



RESEARCH ARTICLE

COMPARATIVE STUDY AND IMPACT ON NUTRITIONAL STATUS, DIETARY PRACTICES OF
NORMAL AND MODERATE ACUTE MALNUTRITION CHILDREN UNDER
24 MONTHS IN NIGER: CASE OF MAYAHI COUNTY

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ABSTRACT

Background and objectives: Dietary practices play a vital role in the nutritional status of children. In fact, it has been established that inadequate nutrition is one of the direct causes of malnutrition in children. The objective of this work is to make a comparative analysis and study the impact of infant and young child feeding practices on moderate acute malnutrition.

Method: Thus, a quantitative survey based on a questionnaire was carried out in two groups of 75 mother-child couples malnourished and normonutris.

Results: At the end of this study, it appears that the practice and mode of breastfeeding are identical in both groups ($P > 0.05$). There is no significant (NS) link between breastfeeding practice and the nutritional status of children. However, we found a statistically significant ($P < 0.05$) relationship between the nutritional status of children and the timing of introduction of complementary foods. In fact, 75% of normonutris children consumed a complementary food from the 6th month against 50% of the children of the malnourished group. It is the same between the weaning practice and the nutritional status of children. The study shows that of the 25 children weaned, 96% (24 children) are in moderate acute malnutrition. Regarding the age of weaning, 12% were weaned before the age of one year and 88% before two years. Weaning was brutal in 36% of children for various reasons (mother-to-child distance, lack of breast milk).

Conclusion: At the end of this study, we find that MAM begins with the introduction of complementary foods and continues until weaning in children fewer than 2, compared to normonutris. It is therefore necessary to introduce good dietary practices for a better growth of children.

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INTRODUCTION

In Niger, the rate of acute malnutrition has remained almost static over the past five (5) years. The prevalence of global acute malnutrition (GAM) continues to oscillate in the range of 10 to 15% corresponding to a serious situation according to the WHO classification scale. The results of recent national surveys of vulnerability to food insecurity in Niger show that the proportion of moderately food-insecure households increased slightly between 2011 and 2014, from 25.9% to 33.2% respectively. During the same period the proportion of households with severe food insecurity decreased from 6.3% to 2.5%.

It should be noted that the food situation is often linked to the results of the cropping season, itself dependent on rainfall. Mayahi is located in an agricultural area with a dominant production of millet and sorghum. Yields are closely related to soil fertility and rainfall, which range from 400 mm to 600 mm per year. According to the conceptual framework of malnutrition proposed by Unicef in the early 1990s and adopted by the International Conference on Nutrition (1992), diet plays a fundamental role in the growth of the child. Inadequate infant feeding practices are immediate causes of the high prevalence of malnutrition among young children in general and Nigerian children in particular (Ouattara *et al.*, 2009). In fact, poor dietary practices, when they do not result in a complication following a minor food problem, lead to a dietary problem with a heavy effect (nutritional deficiencies, weight-loss delay, somatic health, death) (Manikam and Perman, 2000, Polan *et al.*, 1991).

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Infant and Young Child Feeding (IYCF) practices are still inadequate in Niger. Only 23% of newborns benefit from exclusive breastfeeding and the quality of complementary feeding is only up to standard for 3 in 100 children (INS, 2012). On the basis of this observation, we proposed to carry out a study whose objective is to make a comparative analysis and study the impact of infant and young child feeding practices on moderate acute malnutrition. This will allow better management for good growth and development of infants and young children.

MATERIALS AND METHODS

Site of the study

The study took place in the Mayahi department, particularly in the communes of Kanembakaché, Issawane, Mayahi urban, Serkin Haussa and Tchaké, in September 2016.

Type of study

It is a descriptive cross-sectional study for analytical and comparative purposes.

Target group: The study population consists of mother / child couples from the five communes of the department of Mayahi. Inclusion criteria for mothers include Mayahi residents, who agree to answer the questionnaire and who followed their children from birth to 24 months of age, in order to gain reliable information on the evolution of the child's diet. Children include those aged 6-24 months normonutris, seen in infant counseling and moderate acute malnutrition (children whose P / T ratio reported in ZScore is <-2 and >-3 standard (WHO, 2006)) in nutritional recovery course in health centers.

Sampling: A 2-degree random survey was conducted to form the sample. - in the first degree, the choice of 5 communes out of the 8 that account the department of Mayahi to have a good geographical representativeness. - in the second degree, the choice of 75 normonutric mother-child pairs and 75 acute malnourished parent-child pairs through a probabilistic method.

Collection tools: An interview guide was used for both groups. It includes the following: socio-demographic characteristics, child data, and mothers' experiences in feeding practices.

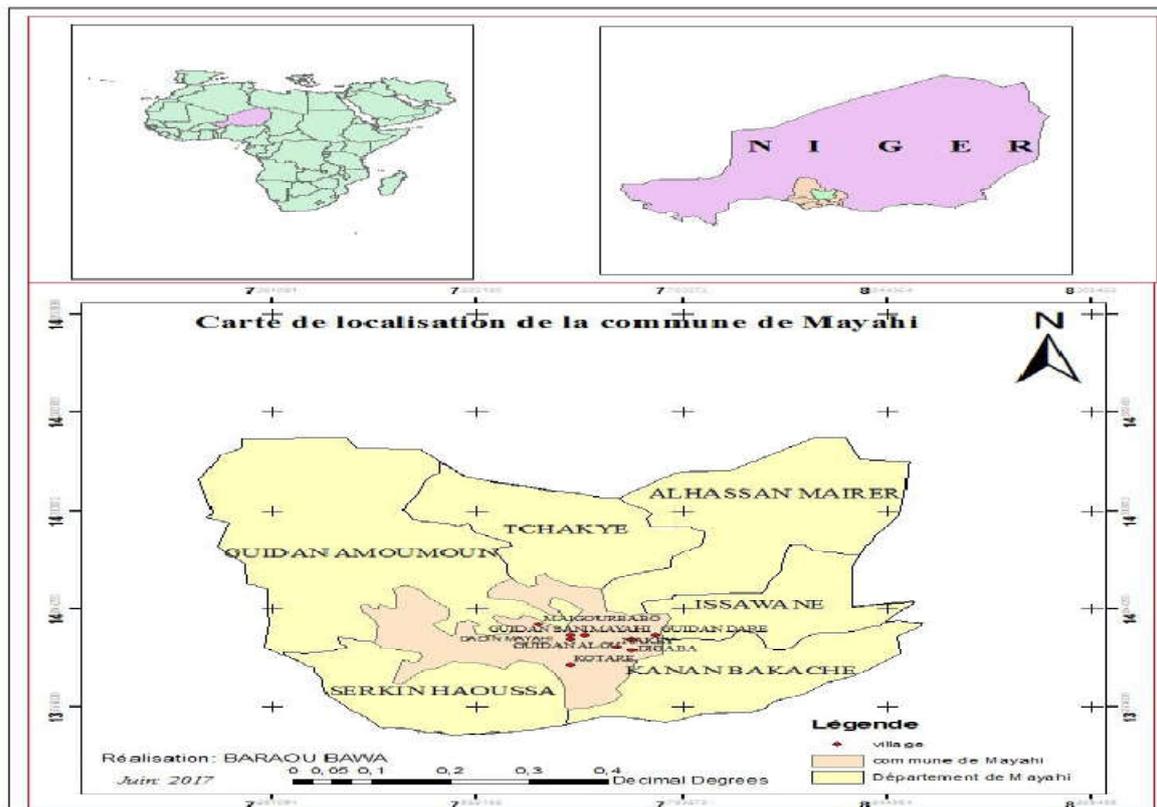


Figure 1. Location of the study area

Table 1. Operational Definition of Variables

variable	Criteria	Définition
Breastfeeding	<ul style="list-style-type: none"> Initial Breastfeeding type of breastfeeding 	Time of first breastfeeding This is the breastfeeding mode (Breastfeeding, artificial breastfeeding, mixed breastfeeding.)
Complementary feed	<ul style="list-style-type: none"> Exclusive breastfeeding Introduction of complementary foods Complementary food suffered Meals available to children / days 	Refers to infant feeding practice from birth to 6 months of age with only breast milk. Time of introduction of other foods other than breast milk to a child These are various types of foods given to children other than breast milk; This is the number of meals children received per day.
Weaning practice	<ul style="list-style-type: none"> Weaning practice 	Weaning is the definitive cessation of breastfeeding in a child

The section on socio-demographic characteristics focused on the age of the mother, the mother's educational level, ethnicity, and so on. The section on child data collected information on age in months and sex. The mothers' experiences with breastfeeding, complementary feeding and weaning were used to gather information on their knowledge, skills and feeding practices of children aged 0-24 months.

Operational Definition of Variables

Methods of statistical analysis

Field data were captured on the SPSS version 20 software. Cross-tabulations and statistical analysis (Chi2 test) at 5% were performed. Word 2010 was used for writing and Excel 2010 for the development of tables and figures.

RESULTS AND DISCUSSION

RESULTS

Characteristics of children included in the study

The age of the children ranges from 6-24 months, with an average of 13.15 months. The median age of children is 11 months and the range is 30 months. It was included in this study 51.5% of male children against 48.5% of female children.

Sociodemographic and economic characteristics of the mothers of normonutric and malnourished children who were the subject of the individual quantitative questionnaires

Table 1 above summarizes the socio-demographic and economic characteristics of mothers of children. Due to the statistical analysis (Chi2), all these characteristics are not related to the nutritional status of children. This same table tells us that more than 20% of mothers are under 18 years of age. The majority of mothers (more than 60%) are under 25 years old. Which denotes the young age of mothers? We note that the Hausa ethnic group is mainly represented (83.8% and 79.4%). They are 33.8% of mothers of children who have no education. However, only 3% of the mothers of normonutric children have secondary and tertiary education. The most common activity of child mothers included in this study is agriculture (76.5%), followed by trade (11.8% and 16.1%). We note that 1.5% of the mothers of normonutric children are civil servants.

Practicing breastfeeding

Initial breastfeeding and type of breastfeeding

The statistical analysis shows that initial breastfeeding ($P = 0.62$) and type of breastfeeding ($P = 0.55$) have no influence on nutritional status in the department of Mayahi.

Table 3. Characteristics of child mothers

variable	Levels	Children (%)		P-value
		Malnourished	Normonutris	
Age	Under 18 ans	20.6	23.5	0.87; NS
	18- 25 years old	45.6	44.1	
	25- 30 years	26.5	27.9	
	More than 35 years	7.4	4.4	
	Houssa	83.8	79.4	
Ethnicity of mother	Touareg	11.8	13.2	0.54; NS
	Fulani	4.4	4.4	
	Kanouri	0	2.9	
level of education	Primary	19.1	10.3	0.29; NS
	Secondary & Sup	0	3	
	Quranic	47.1	52.9	
	No	33.8	33.8	
	Agriculture	76.5	76.5	
Activity of the mother	Trade	11.8	16.1	0.29; NS
	Official	0	1.5	
	No	11.8	5.9	

Source: field data

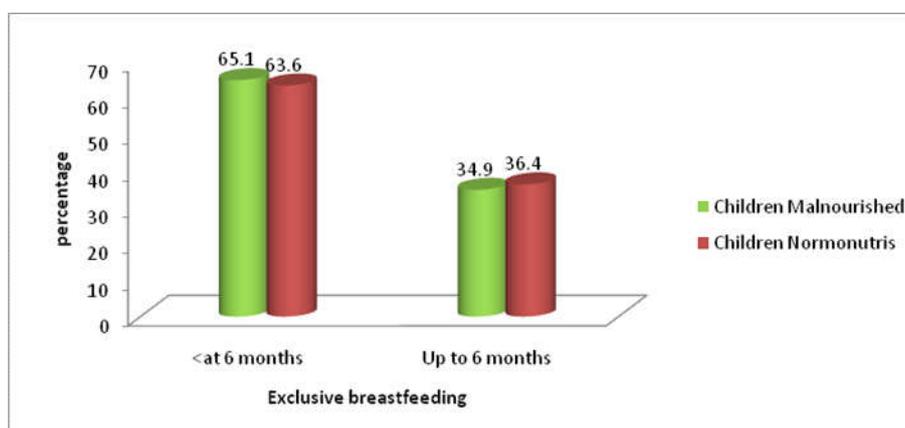


Figure 1. % of exclusive breastfeeding and children's nutritional status

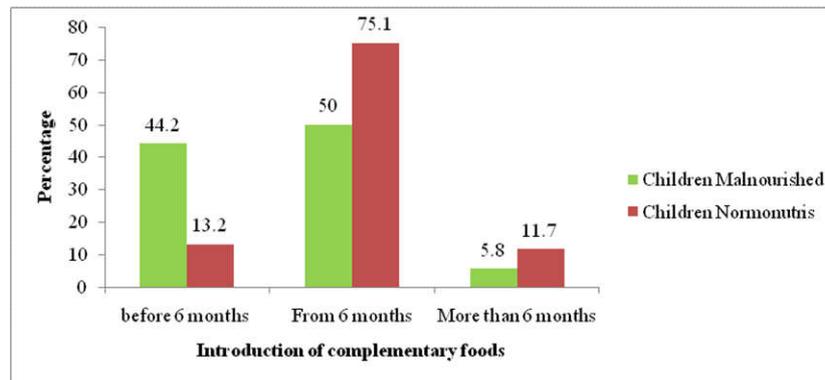


Figure 2. Age of introduction of complementary foods

Table 4. Complementary Supplements Offered and Nutritional Status of Children

Variable	Levels	Children (%)		P-value
		Malnourished	Normonutris	
Complementary foods offered to children	Light porridge	86.8	87.8	0,21 ; NS
	Enriched porridge	5.9	7.8	
	Broth	1.5	0	
	Familydish	4.4	0	
	Light porridge + familydish	1.5	2.9	
	Mashedvegetables	0	1.5	

Source: field data

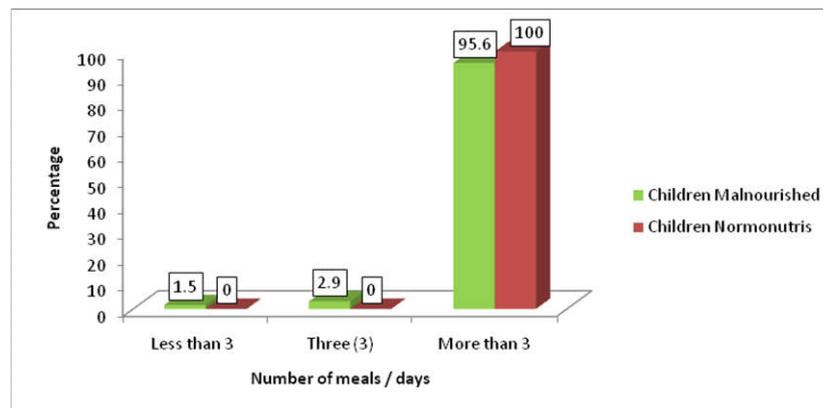


Figure 3. Number of meals and nutritional status of children

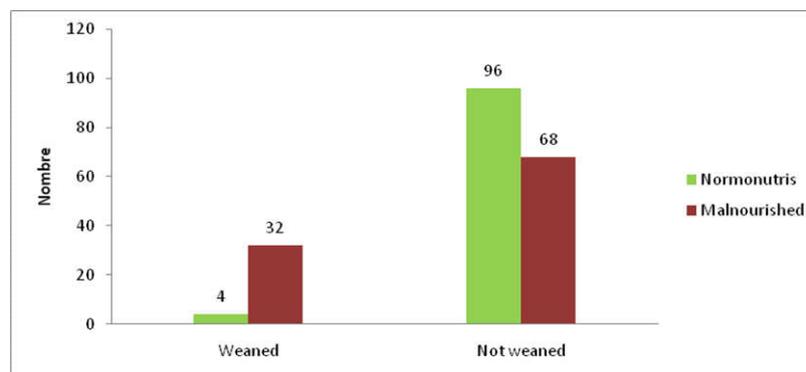


Figure 4. Number of weaned children and their nutritional status

We observe that almost all children (malnourished and normonutris) were breastfed for a period of time. 86.8% and 83.8% of malnourished children and normonutric children were breastfed within one hour of birth respectively. Indeed, this initial breastfeeding reveals a nutritional importance, because it is during the twenty-four hours following the birth that the child receives the colostrum which contains the antibodies of the mother and which is supposed to have avoided certain diseases to him.

However, 13.2% of the mothers of the malnourished children and 16.2% of the mothers of the normonutric children acknowledged having given other type of milk or liquid solution (decoction) before breast milk. This same table II also informs us about the type of breastfeeding. More than 90% of children were breastfed exclusively. Notwithstanding, the duration of this breastfeeding varies according to the mothers. Exclusive breastfeeding is the most dominant followed by mixed breastfeeding, practiced by less than 10% of mothers.

Table 7. Weaning factors and nutritional status of children

Variables	Levels	Children (% , n = 25)	
		Malnutris	malnourished
Age of children at weaning	Lessthan 12 months	12	0
	12-17 months	28	0
	18- 23 months	44	4
	From 24 monthsold atwill	12	0
Cause of weaning	Occurrence of anotherpregnancy	60	4
Weaning place	Family home	36	0
	Other	76	4
Additionaldish	Yes	20	0
	No	44	4
		52	0

Source: field data

Exclusive breastfeeding (n = 128)

Figure N ° 1 provides information on the duration of breastfeeding. This practice is not statistically related ($P = 0.77$) to the nutritional status of children. We note from this figure that more than 60% of mothers have breastfed for less than 6 months after the birth of the child. Often, children are breastfed exclusively until the seventh day (16.9%, 15.7%), until they reach 40 (33.1%, 32.4%) and some until their fifth month (15.1%, 15.5%) respectively for malnourished and normonutric children. However, they are 34.9% of malnourished children who were breastfed exclusively until the age of six months and 36.4% of their congener's normonutris according to mothers.

Reasons raised by mothers for or against AME up to 6 months

We note from Table 3 that mothers who opted for exclusive breastfeeding cited the good growth of their children as the reason for 34.9% of mothers of malnourished children and 36.4% of mothers of normonutric children. There is no statistically significant relationship ($P = 0.79$) between the reasons given by mothers and the nutritional status of children. According to these mothers, this type of breastfeeding can prevent certain diseases such as diarrhea and prevent malnutrition in children. As for mothers who stopped breastfeeding exclusively before the age of six months, 57.7% and 53.2% respectively of the mothers of malnourished children and normonutric children mentioned the reason that it is hot, and that the child as any human being must drink water. For other mothers (7.4% and 10.4%) think children cry because they are thirsty.

Complementary feeding practice**Introduction of complementary foods**

Quantitative data collected in the field, shown in Figure 2, showed a statistically significant relationship ($P = 0.04$) between the timing of introduction of complementary foods and the nutritional status of children. They are 44.2% of malnourished children who started to drink or ingest food before the age of 6 months, and 5.8% at the age of more than 6 months. However, 3/4 of normonutric children, 75.1%, started to drink or ingest food from 6 months of age, compared with 50% of malnourished people who received complementary foods at the same time. Several reasons have been raised by mothers to justify this state of affairs. These include women's work, so that the child is left to his brothers and sisters. The latter (s) cause these children to drink or eat food during the absence of the mother;

Inadequate breast milk has also been mentioned as the reason for the early introduction of supplemental feeding in children as young as 6 months of age.

Complementary foods offered to children Table

With regard to complementary foods for children, we note from Table 4 that the first food given to children is light porridge in 86.8% of malnourished children and in 87.8% of normonutric children. The second food available to children is enriched porridge (5.9%, 7.8%). Only 4.4% of malnourished children consumed the family dish from the age of 6 months as a supplementary food. Mothers mentioned the financial and physical inaccessibility of fortified flour and local foods for the preparation of children's baby food. Indeed, the majority of mothers of malnourished children, such as mothers of normonutric children, have knowledge of local food-based recipes for complementary foods to be offered to children from the age of 6 months. They evoked among other things: the porridge made from peanut paste, fruit and vegetable purées, etc.

Number of meals offered to children / days

Figure 3 shows the number of repairs offered to children as a complementary food. The observation of this figure shows that all normonutric children (100%) were fed more than three (3) times per day. The same is true for 95.6% of malnourished children. Some mothers say they have given children food as many times as they need. Nevertheless, 1.5% of malnourished children receive less than three (3) meals per day; they are also 2.9% of malnourished children who receive three meals a day. We can note from this study that the number of meals given to children is not statistically related to the nutritional status of children aged 6-24 months.

Practice of weaning

It is through this study, weaning marking the definitive cessation of breastfeeding. Figure 2 shows us the number of weaned children included in the study. It appears from this figure that only twenty-five children are weaned. Almost all weaned children (24) are moderately acute malnourished (MAM). Only a child normonutris is weaned. A statistically significant relationship ($P = 0.000$) was observed between withdrawal practice and children's nutritional status. The behavior of withdrawal is a function of several parameters, namely the age of the child. It is the basis for weaning and depends on the cause of weaning through the place of weaning. This table V expresses the various aspects related to weaning.

We note that 22 children out of 25 weaned children, 88% are weaned before their second birthday. Ten children (10) were weaned early, including 3 children before the age of one year or 12%. Several reasons have been the basis of this weaning, we see through this same table V, that 36% of children were weaned abruptly following the occurrence of another pregnancy of the mother without going through a progressive step of substitution from breast milk to other types of food until the definitive cessation of breastfeeding. However, 64% of the children were weaned at will according to the mothers. Another practice is to remove the newly weaned child from the mother; this practice leads to a refusal of food consumption in the weaned child. In this study, 20% of weaned children are referred to other households, most often those of grandparents. The weaned child must have an extra diet outside the family meal. More than 50% of weaned children are satisfied only with the family meal, without any additional feeding.

DISCUSSION

Breastfeeding Practice: Breastfeeding should be the primary source of nutrition after childbirth. In this study, over 92% of children were breastfed for a period of time. This result is similar to that of Diallo in 1999, who found in Guinea 96% of children were breastfed, it was the same in Haiti (97%), (Anonymous, 2003) and confirmed by another study in Côte d'Ivoire (96%), EDSCI-II (2002). Initial breastfeeding during the hours following birth must be a first reflex after delivery. We find that in both malnourished and normonutric children, only 86.8% and 83.8% respectively were breastfed within one hour of birth. This practice is conducive to the growth of the child. Not breastfeeding at birth can have a detrimental effect on your health because it is during the first breastfeeding, in the twenty-four hours following the birth, that the child benefits from the colostrum which contains the antibodies of the mother and which are essential for him to avoid many diseases. In addition, if the newborn is not breastfed within twenty-four hours, he receives, instead, various liquids that may put him in contact with pathogens. With regard to exclusive breastfeeding up to the age of 6 months, they were 39.4% of the malnourished children and 36.4% of the normonutric children to benefit from it. This result is similar to that of WHO (2017), which found that, on average, only 36% of children aged 0-6 months were exclusively breastfed between 2007 and 2014 in the world.

From birth until the age of 6 months, breast milk alone is enough to cover the nutritional needs of the infant. To this end, WHO and UNICEF recommend that children be exclusively breastfed for up to 6 months. Exclusive breastfeeding for a 6-month period has many benefits for the infant and the mother, including the insignificant benefit of protecting against gastrointestinal infections in both developing and industrialized countries. Early breastfeeding, within one hour of birth, protects the newborn from infection and reduces the related mortality rate. The risk of death from diarrhea and other infections may increase in infants who are partially breastfed or who are not breastfed at all. Breast milk is also an indispensable source of energy and nutrition in case of illness and reduces the mortality rate of malnourished children. For Diallo (1999), breast milk has particular properties because it is sterile and because it transmits the mother's antibodies and all the necessary nutrients to the child during the first months of life. It also helps to avoid nutritional deficiencies and to limit the prevalence of diarrhea and other forms of illness.

Breast milk is the only food truly adapted to the needs of the newborn and infant during the first months of life. It provides in a suitable form, carbohydrates, proteins, lipids, minerals and most vitamins necessary for the development of the baby. According to UNICEF (1985), a child who is born in a poor household and is exclusively breastfed during the first half of life, by a mother in good nutritional status, is likely to develop as healthily and harmoniously as a child born into a wealthy family. For example, feeding exclusively breastfed children for the first six months of life contributes to reducing the health differences between children born in a poor environment and those born in a rich household. However, breastfeeding practice was not significantly related to children's nutritional status. The same practices are observed in both malnourished and normonutric children.

Complementary feeding practice

From the age of 6 months, breastfeeding should be supplemented by the introduction of other appropriate foods to meet the child's needs. Thus, at the end of this study, we find that 44.2% of malnourished children had drunk or ingested another diet before the age of 6 months, 50% of children malnourished from the age of 6 months. However, 3/4 of the normonutric children surveyed had seen or ingested another diet from the age of 6 months. This result is higher than that of Brou-Tanoh & al in Côte d'Ivoire (2010) who found that 93% of children drank or ingested another food before 6 months of age. The early introduction of complementary feeding has particularly important implications for the health status and nutritional status of children. In addition to breastfeeding, this practice exposes newborns to pathogens, especially diarrheal diseases. This study allowed us to observe a statistical link between the nutritional status of children and the introduction of complementary feeding. The main foods offered to children as a complementary food in this study are light meals in over 86% of malnourished children and normonutric children. Some malnourished children (4.4%) were already receiving the family dish at this age. Women do not consider the quality but rather the amount of food to stuff the belly of the child and after a few months, the child begins to lose its shape. The acceleration of these foods in the child's nutrition forces the mother to reduce the amount of milk given to the child. From there, the child no longer benefits from the proteins, vitamins A, C and calcium contained in the milk, which should protect him from all diseases (NGOUNDE, 2004) quoted by Abraham (2011). Supplementary foods given to children are not a bad thing in themselves, since it is strongly recommended to supplement breast milk with supplementary foods that can provide calories, especially from the sixth month.

Practice of weaning

The practice of weaning, which constitutes the definitive cessation of breastfeeding and the consumption of another diet by the child, depends on socio-cultural contexts or parents. Almost all of the weaned children included in the study (96%) were moderately acute malnourished during nutritional recovery. We find through this study that many children were weaned early following the occurrence of another pregnancy of the mother or at will. At weaning, 50% of weaned children did not have an extra diet. The weaning diets offered to children are largely responsible for the many nutritional diseases prevalent throughout Africa (Abraham, 2011). The nutritional poverty of weaning foods combined with the insalubrity

surrounding their preparation means that weaning (total or partial) generally corresponds to the beginning of the period at high risk of malnutrition. The period after weaning is characterized by increased sensitivity to environmental effects that can lead to death. After weaning, the child has just lost its main source of protein, which is breast milk and wades through the mud and drinks the water of the marigot or torrents, which feeds the infectious agents. And protein-based foods are rare in their environment either because of poverty, or because of beliefs and taboos. For these reasons, children often suffer during this period from protein-energy malnutrition and serious nutritional diseases (Bougma, 2007). Apart from this study, we note that the practice of weaning was statically more related to the nutritional status of children aged 6-24 months. This situation was noted by (TOHOUEGNON, 1993), who said that after weaning, undernourishment and malnutrition affect the child's immune system. Many researchers have shown that child withdrawal can slow down growth. Withdrawal is one of the direct causes of child malnutrition in some societies. It remains nonetheless in Niger in general and more specifically in the department of Mayahi.

Conclusion

Globally, it appears from this study that feeding practice has a statistically significant link at the 5% threshold on the nutritional status of 6-24 month old children in the Mayahi Department.

This is the practice of complementary feeding and the practice of weaning. Breastfeeding was not significantly related to the nutritional status of the children. Breastfeeding is practiced equally in malnourished mother-child pairs as well as in normal-mother-child pairs. From this study, we can conclude that the nutritional status of children aged 6-24 months begins to deteriorate with the introduction of complementary feeding before increasing during the practice of weaning. Thus, it is up to the decision-making power, the technical and financial partners, to increase the awareness and the promotion of the good feeding practices defined by WHO, with a view to ensuring good growth for infants and young children.

Recommendation

We would like to thank the NGO ACF-E (Action Against Hunger-Spain), representative of Niger, for having facilitated access in the communes and the different centers of nutritional recovery for the collection of data, the GRET, the Pasteur Institute through the MALINEA Project (Malnutrition and Childhood Infection in Africa) for financial support throughout this study.

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