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Nutrition and Health Integration: A Rapid Review of Published and Grey Literature





Introduction

In 2012 the United Nations passed a landmark resolution endorsing and prioritising universal health coverage (UHC) as a mechanism for achieving sustainable development (1). UHC aims to ensure that all people are able to access good-quality promotive, preventative and curative health services (1). Strong health systems are fundamental to achieving UHC and thus a focus on health systems strengthening (HSS), where needed, has been a focus of governments and their development partners (2). This is particularly true in fragile states and countries that have faced extended periods of conflict; health systems can be seriously damaged and infrastructure poorly functioning or entirely non-functional (3). Thus, achieving UHC is a significant challenge in these contexts. HSS interventions as classified by the World Health Organization (WHO) Health System Building Blocks of service delivery include the following: the health workforce; information; medical products; vaccines and technologies; financing; and leadership/governance (4). As a key component of HSS, there is a growing body of evidence linking integrated delivery systems with better quality and efficiency (5).

Nutrition and health are highly interrelated, with approximately 45% of infant and child deaths associated with undernutrition, and maternal undernutrition contributing to 800,000 neonatal deaths annually (6). Thus, integrating nutrition interventions into health systems is critically important; and, in many ways, nutrition integration can serve to invigorate and prioritise

HSS interventions. There is a wealth of evidence on positive health and nutrition outcomes as a result of integrating nutrition interventions into health systems, but knowledge of how to set up and sustain effective integration is limited (7). There are many preventive and treatment-focused entry points for nutrition integration. As outlined in the Lancet 2013 report (8), these include the following evidenced and priority areas:

- Micronutrient supplementation for pregnant women;
- Nutrition education during pregnancy;
- Promotion of breastfeeding and appropriate complementary feeding;
- Child growth monitoring and promotion (GMP);
- Management of severe acute malnutrition (SAM);
- Nutrition education within integrated management of childhood illnesses (IMCI) packages;
- Vitamin A supplementation for children; and
- Treatment of diarrhoea with zinc (8).

However, there is currently no one successful model of how to integrate nutrition into health systems; this varies according to the context and type of intervention (7). Some nutrition-specific interventions have, for decades, been part of standard health services. For example, GMP programmes have been part of routine medical care for children since the 1970s (9) and a recent survey of Ministries of Health (MoH) reports that GMP is high in 88% of MoH reporting countries (10). Since the 1990s, vitamin A supplementation has almost always been delivered in combination

with other health services, including vaccines, antihelminthics and insecticide-treated mosquito nets (11).

However, for other interventions (notably the treatment of acute malnutrition in children (wasting and kwashiorkor)), there is a long-standing history of implementation through parallel structures and systems (12). Treatment programmes emerged out of humanitarian response in many countries and saw international agencies implementing directly rather than through government systems (13). Still today, the treatment of acute malnutrition is often managed by UN agencies directly or via non-governmental organisations (NGOs), and may or may not be implemented through the health system (12). Similarly, in crisis responses, infant and young child feeding concerns have, in many situations, been conducted as separate nutrition interventions rather than being integrated within antenatal and postnatal healthcare provided by government health staff (14). This impacts on the sustainability of interventions and creates a false divide between the health and nutrition of individuals (15).

Recent years have seen a push in many countries to integrate nutrition and health interventions, particularly in middle-to-low-income countries. This paper presents a broad overview of the available literature on integrating nutrition into health systems through an examination of alignment at a governance and leadership level, financing, supply chain management, health workforce, service delivery and monitoring and evaluation standpoint. Nutrition integration was defined as “the extent of adoption of nutrition interventions into critical health system functions” and from October 2018 to February 2019 key word searches were conducted through Google Scholar, PubMed, ENN’s website and other nutrition information repositories (e.g. websites of large organisations such as Action Against Hunger, International Rescue Committee, Concern Worldwide, UNICEF, WHO.) Both grey and published literature were included in relation to nutrition-specific interventions. Key search terms included: “integrated healthcare delivery”, “comprehensive healthcare”, “integrated programmes”, “primary healthcare”, “nutrition programmes”, “community management of acute malnutrition”, “micronutrient supplementation”, “vitamin A”, “breastfeeding”, “complementary feeding”, “growth monitoring and promotion

programmes”, “management of severe acute malnutrition programmes”, “nutrition education”, “child health days”, “maternal nutrition”, “child nutrition”, “antenatal nutrition”, and “zinc treatment”. In total, 178 relevant articles were identified and read for the purpose of this rapid literature review.

Efforts were made to examine nutrition interventions in the broadest sense, taking into consideration opportunities to harmonise infant and young child nutrition, adolescent nutrition, pregnancy-related nutrition concerns and adult nutrition with health systems. However, much of the available literature is focused on the treatment of acute malnutrition and how community management of acute malnutrition (CMAM) has been aligned and integrated within health structures and systems. It must be noted that, while every effort was made to review all literature on the topic and an extensive selection of articles was read, the search was not exhaustive and additional resources on the topic of nutrition and health integration may be available.

Governance and Leadership

One of the most critical considerations for nutrition and health integration is governance and leadership. First and foremost, governments need to understand the benefits of bringing nutrition and health interventions closer together and the importance of enhancing nutrition interventions in the health sector (16). High-level government buy-in is essential for nutrition and health integration; particularly in relation to addressing barriers to harmonisation, influencing the wider enabling environment, and identifying what is feasible within the broader health system (17). Furthermore, political leaders need to ensure that services are contextually relevant and targeted at the most vulnerable populations (17).

As an initial first step to harmonising nutrition and health agendas, many countries have benefited from high-level political commitment. In Kenya, for example, leadership by the First Lady's office has kept malnutrition high on the political agenda, which has supported work in the country to integrate nutrition in routine health services (18). In the majority of low- and middle-income countries, the nutrition department and mandate fall within the Ministry of Health; however it is only with this high level of political support that true integration occurs (18).

Secondly, nutrition needs to be included in national health policies and plans, and agreed guidelines are an important prerequisite for integration (6). Positioning nutrition within health policies can help to enhance the sustainability of nutrition interventions and enables nutrition to be prioritised within the health system (6). Many countries have included nutrition in their national health policies and plans to varying degrees (18). Generally speaking, most health guidelines include elements of nutrition interventions, and a recent systematic review of the topic concluded that nutrition governance was well integrated as the majority of interventions examined incorporated

nutrition-specific interventions into existing health strategies and guidelines (7).

However, policies and guidelines often lack the integration of the full eight nutrition interventions listed above; or, at times, nutrition features only as one of the last chapters in guidelines. For example, in Nepal the 2014 National Health Policy positions nutrition as one of the main health challenges in the country, but then focuses more on health treatment interventions and largely neglects the importance of nutrition-related interventions (26). The 2016 Ugandan Clinical Guidelines document has a separate chapter for nutrition interventions which includes infant and young child feeding (IYCF), management of severe acute malnutrition (SAM), nutrition interventions for HIV-positive patients, and nutrition interventions for those diagnosed with diabetes, but this is one of the last chapters in the guidelines. While other nutritional elements are contained in different chapters, such as on antenatal care, the importance, for example, of nutritional education and GMP do not feature as strongly as they could (27).

One of the more controversial interventions to be included in health policies and guidelines is CMAM, although recent years have seen a shift, with more countries including CMAM in their national plans and strategies (3). For example, in Malawi CMAM was incorporated into national strategies for Integrated Management of Childhood Illnesses (IMCI), Accelerated Child Survival and Development and IYCF (28). This facilitated integration between SAM treatment and other health interventions and has been noted as a key factor leading to the successful scale-up of SAM treatment in health facilities in the country. In Mali, Community Health Worker National Guidelines were aligned to the CMAM guidelines, which enabled the expansion of SAM treatment from health facilities to community level, under a coherent framework (29). While there are many examples of such policy alignment, most countries

continue to have separate nutrition and health policies, and nutrition remains at the periphery of health policies when it has been included. For example, in Kenya, where nutrition is relatively well integrated into health systems, nutrition appears only 16 times in the 87-page outline of the health policy in the country (13). In order to advance the harmonisation of sectors, countries should be encouraged to integrate nutrition interventions further into health policies and plans and place priority on such interventions so that they are not neglected in favour of more clinical-related health interventions.

While policies are the articulation of the commitment to act, they do not in themselves provide the capability to ensure integration. In order to further ensure alignment, many governments have set up technical working groups. For example, in Malawi, the government has established a National Nutrition Committee for coordinating efforts to reduce malnutrition within a health framework (19). In Chad, a permanent technical food and nutrition committee was established to support coordination and carry out a nutrition capacity assessment within the health system, examining technical and functional capacities at a health facility level (20), and in Pakistan, in order to support integration at a sub-national level, a provincial nutrition focal person was appointed to ensure that Ministry of Health staff understood the need to prioritise nutrition activities, highlighting the evidence for effective strategies and the support they could expect from the national level (21).

Many governments have come a fair way in establishing an enabling environment for nutrition and health integration, particularly in relation to evidence-based policymaking. However, fragile and conflict affected states (FCAS) generally lag behind as health governance is often weak, making integration challenging (22). In FCAS, particularly those that have experienced prolonged periods of conflict, health policy, planning and management capacities are weak and health systems generally have little authority or legitimacy. For example, the conflict in Uganda left an institutional void in the health system that took many years to fill until the government was able to develop a health policy (3). NGOs typically respond to crisis contexts by bypassing government systems and structures, particularly in relation to life-saving nutrition interventions (23). This can erode the potential of

the health system to be strengthened and for nutrition to be integrated within health structures. In these circumstances, functioning governments need to be supported to take ownership of previously NGO-led nutrition interventions through a process of capacity-building and gradual handover (22). One example of such an approach was seen in Somalia's South West State, where World Vision (WVI) used a partnership model to support the government (24) by strengthening the pillars of governance and leadership; health financing and resource mobilisation; human resources for health; supplies of medical products; and quality service delivery (24). As one of the key tasks within this package of support, WVI worked with the MoH to align the health and nutrition management structure, encouraging the use of WHO recommendations, UNICEF practices and the WHO Essential Package of Health Services guideline (24). As a result, the MoH gained practical experience of how to manage health facilities, was exposed to international best practices, and was able to develop quality control mechanisms (24). Furthermore, this approach helped to change communities' perspective of the MoH and fostered greater trust between communities and the state (24). A further example of this is the Health Pooled Fund (HPF) in South Sudan, which aims to "lay the foundations for the MoH to provide quality healthcare for its own people" (25). The HPF works to support the MoH in its stewardship functions, such as planning, management and coordination in accordance with MoH guidelines and tools (25).

Financing

At times, nutrition and health integration is hindered by a lack of government funds to facilitate and drive such harmonisation. Even for broader health interventions, government funding is often limited (30). For example, in 2001, heads of African Union countries pledged to allocate 15% of their annual budgets to health in the ‘Abuja Declaration’; 10 years later, only one country, Tanzania, had achieved this target (30). In 11 countries, health budgets had reduced and in a further nine countries, there was no obvious upward or downward trend (30). Thus, in most middle- and low-income countries, adding nutrition to an already poorly funded health system is a major challenge and insufficient financial resources to carry out nutrition activities remains the major problem (31). It is even more difficult, if not impossible, in FCAS (32). Governments also need to assume responsibility and ownership of programming, as indicated by dedicated budgets for operational expenses and supplies (33). This is currently not the case, even for well accepted and integrated nutrition interventions (33). For example, only one third of priority countries currently contribute to Vitamin A supplementation through national budgets – primarily for operational expenses (11). One aspect making this difficult to achieve are the challenges around accurately costing nutrition interventions. Even for low-cost interventions, costs can vary considerably; for example, GMP programmes range in cost from US\$1.60 in Kenya to US\$6.2 in Jamaica (42) and the cost per child cured within a CMAM programme has been estimated to cost between US\$315 and US\$332 (43). The expense of CMAM programmes further makes many governments very reluctant to include nutrition interventions in health budgets (43).

Thus, even in countries which have a national budget line for nutrition, the bulk of funding is provided through development and humanitarian partners (31). Work has been done on nutrition financial tracking in a few countries which revealed the following:

- Nepal spent only 1.1% of its total budget on

nutrition in 2015–2016 and Kenya spent 1.3% of its total healthcare budget on nutrition-specific interventions in 2014 (18).

- In Uganda, an analysis of nutrition financing between 2013 and 2015 found that nutrition funding was only 1% of the national-level government budget and a further 5% of the total development assistance to Uganda from external development partners (32). Between 2014 and 2016, 63% of nutrition funding was provided by NGOs and not included in government budgets or managed through the Treasury (32). Despite this limited amount of funding, only between 50–60% of allocated government funds for nutrition was spent each year due to delays in funds being released or procurement delays (32).
- In Ethiopia in 2015/2016 development partners budgeted USD\$405 million for nutrition programming out of USD\$455 million of all financing sources and 40% of the annual health sector budget was under-disbursed (33).

One strategy to ensure that governance is not eroded through humanitarian and donor funding is to allow governments to manage funds themselves. This was done in Ethiopia, where approximately 45% of funding was government-managed, along with 30% of emergency-response funding, which enabled the government to take control of nutrition programming and integrate funds within the health sector (33). Such an approach has been encouraged in other countries; however, it is not without its challenges, including weak coordination and monitoring by Ministry of Finance, a lack of transparency of national budgets with partners, and unpredictability of exact funding baskets available (33). Furthermore, it has been found that, when development assistance for health is channeled through government budgets, it can have a negative and significant effect on domestic government health spending (34). A study on sub-Saharan African countries found that, for every US dollar provided through development assistance to governments, government health expenditure from domestic resources was reduced by US\$0.43 to US\$1.4 (34). Thus, it is clear that new and innovative mechanisms for financing need to be

explored so that governments are not only in charge of funds but are also committed to financing interventions through national budgets. Such strategies could include enhancing pooled-funding mechanisms, exploring matched-funding initiatives, and front-loading donor financing to help catalyse greater domestic investment (35).

One such innovative funding mechanism has been seen in Nigeria, where a Basic Health Care Provision Fund (BHCPF) was set up by the government to serve as the principal funding vehicle for the Basic Minimum Package of Health Services, which includes nutrition (36). The fund is derived from a yearly grant from the Government of Nigeria of no less than 1% of its revenue and grants by international donor partners and funds from other sources (36). As the country starts to implement the BHCPF, it is expected to mobilise almost US\$150 million in new money annually for primary healthcare strengthening and service delivery (36). In the Democratic Republic of Congo, a ‘single contract’ approach has been used to align domestic and external resources and improve coverage of interventions (37). The single contract (known as ‘contract unique’) is signed between the Ministry of Health and development partners at the provincial level with the aim of pooling financial resources to support a single, integrated provincial health and nutrition action plan, thereby reducing fragmentation of financing and service delivery. The contract further serves to strengthen the fiduciary capacity of the provincial health administration by using a single accounting system and to enable tracking of government and development partners’ commitment and expenditure (37).

While obtaining the necessary funds is critical, appropriate financial tracking needs to be developed, and it has been widely noted that there is an acute shortage of nutrition financing data (38). Tracking and monitoring nutrition financing is critical to ensuring that policy-makers have relevant necessary data and that nutrition and health integration is prioritised (39). This is particularly the case when nutrition funds are channeled through the MoH, where the risk of available nutrition budgets being ‘lost’ and not allocated to nutrition interventions is high (35). For example, in Nigeria it was noted that there was limited information available on public expenditure on nutrition (40). At federal level, any budget for nutrition was subsumed within the Ministry of Health’s (FMoH) Department of Family Health

(DFH) budget, making it hard to identify and utilise (40). Furthermore, each state determined where to allocate funds; hence different states had different budgets available for nutrition. For example, in Kebbi an NGN185 million budget line was approved for nutrition in 2013, with funds largely earmarked for CMAM. In contrast, in Zamfara NGN20 million was allocated for nutrition as a whole, within the same year (33).

While many countries have in recent years developed costed nutrition plans (for example, Tanzania and Nigeria have been praised for their work on costing national health and nutrition plans (36, 41)), there is very little in the available literature that illustrates how countries can ensure accountability of funding for nutrition-costed plans; how health budgets earmark sufficient funds for nutrition interventions; and how budgets respond to initial plans (39). Often the level of detail provided in national budgets is not broken down to the same degree that it is in costed plans, which makes comparison challenging (39). Items such as salaries and overhead costs, which represent a significant proportion of expenditure on nutrition, are reported in the government’s overall payroll and administrative costs, making it almost impossible to compare it to nutrition-related inputs (3). Thus, sadly, there appear to be more challenges to financial integration than there are success stories in the available literature, and more work is needed on supporting costing, resource mobilisation and financial tracking for nutrition and health integration. This was emphasised in a recent systematic review on nutrition and health integration which found that “most integrated nutrition-specific interventions had external funding which did not come through existing health system financing” (7, p8). The review further noted that funding was largely driven by development partners, with a lack of coordination between nutrition and health funding (7).

Health Workforce

In order to integrate more nutrition activities into health systems, consideration needs to be given to the available workforce as, in many countries, the health workforce is stretched, even before integration occurs and there are a limited number of available health workers, particularly in rural or hard-to-reach areas. For example, in Mali in 2016, it was noted that the ratio of health professionals (doctors, midwives and nurses) was 5.2 per 10,000 inhabitants. When excluding those working in the capital, Bamako District, the figure fell to 3.9 health professionals (44). Similarly, in Bangladesh, 3.92 community health workers per 10,000 inhabitants were reported, with five physicians and two nurses for every 10,000 persons (45). These were also reflective of the situation in Sierra Leone, with only 56 medical officers in the country in 2009 (50). Such ratios are well below the WHO recommendations of 23 health professionals for every 10,000 persons (44). Thus, there is a critical shortage of skilled professionals and adding nutrition interventions to the job descriptions of an already stretched workforce is challenging.

In order to mitigate this, many countries have taken the approach of upskilling their community health workers (CHWs). For example, Ethiopia has hailed its success in improving health outcomes as a result of its Health Expansion Workers programme (46) and in Pakistan, the Lady Health Worker programme is held up as an example to replicate (47). However, nutrition interventions are often not included in the CHW package of care, aside from screening for malnutrition and, to a limited degree, nutrition education, breastfeeding counselling and support during campaigns such as vitamin A (48). A recent study from Mali, however, found that CHWs, with minimal training, were able to treat SAM in the community effectively, with similar treatment outcomes and improved defaulter rates compared to children treated at a facility level (49). Further additions to CHWs' scope of work could serve as one mechanism to integrate nutrition into health services. However, scaling up the CHW workforce needs to be prioritised in order to create a dedicated workforce

to provide outreach for community-based nutrition services (51).

Another way to ensure an adequate workforce could be to take a partnership approach with NGOs. An example of this was seen in Sierra Leone, where the MoH requested NGOs to hire 12 nutritionists to assist with effective CMAM implementation (50). Furthermore, UNICEF supported two positions in the National Nutrition Programme to coordinate, monitor and evaluate activities at a national level (50). A similar approach was taken in Afghanistan, where UNICEF supported the hiring of nutrition counsellors for every health centre in 18 provinces in the country (52). These nutrition counsellors were primarily responsible for maternal nutrition and IYCF counselling, GMP, anthropometric assessments, nutrition education and monthly reporting (52). Other countries have also taken a similar approach, with NGO or UN staff being seconded to government positions to support the implementation and integration of nutrition interventions, particularly in FCAS where it is seen as an essential part of health-system strengthening (22). However, questions have been raised in relation to the sustainability of such an approach, given that long-term financial support cannot be assured (22).

Attention is often given to increasing available health staff to support nutrition interventions. However, the knowledge and skills of health staff to carry out nutrition interventions is often also quite limited and requires consideration. The training of doctors, nurses and midwives in relation to nutrition is poor, with a recent study concluding "in most countries the nutritional knowledge of health workers was outdated and their nutrition competencies severely limited" (53, p684). Thus, capacity-building, an essential prerequisite for achieving nutrition and health objectives, is challenging; this is also due in part to a lack of donor enthusiasm for longer-term capacity-building (50).

Several countries have taken different approaches to capacity-building. At a structural level, Kenya

developed a Nutrition Capacity Development Framework, jointly created by the government, in partnership with international and local NGOs (54). The framework outlined mechanisms to identify capacity gaps in the health workforce and approaches to implement and monitor capacity initiatives (54). It is recommended within the framework that a capacity-gap analysis be carried out every two and a half years to guide follow-up actions in each county (54).

In Mali, in order to address capacity gaps, the 'URENI' (Units of Recovery and Intensive Nutrition Education) School model was developed in response to capacity-gap needs (55). ALIMA, in partnership with UNICEF and the Nutrition Division of the MoH, established a three-week training programme in which trainee doctors worked with URENI doctors and nurses to gain hands-on training in malnutrition treatment (56). Daily medical meetings were held to discuss complicated SAM cases and a written test with a practical examination was used at the end of the three weeks to evaluate learning (55). Between August 2015 and April 2017, the initiative trained 262 Malian health workers, including 67 doctors from 41 health facilities (55). The success of this model has gained the interest of other countries, with Chad and Nigeria considering similar interventions (56).

In Lebanon, the Ministry of Public Health requested two healthcare staff from each primary healthcare unit (PHC) and selected social development centres in areas seeing an increased number of malnutrition cases to attend a two-day training on screening and referral of acute malnutrition (57). Selected PHCs who were targeted to become treatment centres received an additional one-day training (57). Follow-up mentorship was conducted in the health facilities (57). In total, 427 healthcare providers (nurses, physicians and midwives) attended the training in 2015 and 269 in 2016 (57).

In Yemen, a six-day training course was carried out for doctors, nurses, medical students and health workers on the management of SAM (58). The course was supported by UNICEF and WHO. By targeting medical students it allowed for SAM treatment to be integrated into the medical curriculum to ensure sustainability (58). The training was conducted over two years from 2011 and has been reported as having helped to build capacity to prepare for the current crises (58).

In Rwanda, the government has adopted the 'Mentoring and Enhanced Supervision for Healthcare (MESH)' model, in which one-on-one provider mentorship is used to ensure continuous quality improvement (59). Hospital-based nurses who have demonstrated "exceptional provision of quality care" are selected to become mentors and trained in mentorship methods and facilitation skills. They provide mentoring to local clinics using a quality-of-care checklist (59).

As is clear from these examples, there is a wide range of approaches to developing a health workforce that is able to carry out nutrition interventions. While a plethora of training guides is available at a global level to support integration, standards in relation to the length and type of training needed do not yet exist and may be helpful for countries when examining how best to align their health human resources to support nutrition interventions. Developing the workforce to act at the scale of nutrition needs required in many countries, particularly in FCAS, requires more new and innovative methods (53). The workforce further requires dedicated funding to support such initiatives, given that current models of humanitarian funding are often inflexible and do not tend to allow for the payment of salaries in FCAS (53).

Supply Chain Management

In order to integrate nutrition into the health system, nutrition supplies need to be considered as part of the broader health supply chain. Some nutrition products, such as iron and zinc supplements, are relatively easy to include in broader health supply chain mechanisms, although even these products can be subject to shortages and supply chain breakages (60). However, even for items that are relatively cheap and easy to include in supply chain mechanisms, they have often been supplied outside of health systems (11). For example, since 1997 the Canadian International Development Agency (CIDA) has donated four billion vitamin A capsules through the Micronutrient Initiative (now known as Nutrition International); thus, vitamin A was supplied through NGO and partner supply chains in many high-burden countries (11). However, this is changing and, increasingly, improvements in capsule supply chain management systems are being seen (11).

As previously noted, nutrition supplies for CMAM programmes (such as ready-to-use therapeutic food (RUTF), F100 and F75) have historically run in parallel to the broader health supply chain and relied on humanitarian financing (61). While many countries have begun considering integration of supply chains, a lack of available funds has eroded the potential to harmonise systems (62). Furthermore, there are significant barriers because of the need to import RUTF (few countries are able to produce it locally); the confusion over whether such nutrition products should be classified as food or medicine; the size of RUTF (which makes transportation and storage challenging); and the risk of misuse of RUTF supplies, particularly in relation to the commercialisation of nutrition products (62).

One suggestion to limit these challenges is to put nutrition supplies (particularly RUTF) on countries' lists of essential medicines (EML) (63). Some nutrition products have been easily integrated into country's EMLs, such as vitamins and minerals, particularly Vitamin A and zinc (71). For example,

Uganda's EML includes a chapter on nutrition-related medicines, as well as anthropometric tools (71). However, some nutrition commodities have proved far more controversial to integrate, including RUTF, F75 and F100. At a global level, an application was made in 2017 to place RUTF on the List of Essential Medicines and the WHO is currently considering the merits of this application through a comprehensive evaluation of the benefits and potential trade-offs (64). Various countries have already placed RUTF on their country-level EMLs, including Zimbabwe, Burundi, Burkino Faso, Uganda, Ivory Coast and Malawi, with applications in progress in Nigeria, Ghana and Liberia (65). In Zimbabwe, adding RUTF to the EML has led to it being seen as a therapeutic product with health workers noting that it had changed their perception and encouraged them to handle the product as a treatment rather than merely food. It was also linked to improved quality assurance and storage (65). Furthermore, it allowed for better integration of nutrition products into the distribution system and improved data availability of stocks (65). As a result, between September 2013 and September 2015, between 94% and 100% of health facilities had received the RUTF products that were required (65). Similarly, in Ethiopia, it was noted that integrating nutrition commodities into the government pharmaceutical supplies management system enabled a more sustainable and coordinated delivery of supplies (66).

However, not all countries have experienced successes since placing nutrition products on the EML (67). In Burundi, for example, inclusion on the EML has not led to the management of these products being normalised (67).

While other countries have not gone as far as to list nutrition commodities on their EMLs, they have listed them as either a food or a medicine item (68). For example, in the Democratic Republic of Congo, Vietnam and Tanzania, RUTF is listed as a drug, and in Kenya and South Africa it is listed as a food (68). In South Sudan, nutrition commodities are registered with the health authorities, and in

Guinea RUTF is on the 'Guide Therapeutique National' (68). Such classifications have been found to increase alignment of nutrition and health integration and aided in reducing supply chain problems (68). Classifications could offer an important initial step for FCAS to begin to take ownership of supply chains (69).

It is clear that not all countries have included RUTF on their EMLs and there is still a reluctance at a global level to do so. However, many countries have taken other steps to integrate nutrition and health within their broader supply chains, particularly in relation to transportation and storage (68). For example, in Sierra Leone supply chain systems were simplified to allow for nutrition commodities to be sent directly to districts (50). District nutritionists and members of the district health management team were trained on storekeeping and supply chain monitoring which helped ease stock-outs and loss of supplies (50). A UNICEF report on integration found that aligning health and nutrition supply chains often begins with harmonising transportation of medicines and nutrition products, often as a result of pragmatic problem-solving (70).

As noted previously, storage is often a challenge, given the size of nutrition products (70). In some countries, this has been overcome through securing storage from food wholesalers, although this further serves to increase the divide between nutrition and health supply systems (70). In Ethiopia Concern Worldwide supported the MoH through the provision of large, lockable, metal cabinets in each of the health facilities in Tigray (66). Follow-up visits found that all the health facilities were using the cabinets for the storage of nutrition and health products, and health workers reported that there were no losses of RUTF as a result of rodents, insects or theft (66).

Forecasting treatment needs presents a further difficulty (68). Mechanisms to improve this largely centre around data-quality mechanisms (68). In Mozambique a technical working group for medicines has a subgroup that deals with nutrition products whose main task is to estimate needs and develop procurement plans (68). A similar approach is used in Malawi (68). In Zimbabwe, an electronic data processing system has been set up in a few clinics to support the distribution of products (68). However, further mechanisms are needed to improve the ability of countries to estimate supply chain needs accurately (68). This

is critical in order to avoid stock-outs, which remains a critical challenge in treating SAM in health facilities (68).

Service Delivery

The degree to which health facilities are providing quality nutrition-specific services has increased in recent years, although the coverage of such interventions has remained low (7). Such mechanisms include nutrition integration into IMCI/integrated Community Case Management (iCCM), antenatal and postnatal care, immunisation, and child health days (7).

The iCCM/IMCI platform aims to strengthen coverage for prevention and treatment of child morbidity, and iCCM guidelines have tended to focus on curative care, particularly the identification, treatment and referral of children who are ill with diarrhoea, pneumonia and malaria (72). Although iCCM guidelines incorporate nutrition components, such as the identification of acute malnutrition, immediate referral of SAM cases and guidance on feeding a sick child, these interventions have not been delivered with the same intensity, quality and coverage needed to impact on child nutritional status (73). Often nutrition components of care are forgotten or are an 'afterthought' to curative interventions (72). However, strengthening nutrition services within iCCM can improve IYCF and care practices, improve child nutritional status and lower child mortality and morbidity (48, 74). There are some positive examples of focused integration; for example, in Rwanda an iCCM programme with strengthened nutrition education resulted in a 55% improvement in dietary diversity and meal frequency in children whose mothers took part in the intervention compared to those whose mothers were not part of the programme (75). In Bangladesh, an IMCI intervention focusing on improving exclusive breastfeeding for the first six months was associated with a 7.3% reduction in childhood stunting (76). Furthermore, recent research by Action Against Hunger in Mali and Pakistan found that CHWs were able to successfully treat uncomplicated cases of SAM at a community level (49). In line with this approach, International Relief Committee has developed a series of simplified tools to enable low-literacy health workers to treat SAM in South Sudan (77).

Integration of nutrition services into antenatal and

postnatal care remains limited. In a study conducted in Ethiopia, Kenya, Niger and Senegal, it was found that coverage of nutrition interventions for pregnant women is very limited, and health services are generally kept separate to nutrition services for PLW, with little breastfeeding support and infant feeding counselling being offered at antenatal and postnatal visits (78, 79). Even providing iron and folic acid supplements to pregnant women during antenatal visits was found to be a neglected nutrition activity in the countries studied (78), although it must be noted that this varies from country to country; with, for example, Kenya and Bangladesh reporting that almost 60% of health facilities were providing iron and folic acid for pregnant women (80). Interestingly, in antenatal visits, around 80% of health facilities in Bangladesh, Haiti, Kenya, Malawi, Namibia, Nepal, Rwanda and Senegal had weighing scales for pregnant women, but the percentage of women being offered counselling on nutrition during pregnancy was around 40% of health facilities in these countries (80). While growth monitoring takes place in these visits, much more can and should be done to link IYCF and nutrition interventions to antenatal and postnatal visits (81). An example of integration could be through care groups being run at health facilities in Malawi in which 'lead mothers' provide support and education to other mothers on topics such as family planning, safe motherhood, proper breastfeeding, complementary feeding practices, growth monitoring and immunisation (82).

Growth monitoring of infants and children is somewhat more integrated, with examples of child health services having a GMP component within them in many countries such as Haiti, Namibia, Rwanda and Senegal (83). However, GMP has been widely criticised for failing to ensure growth-faltering children are identified, acted on and referred where needed. For example, links between GMP and CMAM programmes are often poor, even though very low-weight-for-age children may well need urgent attention, given the mortality risks (24).

Child health days (CHD) developed from linkages of vitamin A supplementation with the Expanded

Programme on Immunisation Days for polio eradication, and therefore offer important learnings on integration of nutrition interventions into broader healthcare systems (85). They are intended to be biannual, campaign-style events to deliver child survival interventions, including vitamin A supplementation, childhood immunisation, deworming and the distribution of insecticide-treated nets to children under five years old (84). The coverage of vitamin A supplementation has increased drastically since being part of the CHD mechanism. For example, in Madagascar coverage of vitamin A supplementation increased from 4% in 1997 to 76% in 2004 as a result of the introduction of CHD initiatives (84). In recent years the CHD package has evolved to include screening for severe malnutrition and nutrition education but these components, and their impact on coverage, has yet to be fully evaluated (85).

One area where there has been far more documentation on service delivery integration is that of SAM treatment, particularly in terms of how it moved from being an intervention conducted by NGOs to being part of the health system package of care. In Malawi, for example, initial pilots were conducted by Concern Worldwide and Valid International in 2002, but were quickly taken up by the government and integrated with other health interventions, including HIV treatment and prevention of mother-to-child transmission (PMTCT) programmes, Expanded Programme for Immunisation, and insecticide-treated net schemes (86). A CMAM Advisory Service (CAS), made up of staff from the MoH Nutrition Unit and Concern Worldwide, was set up to coordinate CMAM activities, provide technical support and integration within health systems (87). The overall aim was to enable national and district health officers to manage CMAM as part of the essential health package (87). Through the CAS, the percentage of health facilities conducting CMAM activities increased rapidly over time; from 32 government-run CMAM facilities in 2005 to 258 in 2008 (88). A similar process occurred in Ethiopia, where, since 2004, UNICEF has advocated for the integration of SAM treatment within the health system. As a result of government support, this was achieved in 455 hospitals and health centres by November 2008 (89).

Similar examples of integration of CMAM services have been documented in Nigeria, Niger, Kenya, Sierra Leone, Ghana, Pakistan and Nepal (90, 91,

92, 93, 94, 95, 96). However, it must be noted that no two health systems are the same and thus, while the community-based approach to SAM treatment has been shown to be universally effective, the manner in which this is delivered needs to be contextualised and adjusted to fit each country's own unique needs and requirements (97). One example of innovation is the 'surge model' which prepares the health system to plan for, detect and respond effectively to increases in MAM and SAM caseloads. In the model, health facilities conduct a thorough analysis of their capacity, set thresholds for when an increasing caseload would overburden the health facility and determine a set of activities to action when an increasing caseload is seen (98). The model has been developed by Concern Worldwide and has been successfully implemented in Uganda, Kenya, Chad, Ethiopia, Pakistan and is due to be implemented in Burundi and Sudan shortly (98). Another example of innovation is seen in countries that have included a community-based management of at-risk mothers and infants under six months (C-MAMI) component (99). While research on this topic is still ongoing, the approach is currently being piloted in Bangladesh, Ethiopia and Rwanda (99).

Monitoring and Evaluation (M&E)

M&E integration of nutrition and health programmes have largely centred around including nutrition indicators in national health management systems (100). Having nutrition indicators aligned to the health system structure is critical as it allows for understanding the extent, location and determinants of malnutrition, as well as offering preliminary insight into nutrition and health linkages (for example, linkages between diarrhoea prevalence and malnutrition cases) (101). Thus, at a global level, many actors, such as UNICEF and those involved in the SUN Movement, have pushed for nutrition indicators to become part of countries' health information management systems (100). In 57 low- and middle-income countries, health monitoring is conducted through the DHIS2, which is an open-source platform that can be customised to suit many purposes, both for the health and non-health sectors (102). Many of these countries have started including nutrition indicators in the DHIS2 platforms and have also looked beyond the DHIS2 to conduct nutrition-monitoring on a more regular basis (102). The literature has many positive examples of how countries have integrated nutrition into their health information management platforms.

Examples of M&E integration

- **Zimbabwe:** A demographic and health survey (DHS) is carried out every five years and includes data on wasting, stunting, anaemia prevalence, breastfeeding practices, low birth rate figures and childhood obesity. These data points are disaggregated according to geography, wealth, gender, livelihood and age group. On a monthly basis, nutrition indicators such as wasting prevalence and underweight prevalence are collected within the Health Information System and a weekly disease surveillance system that monitors outbreaks of diseases of public health importance, including cholera, malaria and measles (101).
- **Rwanda:** Every three to five years a comprehensive DHS is conducted that includes nutrition indicators. On a more regular basis, key nutrition indicators are inputted into the health management information system through the community-based nutrition programme. This is done at the district health facility-level through community monitoring tools used by the CHWs. Rwanda also utilises a rapid SMS system which tracks the pregnancy cycle (first 1,000 days). This includes postnatal and newborn care services, tracking childhood killers including diarrhoea, malaria and pneumonia, and community-based nutrition activities such as breastfeeding, complementary feeding and growth-monitoring activities. This allows for real-time, community-based information (101).
- **Ethiopia:** The MoH health management information system collects seven nutrition indicators, including growth-monitoring, CMAM indicators, micronutrient data (vitamin A, deworming, iron and folic acid supplements) and low birth weight on a monthly basis. Given the wide coverage of routine data collection for CMAM activities, the country is able to examine trend data on rates of malnutrition incidence, which is incorporated into early warning systems. Ethiopia has also established a child survival scorecard which includes nutrition indicators such as stunting, breastfeeding practices, vitamin A and de-worming capsule coverage. At a sub-national (woreda) level, the information system (known as 'woreda net') serves all sectors and health officials are responsible for inputting nutrition and health information. Woreda-level administrators are responsible for triangulating agricultural, climatic, nutrition and other data relating to vulnerability to decide on the level of support required and actions to take (101).
- **Kenya:** The DHIS2 has been used for many years as for routine surveillance record-keeping (103). It tracks 11 nutrition indicators, which are disaggregated to allow for 50–60 data elements to be captured (103). In 2013, when governance moved to a devolved system with county government structures, there was an opportunity to evaluate the Kenyan nutrition surveillance system. The evaluation reviewed the 11 nutrition

data points (underweight, stunting, vitamin A supplementation, iron folate supplementation, SAM treatment, MAM treatment, deworming, growth monitoring, early breastfeeding initiation, exclusive breastfeeding and micronutrient powder supplementation) (103). It was found that some indicators were collected in more than one form but used different age categorisations, classifications and reporting rates, and health facility-level data was different from survey data (103). Thus, the Nutrition Information Technical Working Group (NITWG) conducted data clinics, which enabled the critical review of all nutrition indicators across every source of nutrition information to standardise tools and methods (103). The NITWG drew up plans to support joint quality review visits to health facilities and review data at both a facility and county level (103). These mechanisms helped to support the quality of data collected (103).

- **Bangladesh:** A DHS survey is carried out every four to five years. In the years between a DHS survey, a Utilisation of Essential Service Delivery (UESD) survey is conducted and collects data on stunting, underweight, vitamin A supplementation, exclusive breastfeeding and appropriate IYCF practices (104). Nutrition indicators are included in IMCI reporting on a monthly basis and fed into the national nutrition services report on a quarterly basis (104).
- **Somalia:** The Food Security and Nutrition Assessment Unit (FSNAU) integrates nutrition, health, food security and climate-related data and produces a trend and map analysis on a biannual basis. While data gaps remain due to insecurity, the FSNAU provides a valuable tool for informed decision-making. It is hoped that the FSNAU will be owned by the Federal Government and MoH in the coming years and will integrate the Nutrition Cluster reporting mechanisms for CMAM (105).

While many examples of integration exist, data collection is only effective if it informs programmes. Mechanisms need to be put in place to feed results back to decision-makers to inform prioritisation of districts and health facilities and the amount of support required from a national level (101). Thus, the quality and accuracy of nutrition data is critical. As the example from Kenya notes, sometimes the multiple data sources do not correspond. While DHS data collection systems often utilise Standardised Monitoring and Assessment of Relief and Transitions (SMART) methodology (a survey methodology which

measures the nutritional status of children under five years old and population mortality trends), when done in addition to these surveys or nutrition coverage assessments, at times the multiple data sources contradict one another or paint a very different picture to that of routine monitoring data (106). Furthermore, data quality is often compromised when health facilities are required to input data on multiple reporting formats, often with different levels of disaggregation and timeframes (101). For example, in South Sudan, nutrition facilities need to report using the government reporting system, the UNICEF Cluster reporting system and the reporting format from the NGO that is funding nutrition interventions (which may also include the need to report using the CMAM report) on a monthly or quarterly basis (100). Such multiple platforms create confusion and impede data quality. More attention needs to be given to how nutrition-monitoring systems can be streamlined to allow for real-time monitoring but do not create an additional burden on health staff to the extent that quality is affected (100). While the Kenyan example points to ways to increase data quality, there remains few other examples in the literature of how nutrition data points can be incorporated in routine data systems without impacting on quality. With a global effort to improve nutrition, the need for harmonised, accurate and systematic collection of nutrition and health data is critical, and efforts to reduce undernutrition and improve health outcomes rely on continuous improvements to nutrition and health databases and data collection methods (106).

Conclusions and unanswered questions

The available literature on the topic of nutrition and health integration reveals a dominant focus on treatment of acute malnutrition, suggesting that, while nutrition within UHC services encompass a whole range of preventive and promotive activities, treatment and its integration into community-based and health facility systems is the main subject in peer-reviewed or grey literature. The reasons for this are likely to be many, but a key factor could be the strong evidence base underpinning treatment on the one hand, and on the other, the very low level of treatment coverage globally (approximately 15%) representing a failure for treatment to be regularised as a key child-survival intervention delivered routinely via public health systems (as with malaria treatment, for example). As a recent systematic review on the topic noted there is scarce data and information around integrated nutrition programmes (7). Current knowledge and guidance on establishing and sustaining effective integration is limited.

The report concluded that there is a “general lack of global consensus on an agreed definition, framework, and minimum standards for integrating nutrition-specific interventions into health service delivery” (7, p7). Similarly, this review has not been able to report on what optimal nutrition integration looks like, what it costs to reach full integration, what it will take in terms of systems and staff, what sub-optimal or stop-start integration means for the scale-up of evidenced nutrition interventions and, ultimately, what impact this lack of integration at scale has on the mortality, morbidity and nutritional status of individuals and populations.

In this review, while innovative ways of linking nutrition and health programmes have been described, many questions remain which warrant further attention by those concerned with UHC and the nutrition (prevention, promotion and treatment) component of this:

- Who will deliver clarity for setting out the optimal scope, content and cost of nutrition

- within health systems and advancing this agenda?
- What role should the UN agencies and INGOs have in supporting delivery?
- What is the bare minimum health strengthening needed to enable nutrition integration in its broadest sense and in different contexts?
- What are the incentives for governments to lead nutrition integration where humanitarian and development partners are managing parallel systems relatively well?
- What role can donors play in systems strengthening for nutrition integration where direct budget support to government is not an option?
- With regard to low coverage of life saving treatment, how can the stranglehold on the patent for the RUTF paste (plumpy nut) and the high-cost be overcome, so that countries can produce and afford it as part of routine child survival health services?
- How can we move from a dominant UNICEF purchase model who, at the same time also have responsibility for certifying local production?
- How can food market systems support nutrition supply chains (but also continue to emphasise nutrition commodities as health/medical products)?
- How can health staff be encouraged to take on nutrition activities without paying them more?
- What does quality training on nutrition look like? (There still seems to be no standards for nutrition training.)
- In most countries, pharmacies and private clinics are critical for those who can afford it. Is there a mechanism to include nutrition care within this?
- What other innovative mechanisms exist for improving the service delivery of nutrition and health integration (particularly looking beyond treatment)?
- How can nutrition data points be incorporated into routine health data systems without impacting on quality?

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