

Full Length Research Paper

Review of the practices of feeding and food of complement to the young child

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The objective of this synthetic study of the existing data is to make the current situation of the various practices of feeding to determine their evolution in Niger with the aim of a better improvement of the infant food. It is based on the exploitation of available documents, including reports of nutrition surveys, demographic and health, the annual reports of vulnerability and the results of other nutritional researches. The exploitation of these data reveals that generally, the practice of exclusive breastfeeding, breastfeeding nonexclusive, and complementary feeding constitute the childhood bulk supply lines in the world in general and particularly in Niger. In Niger, the national rate of exclusive breastfeeding is experiencing a significant step forward from 2006 (2.4%) and 2009 (9.9%). The non-exclusive breastfeeding rate is declining: 95% in 2006 and 51% in 2009. As for the supplementary feeding using widely cereals (millet, sorghum and cowpeas), the analysis reveals that it is early in children from 0 to 6 months (age median is of 9.7 months) but with a positive trend regarding the recommendations for infant nutrition: 20.6% in 2006 against 15.1 in 2009. However, this practice decreases among children from 6 to 9 months. These inadequate infant feeding practices contribute to the deterioration of the nutritional status of children and infant mortality since more than a decade in Niger. So, a very particular attention is to be concerned with these practices of feeding and finally an accent must be put on the promotion of the accessible, feasible, acceptable, long-lasting and safe local food of complement.

Key words: Niger, feeding practices, children, local food.

INTRODUCTION

The infant and young child has made remarkable progress worldwide (UNICEF, 2006). However, inappropriate feeding practices, including inadequate or no breastfeeding and inadequate complementary feeding, remain in the world what most threatens the health, child survival and also the well-being of future generations. Indeed,

the malnutrition strikes the children from birth and continues beyond the preschool age. So, when it does not lead to the death and when it is not corrected before the puberty, she can end in adults intellectually and physically decreased, offering a lesser resistance to the physical, biological and socio-cultural attacks of the environment

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Abbreviations: **CUN**, Community of Niamey; **DN**, department of nutrition; **EDSN/MICS**, demographic survey and of health and in multiple indicators; **FAO**, food and agriculture organisation; **INS**, national statistics institute; **RUTF**, ready to use therapeutic foods; **UNICEF**, united nations children's fund; **WFP**, world food program; **WHO**, world health organization; **CSB**, corn soya blend; **HDI**, human development index.

in which they live. Such adults are little productive and establish real brakes in the development of their countries. Thus, PAM (2010) estimate that 130 million children under five are underweight and nearly 195 million have stunted growth, and that over a third of deaths of children fewer than five are directly attributable to under nutrition. Niger is characterized for years by unacceptable levels of malnutrition due to droughts and recurrent food crises, poor feeding practices and inadequate access to health services (Trèche, 1994). Therefore, the eating habits of children depend on a large extent on the availability of food households (FAO/PAM, 2009). However, these feeding practices are important predictors of children's nutritional status effects, in turn, morbidity and mortality of these children generally and in particular children of less than 24 months, to whom prevalence of the acute malnutrition constantly is strong (INS, 2012). The first introduced into the supplements were the diet of cod liver oil to prevent rickets and orange juice against scurvy. The next fifty years, it was recommended to add, at the age of 6 months, cereals and fruit and vegetable puree.

The objectives of the review were to: a) describe current feeding practices; b) identify local foods used in complementary feeding, and c) to consider how formulations of local flours can be changed to improve the nutritional status of compromised children.

METHODOLOGY

Cadre study

The Niger is a Sahelian country characterized by high instability of the climate and a high vulnerability in terms of economics and food availability (INS, 2006). With the growth rate which is the highest in the world (3.3%), a total fertility rate estimated at 7.1 children / woman and an estimated population in 2010 to 15203822 inhabitants, 51.9% under 15 years, Niger is a developing country (INS, 2010). However, it was the 182nd out of 182 with a Human Development Index (HDI) of 0.340 (EDSN-MICS IV, 2012). Administratively, the country has eight (8) regions namely: Agadez, Diffa, Dosso, Maradi, Tahoua, Tillabéry, Zinder and Niamey. The present bibliographical synthesis will use the data of all these 8 regions of Niger.

Sources data

The literature search was based on the various documents available. This reports a series of investigations on the survival and nutrition conducted during the lean period and / or the harvest season of the year in 2005, the Demographic and Health Survey Multiple Indicator 2006, the action plan for nutrition from 2007 to 2015 developed in 2006, the national policy on food and nutrition 2006, documents from international organizations (WFP, FAO), non-governmental organizations (NGOs) and information collected at the level of physical structures such as: the Department of Nutrition (DN) and the National Statistics Institute (INS). On the investigation, the data are representative of the surveyed areas but cannot be extrapolated in full for the region of Agadez since only urban areas were affected for reasons of insecurity (INS, 2006). These data are far from being exhaustive; so, these collected studies concern repre-

sentative samples of children and/or parents.

RESULTS

According to UNICEF (2009), rate of exclusive breastfeeding is very low and the prevalence of stunting is high in several countries that have experienced crisis and the challenge remains to meet the longer term in countries such as Côte d'Ivoire, Djibouti, Niger and Chad. However, Africa remains one of the five parts of the world where breastfeeding is the most widespread and longest lasting. However, early initiation of breastfeeding at birth is uncommon in West Africa, because the colostrums are not traditionally given to the newborn (UNICEF, 2009). The rate of initiation during the first 24 h is much lower (51%) than in other regions (86% in East Africa and 83% in Central Africa and South) (Diop, 2002). However, there is great diversity in breastfeeding practices and complementary feeding of young children, as shown in Figure 1. From part of this Figure 1, translating the data on the scale of the world, the rate of premature initiation into the feeding was estimated at 39%, the proportion of the children from 0 to 5 months having benefited from an exclusive feeding was when to her estimated at 37%. Whereas, the contribution of food of supplement had concerned 58% of children from 6 to 9 months. Besides, the pursuit of the breast-feeding concerned 50 and 75%, respectively 12-month-old children and 24 months.

In Africa, most of the time the porridge given to infants is of poor nutritional quality: According to OMS (2003), it is primarily cereal flours containing added sugar, sometimes small fish, and rarely milk powder. These sprays do not cover the needs of children in proteinaceous material, lipid and micronutrients (vitamins, minerals). However, it should be noted in production in the African region of certain flours used locally as food supplements and with good nutritional value. These include, among other flour Misola, Bitamin (Table 1).

Feeding practices for infants and young children in Niger

The infant feeding practices

Practice nursing: Exclusive breastfeeding is always the practice most recommended by WHO and UNICEF to feed children from birth to age 6 months, since babies have specific dietary needs and are born with a weak immune system. Indeed, breast milk remains the best choice for infant feeding and provides the nutritional requirements of children up to six months and may then represent the milk supply diversification. Thus, UNICEF (2006) states between 2003 and 2008, 38% of children on 791 births in 2008 were initiated to breastfeeding with early consumption of colostrums in Niger. Similarly,

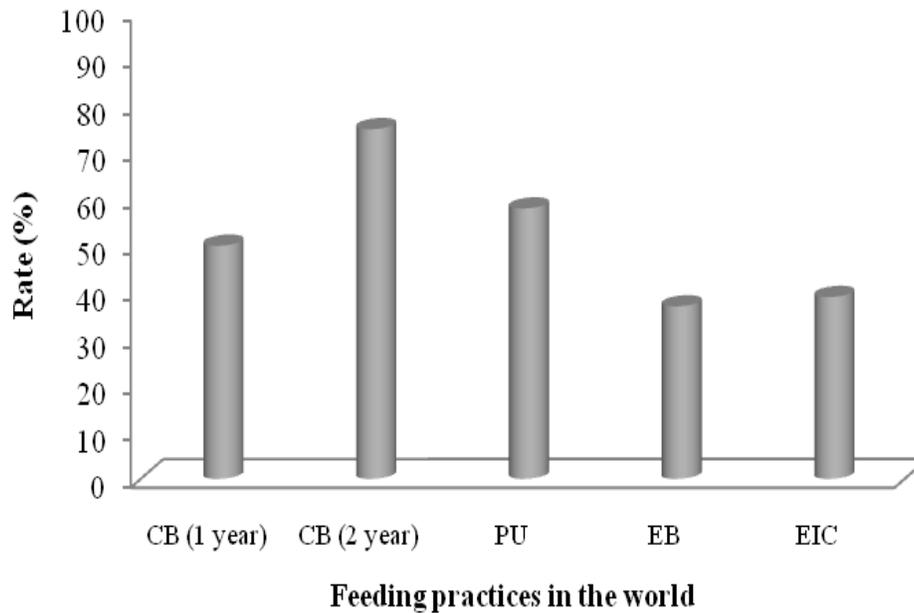


Figure 1. Continuum of infant feeding practices in the world; EIC, Early initiation of breastfeeding; EB, exclusive breastfeeding (0 to 5 months); PU, power-up (6 to 9 months); CB (1 year), continuation of breastfeeding until a year; CB (2 years), continuation of breastfeeding until 2 years. Source: UNICEF (2009).

Table 1. Example of a few meals and their nutritional values per country.

Country	Unity name	Energy (Kcal/100 gDM)	Protein (g/100 gDM)	Fat (g/100 gDM)	Fiber (g/100 gDM)	Calcium (mg/100 gDM)	Iron (mg/100 gDM)
Bénin	Ouando 1	401	9.9	3.4	ND	6	13
	Ouando 2	366	16	4	7	29	9
Burkina Faso	Misola	430	18	11.5	ND	ND	ND
Togo	Nutrimix 1	426	8.2	2.8	0.9	40	ND
	Nutrimix 2	444	17.6	9	2.2	73	ND
Niger	Bitamin	403.3	16.2	8.9	2.2	52.1	4.43

DM, Dry matter; 1, first age; 2, second age; Source: Trèche (1994).

survival and nutrition surveys conducted between in 2006 and 2009 reveal the following information (Figure 2): On the scale of Niger, the rate of premature initiation into the feeding stabilized between 68.8 and 83.2% and children's proportion having consumed the colostrum is understood between 81.9 and 94.9%. Whereas, the exclusive feeding had concerned between 2.4 and 9.9% of the children and finally the proportion of the not breast-fed children is estimated between 0.3 and 3.7% as shown in Figure 2.

The practice of breastfeeding more complementary food: The continued breastfeeding along with complementary feeding after improvement alone could save daily the lives of more than 3500 children, more than any other preventive action. From Figure 3, the continuation

of breastfeeding beyond 12 months is a reality in Niger. This practice is evolving positively; it has increased from 90.6% in 2006 to 92.4% in 2009 and compared it to the world average of 75%. Finally, OMS (2003) states that wait six months before introducing other foods have more health benefits than risks. Yet the practice of breastfeeding which more complementary food remains in children less than 6 months although the results of nutrition surveys from 2006 to 2009 revealed at this level are still positive (Figure 4).

The practice of infant feeding

Before 1920, food supplements are rarely recommended actually the practice of complementary feeding is initiated

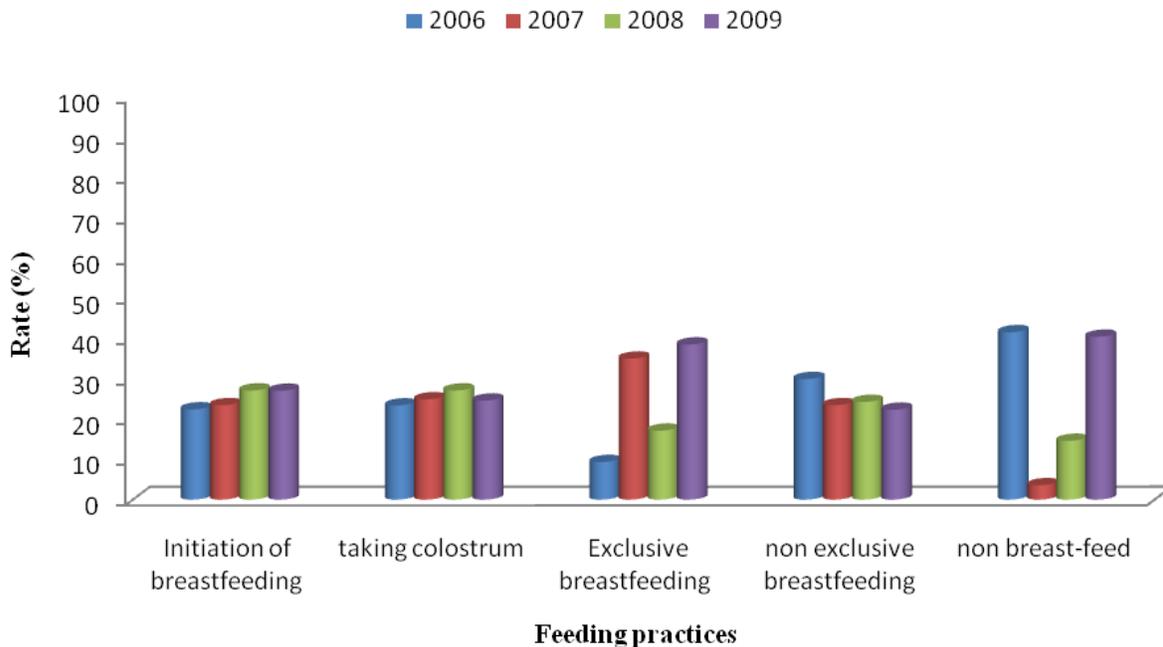


Figure 2. Feeding practices in infants in Niger; Source: INS (2006, 2007, 2008, 2009).

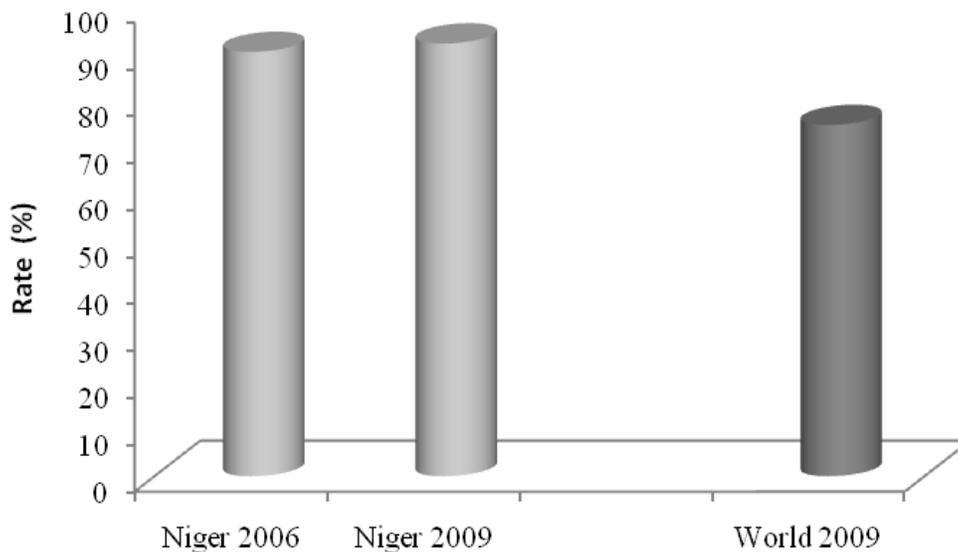


Figure 3. Continuation of breastfeeding: Comparison and evolution; Source: INS (2006, 2009) and UNICEF (2009).

in children from the sixth months (WHO, 2003). This period also called period of ab lactation leading to the gradual replacement of milk with non-dairy foods, is marked by a high risk of nutritional deficiencies (OMS et al., 1994). However, in the context of Niger, it is sometimes early practiced (Figure 5). Indeed, the rate of introduction of complementary foods on time is quite high and involved a maximum of 73.7% of children aged from 6 to

9 months in 2006, but this rate decreased over the years and reached 52.1% in 2009. The survey EDSN/MICS-III showed 62% of children aged 6 to 9 months also received supplementary feeding in addition to breast-feeding. Indeed, the median age of introduction of the first food is of 9.5 months. However, 66% of children aged 6 to 9 months were given a dietary supplement in addition to breast milk (MSP, 2007). In addition, these complementary

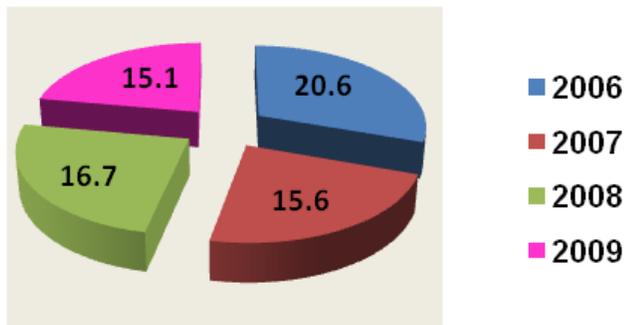
B + CF(0-5 months)

Figure 4. Breastfeeding and complementary feeding in the young children (0 to 5 months); B, Breastfeeding; CF, complementary food.

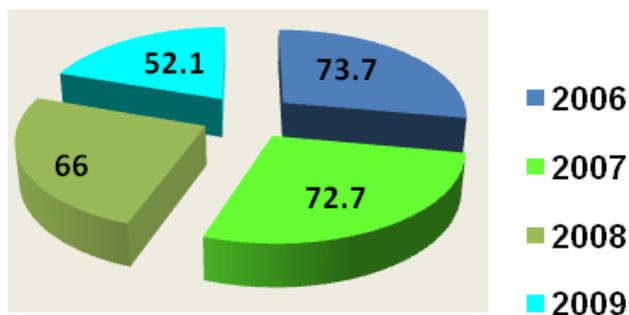
B + CF(6-8 months)

Figure 5. Breastfeeding and complementary feeding in the young children; B, Breastfeeding; CF, complementary food.

foods (Figure 6) are most often the diet that is largely based on cereals, mainly millet and sorghum, which comes in addition to cassava.

According to Figure 6, between 2007 and 2008, the consumption of fruit and animal products is still very low compared to cereals and legumes. However, during the years 2006, 2007 and 2008, respectively 76.5, 74.5 and 66.0% of malnourished children have been placed under supplementary feeding in all rural areas of Niger, according to the report from the INS investigations over the past three years.

DISCUSSION

Feeding practices for infants and young children in Niger

According to Mohamed (2000) and Ohana (2009), the promotion, protection and support of optimal breastfeed-

ing practices and complementary feeding of young children are a priority in the fight against micro-nutrient deficiencies such as vitamin A (which is a major public health), iron, and zinc and so on. However, the majority (96.4% in 2009) of breastfed infants do not experience from exclusive breastfeeding (9.9% in 2009 against only 2.4% in 2006). They are therefore subject to a practice of breastfeeding often at the root of the deterioration of the nutritional status of children. Besides, the initiation of the feeding with colostrum intake acts not at all on the introduction of the water, as well as the certain liquids (juice of fruits/decoctions) or other milk (infantile artificial milk or not) and some milk of animals (goat, cow, female camel) within first hours of the life of the child. The reasons moved forward with regard to the introduction of this food, remain very often, usually the child needs it to be refreshed, to avoid the dehydration and to increase (ACF, 2008). The decoctions generally given to the children are with leaves, of stalks or roots of vegetables with virtue medicinal (Saadou and Soumana, 1993) as the decoctions of *Bauhinia rufescens*, *Chrozophora brocchiana*, *Tephrosia lupinifolia*, etc. In addition, very few children (3.4% in 2008, 2.4% nationally in 2009) receive other types of milk (fresh cow's milk, camel, goat, etc.) in addition to breastfeeding (INS, 2008, 2009). Besides this, consumption of milk is much more marked in urban zone than rural area (MSP, 2007).

In MSP (2007), the practice of exclusive breastfeeding is also dependent on the environment, with 2.4% of children exclusively breastfeed in urban areas and 1.9% in rural areas (say which source and its year). Thus, the progress made in the initiation of breastfeeding (within 1 h of birth and the first 24 h of life) result mainly from the national policy of promoting breastfeeding, adopted in 1994, through which public awareness campaigns were conducted with mothers.

Complementary feeding of young children

Features of complementary feeding

A wide variety of baby food had become available and had been introduced, more and earlier, into the supply of the infant (Abdelaal, 1994). Thus, from the analysis made by the nutritional profile EDSN-MICS IV (2012), infants should begin receiving from the sixth month supplementary feeding is proper to say, local foods rich in energy, protein, iron, iodine and Vitamin A, as the basis of this supplementary feeding necessary for the proper development of young children. Unfortunately, in Niger, one in five children aged from 6 to 9 months is not already receiving complementary foods necessary for their harmonious growth. In addition, pasta nutritious ready (RUTF) are made extra treatment during the usual diet, especially during the lean period: RUTF distributions of food in 2006 in 12 villages in the Maradi region involved children from six months to five years (MSF, 2010). Note that the nutritional

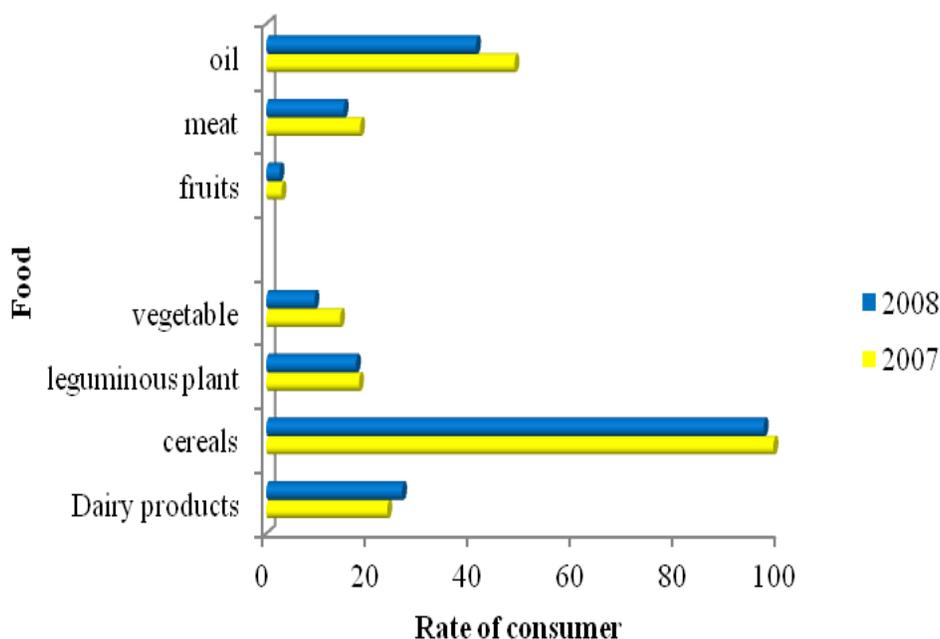


Figure 6. Weaning foods in young children.

Table 2. Nutritional requirements by age of youngest child.

Age (month)	Energy need (Kcal/kg de weight/day)	Protein need
0 to 3	120	It is estimated that for children under 5 should be an average of 2 g of protein per kg per day
3 to 5	115	
6 to 8	110	
9 to 11	105	
12 to 23	550	

Source: MSP (2007).

paste (plumpy nut) is also recommended to be introduced early in infant feeding and not later in only children with severe malnutrition as recommended by WHO, WFP and UNICEF (WHO, 2003). And finally, are made, some local flour fortified milk, egg, peanut meal, cowpeas with intake: Calories, protein, fat, carbohydrates, iron, vitamin A, proportional to each of these supplements but still contribute much to improve the nutritional status of young children (Antonella, 1993); Spirulina: the benefits attributed to spirulina as a food supplement in nutritional recovery are many: it is considered a cyanobacterium, rich in protein, fatty acid, in minerals, vitamins and contains chlorophyll, fiber and a blue pigment (phycocyanin) (Halidou, 2008); ALE (Alfalfa leaf extract) with the nutritional content quite exceptional (protein, vitamin A, folic acid, vitamin E, iron calcium, magnesium, copper, zinc) allows the rapid improvement of the general state of people who use these extracts (FAO, 2006).

Moreover, it is advisable not to introduce one new food at a time, easier to interpret any possible reaction. Also,

excess-off of a food could promote awareness of the food, and frequent consumption of a food affects the diversity of food without the risk of allergies seems to get worse (Bocquet et al., 2003). Finally, complementary foods must meet a number of rules, since it began in a period when the infant is particularly vulnerable. Thus, for the nutritional requirements (Table 2) met, it is necessary that complementary foods be:

- i) Made at the right time, adequate, safe (OMS, 2003);
- ii) Properly administered: that is to say, given consistent signs of appetite and satiety issued by the child, the frequency of meals and the method used to feed the child is age-appropriate and very sick children being actively encouraged to consume sufficient food using fingers or a spoon or feeding himself (OMS, 2003).

Complementary feeding in rural areas

In Niger, particularly in rural areas, supplementary feeding

is very diverse and is usually presented to the child as slurry of cereal simple premises, or a bowl of dough with an energy density which is only about a tenth the energy density of Cérélac and low nutritional value (William and Diakalia, 2002). Moreover, these rural children can even eat complementary foods unsuitable for their age during a time of famine as it was the case in 2005 the consumption of CSB (corn-soya-bean) and the UNIMIX (corn and soybean mixture of minerals and vitamins) for children from 0 to 5 months in the three regions of Maradi, Zinder and Tillabéry (INS, 2006). Also, it should be remembered that the mixture or CSB lack of essential nutrients needed for growth of young children, and that does not prevent malnutrition (MSF, 2010).

Complementary feeding in urban areas

In urban areas, the food supplement is usually given to the child as a slurry or paste, often mild enough good consistency and therefore a significant nutritional value. However, depending on the monetary income of the family, there is use in the preparation of boiled flour Misola nutrients such as flour, which has a high success rate in Burkina Faso (Frederic and Maurin, 2009), made from local cereals (millet or sorghum) by the Nigerian women grouped together in a cooperative. Vitamil flour (made from millet, cowpeas, groundnuts) and finally some flour Cérélac of Nestlé (one dominant product in African markets), which has a great brand, following its sale to a very high price, thereby limiting its use (François, 2010), phosphatine, Blédine, France cereals dairy milk, etc. Which are industrial products from foreign countries? In addition to flour, there are other little flour or sometimes even absent in the market but are generally used in public programs of infant feeding. In fact, despite their value nutritious and low price, they are made only amounts absorbed most often for public health programs (Dolan, 2010). In addition, the contribution of dietary supplement was made and covered urban areas: 73.3%, 40.6% of children [Urban Community of Niamey (CUN)], 69.1% of children (more urban), 86.5% of children (CUN) and 55.9% of children (other urban), respectively in 2006, 2007 and 2008 according to survey results of survival and nutrition. Finally, following the purchasing power of households, vegetable purees, fruit and vegetable soups as industrial products are presented to young children in urban centers.

Ultimately, these sprays do not obey the most appropriate mode of preparation. Indeed, a good preparation of boiled must take into account the energy value, consistency with the best (suitable consistency of the child) can be obtained by adding amylase. The latter plays an important role in the digestion of starch (boiled liquefaction) can also come from the "saliva" of breast milk and malted flour (François, 2010).

Feeding during and after illness

One of the main causes of malnutrition, other infectious

diseases (diarrhea), food is bad practice (OMS, 2003); however, a special feeding practice is recommended especially for infants and sick children (or living with HIV / AIDS) or recovering from malnutrition or illness. Indeed (OMS, 2003), recommended during and after illness, feed more frequently than usual, while encouraging the child to eat more. Thus, the child who is under these conditions must consume much more fluid, and favorite foods, light, varied and appetizing. Finally, note that this practice of frequent and active power (LINKAGES, 1990) is adopted in so many countries like the Niger through its national policy on food and nutrition.

Complementary foods: Acceptability and effectiveness in Niger

The acceptability and effectiveness are generally determined after the tests. These tests are usually done at the population level (particularly at mothers or guardians of children aged 0 to 59 months) are a must recommended by the institutions (WHO, UNICEF, WFP etc) in charge of nutrition before release of different products. Generally, these tests must decide: the energy density, nutrient composition, the organoleptic characteristics of products and finally the most competitive with the information provided to improve the acceptability and nutritional value of the food tested further.

Acceptability

In Niger, it involved: the dietary supplement Grandibien produced by the food processing company (STA) and tested in February 2008 among 172 mothers in the urban community of Niamey (Alejandro, 2009); flour CSB + + that before being distributed to the populations of Niger has been a test of acceptability in May 2010 in two villages of Niger (Diadié et al., 2012).

Effectiveness

In Niger, some products have been proven effective in the fight against malnutrition. These include among others, the plumpy nut or peanut plump (MSF, 2010), the green powder of spirulina (Bocquet et al., (2003); Loïc et al., (2004); Niger (2010) and flour Misola (Frédéric et al., 2009).

Ways to improve the food supplement in Niger

Feeding and adequate nutrition during infancy are essential to ensure a country of human resources in health, a necessary condition for sustainable development (Diadié et al., 2012). This vision has not escaped the Niger authorities who have repeatedly entered the commitments of international summits, especially on nutrition risk groups and also the adoption of a national policy on food and nutrition in November 2006. Through this policy,

the state is largely to address problems of micronutrient deficiencies, consisting of supplementation, fortification and dietary diversification (William and Diakalia, 2002; Loïc et al., 2004; Libération-Niger, 2010). More local assessments will determine the priority to be given to each of the practices mentioned earlier. Local studies should identify good practices and local diets that must be supported, test options for improving the traditional diet and feeding practices related and identify target audiences and effective strategies to achieve (Ralison et al., 2003; Inge et al., 2003).

CONCLUSION

The practices of infant foods remain inadequate to Niger. Indeed, it releases: The rate of exclusive breastfeeding (9.9% in 2009) is still very low compared to the global average (37%) (UNICEF, 2009), despite a slight improvement in the national rate over the past four years; the rate of introduction of water and other liquids is still very early (67.1%) among children younger than 6 months even in Niger, despite the numerous awareness sessions for a change of mentality. Also, the rate of breastfeeding plus solid foods in children aged from 0 to 6 months remains among the highest; the practice of supplementary feeding for children from 6 to 24 months based primarily on local products (cereals, legumes) and in rare cases of dairy products for more than 50% of children; food diversification is still very uncommon and do not meet global recommendations. It should be noted that all these infant of Niger feeding practices differ depending on the place of residence (CUN, other urban, rural), educational level and in particular the food available at the moment is the only concern of the general population in Niger. However, the nutritional status of children remains of concern in Niger. The latest prevalence rate (July 2012) found among children under five years are: 14.8% for wasting and 42.0% for stunting. These results constitute a base of information for programs of intervention. They invite in in-depth researches on the influence of the food practices of the infants and the young children on their nutritional state.

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