

# Influence of Food Practices for Infant and Young Children on Growth Parameters in Kouilou-Congo

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**Abstract** In the Republic of Congo in general and in the department of Kouilou in particular, a variety of complementary foods are used which are introduced into infants and young children. The general objective of this study is to assess the timely introduction, frequency and diversity of complementary foods in infants and young children 0-2 years of age in the Madingou-Kayes district. To do this, a cross-sectional questionnaire survey was carried out on a sample of 129 children from the eight villages visited in the Madingou-Kayes district. The data focused on breastfeeding and complementary feeding practices. Breastfeeding overall is 98% with colostrum intake 31%. 70% of children were still breastfeeding during the survey. The complementary food through the porridge was introduced to 69% of children between 3-5 months and stopped at 36% between 6-8 months. The porridge consumed by children is traditional and imported. The flour used to make traditional porridge consisted of corn, cassava. Corn is the first choice flour, 75% of children were under consumption according to the survey. These porridges have a daily consumption frequency of 2 porridges per day. The nutritional status of children is generally unsatisfactory. In fact, 56% are underweight, 65% are stunted and 29% are wasted or thin. In short, infant feeding during the period of complementary feeding remains to this day a major subject of public health in developing countries. The feeding practices of children from 0 to 2 years old in the Madingou-Kayes district are below the recommendations of the World Health Organization and are at the origin of various forms of malnutrition observed in children.

**Keywords:** *complementary food, infant and young child*

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## 1. Introduction

Poor nutrition among infants and young children is a major public health problem in developing countries.

The feeding practices of infants and young children have a direct influence on the nutritional status of children under 24 months and, possibly, on their survival. Improving feeding practices for infants and young children (0-24 months) is therefore essential to improve nutrition, health and development of children [1]. Breast milk is an important source of energy and nutrients for infants and young children. It can meet half or more of a child's energy needs between the age of six months until the second year of life. In addition, breast milk is also an essential source of energy and nutrients during illness and reduces mortality in malnourished children [2].

In accordance with the recommendation of the World Health Organization [2], breast-fed children (aged 6 to 23 months) should receive daily animal-source foods, fruits rich in vitamin A and vegetables [1,2,3]. Therefore, for breastfed infants, four food groups (cereal or tuber based foods, animal foods, vitamin A rich fruits and vegetables) have been recommended and constitute the minimum acceptable number of groups of food. On the other hand, infants who are not breastfed should receive meals 4 to 5 times a day, with one to two snacks, which allows them to consume more energy from foods other than breast milk.

Few children receive adequate complementary foods. In many countries, less than a quarter of infants (6-24 months of age) meet the criteria for dietary diversity and frequency of feeding appropriate to their age [2].

The comprehensive strategy for infant and young child feeding advocated by WHO and UNICEF recommends that at the age of six months solid, semi-solid and soft foods be introduced. Breastfed children 6-23 months of

age should eat at least four meals a day. In addition, children should have a varied diet from at least four of the seven food groups specified [4].

Inadequate amounts and quality of complementary foods, inappropriate child feeding practices and a high incidence of infections have an adverse effect on the health and growth of children in the first two years. Even with optimal breastfeeding, children will be stunted if the bowl does not obtain sufficient dietary diversity and sufficient meal frequency after the first six months [1,5,6]. The timely introduction, quality, quantity and adequacy of complementary foods are essential to ensure children have adequate mental growth and development [6]. The dietary diversity score is positively linked to the overall food quality and micronutrient intake of young children and can be used as an indirect indicator of household food security and, in the long term, of delay growth in childhood [7,8].

In Africa in general and in Congo in particular, the first complementary food given to young children is porridge little enriched by local legumes (peanut paste or roasted soybean flour) milk or dried fish powder [9,10].

Moreover, a variety of complementary foods are used which are introduced into infants and young children. To date, no studies on feeding practices in infants and young children have been conducted.

This is how we think it is useful to know when and how infants and young children eat during the period between 0 and 24 months at Madingo-Kayes.

The general objective of this study is to evaluate the feeding practices applied in infants and young children aged 0 to 2 years in the Madingo-Kayes district.

## 2. Material and Methods

### 2.1. Material

#### 2.1.1. Study Setting

The study was carried out with residents of the Madingo-Kayes district in two settings: Integrated health centers in some Madingo-Kayes villages, 129 Households of women with children aged 0-2 years.

#### 2.1.2. Presentation of the Study Environment

Madingo-Kayes is a district in the southwest of the Republic of Congo, located in the department of Kouilou. The Madingo-Kayes district is limited: To the north by Niari and Gabon; To the south by the Atlantic Ocean; East by the Kakamoeka district; To the West by the NZambi district.

#### 2.1.3. Target Population

The target population for the study consisted of children aged 0 to 2 years living in the Madingo-Kayes district. The distribution of this population is presented in two units which are: The reporting unit: 129 mothers of children under 0 to 2 years of age residing in the Madingo-Kayes district; The unit of analysis: children aged 0 to 2 years, living in the Madingo-Kayes district.

#### 2.1.4. Teaching Materials

The teaching material consisted of a survey sheet intended to collect data from mothers of children; This

card was made up of open and closed questions that were asked of the respondent and whose answers were noted or checked on the card by the interviewer.

The main points of this sheet were: breastfeeding practices, complementary feeding practices; child health practices (immunization status); socioeconomic factors of the household.

#### 2.1.5. Anthropometric Material

The anthropometric material was made up: a horizontal measuring rod or tape measure for

The length / height of the infant or child; a Salter type balance with panties to measure the child's weight. All the equipment was checked and tared before taking the measurement of each anthropometric measurement session.

### 2.2. Methods

To carry out this study, we adopted a three-dimensional methodology which started with a bibliographic review, then followed a field survey and ended with the processing of the results.

#### 2.2.1. Questionnaire Survey

A survey was carried out on infants and young children under two years of age residing in Madingo-Kayes.

#### 2.2.2. Type of Survey

This is a cross-sectional questionnaire survey using 24-hour recall and consumption frequency techniques.

#### 2.2.3. Survey Frame

The different villages in the Madingo-Kayes district were identified on the basis of a list provided to us by the secretary general of the district sub-prefecture. These villages are: Madingo-Kayes which is the center; Tandouyoumbi located 3km from the center; Yanga located 10km from the center; Youbi located 35 km; Koutou located 45 km from the center; Km4 located 57 km from the center; N'kola located 60 km and Bamba located 72 km from the center. These are the selected village to carry out the study.

#### 2.2.4. Sampling and Sample Size

The selection of these eight (8) villages was made by the reasoned choice method with the accessibility of the villages as a criterion. To obtain our sample, a survey was carried out in each village chosen for four days. Similarly, the children who made up our unit of analysis were chosen by random sample from the reporting unit which is the mother of each child. This allowed us to have 129 children making up the size of our sample.

#### 2.2.5. Inclusion Criteria

Agree to participate in the survey; Reside in the Madingo-Kayes district; Accept the taking of anthropometric measurements; Be registered in households or Integrated Health Centers (CSI); Be between 0 and 2 years old.

#### 2.2.6. Conduct of the Investigation

The data of our study were collected from August 12 to September 25, 2019. During our Field Survey, three preliminary steps were made mandatory and

necessary. This involves obtaining administrative research authorization at the FST, validating our research protocol for the project by the scientific managers of this work and obtaining authorization to deploy to the eight villages. by the officials of the Sub-Prefecture.

Our investigation was ordered as follows: Meeting with the secretary general of the Madingo-Kayes district sub-prefecture. In his capacity as administrative manager of the district, it was necessary for him to be informed of the progress of this investigation; Meeting with local authorities (Heads of districts, village chief, and the police) These figures are the stations of the administrative authorities of the district.

As such, we had deemed it necessary to inform them of the intentions which led to the execution of such an investigation, particularly among children aged 0 to 2 years in this district; Meeting with certain heads of integrated health centers, to acquire certain information relating to our subject. Working on a health topic, it was important to meet them.

To ensure the smooth running of our field study, some of these village authorities have chosen a person to accompany us in the plots to start collecting data. During the survey, the women were interviewed individually, and an information sheet written in French and then transcribed in the national language (Kituba) was presented to each respondent for a good understanding of the objectives of the study in order to obtain reliable information.

### 2.2.7. Data Processing

We used Epi-Info 7.2.1.0 software, Anthro 2005 software.

We have entered our collected data using Epi-info software version 7.2.1.0; For the calculation of the prevalence of stunting, thinness and low weight (underweight), the anthropometric data were calculated using the WHO Anthro 2005 software and Z-scores indices compared to standards and 2006 WHO growth standards / NCHS.

## 3. Results

### 3.1. Gender and Weight of Child at Birth

Table 1 represents the sex and the weight of the children surveyed at birth.

Table 1. Distribution of children by sex and birth weight

Parameters	Variables	Frequency / Number	Percentages (%)
Sex	Male	55	42.6
	Female	74	57.4
	Total	129	100
Birth weight (Kg)	weight < 2,500	10	7.8
	2,500 ≤ weight < 3,500	58	24.0
	weight ≥ 3,500	31	31
	Average = 3,27±0,59		
	Total	99	

The results show that 57.4% of the children surveyed are female against 42.6% of the male.

Regarding birth weight, the results show that 45% of children were born with normal weight (weight between 2.5 and 3.5 kg), Large babies by birth (weight greater than 3.5 kg) represent 24.0%. On the other hand, children born

with a low weight (weight less than 2.5 kg) have a low percentage, 7.8%.

### 3.2. Breastfeeding Practices for Children Breast Milk

Table 2 presents the results on breastfeeding practices among the children surveyed.

Table 2. Distribution of children on breastfeeding practices

Parameters	Variables	Frequency / Number	Percentage (%)
Colostrum	yes	40	31
	No	89	69
	<b>Total</b>	<b>129</b>	<b>100</b>
Feeding with milk	Exclusive	3	2.3
	Mixed	126	97.7
Decision to take milk	On demand	99	76.7
	schedule	16	12.4
	Both	14	10.9
	<b>Total</b>	<b>129</b>	
Stop age Breastfeeding	From 6 months	2	1.6
	Between 7-12 months	19	14.7
	Beyond 12 months	17	13.2
	In progress	91	70.5
	<b>Total</b>	<b>129</b>	

Table 2 shows that 31% of the children took colostrum compared to 69% of the children who did not take it.

With regard to breastfeeding practices, the 129 children surveyed took breast milk, of which 2.3% of children took exclusive breastfeeding while 97.7% were under mixed breastfeeding.

The results concerning the decision to take breast milk show that, 76.7% take breast milk according to their demand, that is to say when the children cry; 12.4% of children take breast milk according to the schedule given by the mother and finally 10.9% of children are breast-fed on demand and according to the schedule given by the mother.

With regard to the age at which breastfeeding stopped, 70.5% of children were breastfeeding during the survey period. Our survey found that 14.7% of children were weaned between the ages of 7-12 months and 13.2% were weaned after 12 months.

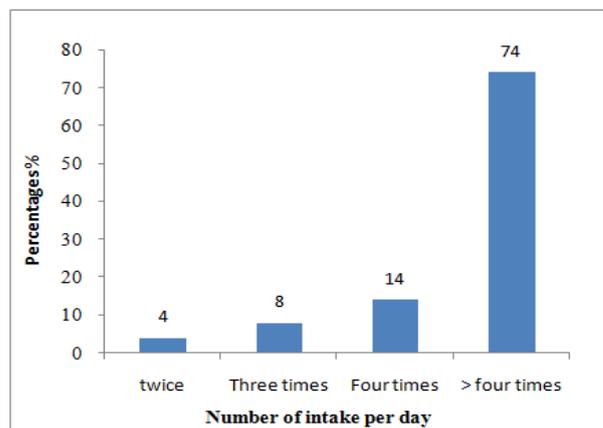


Figure 1. Distribution of the daily frequency of taking breast milk

### 3.3. Daily Frequency of Taking Breast Milk

The different information obtained on the daily frequency of intake of breast milk is represented in Figure 1.

Analysis of this figure shows that 74% of children take breast milk more than four times a day, 14% breastfeed four times a day, 8% take milk three times a day and only 4% breastfeed twice.

### 3.4. Taking the Bottle

Table 3 presents the results on bottle feeding by children.

Table 3 shows that 38% of children take artificial milk against 62% who do not.

Table 3. Distribution of children according to bottle feeding

Parameters	Variables caractéristiques	Frequency / Number	Percentages (%)
Artificial milk	Yes	49	38
	No	80	62
	<b>Total</b>	<b>129</b>	
Age of intake (month)	0-1	21	42.9
	2-3	24	49
	4	4	8.2
	<b>Total</b>	<b>49</b>	
Intake frequency / day	1	35	71.4
	2	14	28.6
Distribution mode	Total	49	
	Biberon	48	98
	other	1	2
	<b>Total</b>	<b>49</b>	
Stop milk	yes	41	83.7
	No	8	16.3
	<b>Total</b>	<b>49</b>	
Stop age (month)	2-3	10	24.4
	4-5	18	43.9
	A partir de 6	7	17.1
	7-9	6	14.6
	<b>Total</b>	<b>41</b>	

Speaking of the age of taking the bottle, 42.9% of children took the bottle between 0-1 months, 49% took it between 2-3 months and 8.2% took it at 4 months.

In terms of daily frequency, 71.4% of children take the bottle once a day and 28.6% of these children take the bottle twice a day. Regarding the distribution method, the analysis of this table shows that 98% of children take formula using the bottle against 2% using other utensils (cup, cup).

This table also shows us that 83.7% of children continue to take artificial milk against 16.3% of children who no longer take it.

For the age of cessation of formula, children whose age between 4-5 months represent 43.9%. On the other hand, those between 2-3 months, from 6 months and between 7-9 months represent a percentage of 24.4, 17.1 and 14.6 respectively.

### 3.5. Complementary Feeding Practices

Age of intake, quality and daily frequency consumed of water.

Table 4 presents information on the age of onset of introduction, the type and daily frequency of water consumed by children.

Table 4. Distribution of children by age of introduction, type and daily frequency of water consumed

Parameters	Variables	Frequency /Number	Percentages (%)
Start age (month)	0-5	121	97.6
	≥ 6	3	2.4
	<b>Total</b>	<b>124</b>	
Type of water	Mineral	20	16.1
	Tap River	24	19.4
	river	80	64.5
	<b>Total</b>	<b>124</b>	
Frequency Daily	Once	15	12.1
	Twice	21	16.9
	Three times	37	29.8
	<b>Total</b>	<b>124</b>	

It appears from Table 4 that, children who took water between 0-5 months are more represented (97.6%) than those who took it from six (6) months (2.4%).

Regarding the type of water consumed by these children, our study reveals that the majority consume water from the river (64.5%). On the other hand, 19% consume tap water and 16.1% take mineral water. Regarding the daily frequency, more children (3%) consume water (29.8%) than those who drink it once (16.9%) and twice (12.1%) per day.

### 3.6. Age Taken, Type and Nature of Porridge Consumed

The results on the age of consumption of the porridge, type and nature of the porridge consumed are shown in Table 5.

Table 5. Distribution of children according to the age of the porridge, type and nature of the porridge

Parameters	variables	Frequency / Number	Percentages (%)
Age taken the porridge (month)	1-2	29	28.4
	3-5	70	68.6
	From 6	3	2.9
	<b>Total</b>	<b>102</b>	
Type of porridge	Traditional	82	80.4
	Imported	14	13.7
	both	6	5.9
	<b>Total</b>	<b>102</b>	
Nature of porridge	Mais	77	75.5
	Cassava	3	2.9
	phosphatin	4	3.9
	other	18	17.6
	<b>Total</b>	<b>102</b>	

From this Table 5, the results show that 28.4% of the children started to take the porridge between 1-2 months. The most represented age group is that of children between 3-5 months with a percentage of 68.6% constitutes the least represented age group

For the different types of porridge, 80.4% of children consume traditional porridge against 13.7% who consume

imported porridge and only 6% consume both types of porridge.

Regarding the nature of the porridge, corn porridge is the most consumed (75.5%) than the other porridges (17.6%): bledine, rice, porridge from fofou flour. Cassava and phosphatin porridge are consumed by 2.9% and 3.9% of children in this district, respectively.

### 3.7. Daily Frequency of Porridge Consumed

The different information obtained on the daily frequency of consumption of porridge is presented in Figure 2.

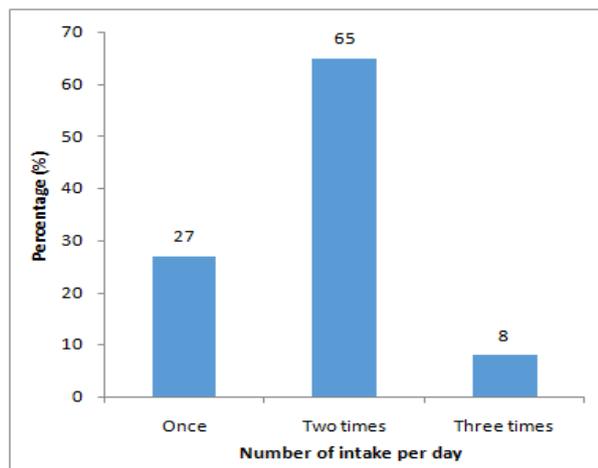


Figure 2. Distribution of children according to the amount of porridge

As regards the daily frequency of consumption of porridge, it follows that 65% of children take porridge 2 times a day, 27% took it once a day and 8% children consumed porridge three times a day.

Ingredients associated with the porridge and age at which the porridge was stopped

Table 6 presents information on the ingredients associated with the porridge and the age at which the porridge stopped.

Table 6 shows that 87.3% of children take porridge with the addition of other foods compared with only 12.7% who consume it without addition. The average age of stopping porridge in our study is  $5.9 \pm 2.02$ .

Table 6. Distribution of the ingredients associated with the porridge and the age at which it was stopped

Parameters	Variables	Frequency / Number	Percentages (%)
Ingrédients	yes	89	87.3
	No	13	12.7
Arrest ages Taking the Porridge	1-5 mois	33	32.4
	6-8 mois	37	36.3
	A partir de 9 mois	8	7.8
	Moyenne	$5,9 \pm 02$	
	Pas encore	24	23.5
	Total	102	

### 3.8. Different Ingredients Consumed by Children

Figure 3 shows the information on different ingredients consumed in the porridge

The results in Figure 3 show that most children consume porridge with the addition of sugar (40%). The other types of ingredients are poorly consumed by children with each a percentage of: 20; 18; 15; 4 and 3.

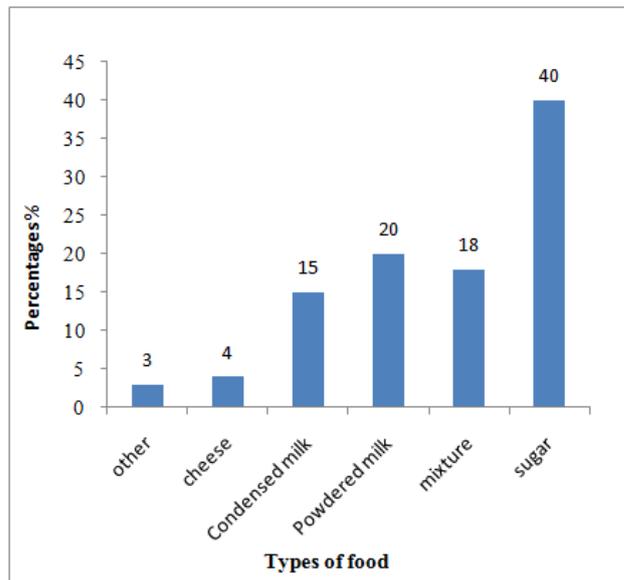


Figure 3. Distribution of the different types of ingredients consumed in the porridge

### 3.9. Consumption of the Family Dish Taking the Family Dish Age

Table 7 presents the results on the children who consume family meals, the age at which they started to introduce this consumption as well as the daily frequency of consumption of these dishes.

Table 7. Distribution of children according to the consumption of the family dish

Parameters	Variables	Frequency / Number	Percentages %
Family dish	yes	71	55
	No	58	45
	Total	129	
Start age of taking (month)	6-8	17	23.9
	9-11	26	36.6
	12-14	23	32.4
	15-24	5	7
	Total	71	
Number of dishes / day	1	30	42.3
	2	37	52.1
	3	4	5.6
	Total	71	

The results in Table 7 show that, 55% of children eat this dish compared to 45% who do not.

In terms of the age at which the family meals were first eaten, this table shows that 36.6% of children took this dish between 9-11 months followed by 32.4% between 12-14 months against 23.9% of those who took it between 6-8 months. 7% of children received a late introduction of the family meal between 15-24 months.

For daily consumption, the results show that the daily frequency of two intakes per day is higher with 52.1%

than those who take a single intake (42.3%) and three intakes (5.6%) per day.

### 3.10. Types of family Meals Consumed

Table 8 presents the results on the types of family meals consumed by the children surveyed.

**Table 8. Distribution of children according to the type of family dish consumed**

Parameters	Variables	Frequency / Number	Percentages %
Type of dish	Fish + Gnetum	3	4.2
	Fish + Vegetable	26	36.6
	Bushmeat + Gnetum	2	2.8
	Bushmeat + Vegetable	3	4.2
	Other	37	52.1
	Total	71	
Container dish	Palm oil	1	1.4
	Alternate mixture	70	98.6
	Total	71	

This Table 8 shows that, 52.1% of the children eat other types of dishes among which we have: mwambe (palm nut juice), saka-saka, legumes. While, 36.6% of children consume nothing but fish plus vegetables, 4.2% eat fish plus gnetum and bushmeat plus vegetables and 2.8% consume bushmeat plus gnetum.

Children who took an alternate mixture of peanut oil, the peanut paste was 98.6% more numerous than those who took palm oil (1.4%).

### 3.11. Nutritional Status of Children

The prevalence of malnutrition among children in the Madingo-Kayes district is shown in Table 9.

**Table 9. Prevalence of malnutrition according to the weight for age, height for age and weight for height indices**

Parameters	Variables	Frequency / Number N= 129	Percentages (%)
Weight for age (Underweight)	slight	9	6.9
	moderate	9	6.9
	severe	38	19.4
	<b>Total</b>	<b>56</b>	<b>33.2</b>
Height for age (growth retardation in height)	slight	10	7.7
	moderate	2	1.5
	severe	53	43.4
	<b>Total</b>	<b>65</b>	<b>52.6</b>
Weight for height (thinness)	slight	14	10.8
	moderate	10	7.7
	severe	5	3.8
	<b>Total</b>	<b>29</b>	<b>22.4</b>

The results in Table 9 show that 19.4% of children are severely underweight compared to only 6.9% of children who are mildly and moderately victimized. For stunted growth, 43.4% of children with severe growth retardation are observed, compared with 7.7% with slight retardation and 2% with moderate retardation.

There are 10.8% of children who show slight emaciation against 7.7% of children with moderate emaciation, while 3.8% are severely emaciated.

## 4. Discussion

### 4.1. Gender and Weight of Child at Birth

For the whole of our sample, the female gender remains predominant over the male gender with respective percentages of 57% and 43%. Our results approximate those obtained by Nitou *et al.* [11] on a study assessing the nutritional status of nursing mothers and their infants in the Congo who found 56.57% girls and 43.42% boys. This predominance of the female gender was also observed by N'golo [12] who found 55.1% of girls against 44.9% of boys on a thesis study on the food and nutritional status of children aged 6 to 59 month of the SIKASSO region. This great predominance can be explained by the fact that the sperm carrying the Y chromosome (boy) is less resistant and of a short lifespan compared to the sperm carrying the X chromosome (girl), which has a longer lifespan [13].

With regard to weight, the results of our study show that 10% of children have a birth weight less than 2.5 kg. This result is close to that observed by Nitou *et al.* [11] who finds a rate of 11.8% of children below 2.5 kg. ESDC-II, [14] in its final report carried out in the Congo reported that among children whose weight is known at birth, 10% of children were of low birth weight (less than 2.5 kg). This could be explained by the fact that, during pregnancy, some pregnant women did not have a good nutritional status, which could have influenced the weight of children at birth.

### 4.2. Breastfeeding Practices

Our study shows that 31% of children took colostrum compared to 69% who did not. This rate is low than that obtained by Sawadogo *et al.* [15] in Burkina Faso (Gnagna province) on the study on infant feeding practices in rural areas (77%). This low intake of colostrum in our study can be explained by the lack of nutritional education of pregnant women in these villages due to the lack of an Integrated Health Center (CSI) in certain villages in the Madingo-Kayes district.

Our study shows us an exclusive breastfeeding rate of 2%. This rate is lower than that observed by Savadogo [16] in Mali who found 13.5% whose study is based on malnutrition in children 0-5 years old and close to that obtained by Sonogo [17], 2.5% of children 0-6 months fed exclusively on the mother's breast, study on the future of malnourished children in the pediatric ward.

Breast milk is the most complete form of nutrition [18] for infants. It provides all the necessary nutrients during the first 6 months of existence and its composition is constantly adjusted to the needs of the child, depending on his age, the outside temperature and his appetite. Breastfeeding has a number of health benefits (breastfed children are more resistant to disease and infection because breast milk transmits antibodies from mother to infant), growth, and development of infants. Motor

development has been proven to be enhanced by exclusive breastfeeding for six months [1].

The mothers of the children surveyed do not put into practice the recommendations of the WHO and UNICEF [19] during their global strategy. This impractical recommendation is due either to the lack of nutritional education of pregnant women in some hospitals of the villages in the district.

Mixed breastfeeding is 98%. This rate is close to that achieved by the ESDC-II [20] in its final report which states that a high proportion of Congolese children receive other types of food (artificial milk, porridge, etc.) while continuing to be breastfed (6-8 months) this rate is 86%. The predominance of mixed breastfeeding in Madingo-Kayes infants could be attributed to the availability of breastmilk substitutes in these villages; the accessibility of purchasing infant milk, or by many occupations of these mothers and as well as for mothers who believe they do not have enough milk for their children.

Our study shows that, 38% of children who took the bottle, this rate is low than that obtained by Lassana [21] who, finds that almost half of the children (53.4%) before the disease were breastfed and bottle. 43% of children (0-1 months) start taking the bottle. This catch from birth could be explained by the fact that mothers are sometimes forced to resort to this method of breastfeeding because of many occupations such as the fields, the harvest of cassava leaves and the harvest of *Gnétum africanum* and sometimes the lack of breast milk production in these women.

### 4.3. Complementary Feeding Practices

The results of our study record a water intake of 3% from 6 months. This rate is largely very low from the point of view of WHO recommendations. This could be explained by a lack of knowledge related to the nutritional education of mothers of children.

Our study reveals that 3% of children have taken porridge from 6 months, this result is very low compared to that obtained in Burkina Faso in a national nutritional survey [22], which found 57%. This low rate could be explained by the early introduction of complementary foods before the age of six (6) months due to the lack of nutritional education of these nursing mothers. Before this age, given the small volume of the stomach of the order of 30g (ml) / kg of body weight [23] and the low frequency estimated, at two doses of porridge per day, these porridges are not able to cover the nutritional needs of infants and young children. The WHO recommends a food diversification from 6 months. 87% of children eat traditional porridge to which other foods are added. This result is higher than that obtained by Pinaud [24]; 37% on the nutritional status and quality of food for children under two years of age in the city of Damé (Côte-d'Ivoire).

The results of our daily consumption of porridge is of the order of two taken per day with a percentage of 65%, this result differs from that reported by the work of Arnaud [25] in Côte d'Ivoire whose study relating to characterization and attempt to identify the determinants of protein-energy malnutrition and dietary practices which have shown a consumption frequency of the order of one intake per day. These low frequencies could be explained

by the multiple occupations of mothers of children. However, in developing countries, porridge lacks protein, lipids, a source of micronutrients and is of low energy density [26,27]. Thus, it is therefore necessary to increase the amount of porridge at least four (4) times a day in a young child, for example, in order to supplement the energy intake of breast milk [28].

The average age of stopping porridge in our study is 5 to 9 months. This age is close to that estimated from 5 to 6 months in rural areas by [29] and is less than 8 months in urban areas by Dinga [30].

According to the feeding schedule for infants and young children, the age of introduction of special dishes and family dishes, should be introduced from 9 months and 12 months respectively. The results recorded by our study respectively show the rates of 16% for those who took the special dish between 9-11 months and 32% for those who started taking the family dish from 12 months.

### 4.4. Food Diversification

52% of children eat other types of dishes, among which we have: mwambe (palm nut juice) saka-saka, legumes. This percentage of consumption of pulses and nuts is higher than that reported by Adam et al. [31] on Saudi children who vary between 22 and 40%.

While, 37% children eat nothing but fish plus vegetables; Fish that contain valuable mega-3 fatty acids, which are rarely found in other foods, should be eaten once a day.

3% consume bushmeat plus gnetum. This rate is lower than that observed by Adam et al. [31] in Saudi Arabia for a study on complementary feeding of Saudi infants and young children, who find 65%. Meat provides protein and iron. In order for the child to receive enough iron, it is important to regularly eat small amounts of meat from the age of 9 months.

Children who took an alternate mixture of peanut oil, the peanut paste had a percentage of 99% against those who took nothing but palm oil 1%.

During the complementary feeding period, it is recommended that children eat, in addition to breast milk, complementary nutrient-rich foods that are hygienically prepared, frequent and varied.

Evidence has shown that a diet that includes at least four food groups (dairy products; grains; meat foods; and fruits and vegetables rich in vitamin A) per day is associated with improved growth in young people children [32].

### 4.5. Nutritional Status of Children

#### Prevalence of underweight (Weight / age):

We found a prevalence of 35% of severe underweight and 8% in moderate form. Our results are higher than that obtained in a study carried out in EDS Algeria [33], relating to the national survey on the end-of-decade objectives for mother and child health which found a prevalence of underweight of 6% including 1, 3% of the severe form. This high rate of severe underweight in our study could be explained by the early introduction of complementary foods such as porridge which was

introduced respectively at 28% and 67% between the ages of 1-2 months and 3-5 months.

#### Prevalence of stunting in height (height / age):

According to our study, 49% of children are severely stunted compared to only 2% who are moderately retarded. In view of these results, we note that the rate of children surveyed in our study and who manifest severe growth retardation is closest to that carried out by Agbèrè [34] in Togo on feeding practices for infants and young people. children in the BE district who found that 44.6% of children had severe stunting compared to 22.4% moderate. This difference could be explained by the dietary practices of this surveyed population, linked to the rural way of life.

#### Prevalence of thinness (Weight / Height):

Our study shows that 5% of children have the severe form and 9% of children have the moderate form. Our results are high than those obtained in Algeria (33), relating to the national survey on end-of-decade objectives for mother and child health, with 0.6% and 2.8% prevalence of wasting in its severe form, emaciation for moderate form. The high prevalence of weight loss could be explained by eating habits that do not comply with WHO recommendations.

## 5. Conclusion

Infant feeding during complementary feeding is a major public health issue in developing countries to date. This study showed that the dietary practices of children aged 0-2 years in the Madingo-Kayes district are below the recommendations of the World Health Organization. The exclusive breastfeeding (0 to 6 months) recommended by this World Organization is far from being respected among the population surveyed. The poor complementary feeding practices of this study population are at the origin of various forms of malnutrition observed in children.

## References

- WHO., 2008. Indicators for assessing infant and young child feeding practices part I: Definition, World Health Organization, Switzerland, ISBN: 9789241596664.
- WHO., 2016. Infant and young child feeding. World Health organization, Geneva, Switzerland. [http://WHO.Int/mediacenter/factsheets/fs\\_342/en/#](http://WHO.Int/mediacenter/factsheets/fs_342/en/#).
- PAHO., 2003. Guiding principles for complementary feeding of the breastfed child. Pan American Health Organization, Washington DC., USA.
- UNICEF., 2016. From the first hour of life: Making the case for improved infant and young child feeding everywhere. UNICEF., New York, USA. ISBN: 978-92806-4852-2.
- Black, R.E., L.H. Allen, Z.A. Bhutta, L.E. Caulfield and M. de Onis et al., 2008. Maternal and child under nutrition: Global and regional exposures and health consequences. *Lancet*, 371; 243-260.
- Reinbolt, A., 2016. Effectiveness of a nutrition education intervention to improve complementary feeding practices: Randomized controlled trial in Cambodia. Dissertation Submitted to the faculty of Agriculture, Nutritional Sciences and Environmental Management Justus Liebig University Giessen for the Degree of Dr. Oec. Troph.
- Labadarios, D., N. P. Steyn and J. Nel, 2011. How diverse is the diet of adult South Africans? *Nutr. J.*, Vol.10.
- Kennedy, G. L., M. R. Pedro, C. Seghieri, G. Nantel and I. Brower, 2007. Dietary diversity score is a useful indicator of micronutrient intake in non-breast feeding Filipino children. *J. Nutr.*, 137: 472-477.
- Trèche, S. (2002). Complementary foods in developing countries: importance, required characteristics, constraints and potential strategies for improvement. In Kolsteren P, Hoerée T, Perez-Cueto eds: Proceedings of the international Colloquium promoting growth and development of under-fives. Antwerpen, 132-148.
- Traoré T, Vieu MC, Traoré SA, Trèche S, (2005). Effet de la durée de la période d'accoutumance sur les ingérés énergétiques à partir de bouillies de faibles et de hautes densités énergétiques chez nourrissons Burkinabé vivant en milieu naturel. *Appetite*: 2-5.
- Nitou J.G., Enzonga-Yoca J.A, Bouanga-Kalou G., Niamayoua R.K, Nzikou J.M, Itoua-Okouango S., Elenga M., Matos L., Mvoula-Tsieri M., Silou Th. - Evaluation de l'état nutritionnel des mères allaitantes et de leurs nourrissons au Congo, 2012: 1687-1697p.
- N'golo TRAORE. -statut alimentaire et nutritionnel des enfants de 6 à 59 mois de la région de SIKASSO, Thèse (BAMAKO) 2010 : 97p.
- Anne Laure Galluchon - Conception: fille ou garçon, la méthode Shettles, (2016); [drolesdemums.com/conception/ovulation-et-fecondation/conception-fille-garcon-methode-shettles](http://drolesdemums.com/conception/ovulation-et-fecondation/conception-fille-garcon-methode-shettles). Consulté le 26/12/2018.
- EDSC-II.-Indicateurs des objectifs du millénaire pour le développement Congo, Rapport final. 2011-2012: 290p.
- Sawadogo Prosper S., Martin-Prével Y., Savy M., Kameli Y., Traoré Alfred S.- Pratiques d'alimentation du nourrisson en zone rurale au Burkina Faso (Province de la Gnagna): description et conséquences nutritionnelles. 2<sup>ème</sup> Atelier international, voies alimentaires d'amélioration des situations nutritionnelles. 2003: 317-327p.
- Savadogo Abdoul Salam. -La malnutrition chez les enfants de 0-5 ans à l'Hôpital Nianankoro Fomba de Ségou, université de BAMAKO 2007: 68p.
- Sonogo D. -Devenir des enfants malnutris dans le service de pédiatrie de HGT Thèse de médecine : 2003, n°61, 62-70p.
- OMS (2001) Stratégie mondiale pour l'alimentation du nourrisson et du jeune enfant: durée optimale de l'alimentation au sein exclusive. 54<sup>ème</sup> Assemblée Mondiale de la Santé. A54/INF.DOC.4.
- OMS, UNICEF: stratégie mondiale pour l'alimentation du nourrisson et du jeune enfant 2003.
- EDS-Congo-II (2012). -Enquête Démographique et de Santé au Congo (EDSC-II). Rapport préliminaire, 2011-2012: 38p.
- Lassana KANTE. -Evaluation de l'état nutritionnel des enfants de 2 à 59 mois hospitalisés dans le service de pédiatrie du CHU Gabriel Touré. À propos de 116 cas. Thèse 2008 : 82p
- Enquête nutritionnelle nationale. - rapport final, Burkina Faso, décembre 2012 :64p.
- Sanchez-Grinan Mi, Peerson J, Brown KH.1992. Effect of dietary energy density on total ad libitum energy consumption byrecovering malnourished children. *Eur. J.Clin. Nutr.*, 46: 197-204.
- Pinaud H.-Etat nutritionnel et qualité de l'alimentation des enfants de moins de deux ans dans la ville de Damé (Côte-d'Ivoire): Identification et estimation de la valeur et de l'apport nutritionnels des aliments de complément. Mémoire de DESS. Université de Montpellier. 2004: 49p.
- Arnaud S. -Etat nutritionnel et qualité de l'alimentation des enfants de deux ans dans les villages de Damé (Côte d'Ivoire) : caractérisation et essai d'identification des déterminants de la malnutrition protéino-énergétique et des pratiques alimentaires. Mémoire de DESS. Université de Montpellier II. 2004: 70p.
- Dewey KG and Brown KH. -Update on technical issues concerning complementary feeding of young children in developing countries and implications for intervention programs. *Food Nutr Bull* 2003; 24(1): 5-28p.
- Elenga M., Massamba J., Kobawila S. C., Makosso V.G., Silou T.- Evaluation et amélioration de la qualité nutritionnelle des pâtes et des bouillies de maïs fermenté au Congo. *Int.J.Biol. Chem.Sci.*, 2009; 3(6): 1274-1285p.
- Trèche S. Techniques pour augmenter la densité énergétique des bouillies. In: Trèche S., de Benoist B., Benbouzid D., Verster A., Delpuech F., eds. - L'alimentation de complément du jeune enfant. Paris: Orstom, collection colloques et séminaires 1994: 387p.
- Tchibindat F., Rodriguez A., Miazzenas S. -Sécurité alimentaire et état nutritionnel des ménages ruraux a Congo. Rapport technique, projet CRDI/DGRST, Brazzaville. 1994.

- [30] Dinga D. - Etude des pratiques de sevrages et de la qualité nutritionnelle dans les bouillies à Brazzaville. Mémoire de fin d'étude IDR, Brazzaville. 1991.
- [31] Adam E. Ahmed and Osana A. Salih, 2019. Infant and young child complementary feeding in Saudi Arabi: Timely introduction, frequency and diversity. *Pak.j. Nutr.*, 18: 216-225.
- [32] Onyango, A. W., E. Borghi, M. de onis, M.D. C. Casanovas and C. Garza, 2014. Complementary feeding and attained linear growth among 6-23-month-old children. *Public health Nutr.*, 17: 1975-1983.
- [33] EDG Algérie 2000/MICS2. -Rapport de synthèse de l'enquête sur les objectifs de la fin décennie: santé mère et enfant Revue: pages 1. 1-15p.
- [34] Agbere AR. - Pratiques d'alimentation du nourrisson et de jeune enfant dans le district de BE (Togo). In thèse Lassana KANTE sur évaluation de l'état nutritionnel des enfants de 2 à 59 mois hospitalisés dans le service de pédiatrie du CHU Gabriel Touré, Bamako 2008: 82p.



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