

Management and Preventive Strategies of Uncomplicated Severe Acute Malnutrition among Children

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ABSTRACT

Severe Acute Malnutrition [SAM] is a major public health problem that is associated with very high rates of morbidity and mortality and threatens the life of millions of children yearly around the world. SAM is the most visible form of acute malnutrition that requires urgent treatment to survive. The management of SAM is critical for child survival and is a key cost-effective component of the scaling up nutrition framework for addressing undernutrition. The goals of SAM preventive strategies are to prevent short-term mortality, achieve sustained nutritional recovery to reduce susceptibility to life-threatening infections and to support neurocognitive development. Successful management of SAM requires the treatment interventions be complemented with preventive interventions aimed at addressing the root causes of malnutrition. SAM can be prevented and treated with the right nutrition responses that are key in reducing morbidity and mortality in affected populations.

Keywords: Severe Acute Malnutrition; Preventive Strategies; Outpatient Therapeutic Programme

Introduction

Severe Acute Malnutrition [SAM] is a major and serious public health problem that threatens the life of millions of children yearly around the world. [1,2] It is the most visible form of acute malnutrition that requires urgent treatment to survive. [3] It results from sudden reductions in food intake or diet quality and is often combined with pathological causes and is associated with loss of body fat and wasting of skeletal muscle, develops because of recent rapid weight loss or a failure to gain weight [4-6]. SAM in children 6-59 months of age is defined as a weight for height <-3 Z-score of the World Health Organization [WHO] growth standard, and/or Mid Upper Arm Circumference [MUAC] of less than 11.5 cm, or the presence of bilateral pitting oedema [nutritional oedema] [7-9]. SAM develops when the child is not getting enough energy or protein and other nutrients from the

food to meet his nutritional needs [10]. The goals of preventive strategies of SAM are to prevent mortality, achieve sustained nutritional recovery to reduce susceptibility to life-threatening infections and to support neurocognitive development [11]. Children Under 5 years of age [CU5] are very responsive to nutrition interventions, making, this a critical period to act [12]. The UNICEF [3], indicates to the management of acute malnutrition is a complex social and political challenge, it refers to a long-term prevention that involves improving equitable access to health services and nutritious foods, promoting breastfed and optimal infant and young child feeding [IYCF] practices, improving water and sanitation, and planning for cyclic food shortages and emergencies. In addition to that, SAM children need urgent lifesaving treatment to survive. Management of SAM in children comprises two potential phases: stabilization for complicated severely malnourished

children and rehabilitation for uncomplicated severely malnourished children [13]. According to WHO recommendations in 2013, suggests that uncomplicated SAM children should be addressed as outpatients, while children who have complicated SAM or severe oedema [3rd degree] should be treated as inpatients [14].

Preventive Strategies of SAM

SAM can be prevented and treated with the right nutrition responses that are key in reducing morbidity and mortality among malnourished children. However, they require an understanding of the complex underlying causes of malnutrition. A multi-sectorial approach is essential to addressing all the causes and their interactions [15]. Successful management of SAM requires the treatment interventions be complemented with preventive interventions aimed at addressing the root causes of malnutrition [6,16]. There are many approaches for the prevention and control of acute malnutrition among children. These approaches include the following: -

Nutrition-Specific Interventions Programmes: Nutrition-specific interventions programmes such as adequate dietary intake, appropriate feeding practices and prevention of infection, mainly address the immediate causes of SAM by integrated strategies [6]. It includes:

A. Providing Adequate Dietary Intake Strategies: Nutrition is a significant factor and a key determinant of good health and is critical for survival. Adequate nutrition is essential in early childhood to ensure good quality of life and wellbeing, healthy growth, a strong immune system, promote physical, social, emotional, and cognitive development and overall functioning of a child [17-21].

B. Appropriate Feeding Practices Strategies: Appropriate and timely support of IYCF saves lives and protects children's health and development especially in emergencies [15]. Optimal IYCF practices is one of the most effective interventions to improve child health [22]. Appropriate breastfeeding and complementary feeding practices are key interventions to prevent the development of SAM among children under five years of age [23]. Wherefore optimal breastfeeding and complementary feeding practices together can allow children to reach their full growth potential and prevent irreversible SAM [24]. It is including the following:

a) Appropriate Breastfeeding Practices: Breastfed ensures optimal brain development and continues to protect infants and children's health, especially in contexts where sanitation conditions are lacking [15]. Breastfeeding practice is the best way of providing ideal food for healthy growth and development of infants, and its advantages range from physiological to psychological for both mother and infants [25]. It is an important source of energy and nutrients for children under two years. Breast milk alone is enough to meet all the nutritional needs of infants for the

first six months of life [26,27], also can provide half or more of a child's energy needs between 6 and 12 months of age, and one third of energy needs between 12 and 24 months. Breast milk is also a critical source of energy and nutrients during illness, and acts to reduce mortality among children who are malnourished [28]. It is divided into three important periods from delivery up to 2 years of child's age:

Early initiation of breastfeeding: Early initiation of breastfeeding, within one hour of birth, protects the newborn from acquiring infection. Colostrum, the rich milk produced by the mother during the first few days after delivery, provides essential nutrients as well as antibodies to boost the baby's immune system, thus reducing the likelihood of death in the neonatal period [27].

b) Exclusive Breastfeeding: Exclusive breastfeeding is a fundamental nutritional support modality for infants, with many health impacts beyond improved nutrition and reduced susceptibility to diarrheal disease and other infections [23]. According to WHO definition, exclusive breastfeeding is defined as the practice of only giving an infant breast milk for the first 6 months of life without other food or water [29]. It guarantees food and fluid security in infants during the first six months and provides active immune protection [15]. Exclusive breastfeeding is a cornerstone of child survival. It serves as a child's first immunization, providing protection from respiratory infections, diarrheal disease, and other potentially life-threatening [29]. According to global public health recommendations of WHO and UNICEF Global Strategy for IYCF, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development, and health [26]. Increasing rates of exclusive breastfeeding can help drive progress against global nutrition targets such as acute malnutrition and is one of the most powerful tools policymakers have at their disposal to improve health [29]. UNICEF indicated that the exclusive breastfeeding in the early months of life is correlated strongly with increased infant survival and lowered risk of illness [30]. During the first six months of life, an infant who is not breastfed is more than 14 times more likely to die from all causes than an exclusively breastfed infant [27].

c) Continues Breastfeeding Until 2 Years: The WHO and UNICEF recommend that infant should continue breastfeeding for up to two years of age or beyond [26]. Black, Victora [31], refer to present recommendations suggest that infant should be breastfed up 2 years with added complementary foods.

d) Appropriate Complementary Feeding Practices: Infants complementary feeding refers to the timely introduction of safe and nutritional foods during 6 to 24 months of age, in addition to breastfeeding. UNICEF indicated that the several studies have shown that feeding appropriate, adequate, and safe complementary foods from the age of 6 months onwards leads to better health

and growth outcomes [27]. Adequate complementary feeding is essential for healthy growth, survival, and the attainment of a child's human potential [32]. It provides key nutrients such as iron and other micronutrients, essential fatty acids, protein, energy, etc. [26]. The WHO defined complementary feeding as the process starting when breast milk is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids manufactured or locally prepared are needed and suitable as a complement to breast milk or to a breast milk substitute, fed to infants during the complementary feeding period from 6 months up to two years. It recommends that infants start receiving complementary foods at 6 months of age in addition to breast milk, initially 2-3 times a day between 6-8 months, increasing to 3-4 times daily between 9-11 months and 12-24 months with additional nutritious snacks offered 1-2 times per day [15,22]. The introduction of complementary foods should be timely and adequate in nutritional content, tailored to meet the age-specific needs of the infant, and should provide all the micronutrients and vitamins needed by infants for adequate growth and cognitive development [32]. Optimal IYCF ensures a child is protected from SAM and their consequences later in life [26]. Complementary foods need to be safe, nutritionally adequate, and appropriately fed in order to meet child's energy and nutrient needs. After six months of age, an infant's need for energy and nutrients starts to exceed what is provided by breast milk, and complementary feeding becomes necessary to fill the energy and nutrient gap [22].

C. Diarrhea and Infection Prevention Strategies: Infection prevention strategies are important in breaking the infection-malnutrition cycle, particularly related to diarrhea and repeated respiratory infections [23]. Children with SAM are more likely to have more severe illnesses and higher mortality rates than non-malnourished children [6]. Walson and Berkley [33], indicated that there is a bidirectional relationship between malnutrition and infection; chronic, repeat, or recurrent infections often contribute to acute malnutrition. The most cost-effective interventions currently available for diarrhea are prophylactic zinc supplementation, ORS, rotavirus vaccine, and household-level water treatment [23].

Nutrition-Sensitive Interventions Programmes: Scale-up of integrated, community-based nutrition programmes linked with health, water and sanitation, and other relevant interventions is a priority strategy that can bring measurable improvements in children's nutritional status, survival and development [27]. Nutrition-sensitive interventions programmes address the basic and underlying causes of SAM which include the following [6]:

A. Good Life Quality and Easily Accessible Health Care Services Strategies: SAM prevention requires very strong linkages with medical screening and services [34]. An additional, improv-

ing water, sanitation, and hygiene as well as housing and access to and use of health services can promote healthy environments and reduce the incidence of infectious diseases, and key interventions implemented at scale can reduce SAM [27], and can have a significant impact on reducing diarrhea prevalence [35]. Access to appropriate health care services for the prevention and treatment of disease, and improved sanitation and hygiene practices are as many ways as possible to prevent underlying causes of SAM [5]. Force [36], mentioned that early and accelerated management of sanitation, hygiene, water sources, and health programmed for common childhood illness should augment the management of acute malnutrition during an emergency. A study conducted in India demonstrates the improved of water, sanitation, and hygiene were associated with better nutritional outcomes in children on acute malnutrition [5]. WFP and others indicated in the Emergency Food Security and Nutrition Assessment [EFNSA] in Yemen findings, that there is a strong and statistically significant association between using of improved source of water and acute malnutrition [35].

B. Food Security Strategies: Food security and nutrition assessments should overlap, as they identify the barriers to adequate nutrition and to the availability, access to and use of food. Joint food security and nutrition assessments can increase cost-effectiveness and link nutrition to food security programming [15]. The Global Nutrition Cluster indicated that household food security has a significant impact on the effectiveness for SAM prevention. In the absence of household food security or livelihood interventions, there is little likelihood to prevent nutritional deterioration over the course of the emergency. Therefore, where food insecurity is a result of an emergency or exists prior to the emergency, resources should be spent on nutrition interventions for prevention of SAM [36]. Lenters, Wazny [5], mentioned that in food-secure populations, caregivers can be counseled and supported in using high-quality home available foods to promote recovery in acutely malnourished children. While in food-insecure populations, including humanitarian emergency contexts, supplementary feeding programmes [SFPs] are used to prevent further deterioration of children's nutritional status.

C. Health and Nutritional Education and Counseling Promotion Programmes: Parental education is one of the important factors relating to childhood nutrition [37]. Nutritional knowledge of mothers has an important role in the maintenance of nutritional status among children [20]. Health and nutritional education and counseling involves a combination of education strategies designed to increase knowledge and awareness, change attitudes, promote positive behaviors and practices for adequate health and nutrition of individuals [6]. This approach focuses on disseminating information on appropriate feeding practices which can

increase dietary diversity and meet nutritional requirements, as well as improvements in sanitation and hygiene practices [38] and provide caregivers of children with information about safe disposal of infants' faeces, laundering practices and the use of nappies, potties, or scoops to manage safe disposal [15].

A cross-sectional study in rural settings in India by Sangra and Nowreen [20], demonstrated that adequate knowledge of mothers regarding dietary patterns of CU5 will enhance the attitude and practice to prevent malnutrition. UNICEF [26], mentioned there is evidence shows that improving maternal knowledge for feeding practices can lead to increased dietary intake and healthy growth of infants. Several studies conducted in developing countries demonstrated significant association of nutritional education of mothers with improvement of nutritional status in children, such as study conducted in Nepal by Yadav, Gupta [39], indicated the nutritional education intervention was effective to reduce acute malnutrition among children. A systematic review conducted in developing countries by Majamanda, Maureen [40], concluded evidence from the identified studies, suggests that community-based nutrition education improves the nutrition status of CU5. Also, study conducted in Nigeria by Fadare, Amare [41], concluded that mother's knowledge of food choices, feeding and health care seeking are vital for producing good nutrition outcomes for children.

Educational interventions to improve the timing and process of complementary feeding are therefore necessary to ensure safe complementary feeding for infants. The introduction of complementary foods should be timely and adequate in nutritional content, perhaps tailored to meet the age specific needs of the infant and should provide all the micronutrients and vitamins needed to infants for adequate growth and cognitive development. The educational messages should emphasize the importance some of the problems commonly associated with complementary feeding include starting complementary feeding too early or late, poor nutrient content of complementary foods, inadequate feed rations, insufficient breastfeeding, poor feeding practices, poor hygiene, and bacterial contamination of complementary foods and feeding utensils [32], also provide them with appropriate use, careful storage and hygiene of feeding utensils are essential for ready-to-use infant formula [15].

D. Micronutrients Deficiencies Prevention Programmes: There are three approaches to preventing micronutrient deficiencies:

a) Supplementation Strategies: Providing micronutrients in highly absorbable form normally results in the fastest control of the micronutrient status of targeted populations such as vitamin A supplementation in children [15]. If the complementary foods

lack basic micronutrients, there may be need for micronutrients supplementation to improve the dietary content of these foods [32]. Zinc is a key micronutrient with a ubiquitous role in biological functions, including cellular division, protein synthesis, and nucleic acid metabolism [31]. Study done in low and middle-income countries by Black, Victora [31] indicated that zinc deficiency has a negative effect on growth. It refers to a meta-analysis of randomized controlled trials of zinc supplementation showed a significant benefit for linear growth in CU5. The effect was a gain of 0.37 cm in zinc-supplemented children. Zinc also plays a vital role in normal growth and development of children [23].

b) Fortification Strategies: In areas where complementary foods lack basic micronutrients, there may be need for food fortification to boost the dietary content of these foods [32]. Fortifying food products with micronutrients can be an effective strategy for controlling micronutrient deficiencies and prevent acute malnutrition such as iodized salt, micronutrient powders or vitamin A fortified vegetable oil [15].

c) Food-Based Approaches Strategies: Food-based approaches are regarded as the long-term strategy for improving nutrition, which would need enormous efforts and proper planning, be it to the general population, to high-risk groups or as an adjunct to treatment [42]. Minerals and vitamins needed to prevent micronutrient deficiencies are present in a variety of foods. Policies and programmes should ensure improved year-round consumption of an adequate variety, quantity, and quality of safe, micronutrient-rich foods [15].

E. Management of Moderate Acute Malnutrition Programmes: Prevention of SAM requires reaching children before they develop it, therefore, consideration must be given to adopting a policy to prevent moderate acute malnutrition [MAM]. If there are no programmes to treat MAM, the prevalence of SAM often increases, which puts additional strain on the available health system and on programmes to manage SAM [7]. Supplementary feeding programme [SFP] is the primary strategy for preventing MAM. There are two types of SFPs that are common: blanket supplementary feeding programmes [BSFP] for prevention, and targeted supplementary feeding programmes [TSFP] for treatment of MAM and prevention of SAM. These types of programmes usually provide a food supplement to the general ration for moderately malnourished individuals, pregnant and caregivers and other at-risk individuals [15]. The prevention and treatment of MAM reduces the incidence and severity of SAM [34]. Seasonal Blanket Feeding [SBF] is better to identify infants and children who are at risk of MAM, or who have poor growth, before they become severely malnourished. It may be targeted by geographic region or age group, tending to include all children wat at risk for MAM

[5]. The most important risk factors that lead to MAM are failing to gain weight, poor appetite, and changes in caregivers or home circumstances [21].

Types of ready to use foods [RUFs] for preventing and treating MAM among children between 6 - 59 months of age: RUFs are specially formulated bars, pastes or biscuits that provide varying ranges of high-quality protein, energy, and micronutrients. It is generally made with peanuts, milk powder, sugar, vegetable oils and vitamins and minerals, though they may be made with chickpeas or other commodities. These products are more nutrient dense than available home foods and do not require preparation, they typically have very low moisture content and are resistant to microbes. With use of each of these products, continued breastfeeding is recommended. It is including the following [3,5,7]:

Ready to use supplementary foods [RUSFs], such as Plumpy'Sup, are designed to treat MAM.

Lipid based nutrient supplements [LNSs], such as Plumpy'Doz, are designed to prevent MAM.

F. Outpatient Therapeutic Treatment of SAM Programmes:

The outpatient treatment of SAM programmes aims for more widespread access to treatment primarily by establishing the appropriate centers and activities within more communities [43]. The rapid expansion of community-based treatment programmes worldwide, lead to every year millions of children are treated for SAM [44]. The outpatient therapeutic feeding programme is one approach of the community-based management of acute malnutrition [CMAM] that provides screening, diagnostic and treatment services for uncomplicated SAM children 6–59 months of age, by providing home-based treatment as RUTF and routine medical treatment [9,45]. It brings the management of SAM closer to the community by making services available at decentralized treatment points within the primary health care [PHC] settings [46,47]. Uncomplicated SAM refers to severely malnourished children who are clinically well with a good appetite, where managed at home by RUTF with weekly visits at a nearby health facility with receive essential medical care as part of the management of SAM [34,48]. The effectiveness of management of SAM has been proven through health interventions during emergency settings and routine development programmes [49]. Uncomplicated severely malnourished children should be managed as outpatients, by providing them with weekly RUTF, which can often be followed at home if the child has a clinically well, alert and a retain appetite. [5,21,48,50].

Conclusion

Severe Acute Malnutrition is a major public health problem that can be preventable and addresses. It can be prevented and treated with the right nutrition responses that are key in reducing morbidity

and mortality in affected populations. There are many approaches for the prevention and control of acute malnutrition among children. Successful management of SAM requires the treatment interventions be complemented with preventive interventions aimed at addressing the root causes of malnutrition.

Conflict of Interest

The authors declare there is no conflict of interest.

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