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Literature Review on Ready-to-Use Therapeutic Foods in the Fight against Severe Acute Malnutrition in Africa: Modes of Access and Uses in Households

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Abstract

Introduction: Each year in Africa, one million children under the age of 5 die from causes related to malnutrition in all its forms, at present, the treatment of severe acute malnutrition, especially without complications, is managed in the integrated community outpatient therapeutic program using RUTF, which led us to ask ourselves the question about the place of these foods in the fight against SAM.

Objective: Take stock of the place of ready-to-use therapeutic foods (RUTF) in the fight against SAM in African countries.

Materials and Methods: The study consisted of a documentary review on the place of ready-to-use therapeutic foods in the fight against SAM in African countries (modes of access and uses in households). Twenty-one relevant articles were searched to highlight the operation of supplementation programs, and the challenges of these programs in treatment centers.

Results: Nutritional rehabilitation centers are surrounded by technological innovations in RUTF supplementation programs, but countless consulted literatures relate the challenges and perspectives that are experienced in the availability and regularity of RUTF. Achieving this requires multisectoral collaboration.

Conclusion: To provide quality care and services to populations and households with children suffering from SAM in Africa, sufficient resources must be allocated to RUTF supplementation programs, and proper supervision of supply and care centers must be ensured. rigor.

Keywords: RUTF; SAM; Africa; Access; Household

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Abbreviations

RUTF/RUTF: Ready to Use Therapeutic Foods; VAC/SCN: Administrative Committee on Coordination/Sub-Committee on Nutrition; AOC: Central and West Africa; DACs: Ambulatory Nutrition Center; CNT: Therapeutic Nutrition Center; CS/CSI: Health Center/Integrated Health Center; CCS: Social Communication for Behavior Change; CRENA: Ambulatory Nutritional Recovery Center for severe malnutrition; CRENI: Intensive Nutritional Recovery Center; DALY: Disability-Adjusted Life Years; CAM: Foods and Agriculture Organizations; FARN/HD: Nutritional Rehabilitation Hearths/District Hospital; IFPRI: International Food Policy Research Institute; IRA/Kcal: Acute Respiratory Infection/Kilocalorie; SAM/MAM: Severe Acute Malnutrition/Moderate Acute Malnutrition; UN/WHO: United Nations/World Health Organization; WAHO: West African Health Organization; PB/P/T: Arm Circumference/Weight for Height; Ground floor: Democratic Republic of Congo; UNT: Therapeutic Nutrition Unit; UNICEF: UNICEF; URENA/I: Ambulatory/Intensive Nutritional Recovery Unit; VAD: Home visit; HIV: Human Immunodeficiency Virus

Introduction

Nutritional deficiencies are one of the major public health issues in the world. Undernutrition in women of reproductive age and children is the underlying cause of 3.5 million deaths, 35% of illnesses in children under 5, and 11% of the world's total Years of Life Adjusted for Disability (DALY) [1]. According to the Lancet series on maternal and child undernutrition, 90% of the world's stunted

children are found in 36 countries [1]. UNICEF's West and Central Africa (WCA) region, which brings together 24 countries, includes 8 of these 36 countries in which stunting is particularly high [1].

In the Lancet papers, low investment in nutrition in most developing countries has been identified as a barrier to scaling up high-impact interventions in this area [1]. Several West and Central African countries have strategic plans for nutrition or food and nutrition security. However, very few of these plans are based on the latest science and are budgeted. Each year, nutrition officials, national-level nutrition actors, and their regional and international partners convene the Annual Economic Community of West and Central African States Nutrition Forum, under the technical direction of the West African Health Organization (WAHO). In 2010, the forum would have provided an opportunity to disseminate the latest technical information related to the theme of the forum: "Financing and planning nutrition programs in Africa" [1].

Every year in Africa, one million children under the age of 5 die from causes related to malnutrition. Malnutrition contributes to 35% of all child deaths in the region [2]. In 2009, the United Nations Children's Fund (UNICEF) conducted a nutrition vulnerability analysis that looked at factors such as the prevalence of child undernutrition, access to vitamin A and salt iodized, the level of food insecurity and governance [2]. This analysis has shown, for example, that Burkina Faso, the Central African Republic, Chad, Guinea Bissau, Niger and Sierra Leone have the highest level of nutritional vulnerability in WCA [3]. The regional prevalence of wasting among children is 10%, indicating that the nutritional status of children is a serious concern. Moreover, these average hides significant disparities [2]. Wasting rates among children under 5 are alarmingly high in Sahelian countries such as Burkina Faso, Chad, Mali, Mauritania and Niger and range from 11% to 19%, affecting more than 1 million children (UNICEF, 2006). As in the results promulgated by UNICEF, the UNICEF WCA region, which comprises a total of 24 countries, includes 8 of the 36 countries in which stunting is particularly high, for which an estimate of stunting is available. funding needs, and 11 of 32 smaller countries with rates of stunting and/or wasting in children >20%, which could be added to previous estimates at an additional cost of 6% [1].

With regard to accessibility to RUTF (plumpy'nut/fortified biscuits) and its use in households, this depends on the food supplementation program or the social protection and food aid programs based on the level malnourished [4]. As we can see; for SAM with medical complications (P/T<70% of the median or bilateral edema or MUAC <115 mm and at least 1 of the following: Anorexia, ARI, fever >39ºC, severe dehydration, severe anemia, drowsiness or coma), management and supply of RUTF are done at the level of URENI/CRENI/CNT/UNT (hospitals) [4]. But SAM without medical complications (<70% of the median P/T, or bilateral edema or PB. <115 mm, appetite preserved and the absence of worrying or warning clinical signs), the supply here and the taking care is done on an outpatient basis at the level of the URENAS/ CRENAS/CNA/ (CS), only the non-malnourished can be taken care of by the family [4]. Reason why UNICEF wants all of Africa to aspire to achieve food and nutrition security, to say adequate food (quantity, quality, safety, cultural acceptability) is available, accessible and used satisfactorily by all individuals in order to lead a healthy and happy life [3]. Despite the efforts made by many African countries in the fight against malnutrition, care and food supply centers suffer from the unavailability and regularity of RUTF at their breasts, while most African countries are subject to nutritional emergencies. However, these dysfunctions do not prevent the hospital or the center from being frequented. So how to deal with these constraints that hinder the proper functioning of places of supply of RUTF and management of SAM? What can a nutritional rehabilitation center supplementation program for children with SAM look like in the African context? In order to answer these different questions, let's see what the rest of our work has in store for us.

In countries with limited resources, one person in five is chronically undernourished, that is to say more than 800 million individuals. Every year 6 million children under the age of 5 die from the consequences of hunger and malnutrition [5]. On the other hand, more than 2 billion people suffer from various micronutrient deficiencies, of which 2 billion people, including 52% pregnant women and 39% children under five, suffer from anemia due to lack of iron, 740 million of people suffer from iodine deficiency; 120 million children are victims of vitamin A deficiency; 180 million children are stunted due to nutritional deficiencies [5,6].

In Africa between 15 and 30% of adults are chronically undernourished and up to 50% of children have low birth weight. To achieve the objective set at the last World Food Summit, which is to halve the number of those who suffer from hunger, the number of undernourished people would have to be reduced by 22 million a year, whereas this figure is currently only 6 million per year [5]. About 11% of children under 5 or 7.8 million suffer from acute malnutrition (wasting) (1.7 million in Nigeria, 1.7 million in the Democratic Republic of Congo (DRC) and 1.3 million in the Sahel countries (based on the latest available data from 2005-2010) Chronic malnutrition (stunting) affects 40% of children or 26.5 million children in the region (10.1 million in Nigeria and 5.3 million in DRC); underweight, an indicator used for the first Millennium Development Goal (MDG), affects 22% of children under 5 - or 15.4 million children in the region (5.7 million in Nigeria and 2.9 million in the DRC) [1].

Access methods

The World Health Organization (WHO) recommends the community-based outpatient treatment program as the standard treatment protocol for the management of uncomplicated severe acute malnutrition at the community level [2].

In 2016 Eva-Charlotte et al., in Ethiopia in her study on the challenges in the implementation of the integrated community outpatient therapeutic program shows that the availability of RUTF must be ensured by the application of the appropriate supply chain and policy monitoring. Furthermore, nutritional interventions that address household food insecurity have the potential to reduce the sharing and sale of RUTF, thereby improving the effectiveness of SAM management. This might need a political platform that brings together different actors such as local communities, non-governmental organization and international organizations [2,7]. For the United Nations background the limited availability of inpatient care and a weak referral network between health posts and health facilities further consider barriers to referral of children who have failed to meet recommended program criteria to their exit from the program [2].

Acute malnutrition is a continuum condition, but severe forms are treated separately, with different treatment protocols and

products, managed by separate UN agencies [8]. The Combined Acute Malnutrition Study Protocol aims to simplify and unify the treatment of severe uncomplicated acute malnutrition in children 6 to 59 months of age into one protocol for each country in order to improve global coverage, quality, continuity care [8]. In humanitarian settings, current national and international recommendations imply treatment of SAM is done with RUTF in separate UN programs, using separate protocols and UN agencies in an outpatient therapeutic program [2,8]. Only patients with SAM and medical complications require hospitalization to be stabilized while those without medical complications can be managed in outpatient therapeutic management with RUTF [9]. The WHO recommends the use of Ready-to-Use Therapeutic Food (RUTF) during the rehabilitation phase in outpatient therapeutic care for patients with SAM.

SAM management at community level

The management of SAM presents a huge challenge, especially in health facilities with insufficient resources. The integrated management of MAS includes both inpatient and community services. Children with SAM and complications such as severe oedema, fever or diarrhea are treated as hospitalized patients [4]. Community-based therapeutic care was instituted because admission to hospital had several disadvantages, including the risk of nosocomial infections and high expenses for the family. The health of siblings and the consequences of removing the mother from the household must be considered [4]. Children with simple SAM who are clinically well and pass the appetite test are better managed in the community; household provides higher coverage than residential programs (more than 70% *vs.* 10%). Community therapeutic care was endorsed by WHO and UNICEF in 2009.

Generally, community therapeutic care is based in local health centers. At registration the child receives a course of oral broad-spectrum antibiotics weekly and appropriate distribution of RUTF with families, but weight gain is usually not as rapid as in hospitalized patients [4]. RUTFs are very palatable and there may be a temptation to share rations with other children in the household sometimes in accordance with cultural norms of food sharing, which is why the goal of its care is to promote recovery by providing nutritious food rations preferably from locally available foods and appropriate health education and, above all, preventing the progression of SAM [2,4].

In an attempt to improve outcomes, and to address the multiple, co-existing abnormalities that occur in SAM, WHO has produced a standard 10-step protocol consisting of two phases (initial phase and rehabilitation phase): Treat/prevent hypoglycemia, hypothermia, dehydration, infection; correct electrolyte and micronutrient imbalance; start of refeeding; achieving catch-up growth; provide sensory stimulation and emotional support and finally follow-up [10]. The objectives of the study were: Describe the organization/functioning of SAM supply and care centers, Describe the importance of using SAM RUTF at community level, identify approaches for implementing SAM interventions, determine the challenges in the African context of RUTF in the management of SAM.

Conceptual Framework

Based on the analysis of the nutritional situation and the determinants of malnutrition, as evidenced by the literature, to achieve our objectives we have adapted the framework of UNICEF, 2008 (Figure 1).

Root causes

Refer to available resources (human, structural, financial) and their use (political, legal and cultural factors) [11]. The degree to which the rights of women and girls are protected by law and custom; the political and economic system that determines the distribution of income and assets; and the ideologies and policies that govern social sectors.

Underlying causes

These are factors grouped into food security, care practices such as appropriate complementary feeding, and hygiene and health

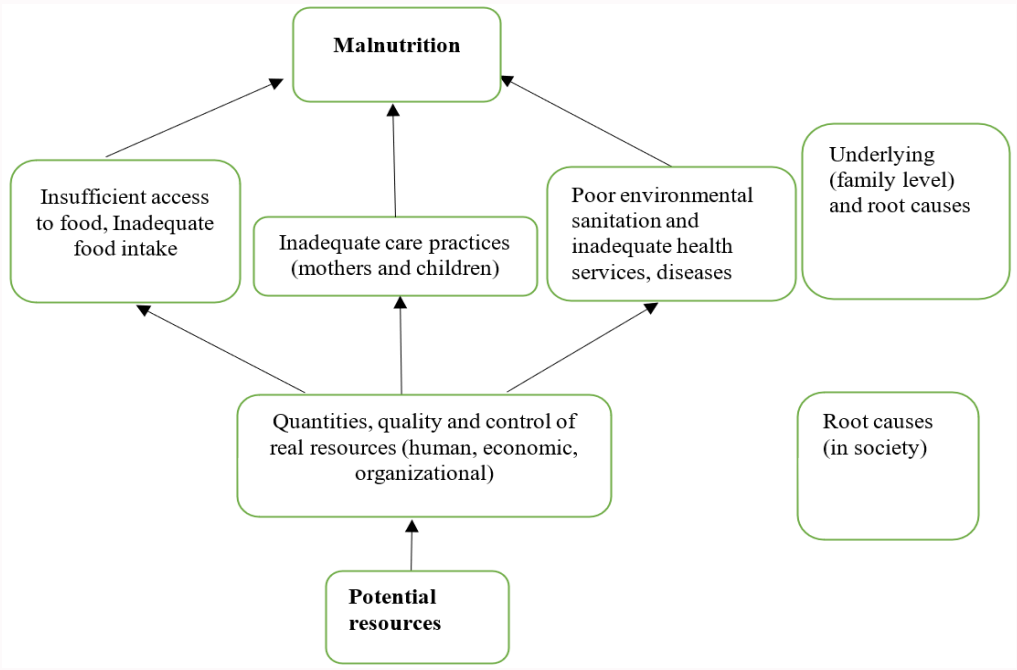

Figure 1: The adapted UNICEF conceptual framework on the causes of malnutrition (UNICEF 2008).

seeking behaviors that promote good nutrition [6]. These practices can be severely disrupted during emergencies, which can lead to insufficient food intake and increased infection. Access to safe water and adequate sanitation facilities can be severely limited in an area.

Immediate causes

These are the causes that can directly lead to lower immunity in non-pregnant women of childbearing age and children. This concerns the state of health of women and children: Parasitic infections such as malaria, or viral infections (HIV), can lead to a drop in the level of hemoglobin, or worsen it if it is already present. The nutritional status of non-pregnant women of childbearing age: The poor nutritional status of women can lead to a deficiency in essential vitamins and micronutrients, including iron, which, in the long term, will impact the hemoglobin level and finally the intake in inadequate food ration [6].

Methods

Study framework and study period

We are interested in sub-Saharan Africa (West and Central Africa) which is the region of the African continent located south of the Sahara Desert and which has the most nutrition problems. It has 48 countries for just over a billion inhabitants. Sub-Saharan Africa is the most dynamic part of the planet in terms of demographic, whose food and nutrition security problems are the most worrying at the global level.

Our study consisted in making an inventory through a review of the literature on the modes of access to RUTF and their uses in households to fight against SAM in sub-Saharan Africa during a period of four months from the month from March to June 2020.

Study approach

We reviewed the literature on RUTF in the fight against SAM in sub-Saharan Africa. The approach consisted of a situational analysis by compiling 20 relevant articles on the question of knowing the place of RUTF in the fight against SAM. And to make a synthesis on the organization, the challenges and prospects of the centers of supply and assumption of responsibility of SAM.

Results

Overview of SAM RUTFs and their indications

We have found some nutritional inputs, but given the diversity of protocols in African countries, we will limit ourselves to citing RUTF and their indications.

F-75 therapeutic milk: Administer in the stabilization phase of severe acute malnutrition. It must be used in therapeutic re-nutrition centers benefiting from medical supervision and must not be distributed directly to families. This stabilization phase consists of ensuring the rehydration of children and the management of their medical complications, while initiating re-nutrition. In addition to skimmed milk powder, F-75 therapeutic milk contains vegetable fat, maltodextrin, sugar, and a complex of minerals and vitamins.

With a caloric density of 75 kcal per 100 ml of reconstituted milk, F-75 is not intended to cause the child to gain weight, its use should therefore be limited to phase 1 (3 days on average). F-75 milk can be given from the age of 6 months. Once reconstituted, F-75 therapeutic milk can be stored for 3 hours at room temperature, up to 16 hours in the refrigerator. Beyond that, it becomes unfit for consumption and must be thrown away.

F-100 therapeutic milk: It must be used in therapeutic re-nutrition centers benefiting from medical supervision and must not be distributed directly to families. It is administered during the stabilization phase of severe acute malnutrition. F-100 low osmolarity therapeutic milk has been specially designed for the nutritional rehabilitation of people suffering from severe acute malnutrition, during phase 2 of treatment. Once reconstituted, F-100 therapeutic milk can be stored for 3 h at room temperature, and up to 16 h in the refrigerator. Beyond that, it becomes unfit for consumption and must be thrown away.

Plumpy nut: It is the first RUTF intended for the treatment of SAM, with a nutritional value equivalent to that of F-100 therapeutic milk, Plumpy'nut® is specially dedicated to the nutritional rehabilitation of people (children from 6 months and adults) suffering from severe acute malnutrition. This peanut-based paste, sugar, vegetable fats, skimmed milk powder, enriched with vitamins and minerals (see the technical sheet for the complete list of ingredients) comes in 92 g sachets providing 500 kcal. This peanut-based paste, sugar, vegetable fats, skimmed milk powder, enriched with vitamins and minerals comes in 92 g sachets providing 500 kcal (BP-5, BP-100). Ready-to-use food, Plumpy'nut® requires no preparation, no prior dilution in water, no cooking, and can be consumed directly from the sachet. Quantities to plan: 200 kcal/d/kg until the child reaches his target weight, i.e., an average duration of 6 to 10 weeks. For the treatment of a 7 kg child suffering from severe acute malnutrition: approximately one box of Plumpy'nut®, i.e., 13.8 kg (calculation on the basis of 200 kcal/kg/day, i.e., 2.8 sachets/day for 8 weeks).

ReSoMal: Food intended for the preparation of oral rehydration solution in people with severe acute malnutrition. It must be used in therapeutic re-nutrition centers benefiting from medical supervision and must not be distributed directly to families (Figure 2).

Review of the operation and organization of the centers

The SAM prevention and care program in many African countries is modeled on the health pyramid, with a first level, consisting of villages with health huts run by a health worker or a community health worker supported by relays in charge of prevention, screening and referral activities. At the second level of reference, the integrated health centers, with the main tasks of prevention and integrated outpatient management of cases without associated medical complications. The third level is essentially made up of hospitals where cases of undernutrition with associated medical complications are cared for (Figure 3).

Use of RUTF at household level

In DRC, the nutritional management of uncomplicated SAM is based on Ready-to-Use Therapeutic Food (RUTF) product which consists of dry rations containing a mixture of pulses and starch foods fortified with micronutrients, oil, vitamin A and sugar. They provide between 1000 and 1200 Kcal/day/person [12]; and also, cow's milk alternated with vegetable oil sugar preparations corn, soy, beans, is an acceptable alternative to conventional formulations of RUTF. This food is locally accessible in households, adequately responds to shortages in conventional supply in places without an adequate health system [6,12]. In 2002, a study carried out in the DRC and Malawi shows that an amino acid enriched milk-free soya-but-sorghum based RUTF can be used to treat SAM in children 6 to 59 months years old. This product achieves recovery and treatment rates that when not lower than standard RUTF and is superior in its ability to treat anemia and restore body iron stores [8]. The significantly lower cost

Figure 2: SAM nutritional inputs.

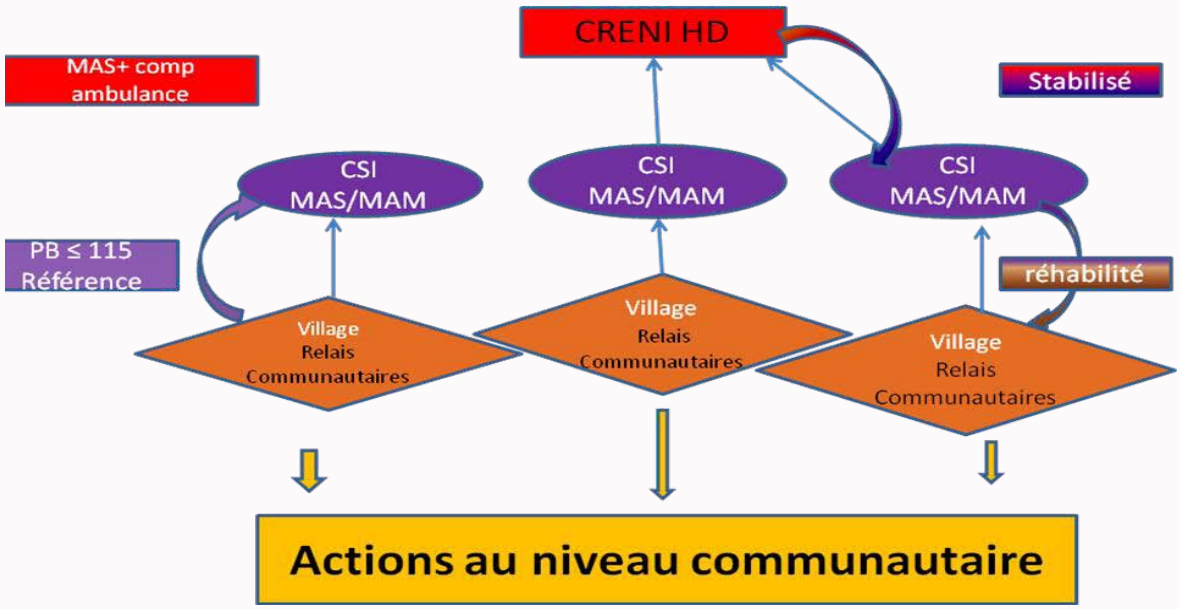

Figure 3: Package per level and per target group.

of this new RUTF and its reliance on locally grown ingredients would reduce SAM treatment costs, more children will be treated within existing budgets and facilitate the production of RUTF in countries with high SAM burden [13,14]. RUTF solved SAM problems with low water content and high energy density composition, which allows decentralized management of SAM, called community management of acute malnutrition, right at home [15]. Commercial RUTFs are biphasic oil/powder systems made from peanuts, skimmed milk powder, sugar, rapeseed and palm oil, and a mixture of vitamins and minerals [15]. Nowadays, local production, following the precise specificities of the United Nations (UN), Food and Agriculture (FAO) and the United Nations for Children (UNICEF), is possible, but with costs of still high ingredients, especially skimmed milk powder. Therefore, it is important to define new alternative recipes, using local products for a sustainable production of the dough [15,16].

Main Approaches to Implementing SAM Interventions

Most African countries use, among other things, the positive deviance approach commonly referred to as "Home for Learning and Nutritional Rehabilitation" (FARN) and that of Community-Based Growth Promotion are the most frequently implemented by example in Niger. Home gardening, home visits (VAD) and community screening for malnutrition are most often integrated as activities in both approaches. Social Communication for Behavior Change

(SBCC) or Communication for Development is a cross-cutting strategy for transmitting the messages of essential family practices that constitutes the bulk of interventions at the community level.

Challenges in the African context of RUTF in the management of SAM

The most used approaches are community-based, the following are the challenges:

– The identification of promising intervention centers,

– The scaling up of community interventions in the fight against SAM,

– Ownership of interventions with full community participation,

– Intersectoral collaboration for the availability of RUTF,

– Good governance/political commitment to sustain investment in nutrition.

Prospects for SAM supply and care centers

Many changes have taken place at the heart of the health system, often in response to contextual changes and health challenges. On the one hand, solutions have emerged, on the other hand, the actors have diversified, creating new challenges in terms of coordination, especially in emergency situations. Development strategies based on economic growth alone are insufficient to reduce SAM, hence the accompaniment by specific investments in nutrition or integrated approaches in nutrition, the strengthening of resilience are created in some African countries to assess the performance and effectiveness of a dietary supplementation program.

Conclusion

In view of the importance of these results from the documentary review, RUTF supplementation programs are of great value in Africa where malnutrition is experienced intergenerationally, ravaging human lives, especially children and adults. here that successful interventions are those designed and implemented in a decentralized way that is community-centered and encourages community participation at every stage of planning and implementation and at all levels of decision-making. To end this contribution to the reflection on ready-to-use therapeutic foods in the fight against SAM in Africa: Modes of access and uses in households.

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