

- 1 **Complementary Food Situation in Sierra Leone: Nutritional Problems and Possible Strategies -A**
- 2 **Review.**

Abstract

Low nutrient density and bulkiness of complementary foods, early introduction of solid foods, and unhygienic practices during weaning stage of a child predispose infants to malnutrition, growth retardation, infection and high mortality. In most West African countries, especially in Sierra Leone, the use of a variety of home-made complementary foods prepared from locally grown foodstuffs during the weaning process is popular, with products traditionally known as *pap* (mesh ricewater) *fofo* from cassava, *ogi*, *akamu* and *couscous*.

Sierra Leone is one of the countries in West Africa that has been reported to have a challenging situation with regards to complementary foods, little effort has so far been done to improve the situation. Despite these challenges, very little work has been directed towards the development of complementary foods using local foodstuffs as practiced in some other African countries. This situation has serious impact on the lives of infants in Sierra Leone, thus increasing the rate of mortality in the country. Complementary food situation in Sierra Leone was reviewed in terms of the past and present practices as well as the types of complementary foods used in Sierra Leone. Thus, the objective of this review was to discuss the complementary food situation in Sierra Leone: Nutritional problems and possible strategies. Formulation of high nutritive value home-made complementary foods in the country was recommended using traditional food processing techniques such as fermentation and germination, since these methods are simple, and could easily be employed at household and community levels without the use of sophisticated machinery. Nonetheless, it was recently reported that a product from the orange-flesh sweet potato could address the issue of complementary food in the country as it is easy to prepare, and the products are easily available in the rural area and even urban settings. Other recommendations made include: community nutrition education, the development of weaning recipe book, reduction in the workload of the suckling mother, promotion of breastfeeding and increased maternity leave period, were suggested to be the most immediate possible strategies to the problems highlighted.

Keywords, Complementary food, Pap, Malnutrition, Growth retardation.

Introduction

The current infant mortality rate for Sierra Leone in 2023 is 70.123 deaths per 1000 live births, a 2.95% decline from 2022[1].

Sierra Leone is among the countries in the world that has not been making high gains around complementary foods even though the country is making progress in infant mortality rate in the world. Statistics show that infant mortality rate for Sierra Leone in 2023 is 70.123 deaths per 1000 live births, a 2.95% decline from 2022 according to Chart and table of the Sierra Leone infant mortality rate from 1950 to 2023 [1].

Even though the statistics is indicating some progress in the country in the infant mortality rate, but the country is still struggling with food insecurity.

It is well over half of the population in Sierra Leone are food insecure. It was reported as 78% of the people of the country could not afford food but with all of that, the Global Acute Malnutrition rate in children under 5 (by MUAPF) remains low and progresses from 5% in August (which is the food lean period) to 3% in February as reported by the World Food Programme Sierra Leone Country Office [2] According to the above survey report it states the 21% of the national households have a meager food consumption score. And most families cannot provide a healthy balanced food which has implications on their health and nutritional status in the long run. A nation with a high rate of food insecurity, it has serious impact in addressing the deplorable complementary foods situation in the country. The situation is worsened with the fact that food safety awareness is very limited as reported by P. J. Kanu et al [3]. Very little information is available on the formulation and improvement of home-made complementary food as seen in other African countries. Therefore, it is essential to bring out these problems so that food scientists in collaboration with government and other relevant research institutions can take appropriate action. Research indicated that very little research has been undertaken around complementary foods in Sierra Leone while the nutritional composition of available complementary foods has been reported by few researchers [4] [5].

Exclusive breastfeeding is usually recommended for a period six months of age in Sierra Leone, but after this period it may become increasingly inadequate, hence the need to support the nutritional demands of the growing child [6]. This is so because the type of food suckling mothers eat cannot adequately support the required nutrients for both the mother and the child at the same time. The situation is now more serious today when it was reported that 78% of the population is food insecure in the country. Hence, the need for mothers to introduce home-made complementary food to their children at an early age is necessary. But in a weaning process, there is always the need to introduce soft, easily swallowed and digested food to supplement the needed nutrients by the infant [7] [8].

In Sierra Leone, weaning is a problematic period for the family and vulnerability for the survival of the child. Most families, particularly those in the rural areas depend on traditional complementary foods and weaning practices using fermented corn, “*ogi*”, for consumption by both adults and infants of weaning age. The reason is that it is one of the countries in West Africa which does not have too many researched literatures on complementary foods that is produced locally at industrial scale [9]. This makes it difficult for families to have options for the children. The nutritional composition of *Bennimix* baby food (BBF) produced on industrial scale has been established [4], Since its formulation between 1964 and 1966 by Dr. Pamela Greene with the support from WHO. The *Bennimix* formula was only field tested for rural mothers as a complementary formula but was not scientifically investigated to ascertain whether it meets the FDA Recommended Daily Intake (RDI) [10]. Its nutritional composition were established but there is the need for more locally products to be in the market[4]. The by-product as waste materials were researched on by an animal scientist in one of the country’s universities and developed animal feed that could be given to chickens and within six weeks they will be ready for consumption. With all that interesting breakthrough within the animal industry, unfortunately, those findings were not published.

In developing countries, one of the greatest problems affecting millions of people, particularly children, is inadequate protein intake in terms of quality and quantity as in developing countries, the amount of protein intake is very low or insignificant in comparison with requirements needed for the proper functioning of the human being [11]. It has been reported that the recommended nutrient densities for weaning food caloric protein 12%, fat 30% while 58% carbohydrates [12]. The recommendation for complementary food, it

was reported that at least protein should be 15 g per 100 g dry weight, while energy was recorded to be 21% from fat [13]. An imbalance of calories from different nutrients may affect the quality of the diet. The Codex Alimentarius states that when a supplementary food for older infants and young children is supplemented with one or more nutrients, the total amount of the added vitamins and minerals should be at least 2/3 the reference daily requirements per 100 g of the food on a dry-matter basis [14].

Evidence has shown that protein deficiency is a major nutritional problem among children and hinders their health, mental capability, school performance and productivity, thus affecting the country's economic growth [15] [16]. Seventy percent of the problems were attributed to low protein intake particularly among those in low-income class, poverty and lack of nutritional knowledge [7] [17]

Also, findings have shown that in traditional communities, special food for the weaning-age-child is uncommon [17]. The child slowly gets accustomed to the adult food, which is low in protein. The situation is aggravated by the fact that the child may not be physiologically prepared for adult food [17].

So many countries have introduced home-made complementary foods, which are not readily accessible to majority of rural nursing mothers. However, a cheaper source of protein that could help in alleviating the problem of undernourishment and malnutrition among children is sesame, pigeon peas, soybean, cowpea and orange-sweet flesh potatoes supplemented products [18] [4] [3]

These are important sources of protein and vitamins, particularly for those nursing mothers who cannot afford to purchase commercial complementary foods for their children. The nutritional composition of the blend of sesame seed and pigeon peas has shown to be a very good protein source as reported by Kanu *et al.* [4]. While the nutritional value of cowpea lies in their high protein content, which is higher than that of cereals [19]. The utilization of cowpea as complementary food for infants is widespread in Nigeria and other developing countries and is prepared either solely or in combination with cereals or other food materials [17]. Soy-ogi (porridge of sorghum or corn and soybean) is another form of local complementary food. The nutritional quality of "ogi" is improved by soybean supplementation. Soybean is rich in most of the essential amino acids needed by human body and a plant protein source that is comparable to animal protein [18]. Since other developing countries have embarked on alternative means of solving the issue of complementary food for infants, it will also help the rural community to know some of those strides those

countries made over the years to come up with workable solutions to address the problem of infant complementary food. Countries like Philippines and Tanzania effected some measures which could serve as a starting point for Sierra Leone [20]. The aim of this review is to highlight the problems that parents encounter with respect to complementary foods in Sierra Leone, nutritive value of various foods, and nutritional problems, with a view to come up with recommendations, which will form a basis for solving complementary food problems provided they are implemented carefully in Sierra Leone.

Weaning Practices and Complementary Foods in Sierra Leone

In most West African countries weaning practices and complementary food production are almost similar [7]. Sierra Leone uses *ogi*, *couscous* *ogi* as complementary food for infants at 4-6 months, Ghana uses *koko*, *kenkey* as complementary food for infant at 3-6 months while Benin serves *ogi* as complementary food at 3-6 month [7]. All the above are prepared from a cereal crop either rice, sorghum, millet, maize or guinea corn [7]. In Liberia, yam is processed into a thin gruel, and given to children as complementary food [21] (WHO, 2000). In Nigeria the usual first complementary foods are called *pap*, *akamu*, *ogi*, or *koko* and are made from maize (*Zea mays*), millet (*Pennisetum americanum*), or guinea corn (*Sorghum* spp.) and introduce to the infant at 3-6 months [7] [22]. In Anambra State of Nigeria, most mothers introduce the thin gruel at three to six months of age [22]. After the successful introduction of cereal gruel, other staple foods in the family menu are given to the child. While in some developing countries like Tanzania, certain foods include yam (*Dioscorea* spp.), rice (*Oryza sativa*), *gari* (fermented cassava grits), and cocoyam (*Xanthosoma sagittifolium*), which may be eaten with soup. These are prepared as homemade complementary foods for infants [23].

These foods are usually mashed, thinned, or pre-chewed. As soon as the child can chew, he or she is given pieces of food from the family pot. Legumes are rarely used for complementary and are introduced much later (after six months of age) because of the problems of indigestibility, flatulence, and diarrhoea associated with their use [24].

Carlson and Wardlaw, [25] however, noted that 67% of their study population satisfactorily used cowpea products as complementary food in Ghana. Most Ghanaian mothers start weaning by the sixth month of the child's life [25]. Based on interviews with breastfeeding with Ghanaian mothers, Appiah, et al. [26] in a population-based cross-sectional study reported that the main weaning food for infants up to six months of age in Ghana was a traditional fermented maize porridge (*koko*). From six months onwards, the infants are given the family diet with complementary breastfeeding. The family foods on which infants are weaned include dishes made from cereal, starchy tubers, legumes, and vegetables [26]. Guinea, a neighboring country to Sierra Leone a research was conducted to produce weaning using dissimile rice and Philippine peanut locally grown in Guinea [27]. It was compared with cereal based products in Guinea, the product was of superior quality which could be done in an industrial scale to address the issue of weaning food in that country.

West African mothers usually breastfeed for 12 months. Many urban poor and rural women breastfeed for up to 18 to 24 months, but solid foods are usually introduced to the child at an early age (4 months) [25]. Sierra Leone has produced for several years a mixture of food for babies containing local ingredients: rice, and sesame called “*benniseed*” in Sierra Leone. Pigeon pea and sugar at various percentage to give a balanced complementary food. This mixture is reported to contain a balance of proteins, calcium and carbohydrate based on the ingredients [4]. This food is reported to be appropriate for the lactating mothers as well as children above the weaning age but are victims of malnutrition [4]. Recently it was reported that orange flesh sweet potato is suitable for complementary food for babies 6-24months [3]. But that product has not been produced on an industrial scale in the country.

In Sierra Leone, during the weaning period most mothers start giving their children rice cooked in excess water which is called “*Pap*” [9]. This report indicated that there is early supplementation with solid foods, or early weaning. Although most women start the weaning process of their infants at the age of three to four months, few begin within the first two months of life [28]. The first solid food and the most popular complementary food is a thin cereal gruel that is called by different names depending on the type of cereal or the West African country. *Ogi*, prepared from maize or sorghum (*couscous ogi*), is a popular weaning food in Sierra Leone also [9]. Other staple foods include yam, *gari* and *foofoo* from cassava and legumes,

which are also given as complementary foods [9]. But very little information on the proximate composition of such foods is available in literature for these foods to create a comprehensive data base that could serve as a reference for food scientists.

In Sierra Leone, the lack of a complementary foods data base is a serious gap in knowledge for researchers. The lack of adequate and balanced nutrients in the local complementary foods, coupled with poor feeding practices might be reason the country is grappling with the issue of infant malnutrition, growth retardation, infection, and high mortality rates [28]. Kwashiorkor and Marasmus are two severe conditions that develop because of protein energy deficiency [29].

Kwashiorkor is a form of malnutrition caused by inadequate protein intake. Early symptoms of any type of malnutrition are very general and include fatigue, irritability, and sluggishness. As protein deprivation continues, it causes growth failure, loss of muscle mass and decreased immunity [21]. Marasmus is basically the same thing, but it is not connected directly to protein deficiency but other nutrients like minerals and vitamins and reduced food intake [29].

The food system for the entire population in Sierra Leone in the past was reported to be disorganized [30] and seems to have changed little as the country is still experiencing limited food production within the country [31]. Thus, the issue of planning for a better complementary food for children of that country need attention of food scientists. The already insufficient food production hampers even further with the addition of the past eleven years of war, the Ebola, and now the Corona. Now, the focus is shifting to the improvement of nutrition and production, in order to improve the lives of the people. This improvement is most critical in the early stages of a child's life.

A major problem in Sierra Leone is that children at a critical age are not receiving the necessary food nutrients including vitamins and essential minerals [7]. This is because some parents cannot afford the money to prepare or buy the required food for their children. Poverty and illiteracy are very high in the country that has prevented parents to give their children the right complementary food. Parents could not give babies milk powder after weaning age due to poverty as baby milk powders are very expensive. The first solid food and the most popular complementary food introduced to children when they are three to six months of age lacks those useful essential minerals either due to the production process or because they are

naturally lacking in the foods used to prepare the complementary products [4] [9]. After the introduction of solid foods, the child receives this type of cereal gruel or other staple foods from the family menu. These foods include yam and rice, which may be served with soup. These foods are usually mashed, thinned, or pre-chewed [7]. As soon as the child is able to chew, he or she is given pieces of food from the family. Few infants are fed with meat, eggs, or fish products because of lack of resources [6]. *Pap, ogi, or koko* is similar to a porridge made from corn and other starchy grains, roots, and tubers [9]. It is high in carbohydrates but lacks other nutrients which the child requires to develop properly [9]. Carbohydrate is the main source of energy and is commonly found in potatoes, bread, rice and other starchy foods [17]. The diets of the families, which most infants are introduced to, are most time found to be predominantly carbohydrate and are also low in other nutritional value for the infants [18]. These traditional foods are low in protein, calcium, and other nutrients. These nutrients are further lost due to poor processing of the food [17] [23]. The other problem with the diet is the bulkiness of the food for the baby to swallow. For adults and older children, it is possible to get a reasonable protein intake because of the size of their stomach but for infants the volume of the traditional diets may be too large to allow the child to take in all the food necessary to cover his or her energy needs [23].

The Vicious Cycle of Deprivation of Good Complementary Food for any Infant

Every year, more than 20 million low birth weight (LBW) babies are born in globally and majority of the figure could be found in developing countries [32]. In countries like Sierra Leone, Guinea, and Bangladesh, more than 30% of all children are born underweight. From the moment of birth, the scales are tipped against them [31]. LBW babies face increased risk of dying in infancy, stunted physical and cognitive growth, and reduced working capacity. This scenario is exacerbated when these children are given complementary foods that are deficient in nutrients required for normal growth [23]. Compared with normal babies, the risk of neonatal death is four times higher for infants whose weight is less than 2.5 kg at birth and 18 times higher for those who weigh less than 2.0 kg [33]. LBW babies also suffer significantly higher rates of malnutrition and stunting later in childhood. A study in Guatemala Bay found that by the time they reached adolescence LBW boys were 6.3 cm shorter and 3.8 kg lighter than normal, while girls lost 3.8 cm in height and 5.6 kg in weight if they are not given a balanced complementary diet [31]. This is

happening in Sierra Leone because of the problem of inadequate weaning practices and food for the infants [25]. Almost one third of the children in developing countries are stunted, with heights that fall far below the normal range for their age. This signal chronic under nutrition caused by the absence of balanced diet during the weaning stage [34]. Stunting, like LBW, with the lack of proper complementary food at the weaning period has been linked to increased illness and death and reduction in the cognitive ability of the child, thus likely to lower productivity of that child in future [31].

When stunting occurs during the first five years of life, the damage to physical and cognitive development is usually irreversible [35]. Undernourishment and stunting frequently overlap with vitamins and mineral deficiencies that affect nearly 2 billion people worldwide [36]. Even when mild, these micronutrient deficiencies significantly increase the risk of death and severe illness [36]. They can also cause irreversible cognitive deficits in children. Iron deficiency, for example, has been linked to increased maternal mortality in childbirth, and poor motor and cognitive development in children [37]. It is one of those nutrients lacking in the weaning food introduced to infants in Sierra Leone. Iron deficiency affects an estimated 1.7 billion people worldwide, half of whom suffer from iron deficiency anemia [37]. In Sierra Leone, the impact is not specifically known as little information is available in literature.

Nutritive Value and Nutritional Problems of Complementary Foods in Sierra Leone

Complementary feeding mainly aims to prevent the development of nutritional deficiencies in an infant at an early age [25]. Because after 6 months, the needs of a child for energy and other nutrients could not be provided all again by the milk, hence complementary foods ould now be important to support needs of the child. A child of 6months old and above is now ready for other foods which could help the child to transit well through complementary feeding. The most commonly observed nutrient deficiencies during infancy are inadequate protein intake, iron, zinc, vitamin A and vitamin D [38] [8]. Recommended Dietary Allowance (RDA) for energy intake in infancy is 108 kcal/kg/day from birth through six months of age, and 98 kcal/kg for the second half of the first year [39]. The body needs protein increases from about 11.0% to 15.0% over the first year [39] [40]. The recommended intake is 2.2g/kg for the first six months (compared with 0.8g/kg for an adult) and 1.6g/kg from 6 to 12 months [40]. The very high requirement for protein during early growth and development makes this age group vulnerable to protein deprivation [40].

In West Africa, infant food is characterized by low nutritive value and high bulkiness [9]. Maize *pap* and *koko* from Sierra Leone have been implicated in the aetiology of protein-energy malnutrition in children during the weaning period [9]. Cereals form the primary basis for most of the traditional weaning foods in Sierra Leone. Cereal-based diets have lower nutritional value than animal-based ones [17]. For example, maize is low in lysine and tryptophan [9] [25]. These two amino acids are indispensable to growth of the young child [7]. Comparing the food given to infants in Sierra Leone and the commercially produced infant weaning food, *pap* or *ogi* which is given to most Sierra Leonean infants within the weaning age, is of poor quality [4]. In Anambra State, Nigeria, it was observed that *Pap* contained only 0.5% protein and less than 1% fat, as compared with 9% protein and 4% fat in corn [7]. Recently, in Nigeria, it was reported that the protein content of plantain *pap* was too low to support the growth of children, so it has to be blended with soybean to improve its nutritional content [41]. Similarly, the traditional maize gruel used for weaning Senegalese children is not energy dense and is insufficient to cover all the nutrients needed by the infant [19]. Cereal gruel processing methods have resulted in the loss of other nutrients apart from protein [23].

Ninety eight percent of the original tryptophan in maize is lost during the processing of *ogi* [9]. Large losses of niacin during the processing of *ogi* could account for the high incidence of pellagra in infants during weaning in Sierra Leone [9]. Many investigators have reported that these traditional foods are low in protein and that other nutrients are lost due to poor processing [7]. However, the use of foods of high nutrient density (good mixture of legumes and cereals) and frequent feeding schedules can help to provide adequate food for growth and activity [7].

Children in Sierra Leone are at higher risk of infection during weaning [6]. Malnutrition increases susceptibility to infectious diseases and increases child mortality from diseases such as diarrhea, whooping cough, and acute respiratory infection [42]. It reduces the capacity of the host to resist the consequences of such infection, making death inevitable for some [33]. As solid foods are introduced, infection with microorganisms that cause diarrhoea or other diseases is more likely to occur. Rural and poor urban mothers often contaminate the food during handling. Contamination can also occur due to use of dirty water and utensils, and poor storage [33]. This is a similar challenge for working mothers, who leave infants in the care of maids who are usually ignorant and inexperienced, and sometimes very unhygienic

[42]. According to available statistics from Sierra Leone Red Cross Society, infant mortality accounts for 50% of all deaths in children up to 14 years of age, and under-five mortality accounts for 93% of these deaths, 70% of which are attributed to preventable diseases and lack of appropriate complementary foods in Sierra Leone [43].

The inherent problems in the traditional complementary foods and feeding practices predispose the infant to malnutrition, growth retardation, infection, and high mortality [25]. Thus, protein-energy malnutrition is a common problem among infants and children in the poor socio-economic groups of developing countries [7]. Severe protein-energy malnutrition results in kwashiorkor and marasmus [7]. The inadequate growth or stunting produced as a result of poor supplementation is best described as hidden malnutrition [7]. This is because the child may appear healthy while being severely malnourished because of the poor weaning food given to that child.

Formulation and Development of Complementary Foods of High Nutritive Value for Sierra Leone

In Nigeria and Ghana, many researchers have worked extensively on cereal-legume blends. For example, Sefa-Dedeh *et al.* [19] formulated a local complementary food mixture of maize and cowpea. Akinrele and Edwards, [44] formulated soya-ogi (corn gruel plus soybean), and the Collaborative Research Support Programme (CRSP) Cowpea Linkage Project at the University of Nigeria, Nsukka, formulated *cerebabe* (corn plus cowpea). Other useful combinations include *ogi* and melon protein (corn gruel plus melon seed) and cowpea-ogi [19]. However, single protein from the above sources was adequate to promote growth or enhance nitrogen retention as well as a milk-based diet. To this end, a mixture of legumes and cereals has been reported to be superior to any single protein source in protein efficiency ratio, net protein retention, biological value, and net protein utilization [19]. In Ghana, low-cost, nutritious, well-balanced weaning foods rich in protein and energy have been developed from locally available foods [17] [26]. One of such foods is *weanimix*, a blend of legume (groundnut and/or cowpea) and cereal (maize) in the ratio of 1:4 w/w. Alfalfa could also be incorporated into the weaning diet of infants [39]. This legume has been reported to contain higher levels of protein, minerals, and beta-carotene and could support child growth better than *weanimix* [39]. In Senegal, millet meal-peanut flour mixtures were virtually equal in value to millet-milk mixtures in treating children suffering from protein malnutrition [29]. These strategies of adopting locally

available food stuffs for appropriate weaning food production in Sierra Leone would be worth investigating. The following technologies are also recommended.

Fermentation and germination

Fermentation enhances the nutritive value of foods by increasing thiamine, nicotinic acid, riboflavin, and protein content as a result of microbial activity [45]. Many researchers have observed that the digestibility, protein efficiency ratio, net protein utilization, and biological value were much higher in fermented food [45] [46].

Steinkraus, [45] also noted that minerals were made more available and phosphorus released from phytate during fermentation of corn (*Zea mays*). Fermentation also reduces the high bulkiness of traditional West African weaning foods by reducing the viscosity of cereal gruels [45]. During cereal fermentation, microbial activity hydrolyses starch granules, resulting in reduced viscosity of the porridge. In addition to fermentation, germination improves the nutritional value of weaning foods by reducing the water-binding capacity of cereal flour and the incidence of food pathogens [45]. This allows the porridge to have a free-flowing consistency even with a high proportion of flour [45] [46]. Germination also converts insoluble proteins to soluble components and increases the levels of lysine as well as of vitamins B and C [46]. It is a method that could be used in Sierra Leone to remedy the problem of complementary food since Sierra Leone has all the crops mentioned above [30]. Vegetables are produced everywhere in Sierra Leone and they grow well with or without the application of fertilizers. Most vegetables, like legumes, potatoes, cucumber, lettuce, which can help to supply vitamins, are produced by most people in the rural areas and some urban centres in Sierra Leone [47].

OTHER RECOMMENDATIONS

Several recommendations could be proposed to overcome the problems associated with weaning foods in Sierra Leone. These are described below:

Community Nutrition Education

Nutrition education can be incorporated into primary health care programmes, schools and colleges so that the message would be discussed at all levels. This process can have a long-term impact on weaning

practices and nutritional status in Sierra Leone because similar programmes have been undertaken by other developing countries such as the Philippines where a weaning education programme led to a reduction in the prevalence of malnutrition from 64% to 42% [20]. In Nigeria, the Africare Child Survival Programme yielded similar results. The governments of some West African nations have yet to realize the importance of nutrition training and education. But it can work if it is planned properly and the medium of communication is in the community's local languages.

Most people in developing countries perceive provision of clean drinking water as the responsibility of governments. That concept can be changed by educating the people to use locally available materials to protect their drinking water because it is not easy or feasible yet for a developing country like Sierra Leone to provide pipe-borne water all over the country. But that can be addressed by educating the people to know where to construct wells and protect these wells so that they would be free from contamination. Proper sewage disposal in rural communities must be emphasized. These precautions would go a long way to reduce the incidence of food contamination and infectious diseases that affect infants in Sierra Leone.

The Development of Weaning Recipe Books

Where recipe books are available, they should be properly distributed to mothers if such books are not available, which might be the case in Sierra Leone. For the rural illiterate mother, nutrition counseling and demonstrations are appropriate. Some countries in West Africa have developed some weaning recipe books that Sierra Leone could copy from and try to adapt. The availability of appropriate ready-to-use flour from a village mill process will increase the use of complementary foods and decrease costs.

Reduction of the Work Load of the Suckling Mother



Rural women spend about three hours a day in meal preparation, as against one hour for child care [48]. Reducing the workload of the mother would save time and energy for tending the children. A typical rural African woman spends 14 to 18 hours per day (an average of 13 hours) working towards taking care of the home. African women are the key to household food security and nutrition. They form 47% of the continent's agricultural labor force and account for two-thirds of food production [49]. With such time and energy consuming activities, these rural women are not able to prepare nutritious weaning foods. Time and

energy saving processing methods, equipment and appropriate technologies are needed for both agricultural and domestic uses in the rural communities.

Promotion of Breast-Feeding Messages



The continuous promotion of breast feeding should be encouraged in Sierra Leone. This will help children within the weaning age bracket not to be exposed to danger like protein energy malnutrition at an early stage of their lives. The United Nations Children's Fund (UNICEF) in its Convention for the Rights of the Child considers breastfeeding an issue of human rights that falls under three different categories. These are;

- i. The rights of a child to food security.
- ii. Optimum nutrition and the highest standard of health.
- iii. Support for women in carrying out her role as a mother [49].

Maternity Leave

UNICEF believes that once the rights of women in relation to breastfeeding are accepted, working women will get more support and therefore exclusive breastfeeding will be made easier. The Maternity Protection Convention of 2000 provides for 14 weeks maternity leave [49], but in Sierra Leone the maternity leave is for only six weeks [6]. Employers have indicated their readiness to provide space at work places for mothers to breastfeed their babies instead of extending the maternity leave. In other countries, working mothers are given time between work schedules to go home and breastfeed their babies or are provided with facilities and space at work to do so. For instance, in many European countries, there is greater support for women continuing to breastfeed on returning from work; in Norway, breastfeeding mothers are entitled to two hours off during their working day to breastfeed; in France, women breastfeeding less than 12 months is allowed hourly breaks per working day. Likewise, in Italy, new mothers who work full-time are entitled to two daily rest periods of one hour each, and can take them together at the end of the day, to shorten their working day [21]. The same is the case in countries like Spain, Portugal and Austria.

In both Tanzania and Kenya, maternity leave is a three-month paid leave and recently, the new labour laws in Tanzania have introduced a three-day paternity leave for fathers while in Kenya employing authorities

give mothers three months (90 days) but forfeits the one-month annual leave and fathers to have two weeks' paternity leave. But the law for Kenya fathers is not yet operational, it is still under debate [50]. According to UNICEF, it is important that working women get enough time to harmonize their productive and reproductive roles because both are very important [50]. However, Sierra Leone has not yet ratified the Convention and as a result, some companies especially private ones require working mothers to report back to work a week after giving birth, failure of which would mean losing their jobs [6]. All of the above recommendation could help but the best is to produce the product investigated in Sierra Leone recently using the orange-fleshed sweet potato blend as a complementary food for the country as the potato could easily be grown in the country [5].

Conclusion

Many of the traditional complementary foods used in Sierra Leone are of low nutrient density, foods like, pap from rice, cassava, corn and potatoes. Cereal gruels and starchy roots and tubers continue to form the bulk of the complementary foods for the infants. However, the recent product from the orange-flesh sweet potato could address the issue of complementary food in the country as it is easy to prepare, and the products are easily available in the rural area and even urban settings. Some children, however, are weaned directly into the family diet early in life. Infant feeding practices are not fully developed. Infection and malnutrition are problems associated with poor weaning methods. The existing weaning methods and the type of food utilized as complementary foods were reviewed and some recommendations like community nutrition education, the development of weaning recipe books, reduction of the work load of the suckling mother, promotion of breast-feeding messages and maternity leave are suggested as to address the complementary food situation in Sierra Leone. It will serve as a foundation for addressing the long-standing problem of complementary feeding in Sierra Leone.



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