfully address some of the most immediate needs of children with disabilities, such as inadequate care practices and limited access to treatment for older children with undernutrition. However, additional holistic support is needed, including improved household income and food security to sustain recovery and ensure long-term wellbeing.

According to the *Global report on health equity for persons with disabilities*, 16% of the global population lives with some form of disability. An estimated 80% of those people with disabilities live in low- and middle-income countries, where access to health, nutrition, and social support services are severely limited and where children with disabilities are among the most vulnerable (WHO, 2022). The exact prevalence of children with disabilities in Zimbabwe is unknown. The most recent survey on the prevalence of disabilities in Zimbabwe, conducted over a decade ago, estimated that 7% of the population live with some form of disability. Additionally, 26% of surveyed households reported having at least one family member with a disability (Ministry of Health and Child Care (MOHCC) & UNICEF, 2013).

Zimbabwe's strategy on the management of malnutrition aims to address childhood undernutrition by combining hospital- and community-based treatment. Unfortunately, the nutritional guidelines do not highlight the unique needs of children with disabilities. The main treatment for wasting, which is ready-to-use therapeutic food (RUTF), is primarily designed for children aged 6 to 59 months with wasting, excluding wasted children over five years old, and those with disabilities. Currently, no alternative treatment or specialised supplement exists for these children. Ideally, families caring for children with disabilities are provided with a comprehensive social support package, including access to appropriate nutritional products, protein-dense foods that are affordable, locally available, and culturally acceptable, and, where possible, cash-based assistance.

Challenges faced in the Zimbabwean context

Children with disabilities in Zimbabwe experience multiple challenges, including medical complications, mental health issues, social exclusion, and limited access to essential services. These difficulties extend beyond the child, placing immense strain on caregivers, often leading to family breakdown, loss of employment, and mental health struggles for parents (particularly mothers).

A major challenge in addressing childhood disability in the country is the lack of effective early identification tools and the absence of a national registry for children born with disabilities. Currently an 'at-risk' surveillance system is used to identify infants who may be prone to developmental disabilities. This system flags babies with risk factors such as low birth weight, prematurity, HIV exposure, birth complications, low APGAR scores, severe jaundice or neonatal convulsions. An "at-risk" sticker is placed on their Child Health Card to prompt closer monitoring. However, identification and registration are inconsistent and, in most cases, do not translate into access to additional resources or specialised healthcare services.

Stigma and social isolation of children with disabilities are pervasive, further compounding the difficulties faced by these children and their families. These children and their caregivers are often marginalised and belong to the poorest segments of society. In some cases, fathers abandon their families upon the birth of a child with disabilities, accusing mothers of witchcraft and leaving them to care for their children alone. With full-time caregiving responsibilities, these mothers struggle to secure employment, resulting in significant financial, emotional, and psychological burdens. Children with disabilities are also at heightened risk of violence and abuse, and many mothers fear leaving their children unsupervised, further limiting their ability to work or engage in income-generating activities. Government support for these families is minimal, making daily caregiving extremely difficult, particularly for children who require special feeding, rehabilitation, or assistive equipment.

It is well established that children with disabilities are at great risk of developing undernutrition, while undernutrition, in turn, can exacerbate disability. Feeding difficulties are a major factor causing undernutrition among

Nutritional counselling session, Dzivarasekwa, Harare. Zimbabwe

these children, with 80% of children with disabilities experiencing challenges with feeding (Klein et al, 2023).

A unique community-based intervention

Sally Mugabe Children's Hospital is one of two central referral hospitals in Harare, for those with severe wasting needing inpatient care. At Sally Mugabe Children's Hospital, efforts to standardise and improve care have successfully reduced hospital mortality rates. However, clear gaps in care remained for children with neurological disabilities, who accounted for approximately one-third of children admitted to the malnutrition unit. These children experienced longer hospital stays, higher mortality rates, and frequent readmissions due to recurrent episodes of complicated malnutrition. Their caregivers often struggled to manage daily care during extended hospital stays, with little to no support available outside the hospital. Given this, it became clear that, to break this cycle of recurrent hospital admissions, improvements to their care needed to be made.

With assistance from UNICEF and support from MOHCC, the hospital developed a pilot community care intervention to provide a more comprehensive and holistic service for children with disabilities. The initiative targeted high-density areas in Harare. It expanded the already existing rehabilitation team, run by the hospital's rehabilitation unit, consisting of rehabilitation specialists (physiotherapists, occupational therapists, and rehab technicians) to also include paediatricians, nutritionists, and trauma counsellors. Several teams conducted outreach visits to 12 high-density urban sites in Harare, visiting the same sites every three weeks.

The intervention provided a comprehensive package of care to children with disabilities and their caregivers. Children were enrolled through the hospital's rehabilitation unit or via self-referrals from the community. The comprehensive package of care included a medical assessment, as well as, where needed, psychological counselling and physiotherapy. The nutritionist would also conduct a growth monitoring assessment on each child. Any child with low weight-for-height or length z-score (WHZ/WLZ) would receive RUTF according to the national guideline, as would children above 5 years of age with low body mass index-for-age z-score (BMI-for-age). However, it was not always possible to measure a child's height or length, and low mid-upper arm circumference (MUAC) or low weight-for-age z-score (WAZ) was used to assess eligibility for RUTF, in consultation with the paediatrician. Considering compounding challenges that children with a disability face, like difficulty eating and food insecurity, the team recognised that these children required nutritional support beyond the standard age cut-off for wasting treatment of five years.

The nutritionist also led educational group sessions covering essential topics around caring for a child with disability. The sessions were adapted based on materials from the SPOON Foundation. Topics included responsive feeding, safe feeding practices, positioning of children during feeding, improving the nutritional value of foods, identifying cheap, nutrient-dense, locally available foods, and preventing iron deficiency anaemia. Some sessions also focused on caregivers themselves, such as how to deal with stigma and self-care. The same standard package was delivered across all the facilities. When needed, some caregivers would receive one-on-one counselling, which would often include an assessment of feeding and feeding positioning.

The intervention was monitored and evaluated by analysing the anthropometric and medical assessments of the children and as well as through caregivers' feedback, collected through individual semi-structured interviews, as well as group discussions. This included assessing the acceptability and impact of the intervention on nutritional and rehabilitation needs. To better be able to provide further support, a register of children living with disabilities in the target areas was set up, along with a community support network led by trained lead mothers.

The intervention was implemented with permission from MOHCC, as well as the City of Harare administration.

Findings

Health and nutrition outcomes

A total of 617 children with disabilities, aged 5 months to 13 years, were enrolled in the programme across 12 participating sites. Of these, 27 (4%) children were aged 0-5 months, 454 (74%) were aged 6-59 months, and 136 (22%) were over 5 years old. Sessions were held in community halls or local clinics, with attendance varying between visits due to factors such as travel distance and caregivers' conflicting commitments. Most children in the programme had cerebral palsy (72%), primarily attributed to birth complications, with a smaller proportion linked to neonatal jaundice. Other disabilities included trisomy 21 ("Down's Syndrome") (4%) and hydrocephalus (spinal fluid build-up) (3%). Due to limited diagnostic capacity in Zimbabwe, where childhood disability assessments are often based on clinical assessment alone, 21% of children enrolled in the programme did not have an established cause for their disability.

At the onset of the programme, severe wasting was identified in 15% of the children and moderate wasting identified in 34% (see Table 1). Height or length measurement was not possible in 89 (65%) of the children aged above 5 years due to presence of contractures (stiffness of limbs). However, weight measurement was possible in all enrolled children, and so underweight was also used as a criterion for RUTF. 51% of children enrolled in the programme were underweight, highlighting the high prevalence of undernutrition in these children. The

Table 1 Nutrition status of children on enrolment into the programme

		0-<6months n (%)			6-59 months n (%)			≥ 5 years n (%)		
		M	F	Total	M	F	Total	M	F	Total
	Total	11	16	27	235	219	454	78	58	136
Wasting*	Wasting	2 (18.2)	3 (18.8)	5 (18.5)	107 (45.5)	109 (49.8)	216 (47.6)	21 (77.8)	17 (85.0)	38 (80.9)
	Severe wasting	0	1 (6.3)	1 (3.7)	31 (13.2)	36 (16.4)	67 (14.8)	5 (18.5)	6 (30.0)	11 (23.4)
	Unable to measure length**	0	0	0	0	0	0	51	38	89
Under-weight***	Under-weight	3 (27.3)	3 (18.8)	6 (22.2)	115 (48.9)	113 (51.6)	228 (50.2)	43 (55.1)	37 (63.8)	80 (58.8)
	Severe underweight	1 (9.1)	0	1 (3.7)	41 (17.4)	37 (16.9)	78 (17.2)	17 (21.8)	15 (25.9)	32 (23.5)

* WHZ/WLZ <-2 (0-59m), severe <-3 and MUAC <12.5 cm (0-59m), or BMI-for-age <-2 (≥5 years)
** Excluded from calculation proportion
*** WAZ <-2, severe <-3

Table 2 Endline data on children enrolled in the programme that were measured at baseline

		6-59 months n (%)			≥ 5 years n (%)		
		M	F	Total	M	F	Total
	Total	193	187	380	58	51	109
Wasting*	Wasted	61 (31.6)	56 (29.9)	117 (30.8)	16 (80.0)	13 (76.5)	29 (78.4)
	Severely wasted	21 (10.9)	18 (9.6)	39 (10.3)	3 (15.0)	4 (23.5)	7 (18.9)
	Unable to measure length**	0	0	0	38	34	72
Under-weight***	Underweight	58 (30.1)	52 (27.8)	110 (28.9)	29 (50.0)	26 (51.0)	55 (50.5)
	Severe underweight	20 (10.4)	15 (8.0)	35 (9.2)	9 (15.5)	11 (21.6)	20 (18.3)

*WHZ/WLZ <-2 (0-59m), severe <-3 and MUAC <12.5 cm (0-59m), or BMI-for-age <-2 (≥5 years)
** Excluded from calculation proportion
*** WAZ <-2, severe <-3

breakdown by age category showed: 22% among infants aged 0-6 months, 50% among children aged 6-59 months, and 59% among children aged above 5 years were underweight. Among all age categories, underweight and wasting was slightly more prevalent in girls compared to boys, except underweight in infants aged 0-6 months, where 27% of boys were underweight compared to 19% of girls.

Over half of caregivers reported feeding difficulties in their children, including choking on feeds, regurgitation, and difficulty tolerating age-appropriate textures. Inappropriate feeding practices were frequently observed, such as force-feeding and unsafe feeding positions. Additionally, the quality and nutrient density of provided meals was often inadequate, with children frequently given diluted porridge or maize-based drinks, under the assumption that they would be unable to tolerate other foods.

Of the 617 children enrolled, 489 were included in the final analysis at the end of the intervention (see Table 2). Over the course of the intervention, improvements in undernutrition rates were observed. The proportion of children with underweight, combining all age categories, declined from 50.9% on enrolment to 33.7% at the end of the intervention and for severe underweight from 18.0% to 11.0%. However, despite the progress, a significant number of children remained undernourished after a year in the programme, highlighting the ongoing need for sustained nutritional and caregiving support.

Impact on caregiving practices

Through caregiver feedback it was found that the programme was well received by both the caregivers and their children, with most parents reporting greater confidence in looking after their children following the intervention. Caregivers gained a better understanding of their children's nutritional needs and learned how to enhance meal quality using affordable, locally available foods. This led to improved feeding practices and more enjoyable mealtimes for both children and their caregivers.

Lessons learned

This initiative was able to fill a major service gap for children living with disabilities in the targeted communities in Harare. Support for this group has traditionally been fragmented, often relying on non-governmental organisations rather than a structured government service. By integrating this initiative with the existing rehabilitation outreach programme, it was possible to provide support despite a limited budget. This small pilot project demonstrated that both the nutrition status of disabled children and caregiving practices can be improved through a coordinated effort to address different aspects of their needs.

However, there were also some challenges in the implementation of this intervention. For example, many caregivers skipped sessions due to conflicting commitments. Some children with feeding difficulties had issues with consuming RUTF due to swallowing difficulties, and alternatives were not available. There was also limited access to medications, requiring referrals to local health centres rather than direct provision. Many of the children continued to have feeding challenges in food-insecure households and sharing of RUTF within the household was common. One potential improvement could be the provision of additional nutritious food options for children unable to tolerate RUTF, ensuring they still receive adequate dietary support. The initiative also highlighted the need for validated approaches to identify children with disabilities causing contractures. WAZ could potentially be used for this, but further research is needed.

Conclusion and recommendations

Children with disabilities and their families can greatly benefit from community-based interventions providing coordinated multidisciplinary support services. This should include early screening and diagnosis, followed by a comprehensive care package in early childhood and ongoing support for caregivers to promote better care practices and social inclusion. To maximise impact, this community care model should be expanded to other urban centres in the country. This requires strong collaboration and buy-in from the relevant government departments, including MOHCC, the Ministry of Labour and Social Welfare, and the Ministry of Education to ensure sustainability and integration into national policy frameworks. Sadly, due to the recent global funding cuts, it appears that funding for this initiative may be limited in the future while MOHCC focuses on identifying funding for critical HIV and tuberculosis treatment services. Going forward, services for children with disabilities are unlikely to be prioritised, highlighting the vital need for sustainable solutions to support these vulnerable children.

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Group counselling session, Kuwadzana, Harare. Zimbabwe

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The nutrition team conducts mass MUAC screening registration of children under five, Garamsir district, Helmand Province. Afghanistan, 2024

Community mass MUAC screening in emergency contexts: Lessons from Afghanistan

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What we know:

Nutrition assessments are essential for understanding nutritional needs, identifying high burden areas, and estimating resource requirements.

What this adds:

In resource-limited and complex settings, mass MUAC (mid-upper arm circumference) screening can be an effective tool for assessing nutritional needs, monitoring coverage, and identifying and referring cases. This mass screening exercise successfully brought together 21 partners across 17 provinces and was completed within three months.

Afghanistan has endured years of conflict, natural hazards, and climate-related shocks, profoundly affecting its citizens. These challenges have hindered economic growth and restricted access to essential services (OCHA, 2024). Against this backdrop, malnutrition is common, with estimates indicating that, in 2022, approximately one in two children would develop wasting. In 2022, a national Standardised Monitoring and Assessment of Relief and Transitions (SMART) survey was conducted, which showed that 10.3% of children aged 0-59 months were suffering from wasting, of which 1.5% had severe wasting (Afghanistan Nutrition Cluster, 2023).

Community mass MUAC screening

Since 2022, no additional SMART surveys have taken place, and nutritional planning has largely relied on routine data collection through the Community Nutrition Sentinel Surveillance (C-NSS) platform. However, 17 provinces in the country are without C-NSS. In a dynamic, ever-changing context like Afghanistan, the timely identification of emerging nutrition crises is crucial. Without the ability to conduct regular population-representative nutrition surveys or use sentinel surveillance systems, processes to utilise community mass MUAC screenings have been developed. This approach enables regular, resource-efficient, active screening to provide timely understanding of the current nutrition situation. Additionally, such surveys can assess key indicators, including geographic coverage and treatment programme admission rates, as well as inform resource allocation to ensure the areas of highest need are suitably resourced.

In Afghanistan, community mass screening was proposed to support the nutrition cluster's key priorities, which are to assess the current national nutritional situation and to address declines in programme admission rates for the management of wasting.

Assessing current nutritional status

The primary goal of the mass MUAC screening was to collect updated data on the nutritional status of children aged 6-59 months. Specific provinces were targeted due the absence of data or concerns about data quality, enabling a better understanding of the wasting prevalence in these areas and identifying geographic areas with high rates of wasting to target interventions. This subsequently informed the Integrated Food Security Phase Classification Acute Malnutrition (IPC-AMN) analysis and supported estimations of 'People in Need' (PiN) (defined as people who are wasted and in need of lifesaving treatment or nutritional support within the year) to inform nutrition cluster priorities.

Addressing declines in admissions for wasting supplementation and treatment

From January to July 2024, the number of children enrolled in wasting supplementation and treatment services declined by 16.7% compared to the same period in 2023. However, given Afghanistan's rapidly worsening humanitarian situation, it was unlikely that this was due to a reduction in actual cases. Suboptimal screening at health facilities was potentially a contributing factor, as analysis of outpatient department visits for children aged under five years in 2024 indicated that nearly 45% of children were not screened for their nutritional status. The mass screening could support with identifying and referring children with wasting, thereby contributing to improving the coverage of interventions in targeted areas.

Methodology

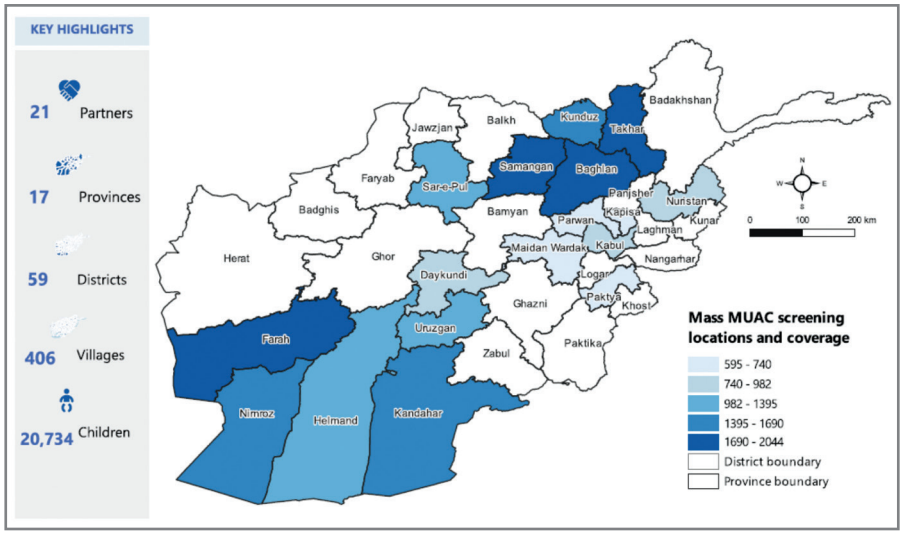
Mass MUAC screening planning

Planning for the mass screening began in July 2024 and included the analysis of admission and screening data, followed by a review and approval of the approach by the Afghanistan Information Management Technical Working Group (AIM-TWG). In August, partner mapping was conducted by updating the 'who, what, where, and when' of organisations (4Ws). At the same time, subnational coordinators discussed the approach at regional levels to orientate partners on screening methods. The mass screening exercise was carried out in two phases: 12 provinces in phase one (conducted in August) and five provinces in phase two (in September), followed by data analysis. The timing of the mass screening coincided with the typical 'peak' season for wasting admissions. The exercise concluded with the findings being validated by the AIM-TWG.

Sampling procedures

In each province, a minimum of three districts were purposively selected, based on the

Figure 1 Mass MUAC screening locations marked in blue



availability of functional health and nutrition treatment sites (both mobile and fixed) and access to nutrition services in underserved areas, as well as districts affected by floods or other shocks. Within each selected district, villages were further chosen based on similar criteria. In each selected village, all eligible children were screened.

The screening was conducted in convenient and accessible locations such as mosques, schools, and community centres. To increase participation, community sensitisation and mobilisation activities were conducted. To ensure screening quality, the screening was conducted by qualified nutrition staff, who received a one-day orientation session prior to the mass screening. The orientation covered key aspects of MUAC screening, including how to obtain accurate MUAC measurements, how to correctly assess oedema, and how to complete referral slips as well as data collection and reporting tools.

Data management and analysis

A MUAC data collection template was translated into local languages (Pashto and Dari). Data was submitted daily to the Nutrition Cluster via an Excel database for remote monitoring to check the data quality, completeness, and consistency. Records with missing or invalid information on sex, age, or MUAC measurements were excluded from the analysis.

The data's plausibility was assessed using the SMART Initiative's standard data quality evaluation procedures (SMART, 2017), as well as methods suggested by Bilukha and Kianian (2023).

Overall, only age-ratio tests were problematic across several provinces where there were more younger children than older children. This was adjusted for by analysing the prevalence of the respective provinces with age-weighting. The methodology and data collection were reviewed and validated by the AIM-TWG.

Findings

The mass screening was carried out across 17 provinces where the C-NSS was not operational (Figure 1). It targeted 59 districts and covered 406 villages, with a total of 20,734 children aged 6-59 months being screened. Twenty-one nutrition partners were involved in the screening process.

Children's nutritional status

The mass MUAC screening revealed varying rates of proxy wasting across the provinces, with the highest rates observed in Helmand at 22.3%, followed by Sar e Pul at 17.2%. In total, the prevalence of wasting exceeded 10% in nine provinces. The lowest wasting prevalence rates were recorded in Wardak (5.6%), Kapisa (7.7%), and Paktia (7.8%). These findings highlight significant provincial variation in wasting prevalence, with several provinces experiencing wasting prevalence well above emergency thresholds for MUAC of 10-14.9%. This indicates an urgent need for targeted nutrition interventions.

Coverage insights

The mass screening also provided findings on programme coverage. To estimate proxy coverage rates, the caretakers of wasted children identified were asked whether or not the child had been enrolled in an outpatient therapeutic programme (OTP) or a therapeutic supplementary feeding programme (TSFP). Of the total 20,734 children screened, 609 cases of severe wasting and 2,146 cases of moderate wasting were identified. Of these, 342 severe and 1,232 moderate wasting cases were not yet receiving nutrition treatment or supplementation, indicating an estimated coverage of 47% for OTPs and 43% for TSFPs respectively.

OTP coverage was below the recommended 50% threshold in several provinces, ranging from 33.3% in Nimroz and Takhar and 38.5% in Kandahar to 71.4% in Kapisa and 63.6% in Paktia. Similarly, TSFP coverage varied, with some provinces falling far below the recommended standards for rural contexts. For instance, Kabul's coverage was very low at 19.2%, while Nimroz and Sar-e-Pul also reported low rates of 30.6% and 28.0%, respectively. Provinces such as Kunduz (60.2%) and Baghlan (57.8%) showed relatively higher coverage, although still below ideal targets.

The nutrition team conduct mass MUAC screening for children under five years in Sangin district, Helmand Province. Afghanistan, 2024

MUAC prevalence by age

The analysis of MUAC prevalence by age revealed that wasting peaked during the first two years of life, consistent with previous SMART survey findings. This finding supports the established understanding that the first 1,000 days represent a critical window of opportunity for improving a child's health and wellbeing.

Referral and admission outcomes for children with wasting

During the mass screening, wasted children that were not yet receiving wasting treatment or supplementation were referred to the nearest health facility with a referral slip and their caregivers were counselled on the importance of these services. The children's details were also shared with the community health programme for follow-up. Some 75% of severely wasted children referred were admitted into an OTP, ranging from 33% to 100% across provinces. The overall average number of days it took for children to be admitted following referral was 5.1 days, with significant variation across provinces from 0.9 to 28.9 days.

With those identified with moderate wasting, 76%, ranging from 40% to 100%, were enrolled into a TSFP. The average time to enrolment was approximately 5.5 days, ranging from 0.6 days to 28.3 days across the provinces.

Lessons learned

The success of this mass screening exercise highlights its value as an alternative data source for understanding an overall nutrition situation, particularly when population-level surveys, like SMART surveys, are unavailable.

The initiative demonstrated that high-quality MUAC data can be collected within a short timeframe using existing resources. Its quality was ensured by close supervision by the AIM-TWG. While the MUAC data was deemed to be acceptable, inconsistencies in age-ratio data indicated a need for further enumerator training.

The mass MUAC screening was an essential tool to assess wasting prevalence across the 17 provinces and provided valuable insights into

the overall nutrition situation. Data from the mass screening became a crucial resource for the IPC-AMN analysis conducted in October 2024. This analysis was not possible the year before due to a lack of available data. The screening exercise also supported PiN estimates that informed the 2025 Afghanistan Humanitarian Needs and Response Plan (OCHA, 2025). Interestingly, results from the mass screening aligned with the PiN estimates on the expected number of wasted children, indicating that different assessment methods showed similar results. It remains important to continue monitoring how different data collection approaches influence estimates of wasting prevalence and PiN over time.

Additionally, the mass screening data enhanced understandings of programme coverage, enabling the identification of service delivery gaps. This information was crucial for nutrition cluster partners and donors to suitably allocate resources based on need, enhancing programme impact. In the absence of routine coverage surveys, the mass MUAC screening facilitated referral to nutrition interventions and helped to reach those most in need.

By identifying a high number of wasted children in a timely manner and referring them for nutritional support, the mass screening exercise contributed to improved access to nutrition supplementation and treatment. Following the mass screening, health facilities, to which children were referred, reported that they were able to manage the influx of new cases without any overcrowding. However, several factors continue to affect access and the utilisation of nutrition services for women and children. For example, the need for a male guardian (a mahram) to accompany women, including female health workers, when leaving the home remains a barrier to accessing care. Additionally, a previous strategy was discontinued that focused on larger cities, like Kabul, and has led to a shortage of human resources at health facilities, contributing to a decline in admissions. The presence and capacity of NGOs vary across provinces, and this is likely to have also impacted coverage.

Furthermore, due to funding cuts and government reprioritisation, approximately 52% (~340) of mobile health and nutrition teams and over 450 TSFP sites throughout the country had to close in 2024, significantly impacting hard-to-reach areas and contributing to the decline in admissions. Provinces like Nuristan and Takhar were particularly impacted by these closures, which contributed to the low admission rates of referred children due to long travel distances and geographical barriers to accessing health facilities. It is expected that, in 2025, even more TSFPs and OTPs will need to close due to the impact of the USAID funding freezes. Initial estimates note that 246 OTPs and 42 TSFPs had already closed in February, impacting over 4,000 children and 2,000 women.

Conducting the screening exercise across 17 provinces and with 21 partners was enabled through several key factors. Firstly, subnational cluster coordinators played a crucial role in coordinating regional stakeholders, as well as cluster partners present at both provincial and district levels. Additionally, strong leadership from the nutrition department within the Ministry of Public Health at national level streamlined the process and facilitated the involvement of experienced nutrition staff, who were instrumental in ensuring data quality. A major learning was the importance of early planning at national level for such a large-scale initiative. This included ongoing engagement with all stakeholders. Moreover, conducting community sensitisation and mobilisation activities helped high levels of caregiver participation in the mass screening.

Despite its success, the planning and implementation of the mass screening faced several limitations, collectively reducing the coverage of the screening initiative. Many partners as well as government departments were unfamiliar with the concept of mass MUAC screening compared to established methodologies, such as SMART surveys. Thus, significant coordination and sensitisation efforts were required, reducing the time available for implementation and data collection, resulting in small sample sizes in certain districts. Additionally, access to remote areas posed a significant challenge, often due to a lack of roads. In some areas, low community awareness affected caregiver participation. Furthermore, given the focus on MUAC measurements, weight-for-height measurements were not collected, and some wasted children may have been missed in the process.

Conclusion and recommendations

The mass screening was planned and conducted relatively quickly, utilising existing resources and the capacity of Nutrition Cluster partners across the 17 provinces. The widespread presence of Nutrition Cluster partners ensured that the screening occurred effectively and efficiently without the need for additional resources. By regularly conducting such screenings, the Nutrition Cluster and its partners can be better positioned to improve the reach of nutrition programmes, assess the current nutrition situation, and respond promptly to emerging needs and trends.

A mass screening does not replace routine screenings by facility-based healthcare workers and community health workers. However, in a rapidly changing context like Afghanistan, integrating quarterly mass screening into national and regional nutrition response plans and programmes is a helpful tool to increase monitoring trends in the nutritional situation in the absence of standard survey data. The mass screening can also provide a proxy estimate of coverage for identifying and prioritising geographical areas with significant gaps and needs, thereby supporting targeting nutrition interventions and strategic resource allocation.

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A social worker is organising children under 5 years for mass MUAC screening in Kamdish district of Nuristan Province. Afghanistan, 2024

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Two mothers are sharing their thoughts and experiences on nutrition. Myanmar, 2024

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Digitalising Myanmar's Nutrition Promotion Month

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What we know:

Nutrition Promotion Month (NPM) in Myanmar aims to improve knowledge and awareness of optimal nutrition for infants, children, adolescents, and women. In recent years, coverage has been constrained by ongoing conflict, insecurity, and natural disasters.

What this adds:

For NPM 2024, innovative strategies integrating digital technology were adopted to address these challenges by leveraging the trend of increased social media use in Myanmar. As a result, NPM 2024 reached 2.1 million people compared with 400,000 in 2023. Key lessons learned included: fostering partnerships and engaging diverse stakeholders ensured buy-in and smooth implementation, while involving prominent figures and technical experts fostered trust, amplifying the campaign's reach. Future campaigns should continue to leverage social media while exploring innovative community-based interventions to expand coverage, particularly in hard-to-reach and conflict-affected areas.

Myanmar has been experiencing the negative repercussions of political instability, persistent conflicts, and natural disasters. These have exacerbated the existing precarious situation of malnutrition, in addition to the lingering effects of the COVID-19 pandemic. Among the many issues, suboptimal infant and young child feeding is a serious public health problem in Myanmar. Almost half of infants aged 0-5 months are not exclusively breastfed (DHS, 2016), and over two out of five children aged 6-23 months do not consume diversified nutritious meals. The situation is worse in rural and conflict-affected areas (MAPSA, 2023) of Myanmar, where almost 70% of the population live in rural areas (World Bank, 2024).

Nutrition Promotion Month (NPM) takes place in August of every year. It aims to disseminate appropriate knowledge to a wide audience to protect and promote healthy diets, services, and practices that support optimal nutrition, growth, and development, especially of children, adolescents, and women. The NPM is structured thematically by week. Week 1 celebrates world breastfeeding week in alignment with the global celebration to protect, promote, and support breastfeeding. Week 2 focuses on nutrition for children under five years, school-aged children, and adolescents. Week 3 focuses on nutrition for pregnant and breastfeeding women, while week 4 focusses on eliminating iodine deficiency and promoting food fortification.

Strategic shift

The NPM has been celebrated in Myanmar since 2003, reaching millions of people over the years. However, in 2020, the campaign faced disruptions due to COVID-19, internal conflict, and natural disasters. In the

A volunteer engages with mothers during a poster presentation on IYCF. Myanmar 2024

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face of these challenges, UN Nutrition Network (UNN) in Myanmar worked to strengthen collaboration among UN agencies, civil society, the private sector, and local communities to uphold NPM's impact. Coverage, however, remained limited also beyond the COVID-19 pandemic, because of ongoing conflict, access constraints, and service disruptions.

In response to these constraints, in 2024 UNN led a new approach to bolstering NPM by integrating digital technology and social media to minimise the impact of the ongoing crises and boost community awareness. This initiative aligned with Myanmar's rising social media usage, with over two-thirds of the total population accessing at least one type of social media platform (Hamza et al, 2024). Social media has the capacity to target and reach diverse audiences since it is not limited by space, time, or geography (Moorhead et al, 2013). It has proved effective in influencing behaviour change across diverse demographics, enabling participatory and interactive engagement (Kukreja et al, 2011; Benetoli et al, 2015). Efforts were made to align and integrate nutrition and care-related messages used on different platforms to maintain consistency and avoid confusion among the communities (Roy et al, 2023). Key opinion leaders and a nutritionist were engaged as resource persons for the campaign to increase engagement and acceptance. The campaign leveraged partnerships with civil society and private sector actors through Scaling Up Nutrition networks to enhance access to nutrition services for vulnerable populations. The innovative strategies adopted were tailored to Myanmar's political landscape, focusing on direct community engagement and building on past experiences to broaden NPM's reach and impact.

NPM campaign innovative approaches

Talk show

Central to the campaign was a pre-recorded talk show featuring celebrities and intended to generate greater interest in nutrition among the Myanmar population. Target groups were caregivers of children under five years, adolescents, community leaders, and key decision makers. The talk show aimed to raise awareness about optimal breastfeeding, address myths, and fill knowledge gaps in maternal and child nutrition. It tackled key issues related to breastfeeding, such as the importance of early initiation of breastfeeding, exclusive breastfeeding for the first six months, and continued breastfeeding up to at least two years with appropriate complementary feeding from six months. It also highlighted the need for better social support for working mothers and the risks associated with commercial milk formula feeding.

The talk show featured a renowned paediatrician, a well-known actress who is also a mother and a practicing doctor, and a popular 'doctor mommy' blogger who regularly shares nutrition-related tips, advice, and better parenting guides through social media platforms. This diverse lineup engaged audiences by offering practical tips, motivational stories, and relatable role models, fostering greater interest and connection with viewers. Practical messages produce more meaningful behaviour changes for feeding and caring practices (Januraga et al, 2020). Moderated by a professional host, the panel delivered a balanced discussion, blending expert advice with personal insights.

To maximise reach and address access constraints, the talk show was disseminated across multiple social media platforms, as well as community-based platforms in hard-to-reach areas with limited internet access. With support from a local production company, UNICEF creatively produced an animated video that distilled key messages from the original one hour-long talk show to increase its reach. This approach was designed to engage caregivers who may not have had the time to watch the full-length video, ensuring the content reached a wider audience across major social media channels, including the UNICEF Knowledge Talk Channel. The live talk show and the animated video reached over 2.1 million viewers and generated significant engagement, with over 1,000 participants actively taking part in associated quizzes and reward campaigns.

Live webinar

UNN hosted a four-topic live webinar to enhance awareness and engagement in NPM among healthcare professionals, policymakers, community leaders, and civil society. The event attracted 77 participants (41 women and 36 men) from various locations and featured 10 panellists, expert presentations, and interactive discussions. The webinar was delivered in both Burmese and English and addressed topics like complementary feeding, commercial milk formula, maternal health, and food safety. Live question-and-answer sessions fostered direct communication, resolving enquiries and enhancing engagement. The live webinar saved costs that would normally be associated with in-person events (travel and accommodation) but still promoted knowledge sharing. It received positive feedback for its content, expert speakers, and engaging, interactive format.

Community-based sessions

In areas with less security constraints, two half-day in-person events were held at the community level. Over 170 mothers, fathers, and caregivers engaged in a range of activities designed to raise awareness about nutrition, particularly for the critical first 1,000 days of life. Through these innovative activities, the campaign succeeded in engaging the community and promoting vital nutrition knowledge in a fun, interactive way.

A 45-minute *question-and-answer session* on breastfeeding, complementary feeding, balanced diets, and growth monitoring was conducted in the local language. It featured rewards for correct answers and a whiteboard for community feedback, with over 70 participants sharing thoughts and experiences on nutrition.

To visually engage participants, six large *vinyl posters and pamphlets were displayed*, covering key messages on infant and young child feeding. Mothers and caregivers took part in discussions and shared their experiences.

Additional innovative activities included a *photo-frame session* where participants took photographs with hand-held posters featuring breastfeeding messages. As the participants posted their photos on social media, messages were disseminated to wider audiences through their networks. A *shopping competition* where groups of mothers were tasked with selecting nutritious, locally available foods provided practical, hands-on learning.

The event also included a *television show* that was a shortened version of the campaign talk show on a large TV screen, thereby reinforcing key breastfeeding messages through a different medium. The event continued with an *experience-sharing session* where a mother of a child aged under five years spoke about her personal journey in ensuring her child's proper nutrition. Her story connected with the audience, presenting challenges and solutions that others could easily relate to and apply in their own lives.

A *drawing competition* was also organised among school-aged children with the purpose of enhancing their understanding of diversified nutritious foods, identifying locally available different varieties of food, and encouraging consumption at the household level.

Quiz contests

Following each activity, in-person quiz contests were organised at the community level, UN offices, and with partners. The extensive quiz campaign was launched to engage participants, assess their understanding on nutrition-related topics, and identify community needs. To maximise reach, the quiz was disseminated through three main messaging platforms: the UNN Channel, the WHO Channel, and the UNICEF Knowledge Talk Channel Thuta. Awards were announced to make the events more interactive and entertaining. Prizes were awarded to individuals with the highest scores and quickest responses. Those who excelled were rewarded with a US$ 1.5 (5,000 MMK) recharge for their mobile phone. The quiz campaign attracted large audiences, drawing in 134 participants from the UNN Channel, 128 from the WHO Channel, and reaching an audience of 13,921 with 956 interactions on the UNICEF Knowledge Talk Channel. The strategy created a platform for community engagement with nutrition experts. The quiz campaign fostered community involvement, encouraging participants to reflect on their eating habits and appreciate the importance of nutrition in their daily lives. By actively engaging the public, the initiative not only raised awareness about nutrition but also empowered individuals to take charge of their health and wellbeing.

Impact

Over 2.1 million people were reached during NPM in 2024, compared with only around 400,000 in 2023. As well as increasing the reach of the campaign, the diversified approaches and use of social media encouraged participants to interact directly with experts and get clarification on their questions and concerns.

Some of the quotes from participants were as follows:

> ***"I learned so many new things about nutrition and this event encouraged me to continue breastfeeding even after two years of age. I will encourage other mothers to follow recommended breastfeeding and complementary feeding practices."*** 27-year-old mother

> ***"I didn't know about the benefits of micronutrient tablets previously. Now, I realise that I need to consume multiple micronutrient tablets not only for the growth and development of my baby but also for our survival."***
> Young mother participant in community-based session

> ***"It is not just a competition but an eye-opener. We learned how to choose the right foods for our families with the little we have. I've started paying more attention to what we eat."***
> Drawing competition participant

Lessons learned

Fostering partnership and coordination

Involving key stakeholders in all stages of campaign design, along with open communication, built trust and secured buy-in from UN agencies, civil society, private sectors, and communities. Preparatory meetings encouraged experience sharing and suggestions for a successful campaign based on experience. Clear role division and regular follow-ups addressed challenges and ensured smooth and timely implementation. Bilateral discussions with key stakeholders further strengthened commitment and contribution.

Digitalisation of the approach

Leveraging social media was strategic, given its growing use and conflict-related inaccessibility in Myanmar. Messages were crafted to be simple, non-ambiguous, and self-sufficient, making them easily understood and appealing to caregivers. The involvement of a famous doctor, actress, and professional moderator increased engagement through the campaign's talk show. Platforms for dissemination such as Facebook, YouTube, and Viber were chosen due to their widespread use. The more focused selection of communication channels emphasising the platform with the greatest ease of use improves the campaign's reach and level of engagement (Roy et al, 2023). Based on regular monitoring and feedback from audiences, shortening the talk show video clip and its translation into the local language also contributed to increased reach.

Ensuring access in hard-to-reach areas

Social media is not a one-size-fits-all solution for behaviour change communication (Korda & Itani, 2013). Also, while social media effectively reaches broader audiences, it cannot replace interpersonal communication in vulnerable, hard-to-reach areas without internet access. Diversified community-based interventions including cooking demonstrations, experience sharing by mothers, photo-frame sessions, and quizzes can be crucial to reach those vulnerable populations. However, community-based sessions were organised only in limited locations due to conflict and current restrictions on gatherings of more than five people in some locations.

Sustained impact

Video clips from the campaign can be used to orient and train community health workers, volunteers, and community members, ensuring continuity of counselling services, uniformity in messaging, and minimising information loss. These tools are crucial for sustainable behaviour change efforts and extending the campaign's reach.

By collecting and analysing quiz responses, the initiative gathered valuable insights into community understanding and needs regarding nutrition. This information is valuable for informing future nutrition programmes and advocacy efforts aimed at addressing specific challenges and gaps for more sustained impact.

Conclusion

In 2024, integrating digital technology effectively increased coverage of the NPM campaign in the access-constrained context of Myanmar, capitalising on increasing social media use in the country. Engaging diverse stakeholders with clear role division increased buy-in, while involving prominent figures and technical experts fostered trust, amplifying the campaign's reach. Future campaigns should continue leveraging social media while exploring innovative community-based interventions to expand coverage, particularly in hard-to-reach and conflict-affected areas. Community-based organisations can help organise in-person activities where internet access is limited. To address caregivers' busy schedules, shorter video clips with key messages in local languages, targeting working mothers, are preferable. Quiz responses provide valuable insights into community needs, to inform future nutrition programming. Further analysis is required to evaluate trends in nutrition service utilisation and caregiving practices.

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Original Article

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Feeding demonstration at Anganwadi centre, Koraput, Odisha. India, 2023

Pathways to improve complementary feeding in Odisha, an Eastern State in India

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What we know:

Complementary feeding practices, like most social and behavioural practices, can be challenging to improve, especially where poverty and food insecurity is high, and misconceptions are common.

What this adds:

This article describes how leveraging existing government-led interventions with additional activities can create synergies to improve complementary feeding practices. Lessons learned in four pilot districts in Odisha state, India, were applied to support the scale-up of the project to cover the entire state. Key approaches adopted for a more sustainable model to improve complementary feeding included integration with existing government schemes, strong government stewardship, and increased budgetary allocations for nutrition.

Odisha is one of eastern India's poorest states, with a large population of over 47 million people. Between 2005-06 and 2015-16, Odisha made great progress in reducing poverty and malnutrition. People living with multidimension poverty dropped from 64% to around 29% in 2015-16 (NITI Aayog, 2024), while stunting rates reduced from 45% to 34% and underweight from 41% to 34%. Wasting rates remained around 20%. Over the same period, exclusive breastfeeding rates for infants under six months increased from 51% to 66%. Complementary feeding practices, however, did not improve. The percentage of children introduced to solids between six and eight months reduced from 65% to 55%, and by 2015-16 only 39% of children aged 6-23 months met the minimum meal frequency, 22% of children achieved minimum dietary diversity, and only 8.5% of children received the minimum adequate diet (IIPS & Macro International, 2007; IIPS & ICF Macro, 2017).

In light of this, UNICEF and its partners advocated for the Odisha government to commit to leading on actions to improve the diets of young children. This commitment included leading on policy and programmatic interventions to support optimal complementary feeding practices, which are critical for children's growth and development. Since 2015-16, complementary feeding practices have improved, alongside further improvements in poverty (now at 16%) and undernutrition rates. In 2019-21, 40% of children had achieved minimum dietary diversity, while 20% of children received the minimum adequate diet. Stunting and underweight both reduced to 30% (NITI Aayog, 2024; IIPS & ICF Macro, 2022). This article describes the key approaches taken by the Government of Odisha and its partners contributing to these improvements.

As a first step in 2015, a study was commissioned in three districts to examine the drivers of poor diets among young children using the ProPAN methodology. This meth-

odology assesses feeding practices and their drivers and subsequently supports the design of cost-effective solutions using locally available nutritious foods for improving infant and young child feeding (IYCF).

The study findings confirmed the poor consistency, quantity, frequency, and diversity of diets of young children (CINI & UNICEF, 2015). Nearly 40% of the children received food thinner than recommended, and only 31% were fed adequately four to five times daily. Over 70% of children aged 6-11 months fell short of the recommended dietary allowance for 70% of micronutrients. Children aged 12-23 months were not meeting their recommended dietary allowances for calcium, zinc, vitamin A, and vitamin C. Poor levels of consumption of pulses, vegetables, fruits, and animal-source foods contributed to these inadequacies. This low consumption was partly driven by a widespread belief that these foods would be difficult to digest. Affordability and low income were the main barriers to adequate nutrition. Additionally, power relations within households meant that mothers often deferred to other family members, including mothers-in-law, on decisions related to feeding practices.

The Pathway to Change project

Building on these findings, and an improved understanding of the drivers and diets of young children, in August 2018 the government made a pivotal decision to launch the project "Pathway to Change" together with UNICEF and CINI. The project was to be a comprehensive district-wide approach for improving both the quality of complementary foods and the feeding practices of children aged 6-23 months through household-level interventions. An initial pilot phase was implemented during 2018 and 2020 in four purposefully selected districts out of a total of 30, covering almost 200,000 children. The Department of Women and Child Development issued detailed standard operating procedure (SOP) for the project to government district administrators.

Between 2020 and 2021, the project was then scaled up across the additional 26 districts, coinciding with the COVID-19 lockdown in India. The project was implemented through expansions within existing government-led interventions, with key support from CINI.

Areas of change

The project was based around a complementary set of interventions.

Firstly, clear and tailored **messages on optimal child feeding practices** were disseminated and reinforced through three channels: digital and social media, information posters at health centres, and influencers. The *"Tiki Mausi"* character was developed and featured in videos shared widely through multiple social media channels. *Tiki Mausi* spreads messages about positive nutrition practices, especially targeting marginalised communities. In addition, influencer videos starring sports personalities, artists, and writers were developed to support caregivers with knowledge and skills on how best to feed their children.

Feeding demonstration at Anganwadi centre, Koraput, Odisha. India, 2023

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Additionally, **a community-level ceremony** was held every month for infants who had reached six months of age and their caregivers. During the ceremony, infants received solid food for the first time, and caregivers received advice on appropriate feeding and care practices while participating in recipe demonstrations.

A major component of the project was to **increase the counselling capacity** of local service providers and their supervisors. Frontline government workers, such as *Anganwadi* workers (village-level nutrition workers) and *ASHA* workers (community health workers), and their supervisors received training to increase their knowledge and counselling skills. The training aimed to improve the quality of counselling provided to mothers and other influential community members at community centres, meal demonstration sessions, and follow-up home visits. Refresher training was provided to ensure compliance with the SOP and discuss field implementation lessons learned. As a result, the core messaging remained evidence based and consistent.

To improve household food availability and accessibility and **strengthen the utilisation of nutritious and safe foods**, the project aimed to improve existing in-kind and cash-based interventions. The Integrated Child Development Scheme (ICDS) is a nationwide intervention to address malnutrition by providing a take-home ration (THR) for households with children aged six months to three years. Pathway to Change provided complementary information to increase community awareness on suitable food choices that would enhance the growth of children aged 6-24 months using the THR. It also focused on building the capacity of women's self-help groups to produce and supply components of the THR to the state, as well as ensure its equitable distribution within the community. Using the THR, families could prepare a variety of nutritious meals for their children, incorporating locally available fruits, vegetables, and eggs provided by the Anganwadi centres. In addition, national and local government food security schemes ensured vulnerable households could access in-kind donations in the form of fortified rice and other grains.

Efforts were made to **leverage synergies** by strengthening the state-led universal conditional cash transfer programme *"Mamata"*, which aims to improve maternal and child health and nutrition. The programme reached 70,000 women (pregnant individuals and those with children up to one year of age) annually in the four pilot districts with a conditional cash transfer of INR 10,000 (USD 140). The cash was provided conditional to the use of maternal and childcare services, including counselling on IYCF. Research has shown that this approach is effective in increasing demand for these services and improves the affordability of nutritious foods (Patwardhan, 2023).

To **strengthen delivery systems and community institutions**, a district-wide plan for delivering a comprehensive IYCF package was developed and endorsed by the Government of Odisha. Core materials were created for frontline ICDS and healthcare workers and supervisors. The government, with support from development partners, led the initiative, while the *Panchayati Raj* (elected representatives of local government) played a vital role in raising awareness and engaging local representatives, ensuring community ownership.

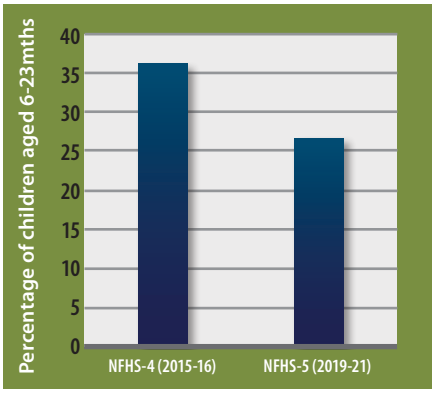
The project was **closely monitored** by collecting routine data on minimum dietary diversity and minimum meal frequency of children aged 6-23 months. The data were gathered through platforms such as ICDS sector meetings and by trained ICDS supervisors using checklists during their supervisory visits. They were then analysed to inform corrective actions during the monthly sector meetings between supervisors and *Anganwadi* workers.

Programme successes

As the project aimed to improve complementary feeding practices, the change over time in the four pilot districts was assessed by conducting secondary data analysis of National Family Health Survey 4 (NFHS-4) (IIPS & ICF Macro, 2017) and NFHS-5 (IIPS & ICF Macro, 2022). Only the four pilot districts were included in the analysis since the scale-up in

Figure 1

Percentage of children aged 6-23 months receiving ≤2 out of 8 food groups in a day, in four pilot districts in Odisha State, India



other districts was still ongoing during data collection for NFHS-5.

Among children aged 6-23 months, those receiving only two or fewer food groups out of eight a day instead of the recommended minimum five food groups decreased from 36.6% to 27.1%. Although this improvement cannot directly be attributed to the project's success, it is still an achievement, particularly considering the disruptions caused by the COVID-19 pandemic.

Lessons learned

The initial activity of analysing factors affecting children's diets using ProPAN was a crucial step contributing to the success of the programme. Contextualised social and behaviour change programmes can potentially improve young mothers' feeding practices and nutrition of children aged under two years (Bhutta, Das, & Rizvi, 2013).

The proactive stance of the Government of Odisha to enhance the nutritional status of women and children, coupled with the extensive coverage of ICDS, presented a unique opportunity for implementing and scaling up the Pathway to Change project. With 86% of children aged six months up to six years receiving supplementary food through ICDS services, along with a high coverage for pregnant and breastfeeding women, the groundwork was laid for impactful interventions. The state-led universal conditional cash transfer programme also provided a unique opportunity to raise demand for these services and improve the affordability of nutritious foods. Cash grant schemes combined with complementary interventions such as information dissemination, quality counselling, and support strengthen women's decision-making power, making them better able to provide improved nutrition and care practices to their children (Antoine et al, 2020).

By leveraging an existing network of government-funded frontline workers and institutions like *Panchayati Raj*, Pathway to Change was more sustainable and aligned with the achievement of the nutrition-related Sustainable Development Goals. Training frontline workers and supervisory staff using adult learning principles ensured that the core messaging was evidence based and consistent.

Achieving social and behaviour change among caregivers and community influencers, despite prevalent cultural practices and misconceptions, posed a significant challenge. Approaching social and behaviour change through multiple contact points provided dividends while innovative strategies, such as introducing the *Tiki Mausi* character, popularised key feeding messages within communities. The Department of Women and Child Development also launched a campaign called "Men Streaming" to emphasise the key role of men in childcare.

The COVID-19 pandemic also presented some significant challenges, but the project continued with some adaptations. There were widespread misconceptions related to COVID-19, in particular that it was spread through animal-source foods. These were compounded by the overall reduced availability of food, which challenged the procurement and sustained availability of resources necessary for feeding demonstrations and counselling sessions at *Anganwadi* centres. Promoting optimal feeding practices at the household level was also difficult, but the project introduced some innovative approaches that helped to sustain coverage. For instance, THRs were delivered directly to households by dedicated *Anganwadi* workers who would wear personal protective gear. Additionally, social and behaviour change messages were disseminated to *Anganwadi* workers and mothers through WhatsApp channels. A special edition of the *Tiki Mausi* comics was created and printed for *Anganwadi* workers to use during home visit counselling sessions, to address misconceptions around the spread of COVID-19.

Coordination between relevant service providers was crucial for enabling effective social and behaviour change. Effective interdepartmental coordination was achieved through joint funding and joint SOP from the Departments of Health and Women and Child Development and the district collectors, who are senior administrative officers responsible for development in a district.

Odisha is the first state in India to create a dedicated nutrition budget with nutrition outcome data being used to make budgetary decisions (Moore, 2024). Thus, the government's strong stewardship and commitment proved a critical foundation for improving the nutritional status of women and children.

Conclusion

The findings suggest that the Pathway to Change project contributed to improvements in the diets of young children in Odisha state. This in turn led to the Government of Odisha scaling up the model through the *Mukhyamantri Sampurna Pusti Yojona*, a state-financed scheme of multi-sectoral convergence that aims to improve the nutrition of children, adolescent girls, and women. This in turn led to an increase in the budget allocation for providing diversified food, such as seasonal fruits, extra eggs, and energy-dense recipes, for young children through the ICDS programme. Additional provisions were also made to support self-help groups to contribute to the ICDS community mobilisation efforts. Further, intensive social mobilisation campaigns were conducted to improve the uptake of ICDS services. Several key approaches provided an important milestone toward this sustainable model for improving nutrition. These included integration with existing government schemes, such as job-course training programmes for frontline workers, as well as the state-wide scale-up and affirmative policy-level actions, such as analysing budgetary outlays through the nutrition budget, and enhancing budgetary allocations for improving dietary diversity.

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Feeding demonstration at Anganwadi centre, Koraput, Odisha. India, 2023

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A mother proudly displaying the pumpkins she harvested from her thriving garden. Afghanistan, 2022

Benefits of an integrated stunting prevention programme in Afghanistan

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What we know:

Interventions that provide an integrated package of specialised nutritious foods, local diet promotion, and social and behaviour change communication (SBCC) strategies are associated with improvements in key nutrition outcomes during the first 1,000 days.

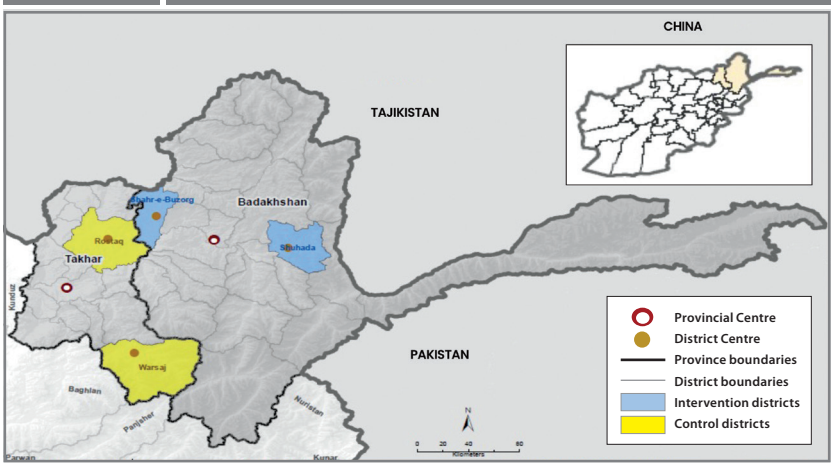
What this adds:

This article reports on the benefits of an 18-month stunting prevention programme providing specialised nutritious foods in combination with SBCC in Badakhshan province, Afghanistan. Results suggest a significant impact on reducing stunting and corresponding improvements in reported infant and young child feeding (IYCF) practices. Despite some limitations to the study, these findings add to the evidence base for promising interventions to address stunting in the challenging context of Afghanistan.

Nutritional supplementation, with or without SBCC, is a proven intervention for preventing malnutrition in many developing countries (Bhutta et al, 2008; Mahumud et al, 2022). However, studies often overlook local factors, which limits their applicability at community level, particularly for a complex context such as Afghanistan.

In 2021 and 2022, WFP Afghanistan in collaboration with the Public Nutrition Department of the Ministry of Public Health implemented a stunting prevention programme. Shahri Buzurg and Shuhada districts in Badakhshan province were chosen as locations (Figure 1) for this intervention due to the high stunting prevalence of 58% at the provincial level (Government of Afghanistan & UNICEF, 2014). The programme was implemented through existing health systems, with monthly delivery of interventions supported by Aga Khan Health Services Afghan-

Figure 1 Intervention and control areas within north-east Afghanistan



istan. At the community level, community health workers (CHWs) and mobile health teams were supported by the Aga Khan Foundation.

Methodology

The intervention package

The interventions were focused on providing specialised nutritious foods to eligible beneficiaries and SBCC messages delivered through existing health systems, mobile health teams, and CHWs. All children aged 6-23 months received a monthly ration of 30 sachets of locally produced lipid-based nutrient supplement-medium quantity (LNS-MQ). Pregnant and breastfeeding women (PBW) received a monthly ration of 7.5kg super cereal (250g per day). This was distributed during the period January 2021 to June 2022. LNS-MQ (or 'Wawa Mum') was made with heat-treated oil, seeds, pulses, cereals, milk powder, sugar, vegetable oils, vitamins, and minerals. A 50g daily sachet provided 255 Kcal.

For the SBCC implementation, a cascade training approach was followed, involving an initial training of master trainers followed by training for health facility staff and CHWs. To create awareness in the community and at the household level, female and male support groups were strengthened in the catchment areas of CHWs. Monthly parents' group meetings were arranged with the assistance of the community support group and health workers, to disseminate SBCC messages related to IYCF practices, child and maternal nutrition, and the use of nutritional supplements. Community mobilisers in the intervention group conducted separate sessions for PBW, mothers-in-law, fathers, and fathers-in-law using educational materials (flip charts) on optimal IYCF practices and maternal and child nutrition. Because of their important role in decision making, male family members were encouraged to participate actively in these sessions.

Study design

A quasi-experimental design was used to evaluate the impact of the integrated intervention package. The primary outcome was stunting prevalence for children aged under two years. Secondary outcomes included child wasting, underweight and anaemia, reported IYCF practices, nutrition status and dietary diversity among PBW, and antenatal care access. Pre- and post-intervention assessments were conducted in both intervention and control districts. The project was implemented for approximately 18 months, with the baseline survey conducted between October and December 2020 and the endline survey between July and August 2022.

Difference-in-difference (DD) estimates were calculated using a generalised linear regression model. This was adjusted for: child gender and age; maternal age, education, and BMI; the presence of a skilled birth attendant; births in a facility; IYCF practices; and household characteristics. Takhar province was selected as the control area (Rustaq and Worsaj districts) as these locations were comparable in accessibility, socioeconomic conditions, geography, and ethnicity at the start of the programme.

Despite similarities, there were significant intra- and inter-district fluctuations in ethnicity at baseline and endline. Other significant socioeconomic changes could be seen with household ownership status, improved water access, household materials, and livestock ownership. Each of these cases was attributed to a combination of seasonal highland and lowland livestock migration and the NATO withdrawal from the country, which occurred mid-programme (2021). These factors are important, as they do make it more difficult to interpret the results since observations could be linked to these underlying population dynamics.

A total of 2,912 children aged under two years and their mothers (1,456 per group per survey) were estimated to provide reasonable precision for baseline and endline surveys. This was based on a 13% relative reduction in the prevalence of stunting in children aged under two years in the intervention vs control group.

All PBW with children aged under two years were eligible to complete the baseline and endline surveys. Eligible participants were identified through two sources. At health facilities, a list of pregnant women who accessed antenatal care services and breastfeeding mothers who accessed postnatal care and childcare services were prepared. At the community level, a list of PBW and children was prepared through CHWs. This included those PBW and children who were not captured at the health facility level. The data collection teams prepared a list of all the PBW with children aged under two years from each health facility and CHW. Households from each village were randomly selected to participate in the survey.

Discussion

Stunting

We observed a significant reduction in stunting prevalence (height-for-age <-2 z-scores) among children aged under two years in the intervention group (28.6% baseline; 24.2% endline, p=0.006). In the control group, there was a small increase in stunting prevalence, but this was not statistically significant (22.3% baseline; 23.5% endline). DD estimates indicated a significant reduction in stunting after adjusting for relevant confounders (DD -5.0%; p=0.041) (Table 1). In fact, DD analysis showed that the intervention group saw significant reductions in stunting prevalence both before and after adjustment for common confounders. This is important, as it may indicate that the effect was independent of other factors and that it may be attributed to the intervention with a greater degree of confidence. In line with findings reported from other settings, we found that stunting was more common among boys than girls in both intervention and control groups (Thurstans et al, 2020).

Underweight

Among children aged 6-23 months in the intervention group, the survey found no significant reduction in the prevalence of underweight (weight-for-age <-2 z-scores), which remained relatively stable throughout (14.9% baseline; 13.2% endline). DD estimates indicated a significant reduction in underweight (DD 4.6%; p=0.028). However, this difference was due to the prevalence of underweight increasing in the control group, rather than a reduction in underweight prevalence in the intervention group (Table 1). This suggests that the interventions were possibly protective against the deterioration of underweight in the intervention locations. In the intervention group, improvement in underweight prevalence was statistically significant among girls (14.6% baseline; 10.8% endline, P=0.03). This matches the stunting findings, where girls tended to improve more than boys.

Wasting

Although wasting prevalence in the intervention group reduced significantly (8.4% baseline; 5.2% endline) p=<0.001), the prevalence of wasting also reduced in the control group (14.2% baseline; 12.1% endline) with overall no statistically significant difference in DD (Table 1). The patterns observed for stunting and underweight were comparable to wasting, which was higher among boys at baseline and endline overall.

Other findings

It is notable that the percentage of women seeking antenatal care during pregnancy improved within the intervention group (67.8% baseline; 93.7% endline). However, there was no significant change in the control group (84% baseline; 88.6% endline). This improvement may indicate a possible pathway to stunting reduction.

Over 90% of PBW in the intervention group and 59.7% in the control group received additional messages regarding the intake of five different food groups every day. Nearly all PBW in the intervention group (97.4%) reported receiving the message regarding super cereal, versus 20.3% of PBW in the control group. This suggests some spillover of the SBCC messaging. Compared to the control group, a higher proportion of PBW in the intervention group (97.0% vs 63.3%) reported receiving messages about initiating breastfeeding within the first hour of birth, continued exclusive breastfeeding, and introduction of age-appropriate complementary foods

Table 1 Difference-in-difference (DD) among children aged under two years in control and intervention groups

	Intervention		Control		Unadjusted DD	P-value	Adjusted DD	P-value
	Baseline (%)	Endline (%)	Baseline (%)	Endline (%)				
Stunting	418 (28.6)	383 (24.2)	327 (22.3)	372 (23.5)	-5.7 (-10, -1.3)	***0.01***	-5.0 (-9.9, -0.2)	***0.041***
Underweight	217 (14.9)	211 (13.2)	222 (15.1)	309 (19.3)	-5.8 (-9.5, -2.2)	***0.002***	-4.6 (-8.6, -0.5)	***0.028***
Wasting	121 (8.4)	82 (5.2)	207 (14.2)	190 (12.1)	-1.1 (-4.1,1.9)	0.455	-1.7 (-5.1,1.6)	0.315

a) Unadjusted and adjusted DD were obtained from mixed linear regression models with an interaction term between health area (intervention vs control) and time (endline vs baseline).
b) Multivariable models adjusted for child gender, age, maternal age, education, skilled birth attendant, facility births, IYCF practices, maternal body mass index, and household characteristics.

along with breastfeeding. Overall, these results indicate the intervention was effective in increasing the coverage of IYCF messaging.

The DD analysis suggests that the SBCC component was effective in improving IYCF practices that are instrumental in the pathway to stunting reduction. Estimates showed significant improvements in early initiation of breastfeeding (within one hour of birth), exclusive breastfeeding aged under six months, minimum meal frequency, minimum acceptable diet, and children ever breastfed (Table 2).

Table 2 Reported IYCF practices in control and intervention groups by difference-in-difference estimates

Reported IYCF practices	Intervention		Control		DD (%)	P-value
	Baseline	Endline	Baseline	Endline		
Early initiation of breastfeeding within 1 hr	759 (52.0)	1,172 (73.2)	1,294 (88.2)	1,442 (89.9)	19.6	**<0.001**
Exclusive breastfeeding under 6 months	198 (82.2)	292 (87.4)	274 (80.4)	250 (74.6)	11.0	0.014
Continued breastfeeding at 1 year	263 (93.3)	277 (96.9)	258 (95.6)	285 (97.9)	1.2	0.607
Introduction of solid, semi-solid, or soft foods	136 (52.9)	157 (61.3)	121 (51.5)	116 (52.3)	7.6	0.232
Minimum meal frequency	354 (29.0)	898 (70.9)	342 (30.4)	625 (49.3)	23.0	**<0.001**
Minimum acceptable diet	61 (5.0)	250 (19.7)	63 (5.6)	92 (7.2)	13.1	**<0.001**
Minimum dietary diversity	236 (19.3)	302 (23.8)	79 (7.0)	127 (10.0)	1.5	0.459
Children ever breastfed	1,358 (93.0)	1,568 (97.9)	1,435 (97.8)	1,573 (98.1)	4.7	**<0.001**
Continued breastfeeding at 2 years	94 (87.0)	116 (85.3)	116 (85.3)	211 (92.1)	-8.6	0.114

Strengths and limitations

The large sample size for this study was a major strength. In addition, both baseline and endline survey instruments asked about a wide range of maternal and child health outcomes, some of which were targeted by the intervention and some that were not. Data collection was also completed in the local language, which likely increased inclusivity and may have reduced the risk of information bias. The data was also carefully reviewed to find outliers and unlikely responses. It is notable that data collection occurred between 2020 and 2022 and is therefore now a few years old, although many of the findings remain relevant and key takeaways important.

In addition to the super cereal (provided to PBW) and the lipid-based nutrient supplements (provided to children aged 6-23 months), another intervention (ready-to-use therapeutic food) was delivered simultaneously in both intervention and control districts as a part of national integrated management of acute malnutrition programming. This affected a small percentage of children (6.3%) and PBW (11.9%) in control districts. Although small, these numbers should be considered when interpreting the results.

Parallel interventions reflect the real-world nature of programming. Although they make data interpretation more difficult, they do highlight the importance of a multifaceted, integrated package of interventions that can tackle multiple pathways. It is likely that parallel interventions had some impact on the outcomes measured, although it is difficult to determine the exact degree. However, the findings from this study highlight impressive reductions in stunting, as well as other outcomes, with large effect sizes observed both before and after adjustment.

Lessons learned

Participation in the intervention combining specialised nutritious foods with SBCC over an 18-month period was associated with significant reductions in stunting prevalence among children aged under two years. With stunting being our primary outcome of interest, these results are encouraging. A large effect size was observed, which increases our confidence in these findings.

It is difficult to determine the effect that underlying population changes and migration dynamics had on these results. This, once again, highlights the challenge of conducting such large studies in volatile regions. Despite the limitations, this work is important in providing evidence from a challenging context. The finding that combining special nutritious foods with SBCC in the first 1,000 days may have a significant impact on stunting and underweight has important implications.

Addressing stunting in Afghanistan remains a critical public health concern. Multisectoral approaches that promote community engagement and participation are key to achieving sustained positive outcomes and require an appropriately trained workforce. Increasing the evidence base for how best to deliver SBCC, promote local, healthy diets, and optimise nutrition commodity use in this complex context should be prioritised.

Building on this, WFP, again in partnership with Aga Khan University, is implementing a new community-based stunting reduction programme targeting children under two years and PBW. Integrated interventions will include nutrition assessment, distribution of specialised nutritious food, promotion of local diets through local nutritious seasonal foods, appropriate maternal, infant, and young child feeding practices, and SBCC. In support of further evidence generation, the 18-month programme will incorporate a longitudinal cohort study design, combined with cross-sectional surveys, and a process evaluation. This new study will investigate the impact of duration and modality of the intervention as well as the influence of other contextual factors on the nutrition outcomes of the target groups.

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Women participating in WFP-supported house/kitchen gardening training on hygiene, healthy food and nutrition, Badakhshan Province. Afghanistan, 2024

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Risk factors associated with severe acute malnutrition relapse in Sudan

A mother-to-mother support group, where the IMC nutrition team shares breastfeeding and complementary feeding practices. Sudan, 2024

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What we know:

In Sudan, the onset of conflict in April 2023 exacerbated already critical levels of malnutrition. Community-based management of acute malnutrition is an effective treatment model, but limited evidence exists on post-exit outcomes and the sustainability of recovery.

What this adds:

This unmatched case-control study adds evidence to potential risk factors for severe acute malnutrition (SAM) relapse. The protective role of individual counselling and breastfeeding are highlighted. The impact of other factors on relapse, such as agricultural land access and suboptimal care-seeking behaviour, need further exploration.

Malnutrition is widely recognised as the greatest single threat to public health, with nearly half of all deaths among children under five attributed to malnutrition (Victora et al, 2008). In 2021, the Global Nutrition Report (GNR) stated that 16.3% of children aged under five years in Sudan were acutely malnourished, although this figure is based on 2014 data. A survey conducted in East Jabel Mara (South Darfur) in 2020 by International Medical Corps reported a global acute malnutrition (GAM) prevalence of 18.1% and SAM prevalence of 5.3%. The onset of the conflict in April 2023 exacerbated the already critical levels of malnutrition, with a persistent risk of famine reported in October 2024. GAM prevalence among children aged under five years had reached the critical (15-29.9%) or extremely critical threshold (≥30%) in 13 localities (IPC, 2024).

In 2022, the World Health Organization (WHO) estimated that approximately 7.3 out of 19 million children with SAM received the appropriate treatment (WHO, 2023). Contributing to the treatment gap is the fact that a proportion of children relapse after completing treatment. The Council of Research and Technical Advice for Acute Malnutrition (CORTASAM) define relapse as "an episode of severe wasting within six months of being discharged from treatment for severe wasting". A systematic review found that relapse cases ranged from 0% to 37% of admissions (Stobaugh et al, 2019). It also found that, there was considerable variation in both the definition of relapse and reporting across settings. Although the body of evidence related to risk factors for relapse is growing, knowledge gaps persist.

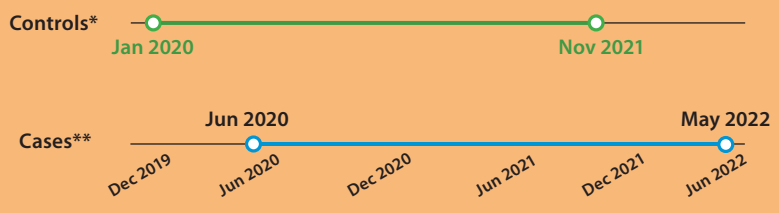
The ongoing conflict in Sudan has severely impacted health infrastructure and reduced access to treatment services (Sudan Nutrition Sector, 2024). Thus, understanding the protective and risk factors for relapse is crucial as this can inform targeted interventions to improve the sustainability of treatment outcomes.

Methods

Study design and participants

An unmatched case-control study was used to assess potential risk factors for relapse. Cases and controls were identified from outpatient therapeutic programme (OTP) registers in 30 International Medical Corps-supported facilities in Blue Nile, South Kordofan, Central Darfur, and South Darfur states of Sudan.

Figure 1 Eligibility period for cases and controls



*Controls = All children enrolled in OTP after December 2019 and discharged before November 2021 without an episode of relapse within three months of discharge.
**Cases = All children enrolled in OTP as a case of relapse after May 2020 and before May 2022.

Relapse cases were defined as children aged 6-59 months enrolled in the OTP for the management of uncomplicated SAM within three months of exiting as recovered (weight for height z-score ≥-3 and/or mid-upper arm circumference ≥11.5 cm) as per the national community-based management of acute malnutrition (CMAM) guidelines. Controls were children aged 6-59 months enrolled in OTP who did not relapse within the three-month window as per the definition of the Sudan CMAM guidelines. To ensure that controls were not misclassified, an earlier enrolment period for eligibility was applied (Figure 1).

Sampling

A list of all eligible children was compiled from 30 OTP registers by health facility staff, systematically reviewed, and cleaned in consultation with the research team. Controls were selected using simple random sampling. However, challenges in locating a high proportion of the randomly selected controls for interview led the research team to incorporate convenience methods. The cleaned study population frame contained 173 validated relapse cases and 2,722 controls. A sample size of 1,200 was estimated using a package in RStudio.

Data collection

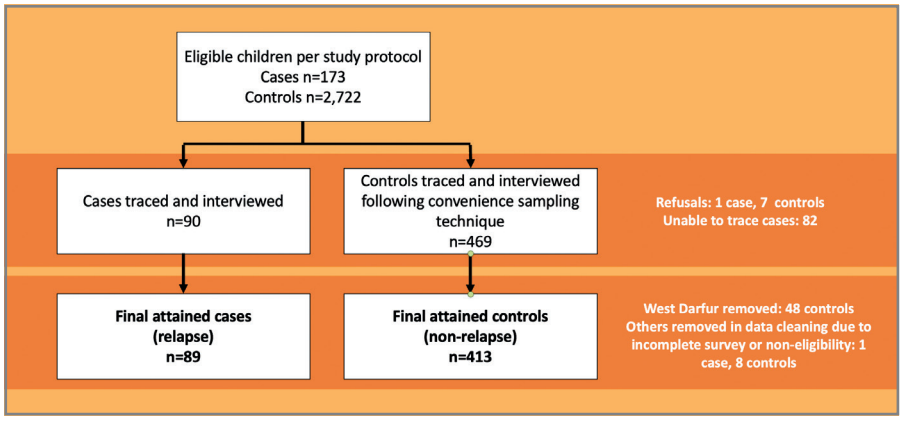
Data was collected using an adapted version of UNICEF's multiple indicator cluster survey (MICS) questionnaire, administered to children's primary caregivers by trained community health workers after obtaining verbal consent. Interviews were conducted between June and October 2022. The questionnaire was completed by enumerators on paper and then entered into Kobo Toolbox. Data quality was subsequently reviewed on the platform.

The study considered individual- and household-level demographics and hypothesised risk factors for relapse. Six thematic areas known to affect children's nutritional status and/or relapse were considered: general demographics, household socioeconomic characteristics and humanitarian assistance received, food security, nutrition, health, and water, sanitation, and hygiene (WASH).

Data analysis

Statistical analyses were conducted using R version 4.0.5 and RStudio version 1.4.1106. Risk factors were summarised as univariable descriptive statistics and cross-tabulated against relapse status. Distributions were compared for categorical variables using a chi-square test with Rao and Scott's second-order correction or Fisher's exact test. Variables that were significant in univariable analyses, along with pre-selected confounders (child's sex, age at admission, and household displacement status), were considered for inclusion in multivariable logistic regression models. These models were used to assess the independent associations between selected risk factors and the odds of relapse. Variables that were dependent on other variables (for example, time elapsed since admission with age, nutrition information source with attending infant and young child feeding (IYCF) counselling), thematically related within a sector (for example, handwashing knowledge and having sufficient quantity of water), or determined by study design (for example, state of residence) were excluded from the regression models to avoid overlapping influence and poor model fit.

Figure 2 Data collection flow chart



Ethics

The University of Khartoum Institutional Review Board represented by the Faculty of Public and Environmental Health Research Board and the National Research Ethics Review Committee of the Sudanese Federal MoH approved this study (number 1-3-22). Written permissions were also obtained from the four state MoHs and the Sudan HAC.

Findings

Among all eligible children, the relapse rate was 6%. A total of 502 children (89 cases and 413 controls) were included in the final analysis (Figure 2). No differences were detected between cases and controls in terms of sex, age at interview, or age of child at treatment enrolment. However, a higher proportion of controls were from displaced households compared to cases (53% vs 38%, p=0.012).

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A breastfeeding manual is passed around a mothers' group. Sudan, 2024

Crude and adjusted odds ratios (OR and aOR) were calculated to assess the relative effect size of associations between risk factors and relapse status. Only the adjusted odds ratios are presented where associations remained significant after confounders were considered.

Protective factors

In the adjusted analysis, several factors were negatively associated with relapse, demonstrating independent protective effects. Children who were ever breastfed had 61% lower odds of relapse compared to those who were not (OR: 0.39, 95% CI: 0.24-0.65). This association remained significant in the adjusted model (aOR: 0.47, 95% CI: 0.24-0.95).

In addition, lower odds of relapse were observed in the adjusted analysis among caretakers who received individual IYCF counselling (aOR: 0.29, 95% CI: 0.09-0.73). Conversely, knowledge of key nutrition practices or group participation was associated with increased

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A mother-to-mother support group, where the IMC nutrition team shares breastfeeding and complementary feeding practices. Sudan, 2024

risk of relapse. Participation in care groups or mother-to-mother support groups was associated with a 70% increase in relapse odds (OR: 1.70, 95% CI: 1.04-2.80). In addition, caregiver knowledge, rather than being protective, was associated with increased odds of relapse. Knowing two or more ways to prevent malnutrition (OR: 2.15, 95% CI: 1.33-3.48), three or more recommended times for handwashing (OR: 2.16, 95% CI: 1.36-3.48), and the recommended breastfeeding duration of 24 months or more (OR: 1.95, 95% CI: 1.18-3.32) were associated with increased odds of relapse. Children of caregivers who cited CMAM services as a source of nutrition information had nearly twice the odds of relapse (OR: 1.99, 95% CI: 1.07-3.74). This association may have been observed as they were more likely to be frequently attending the nutrition facility. These findings highlight the importance of strengthening individual IYCF counselling and personalised recommendations by improving the availability and capacity of community-based nutrition workers, rather than broader knowledge dissemination. This is especially relevant given the current context where counselling might be interrupted due to security, access, or programmatic constraints.

Our findings showed lower odds of relapse among households reporting sufficient quantity of drinking water in the last month (OR: 0.40, 95% CI: 0.23-0.67). The existing evidence base for the relationship between household WASH interventions and relapse is limited and inconsistent (MacCleod et al, 2024). However, our findings suggest that, given the current situation in Sudan, access to sufficient and safe drinking water to prevent relapse should be prioritised.

Risk factors

Households reporting access to land for agriculture had over twice the odds of relapse compared to those without access, even after adjustment for potential confounders such as displacement status (aOR: 2.73, 95% CI: 1.27-6.31). This association could be partially explained by time constraints on the primary caregiver. Previous studies, while not specific to malnutrition relapse, have noted that women's caregiving capacity is strongly influenced by agriculture workload, leading to suboptimal IYCF practices (Nyantakyi-Frimpong, 2021). This warrants further investigation, as research on the topic is limited. It is also important to consider the increased proportion of cases who were from the host community (62% vs. 38%) when interpreting this finding.

Moderate or severe food insecurity was associated with increased odds of relapse (OR: 2.13, 95% CI: 1.12-4.40), although this relationship was not significant in the adjusted model. The link between household food security levels and malnutrition relapse rates remains uncertain. In a three-country cohort study (summarised on page 38), food security was found to be a risk factor for relapse in certain contexts (King et al, 2025). Relapse was negatively associated with certain socioeconomic assets, including owning a phone (OR: 0.51, 95% CI: 0.29-0.89). Furthermore, control households were less likely to report receiving humanitarian assistance in the last 12 months than relapse cases (OR: 0.29, 95% CI: 0.08-0.81). These trends, although not significant in the adjusted models, perhaps echo the vulnerability of the food-insecure households, in households who have access to limited resources.

Other risk factors included the use of unprescribed medications for treating malnutrition, which more than doubled the odds of relapse (OR: 2.21, 95% CI: 1.18-4.02). Although the association between relapse and use of unprescribed medication is not clear, other studies have reported that use of herbal medicine increases the odds of mortality among children with SAM (Gavhi, 2020). This finding supports the link between suboptimal care practices and increased risk of relapse.

Several limitations should be considered when interpreting these results. Despite extensive efforts to ensure the quality of the lists of eligible children, some misclassification of cases and controls is likely. Some relapse cases may have gone undetected if they did not present for treatment, as the study did not include prospective follow-up. The elapsed time between enrolment and interview completion should also be considered in interpreting the findings and may also have introduced potential recall bias. Additionally, the sample size for cases and controls was smaller than anticipated, as not all eligible households were enrolled due to accessibility issues and population movement. Thus, the study may have lacked sufficient power to detect some risk factors.

Conclusion

Since April 2023, International Medical Corps has scaled back its services by 33% due to inaccessibility related to security concerns and funding constraints in three states (South Kordofan, Blue Nile, and South Darfur). Therefore, it is crucial to design and implement interventions that prevent relapse to decrease the burden on treatment services and households. Our findings suggest individual IYCF counselling, emphasising the importance of (continued) breastfeeding, access to clean drinking water, and promoting optimal care-seeking behaviour should be prioritised. Strengthening personalised IYCF counselling at community level by community nutrition workers could improve actionable appropriate care practices, decreasing risk of relapse.

Further understanding the relationship between access to land for agriculture and risk of relapse is important. Ensuring households have local access to enough diverse and nutritious foods is of critical importance to prevent malnutrition. Interventions that support the use of available land without negatively impacting optimal care practices may be worth exploring. This is of particular importance in contexts where acute malnutrition services are frequently suspended due to insecurity, shortage of nutrition supplies, and access and funding constraints.

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Women preparing the ingredients for the LPSF mix. Nigeria, 2023

Locally produced supplementary food and drivers of relapse in northeast Nigeria

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What we know:

High relapse rates after successful treatment for severe acute malnutrition (SAM) have been observed in many contexts. This underscores the need to better understand and address the drivers of relapse.

What this adds:

This study examines the impact of providing a nutrient-rich, locally produced supplementary food (LPSF) post-treatment for SAM. It also offers new evidence on relapse risk factors, particularly those embedded in livelihood systems and community-level influences.

Northeast Nigeria's Adamawa, Borno, and Yobe states face a complex and protracted humanitarian crisis characterised by persistent acute malnutrition, high relapse rates, and worsening vulnerabilities. This crisis stems from a 14-year conflict causing widespread displacement and disrupting livelihoods, compounded by climate extremes and economic challenges. In 2023, Nigeria recorded the highest rates of acute malnutrition in the African drylands, with over 1.5 million children under five and 200,000 pregnant and lactating women affected in Adamawa, Borno, and Yobe states (IPC, 2023). In Borno and Yobe state, 10.2% and 8% of children under five were acutely malnourished, respectively (Nigeria Nutrition Sector, 2023).

Although effective treatments for acute malnutrition exist, high relapse rates after exit from outpatient treatment programmes (OTPs) are reported, especially within the first six months after discharge (Stobaugh et al, 2019). A study in Mali, Somalia, and South Sudan (summarised on page 38) found that, respectively, 30%, 63%, and 22%, of children, relapsed within six months of recovery from acute malnutrition (King et al, 2025). In western Nigeria, a study showed that the SAM incidence rate was 52 times higher in children who received treatment in an OTP compared to the control group (Adegoke et al, 2020).

To address relapse risk, from July 2023 to January 2024 FAO Nigeria implemented an intervention post-OTP exit, providing a nutrient-rich LPSF, consisting of a blend of millet, soybean, groundnut, fish powder, dates, ginger and cloves, to children aged 6-59 months (Figure 1).

FAO trained 140 women, grouped into cooperatives at selected fish processing centres, to support the processing and preparation of the LPSF, simultaneously empowering local communities. The LPSF was supplied to seven OTPs, where it was distributed to 10,000 children aged 6-59 months, who exited programmes as cured. Each recipient received 3kg of LPSF every two weeks for six weeks (totalling 9kg), consumed in rations of about 214g per day, served as porridge.

This article presents findings on the impact of the LPSF, enhancing our understanding of the burden and risk factors for acute malnutrition relapse in children under five in north-eastern Nigeria. Relapse risk factors at individual, household, and community levels were identified.

Methodology

The study focused on four local government areas (LGAs) (Figure 2). These LGAs were selected based on a high prevalence of acute malnutrition. Priority was given to areas most affected by conflict and displacement to ensure the study's relevance in addressing high-risk populations.

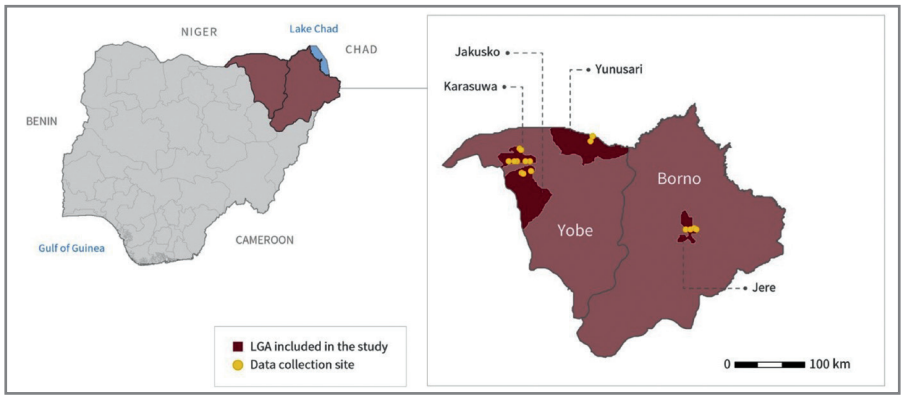
Study design

A longitudinal cohort design with a matched case-control component was used to assess the impact of LPSF to prevent relapse among children under five, six months after exiting OTPs. Each child who received LPSF was matched to a control child from a nearby OTP where LPSF was not distributed. The matching process considered key characteristics, including age, sex, anthropometric measurements at enrolment/exit, OTP exit date, and household factors, including receipt of any other humanitarian assistance.

A child was classified as cured if their mid-upper arm circumference (MUAC) was ≥12.5 cm and/or weight-for-height z-score (WHZ) ≥-2 for two consecutive weeks with sustained weight gain. Relapse

Figure 1 Nutritional profile of LPSF

Figure 2 Study areas in Borno and Yobe states



Source: United Nations Geospatial (2014). Map of Nigeria. Modified by FAO Office of Emergencies and Resilience to highlight areas included in the study (2024).

was defined as a MUAC <12.5 cm and/or WHZ <-2 and/or presence of nutritional oedema within six months of exiting OTP. Children were categorised as having moderate acute malnutrition (MAM) if their WHZ was between ≥-3 and <-2 and/or MUAC was between 11.5 cm and <12.5cm or SAM if WHZ <-3 and/or MUAC <11.5 cm.

A total of 859 children were included in the analysis. Of these, 416 children received LPSF (cases) for six weeks post-exit, while 443 did not (controls). The final sample size accounts for approximately 12% loss to follow-up (among cases).

Data collection

In January 2024, a structured questionnaire was used to collect data on individual, household, and community factors affecting nutritional status. Informed consent was obtained from caregivers prior to participation. The questionnaire included questions on child health, dietary intake, anthropometry, household food security, livelihoods, hygiene practices, income sources, women's workload, and water access. Anthropometry was also taken for female caregivers aged 15–49 years. Data collection teams, each comprising two enumerators, surveyed an average of 13 households daily.

Data analysis

The analysis had two distinct components, firstly evaluating the impact of LPSF in preventing acute malnutrition relapse and, secondly, identifying risk factors for children who relapsed.

The effectiveness of LPSF in preventing relapse was assessed by comparing outcomes of cases (those who received LPSF) and their matched controls (those who did not receive LPSF). Regression analysis was used to assess the impact of LPSF, while controlling for potential confounding variables.

The risk factor analysis compared children in both the case and control groups who relapsed with those who did not. Logistic regression examined potential associations with relapse across individual-, household-, and community-level factors, adjusting for confounders, including LPSF receipt. Geographic information system (GIS) analysis was conducted to evaluate community-level drivers of acute malnutrition relapse. Geographic and environmental factors, such as proximity to conflict areas, land use patterns, and water availability, were analysed to identify clusters of relapse cases and associated contextual factors.

Findings

Impact of LPSF in reducing risk of relapse after recovery from SAM

Six months after exiting OTPs, nearly one in three children, or 29.3% (95% CI: 25.1–33.6), in the control group relapsed, compared with 21.2% (95% CI:17.2–25.1) in the case group. These findings highlight the vulnerability of children who do not receive continued support, such as LPSF, after OTP exit, exposing a critical gap in current approaches that prioritise OTP treatment but inadequately addresses post-exit challenges. The analysis demonstrates that the consumption of LPSF reduced the odds of relapse by 35% (Table 2).

These results should be considered within the broader literature on the seasonality patterns of acute malnutrition, given that vulnerability in many contexts, including Nigeria, fluctuates seasonally (Bliznashka et al, 2022). Further investigation is needed to assess seasonal relapse drivers during peak seasons.

Drivers of relapse

Individual level

Children under two years faced a significantly higher risk of relapse, with a 42% greater likelihood of relapse compared to older children (p-value = 0.00081, OR: 0.58, 95% CI: 0.42-0.81). However, gender was not significantly associated with relapse risk.

Dietary diversity emerged as a critical determinant of relapse. Children below two years old consuming fewer than five food groups were 3.93 times more likely to relapse (p-value = 0.00098, OR: 3.93, 95% CI: 1.62-11.5). Such differences were not observed in older children. This underscores the importance of dietary quality, especially in younger children. However, as infants tend to rely more on breast milk, their lower food group intake could partially explain this result.

No statistically significant associations were found between acute malnutrition relapse and reported symptoms of common childhood illnesses such as diarrhoea (p-value = 0.139), fever (p-value = 0.507), or respiratory illness (p-value = 0.246) symptoms (cough, or respiratory distress/difficulty). Equally, the use of mosquito nets (p-value = 0.591) or deworming treatment (p-value = 0.514) was not associated with relapse. Childhood illnesses are seasonal; thus, while none were statistically significantly linked to relapse in this study, seasonality may have influenced the results.

Household level

Children of caregivers with heavy workloads, particularly female-headed households, had a higher likelihood of relapse (p-value = 0.008, OR: 4.38, 95% CI: 1.42–14.89). This may be due to reduced time and resources for childcare. However, caregivers' nutritional status (measured by MUAC p-value = 0.136) and their pregnancy (p-value = 0.662) or breastfeeding status (p-value = 0.624) were not statistically significantly associated with relapse.

Household food insecurity, based on the household hunger score (p-value = 0.889) and food consumption score (p-value = 0.589), was not associated with a higher risk of relapse. This aligns with previous research showing inconsistent associations between household food security and acute malnutrition (Luc et al, 2023).

Livestock ownership, particularly of sheep, was linked to a higher risk of relapse (p-value

Table 1 Number of children included for effect assessment by community

State	Local government area	Ward	Community	Cases	Control
Borno	Bama	Shehuri	Diru	4	74
Borno	Jere	Dusuman	Maiduguri	176	133
Borno	Jere	Old Maiduguri	Dumbari	92	71
Yobe	Jakusko	Zabudum/Dachia	Jawur	82	54
Yobe	Karasuwa	Gasma	Doganna	51	42
Yobe	Karasuwa	Karasuwa	Garunguna	11	69

Table 2 Comparison of relapse after recovery from SAM

	Case group (n=416)	Control group (n=443)	p-value	OR
% of children who relapsed into GAM (95% CI)	21.2 (17.2 – 25.1)	29.3 (25.1 - 33.6)	0.006	0.65 (0.47 - 0.89)
% of children who relapsed into MAM (95% CI)	17.5 (13.9 - 21.2)	23.5 (19.5 - 27.4)	0.032	0.69 (0.49 - 0.98)
% of children who relapsed into SAM (95% CI)	5.8 (3.5 – 8)	8.8 (6.2 - 11.5)	0.087	0.63 (0.36 - 1.1)

= 0.043), possibly due to increased exposure to zoonotic diseases, although further investigation is needed. Household livelihood activity was statistically significantly associated with the odds of relapse, but the small sample size limited the ability to detect strong patterns for comparison. Children were more likely to relapse in households that had shifted from their grandparents' livelihood production. Internally displaced people (p-value = 0.178) and host community households showed no significant differences in relapse rates.

Most households reported using boreholes as their primary water source. Households relying on unsafe water sources were at an increased risk of relapse, though the small sample size limited definitive conclusions. Good handwashing practices were strongly linked to lower odds relapse to both GAM (OR: 0.63, 95% CI: 0.44–0.90; p-value = 0.008) and SAM (OR: 0.47, 95% CI: 0.23–0.9; p-value = 0.017). This is consistent with a systematic review (summarised on page 38) that found inconsistent associations between WASH conditions and SAM relapse (MacLeod et al, 2024).

Community level

Spatial clustering of relapse cases revealed significant patterns, illustrating the role of community-level factors. For example, in Doganna, 62% of children relapsed within six months, compared to 36% in Garunguna, 24% in Maiduguri, and 14% percent in Dalla (Figure 3).

No single factor directly explained the observed relapse patterns, but clustering was evident among several variables: diarrhoea, child dietary diversity, caregivers' nutritional status, household food insecurity, and displacement status. Clusters of high food insecurity did not always coincide with high relapse rate clusters, suggesting that factors other than food access and diversity might be at play. Multiple community-level explanatory models should be considered to fully understand the complexity and interplay of drivers of relapse.

Interestingly, clusters with higher relapse rates are also clusters where households reported significant changes in livelihood activities compared to their grandparents' generation (for example Doganna at 72% and Garunguna at 55%). These shifts might be linked to localised shocks such as asset loss or resettlement. Conversely, only 29% of households in Dalla, where relapse rates were lowest, reported similar shifts, suggesting lower exposure to such shocks or greater resilience capacities. Localised factors such as ethnicity, vulnerability to shocks (conflict and floods), and access to and use of natural resources (for example, soil type and seasonal access to water) should also be considered when interpreting these findings. Further qualitative research is needed to better understand these variations and underlying drivers.

Conflict events occurring between 15 December 2022 and 31 January 2024 were also reviewed. In Doganna, where relapse rates were highest, a notable conflict event was recorded between seasonal migration pastoral herders (Fulani) and local farming communities. This area is well known for its high risk of conflict over natural resources due to its proximity to pasture/grassland, surface water, and seasonal migration routes. The clustering of livestock in the Doganna area may also increase children's exposure to zoonotic pathogens, potentially raising the risk of enteric infections and acute malnutrition relapse.

Conclusion

This study demonstrates that LPSF can reduce relapse rates by 35%, particularly in younger children, showcasing its potential as an effective and scalable post-OTP intervention. However, to maximise impact, this approach must be complemented by additional interventions that address the underlying and systemic drivers of acute malnutrition. A limitation of this study is that, while anthropometric measurements were monitored every two weeks for cases, they were not systematically tracked for the control group. However, relapse outcomes were assessed for both cohorts six months after OTP exit. Additionally, the sample size was insufficient to stratify the analysis by the severity of anthropometric indicators, limiting the depth of subgroup comparisons.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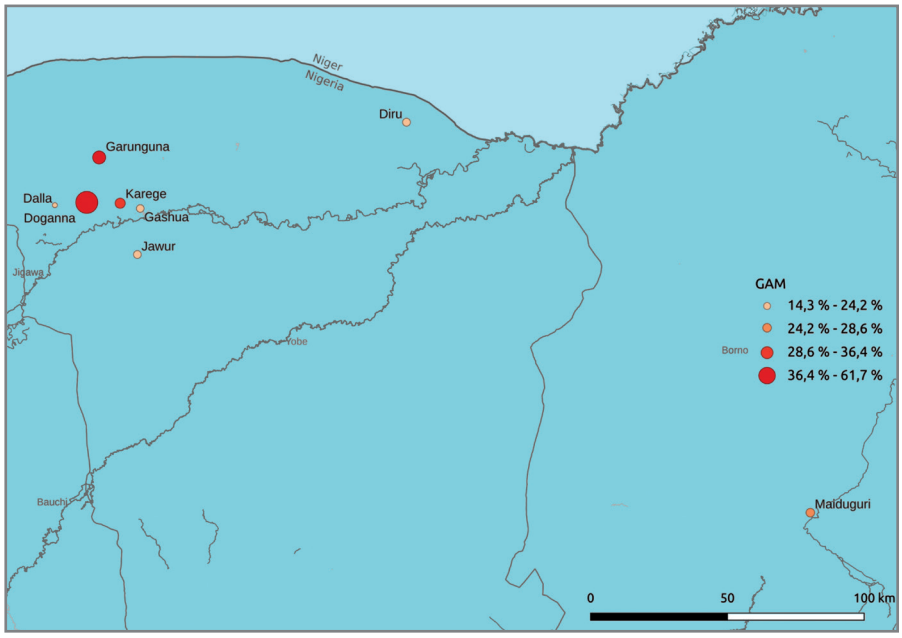
Woman packaging the LPSF mix at a cooperative. Nigeria, 2023

Relapse is driven by complex, interconnected, and clustered factors embedded within broader livelihood systems, extending beyond household food security. The findings reinforce the importance of livelihood-based interventions to mitigate long-term economic and social stressors affecting child nutrition. We call for localised explanatory models tailored to specific nutritional outcomes such as relapse, as well as for community-specific programming, considering that relapse is not evenly distributed but clustered in specific regions.

Figure 3 Incidence of acute malnutrition relapse by study site



Source of data: Authors' own elaboration. Source of map: OpenStreetMap. 2024

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Rates and risk factors for relapse: A three-country prospective cohort study

This is a summary of the following paper: *King S, Marshak A, D'Mello-Guyett L et al (2025) Rates and risk factors for relapse among children recovered from severe acute malnutrition in Mali, South Sudan, and Somalia: A prospective cohort study. The Lancet Global Health. 13,1, e98 - e111.* **https://doi.org/10.1016/S2214-109X(24)00415-7**

Children who recover after being treated for severe acute malnutrition (SAM) in community-based programmes are often readmitted due to relapse. Reported relapse rates vary widely across settings, ranging from 0% to 37%. Contributing to the growing body of evidence, this multi-country prospective cohort study aimed to evaluate the risk and determinants of relapse following SAM recovery in high burden settings.

The study was conducted across three countries, selecting 16 high caseload, accessible clinics. Nine were in Mali, six in South Sudan (which served rural non-displaced populations with limited assistance programmes and funding available), and one in Somalia (an urban clinic in Banadir internally displaced persons camp with more assistance programmes available).

Exposed children were eligible if they were discharged as recovered from uncomplicated SAM while aged 6-47 months. Non-exposed children were eligible for inclusion if, within the previous year, they had not been diagnosed as malnourished and were matched to exposed children based on age, sex, and clinic catchment area. A child was considered to have acute malnutrition if they had a mid-upper arm circumference of <12.5cm, a weight for height z-score <–2 SD, or nutritional oedema. Relapse was defined as an episode of acute malnutrition among exposed children. Some 2,749 children were enrolled on a rolling basis and followed up for six months, with monthly visits conducted where individual child-level and household-level variables were gathered, alongside anthropometric measurements.

The study found that relapse rates varied by country, with 22% in Somalia, 30% in Mali, and 63% in South Sudan having relapsed within six months. In multi-country analyses, children exposed to SAM within the past six months were 3.3 to 5.3 times more likely to develop acute malnutrition compared with their non-exposed peers. Echoing other studies, the most consistent predictor of relapse was having lower anthropometric measurements during SAM treatment, particularly at discharge. Few other child-level or household-level factors at the time of discharge were associated with subsequent risk of relapse. After discharge, children experiencing food insecurity or morbidity (diarrhoea or fever) during the follow-up period were more likely to relapse than those who were not exposed to these factors. During the follow-up period, relapse rates remained generally static, with only a slight peak observed in South Sudan around three months.

Several limitations were noted including the longitudinal design, which required exclusion of households that were unable to stay within the area for six months. Additionally, the low prevalence of oedema limited the generalisability of results. The study concludes that, although exposed children are clinically classified the same as non-exposed peers, they are more vulnerable to subsequent acute malnutrition. These findings reinforce the need for post-discharge interventions to sustain recovery.

Can WASH factors and interventions prevent severe wasting relapse? A systematic review

Community members participate in Global Handwashing Day. Myanmar, 2024

This is a summary of the following paper: *MacLeod C, Ngabirano L, N'Diaye DS, Braun L, & Cumming O (2024). Household-level water, sanitation and hygiene factors and interventions and the prevention of relapse after severe acute malnutrition recovery: A systematic review. Maternal & Child Nutrition, 20, e13634.* **https://doi.org/10.1111/mcn.13634**

Community-based Management of Acute Malnutrition (CMAM) has proven effective in treating severe wasting. However, many children relapse after discharge, often within the first three months. Severe wasting relapse occurs when a child who has recovered from an outpatient therapeutic programme (OTP) becomes severely wasted again. Reported relapse rates vary significantly, ranging from 0% to 37%, highlighting a major gap in sustaining long-term recovery. Poor water, sanitation, and hygiene (WASH) conditions are known risk factors for undernutrition, contributing to about 16% of the global burden in children under five. However, there is limited evidence on whether improving household WASH conditions can prevent severe wasting relapse. Repeated diarrhoeal infections, intestinal parasites, and environmental enteric dysfunction caused by poor WASH increase a child's vulnerability, making them more likely to relapse after treatment.

This systematic review assessed whether household-level WASH interventions can help prevent severe wasting relapse and aimed to identify key WASH-related risk factors for relapse. The review analysed studies published after 2000, focusing on children aged 6-59 months post-OTP discharge. Despite a comprehensive search, only three studies met the inclusion criteria, revealing a significant gap in research on this issue. Findings were inconsistent due to small sample sizes, differing definitions of relapse, and variations in follow-up duration. One intervention study evaluated the impact of providing household WASH kits during OTP treatment and post-discharge. It found no significant reduction in relapse rates at two- and six-month follow-ups, possibly because the supplies were only provided for one month post-discharge. Two observational studies examined links between WASH conditions, such as unsafe drinking water and poor sanitation and severe wasting relapse, but the results were inconsistent. Variability in relapse rates between studies may be explained by differences in OTP admission and discharge criteria, tracking methods, and follow-up duration.

The available evidence, though limited, suggests that children recovering from severe wasting remain highly vulnerable and that CMAM services alone may not be enough to sustain recovery. Addressing relapse risk requires a better understanding of which WASH interventions are most effective, particularly in the critical first three months after discharge when children are at the highest risk of becoming severely wasted again.

Some limitations of this study were noted. The study could have had a broader inclusion criterion, since the small number of eligible studies and the varied study designs made it challenging to identify clear trends. The definition of relapse used could have focused on studies that looked at including relapse to moderate wasting as well. While the review focused on household-level interventions, exploring the potential impact of community-level interventions could provide valuable insights into reducing relapse rates. Discussion of the findings on the evidence of WASH interventions and the prevention of undernutrition could have been expanded upon. Future studies should explore locally adapted approaches that reduce environmental contamination, improve household hygiene, and ensure that recovered children stay healthy, thus reducing the burden of malnutrition in vulnerable communities.

Mass azithromycin and child mortality prevention in Burkina Faso: A subgroup analysis

This is a summary of the following paper: *Sie A, Ouattara M, Bountogo M et al (2024) Mass azithromycin for prevention of child mortality among children with acute malnutrition: A subgroup analysis of a cluster randomized controlled trial. PLOS Global Public Health, 4(10), e0003875.* **https://doi.org/10.1371/journal.pgph.0003875**

Children with wasting are at high risk of morality. Mass azithromycin distribution has been shown to reduce all-cause mortality among children aged 1-59 months in high mortality settings, and the effects may be greater in underweight infants.

This study evaluates the efficacy of azithromycin for reducing all-cause mortality in children aged 6-59 months with wasting (mid-upper arm circumference (MUAC) < 125mm). It hypothesised that azithromycin would be more effective in wasted children compared to non-wasted children (MUAC ≥ 125mm).

The Child Health with Azithromycin Treatment (CHAT) trial in Nouna District, Burkina Faso, was a cluster-randomised, placebo-controlled study evaluating biannual azithromycin distribution's effectiveness in reducing child mortality. The subgroup analysis included children aged 1-59 months, using MUAC measurements to assess wasting. Participants were randomised to receive either azithromycin (20 mg/kg) or the placebo every six months for three years. The primary outcome was all-cause mortality, measured through biannual censuses.

Out of 341 randomised clusters, 297 contributed person-time from August 2019 to February 2023, with 145 clusters receiving azithromycin and 152 clusters receiving the placebo. A total of 1,086 deaths were observed (over 119,139 person years), with a mortality incidence of 9.1 deaths per 1,000 person-years. The incidence rate of mortality was 26.3 deaths per 1,000 person-years (95% CI 17.3 to 36.2) among children aged 6-59 months with MUAC < 125mm, compared to 8.4 deaths per 1,000 person-years among those with MUAC≥ 12.5 cm. Among wasted children, azithromycin reduced mortality by 51%, while the effect in non-wasted children was smaller (a 16% reduction). Azithromycin led to 18 fewer deaths per 1,000 person-years in wasted children and 1.5 fewer deaths in non-wasted children, with no significant interaction by age.

The study has several limitations, including small subgroup sizes, leading to wide confidence intervals and uncertainty in the mortality estimates. As such, the findings are only hypothesis generating and do not confirm whether a targeted azithromycin approach would reduce mortality. The effectiveness of azithromycin may rely on reducing pathogen transmission within communities. With a targeted approach many children would remain untreated, and they could still spread pathogens to malnourished children, limiting the overall impact. Additionally, the study did not include height measurements, so the effects on children who were stunted or wasted (according to low weight-for-height z-scores) could not be assessed. The lack of data on oedematous malnutrition also restricts further subgroup analysis. Children with both wasting and stunting, or underweight, are at higher risk of mortality, and evaluating azithromycin's impact in these groups could provide more valuable insights.

In conclusion, although children with wasting showed greater reductions in mortality risk with azithromycin, differences were not statistically significant. In lower mortality settings where mass distribution may not be necessary, targeted distribution of azithromycin to children with wasting may be worth exploring.

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Measuring MUAC of a severely malnourished child at the MSF Kofar Marusa therapeutic feeding centre, Katsina State. Nigeria, 2022

This is a summary of the following paper: *Cazes C, Stobaugh H, Bahwere P et al (2025) Rethinking "non-response" to wasting treatment: Exploratory analysis from 14 studies. PLOS Global Public Health.* **https://doi.org/10.1371/journal.pgph.0003741**

The World Health Organization 2023 guidelines define recovery in children aged 6-59 months with severe wasting and/or nutritional oedema as reaching a weight-for-height z-score (WHZ) ≥-2 and mid-upper arm circumference (MUAC) ≥125mm, with no nutritional oedema, for two consecutive weeks. Children failing to meet these criteria within 12-16 weeks are classified as 'non-responders' (NR) and considered treatment failures. This study hypothesises that non-responders are not a homogeneous group and may exhibit different growth trajectories.

Drawing data from 14 studies, the study analysed children receiving treatment for wasting, excluding those with oedema or implausible anthropometric measurements. The analysis compared recovered children to non-responders and further categorised non-responders into 'low growth NR' and 'high growth NR', distinguishing between those who showed minimal growth and those who responded to treatment but did not recover within the maximum treatment duration. Growth trajectories and predictors of each group were explored, involving nearly 16,000 children.

Findings revealed that non-responders were generally younger, had a higher proportion of severe wasting, and displayed worse anthropometric indices at admission than recovered children. The high growth NR group started with poorer anthropometric status but exhibited growth along a near-parallel trajectory to the recovered group. The low growth NR group showed limited growth and higher morbidity.

The study underscores the need to differentiate between high growth NRs, who are responding well but require longer treatment, and low growth NRs, who show little to no improvement. Classifying high growth NRs as treatment failures risks premature discharge and underestimation of therapeutic feeding programme effectiveness. For instance, children admitted with very low MUAC (~110mm) may take over four months to recover. Conversely, low growth NRs likely have underlying health conditions constraining their growth, necessitating closer medical investigation.

The findings emphasise the importance of weekly MUAC and weight monitoring to assess individual growth trajectories. Operational research is needed to determine whether individualised growth monitoring is feasible or if a standardised approach should be adopted, such as extending treatment duration for children with MUAC <110mm or weight-for-age z-score <-3 at admission. While prolonged treatment incurs additional costs, it is likely cost-effective in reducing vulnerability to severe illness and mortality. Given that previously wasted children face a 3-5 times higher risk of relapse or death within six months post-discharge, keeping high growth NRs in treatment longer could improve long-term outcomes.

For low growth NRs, existing community management of acute malnutrition guidelines remain relevant, but early referral for further investigation should be considered if no improvement in weight or MUAC is observed by weeks 3 to 4. The study calls for a reconsideration of the "non-responder" label, advocating for a more nuanced approach to treatment categorisation that acknowledges differences in recovery potential.

Can microbiota-directed complementary food improve linear growth in Bangladesh?

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This is a summary of the following paper: *Mostafa I, Hibberd MC, Hartman SJ et al (2024) A microbiota-directed complementary food intervention in 12-18-month-old Bangladeshi children improves linear growth. EBioMedicine, 104, 105166.* **https://doi.org/10.1016/j.ebiom.2024.105166**

A healthy gut microbiome is essential for child development and growth. Birth cohort studies in low- and middle-income countries have revealed associations between undernutrition and gut microbiome impairment or immaturity. This has led to the development of 'microbiota-directed complementary foods' (MDCF) containing compounds thought to promote gut health, such as probiotics.

A small body of evidence exists on the use of MDCF in the management of undernutrition in children aged under 5 years. A product called MCDF-2 was developed with funding from the Bill & Melinda Gates Foundation. It contains chickpea, soy flour, peanut paste, green banana, vegetable oil, sugar, and micronutrients.

In Bangladesh, a randomised controlled trial compared the efficacy of MDCF-2 with a standard ready-to-use supplementary food (RUSF) for treating children aged 12-18 months with moderate acute malnutrition. During the three-month trial, children who received MDCF-2 (intervention) gained weight more quickly than children who received the standard RUSF (control), despite MDCF-2 containing fewer calories per daily dose. No significant changes in linear growth were observed.

This study reports two-year follow-up results from the same cohort of children (n=118). Faecal and blood samples were collected up to 12 months after the intervention ended. Anthropometric assessments continued up to 24 months post-intervention. Standard growth indicators were calculated: weight-for-length z-score (WLZ) and length-for-age z-score (LAZ). Food frequency questionnaires were administered at one month and six months follow-up, and minimum acceptable diet (MAD) scores were calculated.

During the two-year follow-up period, the rate of weight gain (WLZ) continued to be higher in the MDCF-2 group, but the difference between the two groups was no longer statistically significant. However, children in the MDCF-2 group had statistically significantly lower rates of LAZ decline – or linear growth faltering – compared to the RUSF group.

There was no significant difference in diet quality (based on MAD) between the two groups. Some significant differences were observed in the levels of gut bacteria and plasma proteins associated with linear growth in the MDCF-2 group during the follow-up period.

The authors suggest that improvements in linear growth associated with prior consumption of MDCF-2 may be explained by changes in the gut microbiome. However, they acknowledge that further research is needed to understand these effects, with larger and longer duration trials in different geographic and socioeconomic settings.

Effect of heat stress in the first 1000 days of life on foetal and infant growth

This is a summary of the following paper: *Bonell A, Vicedo-Cabrera AM, Moirano G et al (2024) Effect of heat stress in the first 1000 days of life on foetal and infant growth: A secondary analysis of the ENID randomised controlled trial. The Lancet Planetary Health, 8(10), e734-e743.* **https://doi.org/10.1016/S2542-5196(24)00208-0**

This study investigates the impact of heat stress on foetal and infant growth within the first 1000 days of life, a critical window for development. Prior research indicates that extreme heat exposure negatively impacts pregnancy outcomes, but longitudinal studies on its effects on early childhood growth are limited.

This study, using data from the Early Nutrition and Immunity Development (ENID) randomised controlled trial conducted in rural areas of the Gambia between 2010 and 2015, addresses the gap by examining the relationship between heat stress, nutritional supplementation, and child growth. A total of 875 pregnant women were enrolled and randomly assigned to one of four supplementation groups from 20 weeks of gestation until delivery: (1) standard care (iron and folate), (2) multiple micronutrients, (3) protein-energy supplementation, and (4) a combination of multiple micronutrients and protein-energy. Infant anthropometric measurements (weight, length, and head circumference) were recorded at birth and periodically up to two years of age. Heat stress was measured using the universal thermal climate index (UTCI), which integrates temperature, humidity, wind speed, and solar radiation. Statistical analysis involved multivariable linear regression models to assess the impact of heat stress on foetal and infant growth. The study also explored whether nutritional supplementation modified the effects of heat stress.

In the prenatal period, a 1°C increase in mean daily maximum UTCI during the first trimester was associated with a small reduction in weight-for-gestational age z-score (WGAZ). No associations with any of the outcomes were found in the second trimester. In the third trimester, a small increase in head-circumference-for-gestational age z-score was observed with each 1°C increase. Protein-energy supplementation in the third trimester worsened the impact of heat stress on WGAZ. Postnatally, infants aged 6-18 months were the most vulnerable to the effects of heat stress, showing the largest reductions in weight-for-length z-score (WLZ) and weight-for-age z-score (WAZ) with each 1°C increase in mean daily maximum UTCI. At 12 months, exposure to a mean daily UTCI of 30°C, compared to 25°C, resulted in reductions in WLZ and WAZ. No consistent association was found between short-term heat stress and length-for-age z-score (LAZ), suggesting that short-term heat exposure mainly affects weight rather than height. However, there was evidence to suggest a six-month-old infant with a lifetime exposure of 25°C versus 30°C UTCI had an increased LAZ.

Overall, the findings suggest that heat stress negatively impacts foetal and infant growth, particularly weight gain in contexts with high rates of undernutrition. The first trimester is a particularly vulnerable period. The negative impact of protein-energy supplementation in the third trimester suggests that increased maternal metabolic heat production might amplify heat stress effects, although the findings are complex and warrant further investigation. The study highlights climate change as a growing threat to child health, especially in vulnerable populations in sub-Saharan Africa, where undernutrition rates are already high. Given the projected increase in global temperatures, interventions are needed to mitigate the effects of heat stress.

Using foot length measurement as a proxy for low birth weight in rural Pakistan

This is a summary of the following paper: *Tikmani SS, Brown N, Inayat Ali A et al (2024) Postnatal foot length measurement as a proxy to identify low birth weight for frontline health workers in rural Sindh Province, Pakistan: A diagnostic accuracy study. BMJ Open 2024;14:e089153.*
https://doi.org/10.1136/bmjopen-2024-089153


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Low birthweight (LBW) is defined as a birth weight of less than 2,500g. LBW is linked to both immediate and long-term health risks, including higher neonatal mortality, stunting, and cardiovascular diseases later in life. Pakistan has a high LBW rate at 21%, compared to 17% in India and 2.7% in Kenya. Accurate birth weight measurement is challenging in resource-limited settings due to low-quality or unavailable scales. Postnatal foot length (FL) has been used as a proxy for LBW in other contexts. This study aimed to evaluate the diagnostic accuracy of FL in identifying LBW newborns in rural Pakistan.

Cross-sectional data were collected from a rural district in Sindh province. FL was measured using a rigid transparent plastic ruler, while birth weight was recorded with a calibrated digital scale with 10g accuracy. Both measurements were taken within 48 hours of birth, with values based on the average of three readings. The study included all singleton live births registered in the Global Network's Maternal Newborn Health Registry between January and June 2023. Sensitivity (ability to correctly identify LBW cases), specificity (correctly identifying non-LBW cases), positive predictive value (PPV), and negative predictive value (NPV) were assessed.

A total of 336 newborns were analysed, with 26.2% classified as LBW. An FL cutoff of ≤7.6 cm demonstrated a sensitivity of 90.3%, specificity of 81.8%, PPV of 63.8%, and NPV of 96.0%. While other FL cutoffs were tested, ≤7.6 cm provided the best predictive value. Previous research from other countries has suggested FL cutoffs ranging from ≤7.4 cm to ≤7.9 cm, highlighting regional differences. Findings suggest FL cutoffs in Asia may be shorter compared to African contexts. Further multi-regional studies are needed to establish globally relevant thresholds.

In settings where hospitals are distant, prioritising higher sensitivity may be clinically justified, even at the cost of specificity. Ensuring all LBW cases are detected, even if some infants are later found to not be LBW, is preferable to missing true cases. Most FL measurements in this study were conducted at home by research assistants, indicating that FL measurement could be effectively scaled as a reliable proxy of LBW for frontline health workers.

Strengths of this study included that it was conducted in a mainly rural setting with high burden of LBW and it had good internal validity. A limitation of this study was the lack of a fixed vertical support when measuring the heel midpoint, which could enhance accuracy. Despite this, FL measurement remains a practical, low-cost, and non-invasive screening tool for identifying LBW in resource-limited settings. By facilitating timely identification and intervention, this method can contribute to improved neonatal care outcomes. Although not mentioned by the authors, this tool could be useful in filling the gap between other low-cost tools such as mid-upper arm circumference, that World Health Organization recommends to only be used from six weeks of age.

Appetite assessment in severe acute malnutrition management: A narrative review

This is a summary of the following paper: *Teklu Toni A, Girma T, Hetherington MM et al (2025) Appetite and childhood malnutrition: A narrative review identifying evidence gaps between clinical practice and research, Appetite, 207; 2025, 107866;*
https://doi.org/10.1016/j.appet.2025.107866

Severe acute malnutrition (SAM) remains a major global health issue with life-threatening consequences if untreated, and progress is needed in its prevention, diagnosis, and treatment. Appetite tests are widely used in SAM management to determine whether a child requires inpatient or outpatient care, as well as to guide treatment progress and discharge decisions. However, current appetite assessment methods lack standardisation and their reliability is questionable.

Given the limited number of published studies on the use of appetite assessments in children with SAM, the authors undertook a broader review and examined existing research and guidelines on this topic. The 'appetite test' as recommended by World Health Organization (WHO) and national guidelines is done by directly observing a child's ability to eat ready-to-use therapeutic food (RUTF). If a child with SAM fails the appetite test or has medical complications, they are referred for inpatient care. During treatment, appetite is monitored regularly; if it remains poor, alternative interventions are implemented to support recovery. However, appetite loss in SAM can have multiple causes, including illness, nutrient deficiencies, stress, metabolic changes, and gut health issues.

Despite the loss of appetite being clinically observed in almost all malnourished children, the exact mechanisms causing appetite loss in these children are still not well understood. Some studies suggest that poor appetite may be linked to disruptions in hormonal regulation, micronutrient deficiencies, or changes in the gut microbiome. Although appetite tests are often used as a proxy for disease severity, at least one study reviewed found no clear link between appetite test results and clinical complications. This suggests that the current appetite test lacks predictive accuracy for identifying children with complicated SAM.

Despite its limitations, the 'appetite test' is the only assessment method recommended by WHO and national SAM guidelines. Yet it is subjective, unreliable, and time-consuming, as many factors besides appetite can affect a child's willingness to eat. Misinterpreting test results could lead to unnecessary hospital admissions, adding financial strain to health systems and families. Given these weaknesses, the authors argue there is an urgent need to develop a new, objective appetite assessment tool for SAM.

The literature review identified 12 alternative appetite assessment tools, including a parent-rated appetite and satiety tool used in Bangladesh and a short eating behaviour scale tested in children under two years old. However, some tools were developed in high-income settings, and many have not been validated in malnourished children. Further, some methods, such as meal observations, are impractical in low-resource settings. The difficulty in distinguishing "liking" versus "wanting" food in children with SAM, who also often have apathy or irritability, is another challenge.

More high-quality research is needed to create a validated, standardised appetite assessment tool that meets clinical needs in low-resource settings. Future studies should focus on adapting existing tools for practical use, ensuring they are simple, reliable, and effective in guiding SAM management.

Food environments and diet quality in traditional urban markets in Kenya

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A fresh produce market in Kenya, 2024

This is a summary of the following paper: *Demmler KM, van der Steen S, Trevenen-Jones A et al (2025) Food environments and diet quality among vendors and consumers in five traditional urban markets in Kenya. Nutrients, 17(1), 116.* **https://doi.org/10.3390/nu17010116**

Traditional food markets are a vital part of urban and peri-urban food environments in low- and middle-income countries. They provide affordable fresh food and support local livelihoods. Little is known about the associations between market characteristics and the dietary quality of vendors and consumers.

This study explored these relationships in five urban food markets in Kenya, where around two-thirds of food is sourced from traditional food markets, kiosks, and street vendors. All five markets were comparable in size, infrastructure, and vendor density. A wide selection of fresh fruits and vegetables, grains and pulses, and animal-source foods were available.

Survey data were collected from 1,042 vendors and 876 consumers using a random sampling approach. Vendors were asked about their business operations, seasonal availability of food, storage, and interest in nutrition training. Consumers were asked about their purchasing habits, frequency of market visits, and perceptions of market environments.

The diets of vendors and consumers were assessed using the Kenya diet quality questionnaire (DQQ). Two indicators of diet quality were calculated: dietary diversity score (DDS, 0-10) and adherence to global dietary recommendations (GDR, 0-18).

The results showed that overall diet quality scores were high among consumers and vendors. Consumers had significantly higher DDS (7.4) compared to vendors (7.1), representing a wider range of food groups consumed. However, consumers had lower GDR (11.3) than vendors (12.1), which indicates greater consumption of soft drinks, sweets, and highly processed foods by consumers – food groups not recommended by the World Health Organization.

Most consumers (59%) relied on traditional food markets for all or most of their food purchases, and these consumers had better diet quality (higher GDR) driven by greater consumption of pulses, vitamin A-rich vegetables, citrus fruits, and unprocessed meat, alongside lower consumption of processed foods. Consumers who bought more roots and tubers, legumes, seeds and nuts, and vegetables had better diet quality (DDS and GDR). Vendors' diet quality was less clearly associated with food groups sold.

It was common for consumers and vendors to travel for 30 minutes or more to reach the markets. Longer travel times between home and market were associated with lower diet quality for both consumers and vendors. There was no clear link between the frequency of visits to the market and diet quality. Associations with socioeconomic factors were also mixed.

In summary, this study highlights the value and importance of traditional food markets in urban food environments. While causal relationships cannot be determined from cross-sectional data, and the findings are limited to five markets, the potential links with diet quality warrant further investigation. The authors identify research gaps and priorities that could help to improve the diets of people reliant on urban food markets.

Optimising maternal and child nutrition using a simulation-based approach

This is a summary of the following paper: *Bowman A, Lutze S, Albright J et al (2025) Optimal allocation of antenatal and young child nutrition interventions: An individual-based global burden of disease calibrated microsimulation. BMC Global and Public Health, 3(1), 6.* **https://doi.org/10.1186/s44263-024-00120-y**

Undernutrition remains a significant global issue, affecting millions and remaining a priority under the Sustainable Development Goals. Although many effective interventions exist, limited resources and the complex relationship between prevention and treatment make funding allocation challenging. Computer simulation studies can help by using models to understand how interventions work together and identify the most cost-effective packages to improve nutrition outcomes.

In this study, an individual-based microsimulation model was developed using data from the Global Burden of Disease 2021 study to evaluate a range of nutrition interventions. These included antenatal interventions (iron and folic acid (IFA) supplementation, multiple micronutrient supplementation (MMS), and balanced energy-protein supplementation) and child interventions (management of severe and moderate wasting and wasting prevention using small-quantity lipid-based nutrient supplements (SQ-LNS)). Additionally, an analytic approach was created to process the microsimulation results and identify the optimal funding allocation for interventions within a given budget. Ethiopia was used as a case study for this analysis.

The model estimated baseline annual spending of USD 47.1 million on maternal and child health interventions in Ethiopia, with allocations for IFA supplementation (USD 7.7 million), treatment for severe wasting (USD 20.1 million), and universal management of moderate wasting (USD 19.3 million). At this baseline, the model predicted 18.0 million disability-adjusted life years (DALYs) annually among pregnancies and children under five. Reallocation of the baseline budget to minimise DALYs resulted in funding antenatal MMS (rather than IFA supplementation) to maximum coverage and then investing the remaining budget in improving treatment coverage of severe wasting to 62.7%. This resulted in 592,000 fewer DALYs (an 8.3% reduction). Reallocating the budget to maximise child time spent not stunted, the model again recommended to first spend on maximising antenatal MMS coverage but then remaining funds were allocated to prevention of wasting through SQ-LNS. This resulted in 187,000 fewer DALYs (a 6.2% reduction).

To achieve maximum impact (saturation coverage of the most impactful interventions), a budget of USD 268 million (5.7 times the current spending) was required, resulting in 2.2 million DALYs averted annually. Full scale-up of moderate wasting management and SQ-LNS reduced the cost of maintaining severe wasting treatment saturation coverage by half. Sensitivity analysis confirmed that MMS, followed by severe wasting treatment and then targeted moderate wasting management were consistently prioritised in that order as the most impactful interventions.

The study's strengths include a robust modelling approach and comprehensive budget allocation analysis. Study limitations include uncertainty in intervention cost-effectiveness and varying priority of interventions under different budget scenarios. Future actions should focus on refining cost-effectiveness estimates, exploring intervention interactions, and expanding evidence from other settings to optimise resource allocation and intervention strategies for maternal and child health.

This simulation offers a new way to optimise health spending, showing that reallocating existing funds to key interventions can prevent 592,000 DALYs annually in Ethiopia.

The next 1000 days: The call for early investment in child health and development

This is a summary of the following papers: Paper 1: *Draper CE, Yousafzai AK, McCoy DC et al The next 1000 days: Building on early investments for the health and development of young children. Lancet, 404(10467), 2094-2116.* **https://doi.org/10.1016/S0140-6736(24)01389-8**

Paper 2: *Nores M, Vazquez C, Gustafsson-Wright E et al The cost of not investing in the next 1000 days: Implications for policy and practice. Lancet, 404(10467), 2117-2130.* **https://doi.org/10.1016/S0140-6736(24)01390-4**

Early childhood education has long been recognised as the foundation for lifelong health and wellbeing. While much attention has been given to the first 1000 days of life (from conception to two years of age), recent research highlights the next 1000 days (from two to five years of age) as another crucial window of opportunity. Two recent Lancet papers provide an in-depth analysis of these two critical development periods, emphasising that continued investment in early childhood programmes is essential to support both individual wellbeing and broader societal progress.

The first paper explores why ages two to five are essential for growth and development, highlighting the importance of nurturing care, which includes health, nutrition, responsive caregiving, security, and early learning. The key findings include the following:

Global disparities in nurturing care: Only 25.4% of children aged two to four years receive adequate nurturing care in low- and middle-income countries (LMICs), leaving over 180 million children at risk of developmental delays.

Limited access to early learning: Less than 30% of children in LMICs attend structured early learning programmes, despite strong evidence of their benefits.

Negative impacts of poverty and inadequate care: Factors such as poverty, a lack of stimulation, poor caregiver mental health, and exposure to physical punishment negatively impact child development.

An overemphasis on the first 1000 days: Most programmes focus on early infancy, with limited research and interventions targeting ages two to five.

The paper emphasises that the next 1000 days provide a second chance to address missed opportunities from the first 1000 days and reinforce developmental foundations before children enter formal schooling.

The second paper builds on the first paper to quantify the economic and social consequences of failing to invest in early childhood development. It highlights that investments in early childhood care and education (ECCE) and parenting programmes yield high returns, whereas inaction comes at a severe cost. Key insights from this second paper include the following:

High economic returns: Every $1 spent on ECCE generates an estimated 8 to 19 times return in economic and social benefits and a less than 1% of GDP cost of providing one year of universal ECCE in LMICs. Despite this, many governments fail to allocate resources accordingly.

Impact on child development: ECCE programmes significantly improve cognitive, social-emotional, and academic outcomes, while parenting interventions enhance language, behaviour, and emotional development. Cash transfers and nutrition programmes offer moderate but complementary benefits to child wellbeing.

Persistent socioeconomic inequalities: Less than 20% of children in low-income countries attend pre-primary education, compared to over 80% of children in high-income countries. Socioeconomic inequalities in access to ECCE perpetuate cycles of poverty.

Long-term consequences of inaction: Children without access to ECCE are at higher risk of poor school performance, lower earnings, and long-term health issues, with ECCE participation correlating with higher academic achievement and reduced risk of early school dropout. Countries that fail to invest in early learning may struggle to meet the Sustainable Development Goals related to education, health, and equity.

These two papers present a compelling argument that: (1) The next 1000 days are just as important as the first 1000 days, where, without continued nurturing care, early developmental gains can be lost; (2) Intervening at this stage is cost-effective, with the financial and social benefits of ECCE far outweighing the costs; and (3) Inaction has long-term consequences: without investment, millions of children will face developmental disadvantages that affect their education, long-term productivity, and health. Both papers call for urgent policy action to expand ECCE and strengthen multi-sectoral collaboration, to ensure all children receive the support they need to thrive.

Monitoring the cost and affordability of a healthy diet within countries

This is a summary of the following paper: *Herforth AW, Gilbert R, Sokourenko K et al (2025) Monitoring the cost and affordability of a healthy diet within countries: Building systems in Ethiopia, Ghana, Malawi, Nigeria, Pakistan, Tanzania, and Viet Nam. Current Developments in Nutrition, 8(10), 104441.* **https://doi.org/10.1016/j.cdnut.2024.104441**

The 'cost and affordability of a healthy diet' (CoAHD) is an indicator of economic access to a healthy diet, defined as a diet adhering to food-based dietary guidelines (FBDG). The 'cost of a healthy diet' (CoHD) is determined using retail food price data (often routinely collected by governments) to identify the least-cost items in each food group recommended for daily consumption. The 'affordability' of this diet is then calculated by comparing the CoHD to household income available for food. The percentage and number of people who cannot afford a healthy diet can be estimated at national or subnational level.

The paper describes the methods, software tools, and data sources used to calculate these indicators. For the CoHD, three types of data are needed: retail food prices, food composition data, and quantified dietary guidelines. For the CoAHD, three additional data sources are required: income data, an estimate of the cost of (or expenditure on) non-food items, and the total population.

Over an eight-year period, stakeholder workshops and meetings were held in Ethiopia, Ghana, Malawi, Nigeria, Pakistan, Tanzania, and Viet Nam using the CoAHD indicator. Learnings from each country are summarised including the agencies involved, partnerships and collaborations, data sources, healthy diet standards, policy applications, and dissemination platforms.

Four countries used their national FBDG as the healthy diet standard. The remaining three countries did not have quantified national guidelines and used the Healthy Diet Basket (HDB), which summarises average recommendations across many countries.

Despite following a standardised calculation process, the CoAHD differs depending on the data sources and standards used. For example, in Pakistan four calculations were made to compare subnational and global data sources and standards. The CoHD was calculated twice: first using Pakistan's FBDG and second using the HDB. Affordability was also calculated twice, by using non-food expenditures from the Pakistan Household Integrated Economic Survey and by allocating 52% of income for food (aligned with methods used in global monitoring in 2024 and 2023 respectively). The resulting CoAHD values ranged from 56% to 77% of people who could not afford a healthy diet in 2021.

The authors suggest three main reasons why the CoAHD will differ between national and global monitoring systems:

1. Food price data: subnational price lists include more locally important, least-cost items, thereby generating lower estimates for the CoHD.
2. Healthy diet standard: costs vary depending on the food groups recommended, with animal-source foods typically being more expensive than plant-source foods.
3. Income data and affordability standard: the share of expenditure on food varies considerably between and within countries.

The paper concludes that closer alignment between national and global monitoring may be achieved if updated national food price data are integrated into global tracking systems.

Pre-trial feasibility study on integration of care for vulnerable infants in Ethiopia

This is a summary of the following paper: *McGrath M, Girma S, Berhane M et al (2024) Strengthening implementation of integrated care for small and nutritionally at-risk infants under six months and their mothers: Pre-trial feasibility study. Maternal & Child Nutrition, 21, e13749.* **https://doi.org/10.1111/mcn.13749**

It is estimated that 15.5% of infants under six months (u6m) are wasted, 17.4% are underweight, 19.9% are stunted, and 14.7% are born with low birthweight in low- and middle- income countries. Yet the care of at-risk infants u6m has long been overlooked in life-course interventions to prevent and treat malnutrition. To address this gap, the MAMI Care Pathway was developed, modelled on the Integrated Management of Childhood Illness (IMCI) guidelines. To strengthen its implementation, a qualitative feasibility study was conducted in preparation for a randomised controlled trial (RCT) in Ethiopia.

Health workers from facilities outside the RCT study health facilities were purposively selected, and relevant policymakers were identified through purposive and referral sampling for interviews and surveys. A total of 42 individuals participated between September 2021 and March 2022. All health workers attended a two-day orientation on the MAMI Care Pathway and its implementation materials. The Bowen framework was used to analyse the health workers' interviews on the themes of acceptability, demand, implementation, and practicality. Policymakers' survey and interview data were analysed and results were categorised into themes of demand, consistency, acceptability, evidencing policy, and opportunities.

The care pathway was generally seen as acceptable among health workers. Many noted that inpatient severe wasting treatment (the current standard) was often deemed unacceptable, which made the new outpatient-based care pathway more appealing. However, health workers believed mothers' acceptance would depend on practical factors such as medication availability and past healthcare experiences. Mothers facing food insecurity or economic hardship might find counselling-based interventions less relevant.

There was strong demand for the care pathway to fill the existing gap in outpatient care for wasted infants u6m. Health workers welcomed its proactive approach that combined prevention and treatment, particularly its integration of maternal care, including mental health support. While embedding the care pathway within IMCI was seen as an opportunity to streamline services and reduce 'missed opportunities', concerns were raised about already overburdened staff and underperforming services.

Perspectives on practicality varied. Some health workers were already informally dedicating time to these infants, while others found the approach inconsistent with their existing roles due to the additional time required. Policymakers acknowledged that at-risk infants u6m and their mothers were marginalised in current guidance and services. They agreed that integrating or mainstreaming the care pathway into existing policies was essential. All policymakers stated the approach was necessary, 78% believed it was feasible, and many emphasised the need to adapt it to Ethiopia's complex healthcare landscape.

The study concluded that implementing the MAMI Care Pathway in Ethiopia is feasible if health workers receive additional support to ensure quality care and families are assisted in accessing services. The involvement of intended users in implementation research is critical throughout the process. The findings highlight the importance of addressing interpersonal aspects of care delivery through training and ongoing support, particularly for maternal mental health and for newly recruited staff who have not yet built relationships with mothers. By strengthening these aspects, the care pathway can be effectively embedded within routine healthcare services.

Global policy guidance on care of vulnerable infants under six months and their mothers

This is a summary of the following paper: *McGrath M, Wrottesley SV & Deconinck H (2024) Invisible pursuit: A scoping review of global policy guidance on care of vulnerable infants under 6 months and their mothers. 2024 medRxiv 2024.12.06.24318470.* **https://doi.org/10.1101/2024.12.06.24318470**

A pregnant woman listens to a nutrition talk from a nurse in a primary healthcare centre. Nigeria, 2023

Millions of infants worldwide are born vulnerable or become so in their first six months of life. These infants face risks such as poor growth, illness, and even death. Their health is closely tied to their mothers' wellbeing, yet global policies often fail to integrate care for both. This scoping review examined how existing global policies guide the care of vulnerable infants under six months and their mothers, using the MAMI Care Pathway to assess whether these policies support continuous, respectful, and high-quality care for both mother and child.

The review analysed 83 global policy documents, with 62 selected for in-depth review (20 guidelines and 42 guidance and manuals). Many policies focused only on infants, with just one document addressing only mothers (perinatal mental health), while 11 targeted both. Infant vulnerability was described in many ways, such as 'small', 'sick', or 'developmentally delayed'. Similarly, maternal vulnerability included descriptions like 'malnourished', 'absent', or 'suffering from mental health issues'.

The review found that some important conditions, like being small for gestational age, low birth weight, and nutritional oedema, were not well covered. The most common vulnerability identified was congenital illness, followed by low birth weight, preterm birth, breastfeeding problems, maternal health issues, and maternal absence or death. However, policy guidance was scattered across multiple documents, making it difficult to find clear, aligned recommendations for implementation. This fragmented approach prevents holistic care for mother-infant pairs. For example, when an infant is identified with low birthweight, one set of guidance dictates the care, if this same infant remains small beyond six weeks of life, we now classify them as being underweight, and care is guided by other guidelines or policies highlighting a lack of continuum of care.

Another major gap was the lack of connection between maternal and infant care. Policies often identified at-risk infants but did not include support for their mothers, even though maternal wellbeing is crucial for infant survival. Ideally, recognising an at-risk infant should immediately trigger care for both mother and child. Most policies focused only on the early postnatal period, addressing issues like small newborns and breastfeeding difficulties, but failing to guide long-term care for these high-risk infants.

Poor growth or low anthropometry identified during growth monitoring was also not fully considered as a general vulnerability factor, often being seen as a concern only for nutrition specialists rather than all health workers. Although weight-for-age is an important indicator of risk in infants under six months, it is often missed. All relevant policy guidance should include consistent anthropometric assessment and responsive growth monitoring.

To improve care, policies need to be better integrated and consolidated at the country level. Clearer, more practical guidance will help frontline health workers provide continuous, person-centred care, ensuring vulnerable infants and their mothers receive the support they need.

A commentary: Is it time to revisit antenatal supplements?

A health worker speaks to women about multiple micronutrient supplements. Pakistan, 2024

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This is a summary of the following paper: *Das JK & Lelijveld N (2025) Is now the time for revisiting supplements for pregnant women? The Lancet Global Health 13;2.*
https://doi.org/10.1016/S2214-109X(24)00503-5

Millions of infants are born as small vulnerable newborns every year. High rates of protein and micronutrient deficiencies in pregnant women are among the key factors for being born small or prematurely. A recently published meta-analysis assessed the effect of multiple micronutrient supplements (MMS) and small-quantity lipid nutrient supplements (SQ-LNS) on different categories of small vulnerable newborns, which were grouped into 10 categories.

Traditionally, iron and folic acid (IFA) have been the routine supplements recommended during pregnancy. However, the World Health Organization has developed MMS, which have been shown to be a more effective supplement, particularly in reducing low birthweight. Despite these benefits, MMS have not yet been universally recommended as a routine antenatal supplement. With this recent study comparing SQ-LNS with MMS, the debate resurfaced over which antenatal supplement should be the global recommendation.

SQ-LNS are supplements that provide not only micronutrients but also energy and essential fatty acids. They are primarily recommended for antenatal use in food-insecure contexts. The results of the meta-analysis highlight the benefit of antenatal MMS in preventing small vulnerable newborns, especially those at the highest risk of dying. In contrast, SQ-LNS were found to reduce the risk in only one out of the 10 categories of small vulnerable newborns. These findings further underscore the advantages of MMS to both mother and infant.

Further research is needed on antenatal SQ-LNS and their impact on birth outcomes. Additional investigations should explore their role during the preconception period and for non-pregnant adolescent girls, as well as the best methods for delivering these interventions.

Despite the demonstrated benefits of MMS, only 5% of women in need of MMS are receiving them. Significant efforts are needed to address challenges related to production, distribution, costs, and cost effectiveness. Very few suppliers currently produce MMS as per the United Nations-recommended formulation, presenting an opportunity for local production to ensure availability, affordability, and programme ownership. Studies have shown MMS to offer a high return on investment compared to IFA, making them a cost-effective option. In the current global context, there is an urgent need for holistic, dynamic, and context-specific strategies to tackle multifaceted and intergenerational forms of malnutrition, and its far-reaching repercussions.

Report Summaries

A brief guide to updating national guidelines on child wasting

This is a summary of the following paper: *UNICEF (2024). A brief guide to updating national guidelines on child wasting.*
https://www.childwasting.org/media/1676/file/UNICEF-Brief-Guide-Updating-National-Guidelines-ChildWasting-Nov24_EN.pdf

In 2023, the World Health Organization (WHO) published updated guidelines on the prevention and management of wasting and nutritional oedema (acute malnutrition) in infants and children under five years. Since then, many governments have initiated updating their national acute malnutrition guidelines/protocols and policies. One of the guiding principles of the 2023 WHO guidelines is the importance of adapting to the local context to ensure meaningful and realistic implementation of the recommendations. This brief guide from UNICEF provides suggestions on how to plan and carry out the updating process. The intended audience of the document is technical staff and personnel leading and/or involved in the updating of national acute malnutrition guidelines.

The guide provides an overview of 10 steps for updating national acute malnutrition guidelines. Depending on the context, certain steps may be reordered or completed concurrently. Simple, practical tips are provided throughout. First, it is important to identify accountable and responsible focal points. This should include a government focal person who is ultimately responsible for the guidelines being updated. In addition, a focal person/organisation responsible for overseeing the financial or technical support and/or a person responsible for leading the update with dedicated time for this task may be identified. Then, a national technical working group (TWG) should be established, or membership of an existing group reviewed to ensure it is fit for purpose. The third step is to identify the wider stakeholder group and complete a stakeholder analysis. It is important to ensure that the TWG is small enough to stay productive and efficient but has good representation of all those involved in running nutrition and health services.

A mapping/landscape review of exiting national nutrition guidance and relevant international guidance should be completed. Workshops may be organised to complete a stock-taking exercise on the existing national guidelines and to review the new WHO guidelines. Site visits can be an important component to assess what is happening in day-to-day practice. It can also be useful to get stakeholders engaged during these steps to ensure that the guidance will have buy-in and is feasible to implement.

The final steps include writing or adapting the guidelines. Several iterations are likely, with feedback from the TWG essential. Once finalised, implementation tools and resources should be developed (or updated). Then, dissemination/training sessions on the new guidelines and implementation tools can be completed. Finally, it is important to review the update process and collect feedback on the new guidelines and related tools.

Editor's note: *ENN would love to hear your experience if you have been involved in updating national acute malnutrition guidelines following the launch of the updated WHO guidelines.*

Join a conversation on en-net.org

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To achieve '*zero hunger*' we need to address colonialism, racism, and climate change

This is a summary of the following paper: *Humphreys A & Kioko D (2023) The Sustainable Development Goal of Zero Hunger Cannot be Achieved Without Addressing Colonialism, Racism, and Climate Change. Revista Diecisiete, 9.*
http://revista17.org/en/el-objetivo-de-desarrollo-sostenible-de-hambre-cero-no-puede-alcanzarse-sin-abordar-el-colonialismo-el-racismo-y-el-cambio-climatico

This article explores the historical and contemporary connections between colonialism, racism, and climate change and examines their impacts on hunger and malnutrition today. It argues that Sustainable Development Goal 2 of zero hunger cannot be realised without addressing the historical and present-day effects of colonialism and racial inequalities, which continue to shape economic differences and food insecurity.

European colonialisation, spanning from the 1400s to the late 1900s, left a legacy of economic inequality. During this period, the ideology of a racial hierarchy was invented to justify the enslavement and genocide of non-European peoples. The industrial rise of rich nations relied on the vast wealth generated by the exploitation of enslaved labour as well as the exploitation of resources from the Global South. In turn, the industrial revolution also laid the foundation for the creation of today's climate crisis. For example, former European colonial powers are estimated to be responsible for 23.4% of cumulative CO2 emissions while currently constituting 6.7% of the world's population.

The article examines two examples, one from Haiti and one from Pakistan, to highlight the ongoing effects of colonialism, racism, and climate change. Haiti, following independence in 1804, was forced to pay French slaveholders' compensation to secure their sovereignty: this amounted to the equivalent of an estimated USD 21 billion loss to its economy. Pakistan suffered severe climate change-driven flooding in 2022, resulting in damages estimated around USD 40 billion, despite the country contributing just 0.3% of global carbon dioxide emissions since the industrial era. In both cases, historic inequalities laid the foundation for vulnerability to natural disasters and persistent levels of hunger and malnutrition today.

Colonialism has led to enduring economic inequalities across the Global South, which combined with the unequal impacts of climate change have a direct impact on hunger and malnutrition. Wealthy nations' historical exploitation of these regions has created weaker economies that rely on foreign companies that prioritise profit and do not benefit local economies. For example, many countries in Africa import food due to a historical focus on producing cash crops for the Global North such as tea, coffee, and tobacco) instead of growing staple crops like wheat, corn, and native grains to the detriment of domestic needs. This has contributed to widespread food insecurity. Furthermore, climate change is intensifying adverse weather events and contributing to widespread food insecurity, crippling agricultural production, devastating livelihoods, and forcing people from their homes. These disproportionately affect low- and middle-income countries, further deepening hunger and malnutrition.

To address these interconnected challenges, the humanitarian and development systems will require restructuring. The current imbalance of power between international and local and national actors will need to shift to being locally envisioned, locally led, and locally owned, to ensure that humanitarian and development efforts are contextualised, appropriate, and sustainable. The ongoing impacts of colonialism, racism, and climate change must be addressed if the world is to decrease malnutrition and achieve zero hunger.

Nutrition programming for school-age children and adolescents in humanitarian contexts

This is a summary of the following paper: *Lelijveld N, Samnani A & James P (2025). Towards a practical guide: A scoping review of nutrition programming, policy, and evidence for school-age children and adolescents in humanitarian contexts.* **https://doi.org/10.71744/6bcw-s147**

The nutritional needs of school-age children (5-19 years) in humanitarian settings remain under-researched and poorly addressed, despite this phase being critical for growth, cognitive development, and long-term health. Emergencies exacerbate existing nutritional deficiencies, leading to conditions such as thinness/wasting, micronutrient deficiencies, and overweight/obesity. This report summarises current policies, programmes, and evidence on nutrition, health, and wellbeing for this age group in humanitarian contexts, drawing on literature reviews and expert interviews.

The report highlights the lack of nutrition data for school-age children and adolescents in both stable and emergency settings, making it difficult to assess nutritional status during emergencies. Global targets and indicators for this age group are already limited, leading to even greater invisibility in humanitarian response efforts.

Existing global policies acknowledge the importance of school-age and adolescent nutrition but often lack specific guidance for humanitarian contexts. Key policy documents include UNICEF's 'Core Commitments for Children', WHO's adolescent nutrition guidelines, and the multi-agency 'Global Accelerated Action for the Health of Adolescents.' Additionally, the Inter-Agency Standing Committee provides frameworks for engaging young people in crises.

Interviews with practitioners revealed a lack of nutrition interventions specifically targeting school-age children and adolescents in emergencies. Some broader programmes included adolescents incidentally, such as those for people living with HIV or pregnant and breastfeeding women. Other sector interventions, like sexual and reproductive health and education programmes, occasionally incorporated a nutrition component. The report highlights recommended nutrition interventions, including the provision of nutritious foods through school meals, staple food fortification, and general food distributions, with special attention on school-age children and adolescents. The management of wasting and thinness, micronutrient supplementation such as iron, folic acid, multiple micronutrients, and deworming, as well as nutrition education and physical activity promotion, are also emphasised. Efforts to create healthy food environments involve regulating vendors, marketing practices, and as well as cash and voucher assistance. Special support for pregnant and breastfeeding adolescent girls includes nutritional screening, supplementation, social assistance, and empowerment programmes.

Several barriers hinder effective nutrition programming for this age group in humanitarian contexts.

Lack of data and indicators: malnutrition prevalence is not well documented, making advocacy and intervention planning difficult.

Limited funding and policy focus: school-age children and adolescents are deprioritised in humanitarian funding and response plans.

Inadequate assessment tools: MUAC (mid-upper arm circumference) and body mass index-for-age (BAZ) remain underutilised due to lack of standardised protocols.

Weak integration across sectors: nutrition interventions for this age group must especially be embedded within different sectors, like the education, health, and protection sectors, for maximum impact.

The findings of this report can guide stakeholders in developing a more robust, practical, and sustainable approach to nutrition for this critical age group in emergencies.

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A mother sharing her personal journey in ensuring good nutrition for her child
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Deliver Quality: We ensure our content is grounded in evidence and professionally produced.
Amplify Voices: We share a diversity of experiences from those closest to the communities being reached.
Drive Impact: We document experiences showing evidence or learning of better practices to improve nutrition outcomes.
Strengthen Capacity: We facilitate peer-to-peer learning supporting practitioners of all experiences throughout the writing process.
Remain Independent: We present a balanced, open, objective view of experiences and issues most relevant to tackling undernutrition.
Are Accessible: We prioritise the needs of the busy reader with concise, clear, engaging content.

About ENN

Emergency Nutrition Network (ENN) is a UK registered charity that strives to enhance the effectiveness of nutrition policy and programming by improving knowledge, stimulating learning and building evidence. We are passionate about being field-driven and are globally recognised as thought leaders and conveners in nutrition.

ENN is based in the UK but works globally and is made up of a team of technical experts in nutrition with decades of collective experience in the field. We work alongside governments, the United Nations, non-governmental organisations or charities, and research institutions worldwide to look critically at existing practices, raise awareness of issues and drive change so that those working to tackle malnutrition can do the best possible job. We do this by:

1. Capturing what works and what is needed to reduce malnutrition – working with people implementing programmes to help them examine their experiences and document their achievements and challenges.
2. Coordinating technical bodies to increase the global understanding of malnutrition – particularly focusing on the most nutritionally vulnerable including infants and children, adolescent girls and mothers who are pregnant or are feeding their infants.
3. Supporting global efforts to reduce malnutrition – bringing our knowledge and technical expertise to strengthen the activities of organisations working to reduce malnutrition at the global level.

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