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Meeting Report

Management of At risk Mothers and Infants under six months (MAMI) Special Interest Group (SIG) meeting

12 and 13 December 2019

ENN

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A two-day meeting of the Management of At risk Mothers and Infants under six months (MAMI) Special Interest Group (SIG) was convened by Emergency Nutrition Network (ENN) and the London School of Hygiene and Tropical Medicine (LSHTM), hosted by Médecins Sans Frontières (MSF) Operational Centre Brussels (OCB).

We gratefully acknowledge the support of Irish Aid to ENN to undertake this meeting, MSF OCB for hosting the event, Save the Children USA for securing MAMI scholarships through Office of U.S. Foreign Disaster Assistance (OFDA) funding to support attendance of four country programmers, and all self-supporting participants and their institutions who leveraged resources to gather together to support collective thinking and action on MAMI.

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Selection of MAMI SIG meeting participants' feedback, December 2019

"I loved the welcoming tone"
"Is there a way to have some dedicated resources towards a coordinator for this group, to put in place a workplan and to provide regular updates? It is such a valuable group."
"Thank you for organising such a rich and high-quality meeting. Super well organised and exciting"

I was excited by:

"the eagerness and commitment of all the people present in the meeting"
"how interactive and participatory the MAMI SIG participants were – future possibilities are endless!"
"the wealth of different perspectives in the room who challenged ideas and thus encouraged more in-depth thinking"
"the energy in the room and the drive to make change"

What was most valuable:

"Building an active and strong MAMI Special Interest Group"
"The diversity of participants represented at the meeting"
"Getting networked with the multiple experts working on MAMI"

Summary

A two-day meeting of the MAMI Special Interest Group (SIG) was held on 12-13 December 2019, organised by Emergency Nutrition Network (ENN), co-chaired by ENN and the London School of Hygiene and Tropical Medicine (LSHTM) and hosted by Médecins Sans Frontières (MSF) Operational Centre Brussels (OCB). It was attended by 45 delegates from a range of specialities and disciplines, including nutrition, maternal health, early childhood development (ECD), paediatrics and neonatology, working in relevant policy, research and programming at global, regional and country level.

The meeting objectives were to identify clear directions of travel on:

- A common vision and terminology for MAMI;
- Indicators to help identify at-risk infants;
- The collection of standardised MAMI programme data.

Day 1 focused on sharing MAMI approaches and implementation experiences, culminating in discussions around a shared MAMI vision, terminology and urgent technical questions. Day 2 examined cross-sector opportunities for MAMI in three priority areas (maternal and neonatal health, ECD, and maternal mental health) and action and evidence needed to improve identification of at-risk infants under six months old.

The introductory session revisited the MAMI vision, articulated in 2017: ***Every infant under six months of age at every community and health-service contact is nutritionally assessed and appropriately supported to survive and thrive.*** The MAMI approach links prevention and treatment, aiming for healthier infants while acknowledging the need to look after the mother and link with other services to do so. Anthropometry is part of the diagnostic process, but there are many causes of low anthropometry and clear markers of risk are needed to help identify infants who need support.

Country perspectives were shared on MAMI approaches and challenges from India, Ethiopia and Malawi. In all settings, there is a recognised need for earlier intervention before very sick infants present at hospital. The development of standard treatment guidelines for infants has moved things forward, but clear, evidence-based global guidance is needed for countries to effect the necessary institutional, policy and system development required to advance case identification and management. Another major challenge is how to accommodate care of sick mothers when infants present to paediatric care (and vice versa where a sick mother has a young infant). All countries are exploring entry points to integrate the mother-infant dyad, recognising the need to leverage what exists and to link with child development and mental health services.

A panel discussion among programmers explored MAMI programme needs and shared experiences of field realities. Save the Children, Partners in Health and MSF have piloted the C-MAMI tool in Bangladesh, Rwanda and Iraq respectively. It has proved a valuable resource to catalyse case management. A common need in all contexts was to develop shorter, simpler field materials to support implementation, resulting in local adaptations of the tool. A common challenge is poor referral services for maternal mental health. A Bangladesh study found that the C-MAMI tool had greater success in identifying at-risk infants and achieving successful discharge compared with villages where only inpatient care was offered. The need for a good package of post-discharge community care following inpatient care was also highlighted.

Presentations on ‘Building bridges across sectors’ explored MAMI opportunities to connect with maternal and neonatal health (LSHTM), ECD (Jimma University) and maternal mental health (World Health Organization) (WHO). Key considerations were raised around a “global epidemic” in caesarean section rates that negatively impacts on breastfeeding and physical barriers to breastfeeding in health facilities (e.g., mothers and infants not kept together). The nurturing care aspect of ECD supports caregivers of infants. Findings from a project

were shared on a scalable, low-intensity psychosocial intervention targeting mothers to alleviate symptoms of pre- and post-natal depression.[1]

An update from WHO on relevant policy guidance development concluded that more evidence from across continents, especially South Asia, is needed to inform update/development of global guidance on growth failure in infants under six months old. Recent studies suggest that it is important to know whether an infant is appropriate weight for gestational age, as this may define their needs. Important leverage/entry points for MAMI include the integrated management of childhood illness (IMCI) update currently underway and the universal health coverage agenda.

A summary of recent studies on anthropometric indicators (KEMRI Wellcome Trust, Kenya) was followed by experiences on their practical application in MAMI programming (GOAL). Reflecting the importance of non-anthropometric criteria to identify at-risk infants, Action contre la faim (ACF) presented on a systematic review of breastfeeding assessment tools and an evaluation of a baby-friendly space which found improvements in breastfeeding and maternal mental health outcomes after two months. The study called for more evaluation and operational data to inform the evidence base around approaches and tools to support programming.

Over the course of the two days, participants explored and debated the priority themes of the meeting. Modifications were proposed to the MAMI vision and terminology, while urgent technical questions were prioritised around identification and treatment of low birth weight (LBW) and pre-term infants and issues of determining acute weight loss in them, compared to small-for-age infants. Directions of travel were also determined regarding identification of at-risk infants and minimum programme data.

The meeting concluded with agreement to convene small working groups to take the identified steps forward and a list of seven overall priority actions for the MAMI SIG in 2020. To make the most of the current opportunities and momentum, this dynamic group identified an urgent need to scale up its way of working.

[1] www.who.int/mental_health/maternal-child/thinking_healthy/en

Welcome and meeting objectives

***Dr Sebastian Spencer, Medical Director**, MSF OCB,* opened the meeting as hosting agency by welcoming all participants. He encouraged the group to *"make this meeting count"*. He shared how MSF has translated the MAMI approach into its operational plan and strategic plan for health, with a focus on the mother-infant dyad. The organisation is looking to have a holistic approach and exploit opportunities for greater leverage by working together; in particular, MSF OCB is keen to work in partnership for research.

The primary objectives of the meeting are to identify clear directions of travel on:

- A common vision and terminology for MAMI;
- Indicators to help identify at-risk infants;
- The collection of standardised MAMI programme data.

The agenda is included in Annex 1. In addition to MAMI Special Interest Group (SIG) members, other participants were invited who had direct experience and a keen interest in collaborating on MAMI. The meeting was attended by 45 delegates; five participants attended various sessions remotely (see Annex 2). Selected presentations are available on request.

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Session 1 Setting the scene

Marie McGrath, ENN presented some background context to the MAMI 'story'. In 2007, infants were presenting for treatment in humanitarian nutrition programmes and programmers struggled to manage them. An ENN led initiative examined scale of the problem, available guidelines and tools, case management and outcomes. It identified a significant burden of care not limited to humanitarian settings, treatment guidelines based on inpatient care (no community-based options), and higher mortality that older children in admitted cases. The MAMI Special Interest Group (SIG) emerged from the steering group of the MAMI Project, a collaboration between programmers, researchers and policy-makers to address gaps identified multi-levels gaps identified.

To guide actions, the MAMI SIG led a Child Health and Nutrition Research Initiative (CHNRI) research prioritisation exercise that identified the following top five research questions:

1. How should infant <6 month severe acute malnutrition (SAM) be defined?
2. What are the key opportunities/timings whereby infant SAM management can be incorporated with other healthcare programmes?
3. What are the main priority components of a package of care for outpatient treatment of infant <6 month SAM?
4. Having detected SAM in the community, what is the efficacy of providing targeted skilled breastfeeding support to caregivers of stable infants?
5. How can existing tools be adapted and/or linked together to better identify and manage infant <6 month SAM?

Management of at risk infants under six months old have since featured high in CHRNI prioritisations of both wasting and prevention treatment.

In 2017, the MAMI acronym was changed from *Management of Acute Malnutrition in Infants* to *Management of At risk Mothers and Infants under 6 months* to encompass the mother-infant dyad and to reflect that risk is not limited to nutrition factors.

In 2015, the **C-MAMI Tool** was developed as a first step to fill a gap in programming guidance and catalyse case management. It provides a a pathway and resources to assess, classify and manage at-risk mothers and infants under six months old in the community. It is modelled on the Integrated Management of Childhood Illness (IMCI). Version 3 will be produced mid-2020.
www.ennonline.net//c-mami

Programming, policy and research is ongoing; yet, despite WHO 2013 updated guidance on severe acute malnutrition (SAM) treatment that recommends community-based management for this age group, inpatient care still dominates national guidance. This reflects a need for **robust evidence** on:

- What **interventions** work and **how** in different contexts;
- How to **integrate** within existing systems and services, such as community, reproductive health, neonatal, paediatric and community-based management of acute malnutrition (CMAM) services;
- What are the implications for **cost** and **capacity**?
- Is this approach **scalable** and **sustainable**?

The 2018 MAMI meeting involved much technical discussion and sharing of experiences. The aim of this meeting is to pick up on those discussions and progress in building evidence towards answering these questions.

Marko Kerac, LSHTM continued with considerations for today and next steps for the MAMI approach. The MAMI SIG has successfully evolved from a small group to an emerging global network. Our MAMI vision, as articulated in 2017, is:

Every infant under six months of age at every community and health-service contact is nutritionally assessed and appropriately supported to survive and thrive.

To make this happen, we need political will and evidence on which to base what we do. A common vision is key to scaling up, after which we can identify the necessary resources.

Carlos Grijalva-Eternod, LSHTM narrated two stories of support to sick and malnourished infants that illustrated the different perspectives of the mother/carer and the medical providers. Such stories reflect we need a hook or a narrative – something that makes sense to those we are working with and supporting and that resonates with their world view. Clear communication matters.

Plenary discussion highlighted that we need to agree on what we want to achieve and how we are going to communicate our aims. The MAMI approach links prevention and treatment. We need markers of risk. Anthropometry is part of the diagnostic process, but there are many causes of low anthropometry. Can anthropometry work as a screening programme for MAMI?

'Thrive' matters as well as survival. This means helping children fulfil their full physical, cognitive and social potential. Scale matters, too, to reach as many people as possible. To achieve scale, a strong approach is needed, but we should not aim for perfection; we must work in the world of today and be practical.

The type of management that infants need varies because, for example, causes of breastfeeding failure differ. The MAMI approach aims for healthier infants, which cannot simply be equated with bigger infants: evidence suggests that rapid growth may not be beneficial or may carry risks in terms of longer-term consequences. The capacity-load model (J. Wells et al[2]) suggests that the inherent capacity that an individual has can experience several hits (e.g., in utero growth restriction, child malnutrition, inadequate treatment), but when load exceeds capacity, disease ensues. Capacity can be increased in early life by avoiding hits and/or minimising their impact.

We must look after the mother and link with other services to do so, such as mental health, and the wider environment, including political and social aspects; for example, by linking with family and community leaders and exploring the role of grandmothers in supporting mental health.

We need to agree on prevention/treatment terminology.

STRONG[3] infants contribute to STRONG societies. The MAMI approach is about building bridges between specialities, networks/initiatives and individuals. MAMI began using a humanitarian lens; we now need to build our connections with national and international policy and strategy across contexts.

[2] Wells JCK. The capacity-load model of non-communicable disease risk: understanding the effects of child malnutrition, ethnicity and the social determinants of health. Eur J Clin Nutr. 2018 May;72(5):688-697

[3] **S**urviving and **T**hriving th**RO**ugh better **N**utrition and Healthier **G**rowth

Session 2 MAMI approach – country perspectives

India, Ethiopia and Malawi – opportunities and ambitions for the MAMI approach

Unable to attend in person, pre-meeting reflections from India were prepared by ***Dr Ajay Khera,*** *Public Health Specialist and Deputy Commissioner (In-charge) Child and Adolescent Health, Ministry of Health and Family Welfare, based in Delhi; with support from* ***Abner Daniel****, Nutrition Specialist at UNICEF India. Shared by* ***Marie McGrath,*** *ENN. Experiences from Ethiopia and Malawi comprised an informal question and answer-style discussion with* ***Professor Tsinuel Girma****, Department of Pediatrics and Child Health, Jimma University, Ethiopia and* ***Dr Emma Cartmell****, Malawi.*

Spearheading management of at-risk infants in India

Tremendous progress has been made in India in terms of maternal mortality rate (MMR) and under-five mortality rate (U5MR) reductions and in household sanitation, but less progress has been made on neonatal mortality and early growth failure. To address this, India is looking to work within the existing public health delivery model to make the most of the drive on universal health coverage (UHC), examining programmes and schemes being delivered that specifically target mothers and infants under six months of age. This includes intensive home visits, breastfeeding counselling, growth monitoring, 'kangaroo mother care', feeding of LBW babies and referral facilities.

Within the existing services there are gaps that threaten impact, such as system bottlenecks in achieving coverage;

continuity, intensity and quality of services for mothers and infants under six months old; and shortcomings in quality delivery of services. However, India is tackling the burden and care of at-risk infants under six months 'head on'. The only scalable, sustainable way forward for the country is to leverage existing infrastructure and platforms: taking interventions for infants under six months old to scale through a systems approach that considers and connects both facility-based and community-based services.

Marko Kerac, LSHTM reflected on experiences from a recent technical consultation on infants under six months old in India that he attended.[4] The consultation reflects how care of such infants is implemented through many approaches. One interesting observation was that systematic reviews have suggested that slow catch-up growth is associated with poor neurocognitive development, but intervention trials were conducted in India and found no differences in outcome. This is a reminder that we always need to test our assumptions rigorously.

Lessons learned and opportunities in Ethiopia

Tsinuel Girma, Jimma University described how in the hospital setting in Ethiopia, sick babies are admitted at an already advanced stage with signs of illness and severe malnutrition. Most babies who would benefit from early identification and intervention are missed. A major challenge is how to facilitate the care of the mother when her infant is admitted into paediatric care services and whose responsibility sick mothers are.

Much has changed over 20 years in the clinical setting. Previously, young infants would present but nobody knew how to handle them; mortality was high. This has changed now with the development of national standard treatment guidelines. However, these still need improvement.

Ethiopia has a national nutrition policy, which includes multi-sector collaboration across 13 ministries. They are continually looking for entry points to integrate the mother-infant dyad, recognising the need to link with child development, mental health and longer-term outcomes such as schooling. Several opportunities exist for MAMI. For example, health extension workers (HEWs) selected from communities receive one year of training and are prime candidates to manage infants under six months of age. The Health Development Army works with HEWs and offers a strong platform to reach the community and identify infants at risk.

Lessons from the CMAM scale up experience in Ethiopia include the need for a champion to take on the MAMI challenge and lobby for change, alongside a network of individuals. It is vital to link with decision-makers, understand the priorities of policy-makers and make use of all opportunities for advocacy. As an educator, daily discussion and dissemination is effective as graduates pass through the system and take up the issues. A key issue is redesigning the health system to support our aims.

Frontline realities in Malawi

Emma Cartmell, MOH/Independent, Malawi described everyday frontline problems, such as poor appreciation by paediatricians of the need to consider nutrition alongside clinical status of sick children, and challenges of staff relying on an anthropometric measurement at one point in time, without considering the infant's growth pattern or feeding behaviour. Infants admitted through emergency-room services experienced significantly delayed access to nutrition (breastfeeding) support; after much lobbying, this has now improved so that they are given support within a day or two of admission, which allows time to try to re-establish breastfeeding before they leave the hospital.

There is no dedicated funding for MAMI, so even small changes, such as regular weighing of babies, take time to establish. Institutional and system change can only happen once the Ministry of Health has clear global (WHO) guidance to follow.

[4] India consultation on MAMI.

Discussion

A critical output from the MAMI SIG should be quality evidence to inform clinical practice and higher-level decision-making. Governments need credible evidence to change guidance and develop protocols. We also need to demonstrate the value of investments to ensure management of at-risk infants is prioritised.

We must disseminate and improve accessibility of key resources (such as the C-MAMI tool) to support frontline practitioners in their day-to-day work. To support this effort, a MAMI advisor will soon be appointed at Save the Children for short-term deployment to support C-MAMI Tool implementation, through the Global Technical Mechanism for Acute Malnutrition and Nutrition Cluster partners.

We need to find ways to intervene earlier. Subtle risk factors, such as a mother with mental health issues, are often missed and infants are only picked up late, when very sick. Hospital births are a missed opportunity; for example, in a study in Kenya (see below) about 75% of malnourished infants had been born in hospital and should have been identified sooner.

Session 3 MAMI approach – implementation experiences

MAMI toolkit. A support tool for programming. Overview and update.

Elena Rivero, Save the Children

To support implementation of the C-MAMI tool (see Box 1), Save the Children initiated development of the MAMI toolkit to help harmonise programme tool development across agencies, avoid duplicated effort and improve accessibility. Implementation experiences and pilots of the C-MAMI tool have informed this package. Relevant existing materials/resources/tools were collated from partners and reviewed. The MAMI toolkit will be integrated within the nutrition module of Save the Children's COMPASS platform, a web-based, visual, cross-sector, open-access resource. The toolkit will be available in June 2020.

Looking ahead: Maternal interventions research

D Taylor Hendrixson, Washington University School of Medicine (Sierra Leone)

While the focus of the MAMI SIG is currently on infants under six months old, preventive actions during pregnancy are critical. Acknowledging future ambitions for MAMI SIG areas of attention, a presentation on emerging research findings on maternal interventions was shared.

Pre-term and small-for-gestational age (SGA) infants have twice the risk of being underweight when compared to appropriate for gestational age (AGA) infants; term-SGA infants are three times as likely to be wasted and seven times as likely to be stunted compared to term-AGA infants.

The literature suggests effective antenatal actions to improve early post-natal growth include:

- Improved identification of at-risk mothers;
- Strengthening routine antenatal care;
- Provision of nutritional supplements in pregnancy;
- Prevention and treatment of infections.

Proposed criteria for selecting at-risk mothers who will benefit from interventions include:

- Undernourished women: a maternal body mass index (BMI) <18.5 is associated with 58% higher odds of infant wasting and 43% higher odds of underweight;
- Low maternal height: a height less than 145cm doubles the risk of having underweight infant;
- Adolescents;
- Lower genito-urinary infections, HIV and malaria: these are the largest infectious disease causes of LBW, pre-term birth and SGA

A prospective, randomised controlled clinical effectiveness trial of a novel ready-to-use supplementary food (RUSF) and a bundle of anti-infective interventions to improve birth anthropometrics in rural Sierra Leone, has been ongoing since 2017. A sample of 1,500 pregnant women was randomised to intervention or standard care arms, using the following eligibility criteria: less than 35 weeks of gestation by fundal height; mid-upper arm circumference (MUAC) ≤23 cm; commitment to reside in the study area and attend one of the antenatal clinic sites. Preliminary findings suggest that mothers in the intervention group gained significantly more weight during pregnancy and greater fundal height. Birth outcomes in the intervention group were longer infants (0.5 cm) who also weighed more and had higher MUAC and weight-for-height z-scores (WHZ).

Moving forward, there is a need to:

- Strengthen evidence for interventions in at-risk women;
- Identify factors increasing risk of poor outcomes;
- Identify and expand interventions to target sustained growth in the post-partum period. This might be through maternal mental health interventions/support and breastfeeding support.

Key discussion points

The control group received the standard government-supplied corn-soy blend supplement, but differences in nutritional quality were not rigorously assessed between groups.

It may be difficult to interpret small differences in MUAC and weight without knowing gestational age.

MAMI programme needs and experiences. Panel and plenary discussion.

Yasir Arafat *– Save Bangladesh, MSc case study in Rohingya camps; Katie Beck – Partners in Health, Rwanda neonatal unit;* ***Martha Mwangome*** *– KEMRI. Kilifi hospital setting;* ***Alice Burrell*** *– GOAL (formerly Save the Children Bangladesh Rohingya camps);* ***Alison Moebus*** *– MSF Yemen/Iraq*

Experiences implementing the C-MAMI tool

Save the Children has piloted the C-MAMI tool both in the Rohingya camps in Bangladesh and in the more stable context of Barisal through integration into existing programmes. In the Rohingya camps, infant and young child feeding (IYCF) counsellors in outpatient therapeutic programmes (OTPs) and stabilisation centres (SCs) used the C-MAMI checklist with mothers. A major challenge was lack of staff familiarity with the checklist and the time it took to implement, in the face of long queues of waiting patients. Too much data were collected and staff only managed to see four or five infants per day. This was less of a challenge in the Barisal pilot programme. Referral links were poor for maternal mental health needs in the Rohingya camps, with limited availability of services.

In the neonatal unit setting in Rwanda, the Partners in Health team adapted parts of the C-MAMI tool and integrated it within the existing system. The checklist is not used for all patients and only anthropometry and key issues are documented. Most of the patients can benefit from the tool.

In northern Iraq, malnutrition is seasonal and the programme is small; during May to July 2019, 14 infants under six months old were admitted, half of whom were breastfed. Doctors, nurses and the mental health team were trained by MSF on the C-MAMI tool together so that they had a shared goal and understanding of some of the difficulties and approaches needed to re-establish breastfeeding. Challenges included a short duration of stay (maximum of five days), making it very difficult to relactate, as well as significant mental health issues of mothers who had lost family members, endured horrific experiences and were living in camps without any support network. However, an MSF mental health programme offered good opportunities for referral, with an outpatient counselling service available to mothers.

Outcomes of MAMI interventions

In Kenya, a study[5] conducted in a government hospital examined the practical implementation of WHO guidelines[6] for treatment of severely malnourished infants less than six months old. A lactation corner was set up and training provided to community health worker (CHW)-level breastfeeding peer supporters. Links were actively pursued with other services (social services, etc.) but with limited success. For example, there was a significant challenge in admitting a sick mother to an adult ward while enabling her to continue caring for her infant. Similarly, paediatric services could not accommodate sick or malnourished mothers. Several infants were discharged before reaching the WHO weight-velocity criteria and/or without re-establishment of exclusive breastfeeding, having met clinical criteria for discharge and given infection risk of extended stay. Some mothers left due to the long duration of treatment. After discharge, infants were followed up fortnightly. At two weeks, growth stagnated and started to fall, highlighting the need for a good package of post-discharge community care.

Save the Children research in Bangladesh explored what happens to SAM children under six months old in Barisal.[7] The study identified 77 SAM infants and 77 non-SAM at birth (as per WHO criteria) and followed up at six months. The SAM infants identified at birth were referred to standard care (inpatient treatment). At six months, none of the referred cases had attended treatment, despite being provided with financial support for transport. There were

[5] Mwangome M, Murunga S, Kahindi J, et al. Individualized breastfeeding support for acutely ill, malnourished infants under 6 months old. Matern Child Nutr. 2019;e12868. https://doi.org/10.1111/mcn.12868

[6] Government of Kenya guidelines are aligned with WHO guidelines.

[7] Islam MM, Arafat, Connell N, Mothabbir G, McGrath M, Berkley JA, Ahmed T and Kerac M. (20180). Severe malnutrition in infants <6 months – Outcomes and risk factors in Bangladesh: A prospective cohort study. Maternal Child Nutrition.2018:e12642 https://doi.org/10.1111/mcn.12642

three to four deaths in the SAM group and no deaths in the non-SAM group. Three quarters of infants who had been identified as SAM at birth had recovered in terms of weight-for-height z score (WHZ) at six months of age but were significantly more stunted and underweight at six months than infants who were not severely malnourished at birth.

The C-MAMI tool was also piloted in this community, with outcomes compared with villages offering inpatient referral only. The inpatient-referred infants initially attended treatment, but many defaulted within a few days. In the C-MAMI pilot villages, the tool was better at identifying at-risk infants and more cases were successfully discharged, with the average weight gain and MUAC change, weight-for-age z-score (WAZ) and WLZ change significantly for the better in this group. Ministry of Health (MoH) staff were trained in use of the tool but found it a burden to conduct screening. Implementation was therefore dependent on Save the Children staff. Again, the complexity of the tool was a constraint. Summarising the tool into three to four questions facilitated greater participation of MoH staff, with Save the Children staff conducting the remainder of the assessment.

Discussion

There was concern over whether numerous local adaptations would dilute the purpose of a standardised tool, as well as questions over how the C-MAMI tool might be incorporated into an already-overloaded IMCI system.

The aim of the C-MAMI tool was to develop a resource that could inform and be integrated within future iterations of IMCI (currently undergoing review, timeline not available). The C-MAMI tool is a care pathway that brings together existing resources to apply them to the context of the at-risk infant and mother. In future iterations, it will be helpful to differentiate resources from the pathway within the C-MAMI tool (version 2 closely combines both). The process of development and update is a collective effort; there is great value in bringing people together for specialist input and buy-in.

Since CMAM is still not integrated into health systems, it was suggested it may be more efficient and effective to align MAMI with the nutrition agenda for older children and advocate as one. Currently, children under two years old are being differentiated from children over two in terms of prevalence and risk of wasting. This could be an opportune moment to more explicitly include infants aged 0-6 months within the under-two-year-old group. The discussion concluded that, while leveraging and combing efforts with that of older children will have benefits, a distinct effort regarding infants under six months old is still warranted.

Session 4 MAMI Global Café – MAMI vision, terminology and urgent technical questions

MAMI toolkit. A support tool for programming. Overview and update.

During this interactive session, participants self-divided into three groups to discuss different pre-identified issues with pre-ordained and briefed facilitators. Participants had the option to move between groups throughout the session. Each nominated a rapporteur and plenary reporter.

Group 1: Common MAMI vision

During this interactive session, participants self-divided into three groups to discuss different pre-identified issues with pre-ordained and briefed facilitators. Participants had the option to move between groups throughout the session. Each nominated a rapporteur and plenary reporter.

Facilitator: Marko Kerac, LSHTM

The proposed vision is:

Every infant under six months at every community or health-service contact is nutritionally assessed and appropriately supported to survive and thrive

The group was asked to examine the MAMI vision and explore whether it would it be useful to outline some key guiding principles underpinning it.

The group debated whether a vision for MAMI as a stand-alone area is needed or whether it should be considered as a continuum with programmes for older children, to avoid fragmentation of efforts to combat malnutrition and presentation of complex, separate nutrition agendas to government ministries. They also examined how MAMI aligns with the programmes/activities for children aged 6-24 months and for the 'first 1,000 days' window of opportunity.

It was agreed that a separate vision is important to progress MAMI further, because the under-six-months group has been neglected and requires heightened attention; infants under six months of age are also physiologically distinct from older infants and children. This doesn't mean disengaging this sub-group from other age groups and programmes, but distinct, simplified and targeted messages and management approaches are needed.

In terms of the wording of the vision, it was noted that reference to the mother is missing and should be included (assessment and support). For advocacy purposes, it would also be useful to highlight the potential impact of MAMI.

Group 2: Terminology

Facilitators: Nigel Rollins, WHO and Hatty Barthorp, GOAL

Various terms are used to describe infants under six months old with additional needs. In 'MAMI' we use 'at risk' to describe infants and mothers who are identified as needing targeted support. This group discussed terminology, with the aim of agreeing which terminology best resonates with a holistic MAMI approach, guided by the following considerations:

1. Are there any risks/limitations associated with terms in use?
2. What terminology best futureproofs direction of travel in terms of guidance (e.g., WHO)?
3. How would you define the ideal indicator and how would it be measured?

The group agreed that 'MAMI – Management of At risk Mothers and Infants under 6 months' is good as an umbrella term as it already has strong and positive branding.

The 'C-MAMI tool' should be rebranded the 'MAMI tool' to avoid confusion between CMAM and MAMI. The MAMI tool can be used either for integration into IMCI (or others) or, where necessary, as a stand-alone tool.

'At risk' is a useful term to encompass several populations who are at risk of deterioration for multiple different reasons; i.e., maternal health, low birth weight, feeding difficulties, environmental factors, etc., whereby there are different layers of risk outcome; i.e., risk of death, wasting/stunting, poor cognitive development, etc. 'At risk of failure to thrive' may also be a useful term as it can be used to include the various modes of case identification. However, it doesn't translate easily into other languages, thus it has inherent limitations. The group also proposed the need to agree on the terminology used for different classifications of risk within the MAMI tool' e.g., 'red' and 'yellow' (as used in IMCI).

The group decided that the terms 'severe malnutrition', 'moderate malnutrition' and 'acute malnutrition' do not apply to this cohort and there is no benefit in identifying an infant aged under six months as severely or moderately malnourished, as treatment is the same. 'Malnutrition' is used to refer to both under- and over-nutrition and therefore confusing for this age group. 'Undernutrition' raised concerns that there would be a focus on food interventions. The group therefore proposed the use of 'wasting' and 'oedema' as opposed to 'moderate acute malnutrition' and 'severe acute malnutrition'.

Current WHO guidelines only cover SAM and recommend WLZ for anthropometric identification; for infants under six months of age, WLZ cannot be calculated for infants <45 cm. MAMI tries to identify infants at risk of mortality and not just those with severe malnutrition status. (For other limitations around anthropometry, see Day 2).

Discussion raised issues around the reliance on anthropometry. An infant's anthropometry might fall within the normal range but the infant may be sick/not growing well/have a poor outcome. In screening, the aim is to capture at-risk infants beyond those exhibiting poor anthropometry, as well as assessing mother's wellbeing. This raised the issue of whether we are trying to capture too much under one term/measure.

A case was also made for simplification. For example, at country level, if you say, "this is a malnourished child", it resonates with policy-makers and frontline workers. It was agreed that, to progress further, the working group needs to engage in the wider discussion on language currently happening for wasting in children aged 6-59 months.

Group 3: Urgent technical questions

Facilitators: Kirrily de Polnay, MSF and Alice Burrell, Save the Children

Infants under six months identified as SAM/acutely malnourished/at risk in low-resource settings may have been born pre-term and/or LBW. However, this is often unknown. Group three was tasked with examining whether guidance exists or could potentially be applied to answer questions about management of these infants who are admitted to nutrition programmes beyond the neonatal period, and whether it should be different to management of term or non-LBW infants. Participants were also asked to agree which questions are the most urgent, considering the implications of the unknown and how these might be pursued and answered.

A list of potential questions was proposed, out of which the group focused on the following:

1. How to treat LBW and pre-term infants?
2. Can we frequently identify LBW and pre-term? What do we do if we don't have this information?
3. Do we want to identify acute weight loss or small-for-age?

WHO guidelines exist for management of LBW/pre-term infants with SAM and/or in neonates (<1 month). Infants older than one month of age are transferred to inpatient services and treated as per CMAM guidelines for infants under six months (inpatient care). There is no guidance on follow-up post-discharge from inpatient care. In practice, transition is not smooth between protocols for infants less than one month old and over one month old, with different treatments from one day to the next.

A WHO post-natal care guideline[8] is due out within the next two years, as well as an LBW care guideline, both of which will include nutritional care. This will provide justification for more frequent and explicit follow-up times for LBW infants.

The group proposed the following next steps to move the knowledge base further:

1. Conduct a desk review of protocols for low birthweight compared to management of SAM in infants less than

[8] N.B. A WHO guideline refers to a document containing evidence, deliberation and some implementation thoughts. Applicable guidance for implementation use (e.g., Pocket book and IMCI) are derivatives.

six months. Consider differences in management and transition from one 'unit' to another; e.g., neo-natal to paediatric;
2. Implement a research study on what the best feeding option is other than breastmilk for LBW and pre-term infants; i.e., F100 vs diluted F100 vs pre-term infant formula;
3. Explore follow-up of LBW and pre-term infants post-discharge and identify options/recommendations for where MAMI could sit within different contexts; e.g., conflict, humanitarian, development, community health system.

It was proposed that a working group should be established to progress this work.

DAY 2

Day 2 was opened by a brief overview of Day 1 proceedings and an overview of Day 2 plans. The morning presentations introduced cross-sector opportunities on MAMI in three priority areas (maternal and neonatal health, early childhood development and maternal mental health). A series of presentations then examined global policy and guidance, emerging evidence on infant anthropometric indicators and feeding indicators to identify at-risk infants, and programming realities of case identification. These set the scene for afternoon working groups to examine what immediate actions are needed to improve and harmonise identification of at-risk infants and to build multiple-source evidence.

Session 5 Building bridges, clarity and evidence on MAMI

Maternal and neonatal health.

Louise Day, LSHTM

In maternal and neonatal health, a life-course approach is being advocated and there is potential for enhanced MAMI linkages. At birth, there is a push to move from only considering birth weight to a better understanding of gestation, but this continues to be very difficult in practice in many contexts.

Caesarean section (C-section) is currently a global epidemic in obstetrics: C-section rate is 32% in Bangladesh, for example. Evidence consistently shows poorer associated breastfeeding practices.

Neonatal intensive care units (NICUs) separate babies from mothers, which interferes with breastfeeding. Physical barriers to breastfeeding in health facilities need to be dismantled, alongside the provision of proactive support to mothers. It is difficult to work within the segregated spaces of different wards: paediatric, neonatal, etc. Sweden is ahead of most countries and has established family rooms in hospitals. Architects and others are needed to redesign these spaces.

Monitoring reports and global strategies to link with include:
Born too soon. The Global Action Report on Pre-term Birth 2012;

Every Newborn, An Action Plan to End Preventable Deaths (ENAP) by 2030 (published 2014), which includes actions and indicators on kangaroo mother care and breastfeeding support, overlaps and opportunities for MAMI coordination;

Survive and thrive: transforming care for every small and sick newborn 2019, which has standards coming in 2020;

Respectful Maternity Care Charter, which describes the 10 Universal Rights of Women and Newborns (the tenth point is nutrition-focused).

Moving from plans to implementation can be slow; for example, it took 10 years in rural Bangladesh to establish Kangaroo Mother Care (KMC). Special care packages are coming together in many places and it is important not to lose the basics (e.g. (KMC, breastfeeding support) while developing and adopting improved technology.

Discussion revolved around how the MAMI SIG can develop these links. For example, the United States Agency for International Development (USAID) has a Newborn Health in Emergencies Group with a field guide and roadmap for maternal newborn health, which could incorporate greater attention to MAMI.

Early childhood development (ECD)

Melkamu Berhane, Jimma University

While millions of children under five years old die each year, more than 20 times this number survive but do not reach their full human potential. ECD refers to the physical, cognitive, linguistic and socio-emotional development of a child from the prenatal stage up to eight years old. Ii involves a range of activities implemented in many settings that aim to break the vicious cycle of negative impacts on child development.

The 0 to 3 years period includes parent education, early stimulation and nutrition interventions and is an optimal time to incorporate MAMI. The nurturing care aspect of ECD means supporting parents and caregivers to: breastfeed and provide nutritious food; maintain good health during conception, pregnancy and in the post-natal period; provide a nurturing and safe environment; and give children opportunities to explore and learn.

MAMI can be integrated at both health-facility level as well as in community ECD approaches. Good opportunities exist in Ethiopia, where the MoH already has staff with MAMI knowledge.

Maternal mental health: A low-intensity psychosocial intervention for maternal mental health. Thinking healthy for child development.

Xanthe Hunt, WHO

'Thinking Healthy' is an evidence-based, psychosocial intervention for depression tailored to the perinatal period.[9] It provides instructions for empathic, clear and sensitive communication with women and their families and for mobilising and providing social support. It is based on cognitive behaviour therapy (CBT) principles and comprises 16 sessions for delivery by CHWs. It has been designed in such a way that it can be integrated with the health-education material contained in most CHWs' routine training, with the aim of integrating the activity into their existing workload.

The package provides guidance on counselling and listening skills, with a focus on the mother, her baby and things that can be integrated into daily life. It delivers neonatal and child health messaging with an emphasis on social support.

A mother enters the programme through screening or home visits. Seeing a mother in her environment is important, as is the frequency of visits, so home visiting is preferred. Interaction with family is also helpful. To avoid stigma, the package is not framed as a treatment for depression, but as an approach to support wellbeing and optimal functioning.

In its longer version, there are 9 to 10 questions, but an 'ultra-brief' version (Patient Health Questionnaire 2) just has two to three questions and has been validated for use in primary healthcare (PHC) clinics in Ethiopia. An adapted version of the package for peer delivery was trialled among 850 women (280 in India; 570 in Pakistan) and resulted in 35% higher odds of remission at six months post-childbirth compared to enhanced usual care only. Group-based delivery for some content has also been explored.

Conclusions from its use so far are that:

- Scalable low-intensity psychosocial intervention can successfully alleviate symptoms of pre and post-natal depression;
- Screening into care can be integrated into routine health facility-based touchpoints with mothers, but the intervention itself requires higher frequency and greater intensity of contact.

In discussion, it was noted that this approach works well for women with mild mental health issues but needs sustained commitment from countries in terms of capacity-building. MSF shared that they only conduct active screening if there is a response team available that includes psychologists and psychiatric care for depression. Peers need training and supervision. Mothers often present very late in highly traumatic situations; e.g., in Central African Republic or Democratic Republic of Congo, where the context creates the situation. Integration of services is needed, but in humanitarian situations there are significant constraints in terms of staff capacity and midwives do not have time to support this work. It is very difficult to make this happen.

Observation of mother-infant interaction and whether mothers' responses are appropriate or not are not yet included in the package. Ongoing work is examining whether they can be incorporated but this is a difficult skill for untrained staff/peers.

[9] www.who.int/mental_health/maternal-child/thinking_healthy/en/

WHO and MAMI evidence, guidance and policy

Nigel Rollins, WHO

A WHO 'Guideline' is a detailed document summarising the evidence and rationale for an intervention. The WHO 2013 SAM publication was an 'update' that explicitly included community case management of infants under six months of age for the first time. Evidence and language used used for older children was applied to infants under six months whilst recognising its inadequacy; the recommendations are based on low-quality evidence. However it does provide a reasonable framework and aligns well with MAMI tools.

When it comes to uptake, MAMI is 'competing' with other priorities, including maternal mortality, LBW, diarrhoeal management and the new emphasis on ECD. It is hard for governments to take all on board and are much less convinced when evidence is low.

A WHO-convened research meeting in January 2019 on growth failure in infants under six months of age agreed that 'SAM' is not an appropriate term. 'Failure to thrive' or 'growth failure' identifies many infants at risk; growth is not an endpoint but an alert to something else going on. Within WHO, it is likely that the terms 'wasting' and 'stunting' will be used rather than 'malnutrition' and that 'growth failure' or a similar more holistic term will be used for infants under 6 months.

Assessment and case management of infants under six months has largely been informed by studies from Africa, but the biggest burden is in southeast Asia, as is the case for LBW. Context is important and evidence from Africa alone cannot be used to develop global guidance.

WHO is currently examining available data including updated data on an observational cohort examining growth trajectories in LBW and non-LBW infants. All non-LBW infants lost weight after birth and then growth curve flattened. All LBW infants gained weight from birth and SGA babies gained the most. In practice, a pre-term SGA infant at three months will be identified as low WAZ, since WHO growth curves are based on term infants. Being appropriate weight for gestational age is important – we need to know whether a child was born LBW or whether SGA or whether he/she had an insult/problem post-birth. Depending on these circumstances, a child may have a different set of needs. The term 'malnourished' may therefore not be appropriate at all. Risk-of-death data illustrates that an infant cannot escape from the consequences of the prenatal growth pattern. The challenge is how to interpret these trajectories in the context of high rates of pre-term and SGA infants: what is optimal growth? Is catch-up growth the right thing to aim for? Examining breastfed versus formula-fed infants reveals a considerable difference in how infants grow in the first six months. We cannot assume that catch-up growth is better in SGA infants.

There is a large drive for universal health coverage (UHC) and primary healthcare (PHC): we must establish how the MAMI tool fits in.

IMCI will take on more about health and development in coming years (ECD emphasis), with greater consideration of children aged two to nine years. For inclusion in IMCI, screening is only included if it translates into a classification (with evidence) and that classification has a treatment. To integrate the MAMI tool within IMCI requires we assimilate IMCI logic, which requires precision on terminology. More work needs to be done on how to clearly classify an 'at-risk' infant – what are the clinical signs that show risk of mortality or risk of impaired development and what is the action needed to address this risk.

Anthropometric indicators to identify at-risk infants under six months old: Considerations and practical implications

Jay Berkeley and Martha Mwangome, KEMRI/Wellcome Trust Research Programme, Kilifi, Kenya

Principles of screening is a well worked-out area.[10] In many cases we don't know the natural history of the condition in the absence of intervention. An agreed policy of who to treat is lacking in MAMI. It might be useful to start with the intervention and work backwards; screening can only be considered in the context of the nature of the intervention available.

A focus on outcomes and the aims of treatment is important. There is frequent confusion over a risk-based approach to intervention design and case management. It is generally accepted that use of anthropometry should be based on risk of outcomes/mortality. Cut-off points are difficult to set because the curve for risk of mortality is smooth; the lower the WAZ, the greater the risk of death. So, for a preventive package, the cut-off point might be set at -2, with people screened at the extremes for intensive treatment; e.g., this process is used for blood pressure screening.

Using ROC curves, if the area under the curve is 1 it's a perfect test; 0.5 is non-predictive. Anthropometrics come out at 0.6/0.7; i.e., not very predictive of mortality. But are we only interested in predicting death?

Recent research studies have explored the predictiveness of tools and their practicality for use in the field. In a trial of daily co-trimoxazole prophylaxis to reduce mortality after complicated SAM, MUAC <11.5cm was used for children aged 6-59 months and <11cm for the under-six-months group. The cut-off of 11 had a much higher risk of mortality than others; probably because the children were younger, but this also may reflect that the threshold was too low for these sick infants. This raises the idea of using a different cut-off for very sick children than for those who are not very sick. More than 25% of children died; this reflects that once a severely malnourished child is very sick, they fare badly. In the older age group, more than half were well nourished a year later.

The Childhood Acute Illness and Nutrition Network (CHAIN) cohort in Kenya, Malawi, Burkina Faso, Bangladesh, Uganda and Pakistan of children aged 0-23 months is a community trial where a well child is matched with each malnourished child and outcomes examined. Data reveals how few infants had a MUAC below 11cm (20 out of more than 1,000); at 11.5cm there were not many more. Context is important.

Studies to examine the predictive value of anthropometry usually have few deaths and no causes of death are reported; interventions are not well defined and frequently MUAC is not measured.

Studies in Kilifi, Kenya have shown that the level of repeatability/agreement in anthropometric measurement between three CHWs is lower for WLZ than for WAZ or MUAC. Between 1-6 months, the optimal MUAC cut-off is 11cm; at 1-2 months it is around 10cm. There is a lot of variation. Examining MUAC for infants less than three months and for those over three months suggests that none of the varied MUAC cut-offs was superior to the general one of <11cm.

In Burkina Faso, anthropometric measurements were taken monthly on 227 LBW babies for one year from birth. LBW contributed to more than 50% of the <11cm MUAC category and accounted for about 80% of severely underweight infants identified at two months of age (timing of first vaccination). Further analysis (near completion) suggests that there is no added value in identifying an at-risk infant at two months of age by knowing birth anthropometry. LBW infants with low anthropometry at month two are at high risk; approximately 40% of wasted children at six months were LBW.

In summary, the studies found that WLZ is not predictive of mortality or admission in infants under six months old in these settings, while WAZ/LAZ/MUAC are moderately discriminating of outcomes. Asian data is required to supplement the African data.

Conclusions from these studies are:

- Anthropometry for risk assessment performs similarly in infants under six months old to older children;
- LBW is not low risk; it is not acceptable for infants to be low weight because they started life with LBW (a common misconception). LBW infants are always at higher risk of mortality.

We don't know the causes of death in LBW infants and whether they are different for non-LBW babies. Discussion centred on the conclusions on the relevance of the difference between birth weight and two months, as results appear borderline. It was further agreed that anthropometric recovery is not the same as physiological recovery.

[10] Wilson and Jungner, WHO 1968.

Realities of identifying and monitoring at-risk infants in programmes – experiences from GOAL programming in Gambella, Ethiopia

Hatty Barthorp, GOAL

MAMI was originally introduced as an adjunct to CMAM in GOAL's programme in Ethiopia. Getting staff to appreciate other signs alongside anthropometric measurements has required development of programme staff capacity, as well as counsellor training. There is added complexity in situations without referral services for maternal mild anxiety and depression. Workload of counsellors can be significant as it requires a lot more time to be spent with mothers. The time commitment for beneficiaries can also be problematic.

Since early 2016, GOAL has adapted infant admission and discharge criteria five times and is now looking for consensus on how best and most practically to identify at-risk infants. MUAC has advantages in quickly identifying infants and could be aligned with ongoing mass screening of older children in the camps. GOAL has found it a challenge to use LAZ and WAZ: length is problematic in small babies and health workers are afraid of hurting them. GOAL has developed new MUAC tapes and propose using two cut-offs in their programmes: <11cm for the first six weeks to first vaccination; then <11.5 cm once over six weeks of age. The vaccination mark is a definitive point to make the transition to using a higher cut off.

It is difficult to find out which infants were born with LBW in the contexts of GOAL's work. Ultimately, MAMI should not be over-complicated but something that can be implemented in a variety of settings, given resources, capacity and time available to staff and mothers.

Feeding and non-anthropometric indicators to identify at-risk infants

Karine Le Roch, ACF

A systematic review of breastfeeding assessment tools for nutritionally at-risk infants under six months old aimed to address the critical gap of identifying a correct 'diagnosis' of a breastfeeding problem.[11] The review sought to:

a) identify and profile currently available breastfeeding assessment tools;
b) discuss their potential application for assessing malnourished infants under six months old.

Twenty-nine tools were identified. There is currently no gold standard for breastfeeding assessment and several tools lack validation studies: IFE Module 2, BEET, CARE guidelines. For assessing malnourished infants in resource-poor settings, UNICEF Baby-friendly Hospital Initiative tools, IFE Module 2 and the WHO/UNICEF B-R-E-A-S-T-Feed Observation Form look promising as they have a wide coverage of domains and were developed with developing countries in mind. The tool with the strongest evidence was the WHO/UNICEF B-R-E-A-S-T-Feed Observation Form. Further research is important to refine existing tools and develop new ones. Rigorous testing, especially against outcomes such as breastfeeding status and growth, is key.

A process evaluation was conducted of Baby Friendly Space+, an integrative health approach for lactating women and their babies in Nguenyyiel camp, Gambella, Ethiopia. A total of 201 lactating women and their babies were enrolled in a two-month intervention. Statistically significant changes were observed in breastfeeding outcomes during the course of the study; improvements were observed in all indicators and all maternal mental health outcomes.

The evaluation made recommendations for breastfeeding tools, which include: to continue collecting and reporting good-quality operational data using tools that are currently available; expand the current literature on breastfeeding assessment, especially with malnourished children; and to evaluate the use of those tools in low- and middle-income countries and crisis settings.

Recommendations for the maternal mental health tools include: to systematically consider maternal mental health when programming health interventions with babies; to evaluate mother's wellbeing in a culturally-sensitive manner; and to consider the nurturing care environment when it comes to mother and child health.

[11] Breastfeeding assessment tools for nutritionally at-risk infants aged under 6 months old: a systematic review. C. Brugaletta, K. Le Roch, J. Saxton, C. Bizouerne, M. McGrath, A. Seal, M. Kerac. Pending peer review publication.

Session 6 MAMI Global Café – Building bridges, clarity and evidence on MAMI: Taking action

During this interactive session, participants self-divided into three groups to discuss different pre-identified issues with pre-ordained and briefed facilitators. Participants had the option to move between groups throughout the session. Each nominated a rapporteur and plenary reporter.

Group 1: Anthropometric and feeding/other indicators to help identify at-risk infants

Facilitators: Jay Berkely, KEMRI/Wellcome, Kenya and Tsinuel Grima, Jimma University, Ethiopia

Measurable, practical indicators are needed for programmers to identify which infants aged under six months should be targeted for detailed assessment and eligible for any treatment programmes/interventions.

WLZ is currently recommended as the main criterion in WHO 2013 SAM treatment update guidelines. In order to develop a more comprehensive diagnostic approach that would include clinical and historical signs/symptoms in addition to anthropometry, the group was tasked to consider which other indicators, either alone or in combination, might best identify high-risk infants.

The group agreed that the priority of identification (and treatment) is to decrease mortality risk (both short-term and throughout childhood). Secondary goals are to avoid stunting and morbidity and to maximise neurocognitive development.

The group considered which indicators are currently used to identify at-risk infants, which indicators are associated with clinically significant risk, what opportunities can be built upon, and how to make risk assessment simple and accessible for frontline workers.

Group deliberations included which indicators to use in addition to anthropometry and whether MUAC and WAZ could be recommended, based on current evidence. The group concluded that most government programmes would not be able to recommend MUAC in the absence of WHO guidance and WHO would not be able to recommend it without a lot more evidence, including from South Asia. There is greater consensus around a switch to WAZ in place of WHZ; WAZ is close to existing thinking and policy and could be conducted alongside immunisations.

In addition to anthropometry, signs already in use in IMCI could be included, as many danger signs are already considered, although maternal mental health may not be. Alternatively, a four-component screening system could be considered: Feeding, Anthropometry, Sickness, Talking to the mother about mental health (FAST) was suggested as an example. Factors and signs would need to be ranked in order of importance (e.g., substantiated by a good evidence base) or ease of measurement.

At the same time, MUAC trials need to be carefully monitored and planned to gather more evidence. For example, evidence is building around Family MUAC approaches, with ALIMA research indicating that they promote early identification, improved coverage and reduced costs.

There was interest to take this work forward as a working group within the MAMI SIG.

Group 2: Minimum and additional MAMI programme data to collect and potential to collate

Facilitators: Martha Mwangome, KEMRI/Wellcome Kenya & Saul Guerrero, UNICEF

Programmes are identifying at-risk infants and mothers. To harmonise across programmes and to help build evidence, it would be useful to agree minimum and additional data to gather. Feasibility for programmes is a critical consideration, especially in proposing minimum data (i.e. what is essential to collect). In addition, it would be valuable to consider how we maximise use of such data and collate and analyse multi-sourced data.

The group was asked to identify:

1. What minimum MAMI data should be gathered by programmes that enrol/admit infants under six months of age at both facility and in the community?
2. What additional MAMI data should be gathered by programmes wherever possible?
3. How could minimum data be collated for use to build evidence?

The group agreed on the following data to collect, divided into essential, ideal and data that would support research:

It was noted that there is no agreed cut-off for maternal MUAC for lactating women and no evidence around some of the cut-offs in use. We should examine what risk we are seeking to capture through maternal MUAC measurement.

It was also suggested that what is routine and essential might have to be context-specific, depending on the situation and what is feasible to collect.

Routine – essential	Ideal – Intervention (in addition to essential)	Research/monitoring/evaluation (in addition to essential and ideal)
Anthropometry	Maternal MUAC	Demographic -household etc
Infant feeding	Maternal mental health	Follow-up outcome data
	Clinical outcomes/discharge	Monitoring data weekly, monthly
	Infant profile	IMCI danger signs
	Infant illness	Specific illness (diarrhoea, etc.)
	Vaccination	Other maternal data
		Coverage

The group recommended that a small technical working group should develop this further, detailing what already exists and what is needed. This could feed into the MAMI tool review as well as support lobbying for development of a central database.

Group 3: Key initiatives and stakeholders to engage with on MAMI

Facilitators: Sarah O'Flynn, Save the Children US

Management of at-risk mothers and infants straddles many specialities and sectors: we need to identify key leverage/ integration points and with whom to work as a priority. Following on from the insights shared regarding maternal and neonatal health, ECD, and maternal mental health, the group was asked to identify what practical steps can we take to move forward on these and what other opportunities/ specialities we should pursue.

The group was tasked to identify three priority specialities/ sectors to 'build bridges' with on MAMI; then, for each one, to identify key opportunities to leverage, such as guidance, frameworks, initiatives, timelines, and 'how' to do so; e.g., contact points, working groups to engage with. Finally, to consider next steps for the MAMI SIG to take this forward practically.

The group first discussed questions around what we are seeking to integrate and what scale-up might look like.

This focus is not yet entirely clear, pending deliberations of the other group questions. Participants also debated whether integration is the best approach to achieve the aims of MAMI, versus a stand-alone approach (from a policy and advocacy viewpoint). As MAMI incorporates both prevention and treatment, readiness for integration of the different components will vary in different contexts. Participants also discussed whether multiple points of integration could be feasible.

In conclusion, the group agreed on the three priority sectors of child health; the integrated approach to wasting and 'quality of care' incorporating paediatrics, small and sick newborn (SSNP); and maternal and newborn health (MNH). Working groups and upcoming events across these areas in which to participate and raise MAMI issues were identified (see Annex 3).

Session 7 Conclusions

Each of the working groups concluded with some clear directions to move forward and an action point to convene small working groups to take identified steps forward (LBW infant nutrition management, indicators to identify at risk infants, and minimum programme data).

More broadly, plenary discussion identified the following priority actions for the MAMI SIG in 2020:

1. Generate a working MAMI vision and MAMI approach brief to support integration efforts and outreach to other sectors/communities of practice/stakeholders;
2. Create a communications toolkit that could include a two-pager brief, video and case studies;
3. Identify 'MAMI champions' to help in outreach and engagement;
4. Develop a meeting calendar to identify opportunities to leverage MAMI;
5. Develop a MAMI SIG workplan and process to deliver on and monitor progress;
6. Compile key MAMI resources/research into one site/platform (ENN);
7. Develop further case studies across contexts on what MAMI programming looks like in practice.

Discussions identified further opportunities amongst participants; for example, a MAMI advisor will soon be appointed at Save the Children for short-term deployment to support programming, through the Global Technical Assistance Mechanism for Nutrition (GTAM) and Nutrition Cluster partners.

The group concluded that, to make the most of the opportunities and momentum of this meeting and to take forward identified actions, we urgently need to scale up our way of working.

In anonymous meeting feedback from attendees (74% response rate), 98% of participants were satisfied or extremely satisfied with the meeting.

Annex 1 Agenda

Day 1

Chair: Emma Jowett, Facilitator

08.00 - 08.45	*Poster set up*	
08.30 - 09.00	*Registration & Coffee*	
09.00 - 09.10	**Welcome**	Dr Sebastian Spencer, Medical Director, MSF OCB
Session 1: Setting the scene		
09.30 - 10.30	**Setting the MAMI scene.** ***Presentation & plenary discussion***	Marko Kerac & Carlos Grijalva-Eternod, LSHTM & Marie McGrath, ENN
10.30 - 11.00	*Coffee*	
Session 2: MAMI approach - country perspectives		
11.00 -12.00	**India, Ethiopia, & Malawi – opportunities and ambitions for the MAMI approach.** ***Interviews & plenary discussion***	Pre-meeting insights from Dr Khera, MOH India & Abner Daniel, UNICEF India; Interviews with Prof Tsinuel Girma, Department of Pediatrics and Child Health, Jimma University and Dr Emma Cartmell, MOH/Independent, Malawi.
12.00 - 13.15	*Lunch and posters*	
Session 3: MAMI approach - Implementation experiences		
13.15 - 13.30	**MAMI toolkit. A support tool for programming. Overview and update.** ***Presentation***	Elena Rivero, Save the Children.
13.30 - 13.45	**Looking ahead: Maternal interventions research.** ***Presentation***	D. Taylor Hendrixson, Washington University School of Medicine
13.45 - 15.00	**MAMI programme needs and experiences.** ***Panel and plenary discussion***	Panelists from Save the Children, GOAL, MSF, Partners in Health, KEMRI Wellcome Kenya
15.00 - 15.30	*Coffee and posters*	
Session 4: MAMI Global Cafe - MAMI vision, terminology & urgent technical questions		
15.30 - 17.30	**Global Cafe group sessions & plenary feedback**	Through three dynamic, facilitated groups, this session will identify clear direction on 1) Common MAMI vision; 2) Terminology; 3) Urgent technical questions facing programmers on case management
17.30	*Day 1 close*	
19.30	*Group evening meal*	

Day 2

09.00 - 09.15	***Recap of Day 1***	Marie McGrath, ENN
Session 1: Building bridges, clarity and evidence on MAMI *This session will examine cross-sectoral opportunities and clarify why and what immediate actions are needed to improve and harmonise identification of at-risk infants and to build multiple source evidence. All presentation slots include time for clarifications*		
09.15 - 09.30	**Overview of session**	Marie McGrath, ENN
09.30 - 10.15	**Building bridges - Maternal and neonatal health.** ***Presentation***	Louise Day, LSHTM
	Early childhood development. ***Presentation***	Melkamu Berhane, Jimma University
	Maternal mental health. ***Presentation***	Xanthe Hunt, WHO, remote
10.15 - 10.45	**WHO and MAMI: evidence, guidance and policy.** ***Presentation***	Nigel Rollins, WHO
10.45 - 11.15	***Coffee***	
11.15 - 12.00	**Anthropometric indicators to identify At-Risk infants under 6 months: Considerations and Practical implications**	Jay Berkley & Martha Mwangome, KEMRI/Wellcome Trust Research Programme, Kilifi, Kenya
12.00 - 12.15	**Realities of identifying and monitoring at-risk infants in programmes.** ***Interview***	Hatty Barthorp, GOAL
12.15 - 12.30	**Feeding and non-anthropometric indicators to identify at-risk infants.** ***Presentation***	Karine Le Roch, ACF (remote)
12.30 - 13.00	**Plenary discussion**	
13.00 - 14.00	***Lunch & posters***	
Session 6: Global Cafe: Building bridges, clarity & evidence on MAMI: taking action		
14.00 - 15.00	**Global Cafe group sessions**	Through three dynamic, facilitated groups, this session will identify way forward on 1) Anthropometric and feeding/other indicators to help identify at-risk infants; 2) Minimum and additional MAMI programme data to collect and potential to collate; 3) Key initiatives and stakeholders to engage with on MAMI.
15.00 - 15.30	***Coffee***	
15.30 - 16.30	**Group evening meal**	
16.30 - 17.00	**Next steps & Close**	

Annex 2 List of Participants

Name	Affiliation	Country
Alice Burrell	GOAL	UK
Alison Moebus	MSF Iraq/Yemen	Iraq
Arafat Yasir	Save the Children	Bangladesh
Assumpta Ndumi	IRC	US
Gerard (Bryan) Gonzales	University of Ghent	Belgium
Carlos Grijalva Eternod	LSHTM	UK
Chytanya Kompola	ECF	US
Colleen Emary	World Vision	Canada
David Taylor Hendrixson	Project Peanut Butter	Malawi
Elena Rivers	Save the Children	UK
Emma Beaumont	LSHTM	UK
Emma Cartmell	MOH/Independent	Malawi
Engy Ali	MSF	France
Emma Jowett- ENN facilitator	ENN	UK
Fabrizio Loddo	MSF France	France
Hatty Barthorp	GOAL	UK
Indi Trehan	Washington Uni School of Medicine	US (Laos/Malawi/Liberia)
Jay Berkely	Wellcome/KEMRI	Kenya
Katie Beck	Partners In Health	Rwanda
Kirrily de Polnay	MSF	Belgium
Louise Day	LSHTM	UK
Marie McGrath	ENN	UK
Marisa Sanchez Peinado	Accion contra el Hambre	Spain
Marko Kerac	LSHTM	UK
Martha Mwangome	Wellcome/KEMRI	Kenya
Melkamu Berhane Arefayine	Jimma University	Ethiopia
Mija Tesse Ververs	CDC/Hopkins	US
Montse Escruela	MSF Spain	Spain
Natasha Lelijveld	Independent	UK
Navideh Noori	Institute for Disease Modelling (IDM)	Seattle
Nicki Connell	Eleanor Crook Foundation (ECF)	UK
Nigel Rollins	WHO	Switzerland
Rosie Cowper	SDG2AdvocacyHub	UK
Sarah O'Flynn	Save the Children	US
Saskia van der Kam	MSF Holland	Holland
Saul Guerrero	UNICEF	United States
Smita Kumar	USAID	US
Sylvie Fagard	MSF Belgium	Belgium
Tabitha Kieviet - van Immerzeel	CAMA zending (local NGO)	Senegal
Tamsin Walters - ENN rapporteur	ENN	UK
Tsinuel Girma	Jimma University	Ethiopia
William Moore	ECF	US
Remote listen in/presenter (P)		
Andre Briend	University of Tampere	France
Erin Boyd	OFDA	US
Karine Le Roch (P)	ACF	France
Kerstin Hanson	Independent	France
Xanthe Hunt	WHO	Switzerland

Annex 3 Global Café 2 groupwork discussions

Group 1: Anthropometric and feeding/other indicators to help identify at-risk infants

Questions debated by the group included the following:

What are our goals? Which indicators are currently recommended for high-risk infants?

a. Combination of anthropometry (WLZ/WAZ/oedema), failure to gain weight, medical complications

2. Which indicators are associated with mortality/ morbidity (clinically significant risk)?
   a. IMCI danger signs
   b. Low WAZ, WLZ, MUAC
   c. Potentially gestational age, birth weight, weight trajectory since birth. These are not always the easiest to measure, especially in busy, high-burden settings – anthropometry may indeed be easier to do compared to clinical and historical assessments
   d. Sensitivity and specificity seem to be highest for WAZ, MUAC, clinical danger signs in terms of predicting mortality
   e. TASK: compile a list of indicators and those with specific interventions that might be addressed based on the tasks. Other ideas include presence of father, mother alive/dead, adolescent mother, delivery in hospital vs. home, complicated delivery or not, maternal height/BMI/MUAC/education, rural vs urban, birth weight known or not, supporting family present or not, maternal mental health. Is there evidence for these? Need to rank these (on good evidence base, on ease of implementation, etc.), be sure they are not colinear.
3. What existing opportunities should be built on?
   a. WAZ at the time of immunisation clinics (facility level) – or even simple minimum weight cut-offs at key time points
   b. Expand MUAC down to younger age groups. Some data exists but not across continents; evidence would be needed across multiple regions before MUAC is likely to be accepted by WHO
      i. Family MUAC for U6M – could give mother a "present" of MUAC tape at 6-week immunization visit
   c. Whether to start implementing WAZ vs. MUAC in U6M remains controversial. The advantage of MUAC is ease but there may be less data to justify this at this time
   d. Try to get sites (esp. India/Bangladesh) to collect MUAC data during routine immunisation clinics, etc., programme evaluation with minimum 1-yr follow-up
4. 4-component screening: FAST: Feeding, Anthropometry, Sickness, Talk about mental health

Prioritized Sectors	What / Who	How

1. Quality of Care
a. MNH
b. Pediatrics
c. Small and sick newborn (SSNP)
	• WHO/UNICEF lead
	• Quality of Care Network
	• Child Health Taskforce;
	  • Quality of Care Working Group - Paeds –
	LSHTM
		• IWAG meeting – Bangkok, February 2020
		• Newborn Health in Humanitarian Settings
		  • Chaired by SCUS and UNICEF
		• ENAP SIG – key to ask for a seat for the MAMI SIG
		• SSNP – meeting: June, Bangladesh

2. Integrated Approach to Wasting (or broader nutrition community)	• UNICEF, WFP, UNHCR, WHO, FAO led • Involvement of "wasting donors" • Implementing partners • NWL, GNC, IFE Core Group, GTAM	• GAP meetings organized by UNICEF, WFP and/or WHO • 8 focus countries • Nutrition for Growth • WHO Guideline review • GTAM working groups: acute malnutrition, IYCF

3. Child Health
a. IMNCI
b. iCCM
	• PSBI
	  • Led by WHO
	• Childhood Pneumonia
	• IMCI
	  • OFDA
	  • Advancing Nutrition
	• Child Health in Emergencies Working Group
		• Childhood Pneumonia – Barcelona – end Jan 2020, high level meeting or MoH / MoF
		• Institutionalizing Community Health Conference 2020
		• IMCI Guideline Review (18 mos process)
		• Follow up on Ghana Mtg Action Plans

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