(RESEARCH ARTICLE)

Evaluation of the nutritional and hematological-parasitological profile of children aged 6-24 months seen in consultation at the Saint Gabriel Dispensary in Matoto, Republic of Guinea

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Abstract

Infant and young child nutrition is essential for their growth and development from birth until the age of 2 years or older. The objective was to contribute to improving the nutritional and hematoparasitological status of children aged 6 to 24 months during the introduction of solid foods. A prospective, descriptive, cross-sectional study was undertaken at the Saint Gabriel Dispensary in Saint Gabriel to evaluate the nutritional and hematoparasitological profiles of children aged 6 to 24 months. Data were collected through questionnaires administered to mothers, followed by anthropometric measurements and hematoparasitological analyses. The data collection, centralization, and entry were analyzed using ENA software, November 2011 version, and the dietary practice data were analyzed using SPSS software, version 22.0 and Excel 2013. In terms of sociodemographics, there was parity between the sexes (50% each), while 64% of the children were between 6 and 11 months old. 31% of the children came from the commune of Tombolia. The majority of the mothers were between 20 and 39 years old, with a secondary education. Most of them (48%) had a secondary education, while 30% were saleswomen or 22% were homemakers. The children received only cereals as a supplementary food in 99% of cases, which explains the lack of knowledge and practice of dietary diversification. 43% of the children suffered from severe acute malnutrition, and 44% from moderate acute malnutrition. This malnutrition affects girls more in terms of severe acute malnutrition (46%) and boys more in terms of moderate acute malnutrition (47%). Hematological analyses reveal a rate of moderate anemia in 76% of children with severe acute malnutrition, indicating deficiencies in essential micronutrients. Malaria affects 24% of children with severe acute malnutrition, which denotes the weakened immunity due to malnutrition, making these children more susceptible to contracting parasitic diseases and constituting an additional risk to their overall health. In summary, this research highlights acute malnutrition and poor dietary diversification practices. These findings call for improved dietary diversification practices and nutritional and educational support strategies for mothers to strengthen the health and development of young children.

Keywords: Nutritional; Profile Assessment; Hematological And Parasitic Parameters; Food Diversification

1. Introduction

Malnutrition is a public health problem in all countries, particularly among highly vulnerable populations in several regions of the world, including the Caribbean, sub-Saharan Africa and other small island developing states (WHO, 2017). Data from the World Health Organization (WHO) in 2017 confirm an increase in world hunger, after it had been

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declining for a long time, and therefore a reversal of the trend (WHO, 2017). The number of undernourished people stood at 821 million, or about one in nine people in the world, and nearly 151 million children under five, or 22%, had stunted growth; wasting affected more than 50 million of these children, and among them more than 38 million were underweight (WHO, 2017). Addressing hunger, food insecurity and malnutrition in all its forms is one of the main components of the second Sustainable Development Goal, as malnutrition and diets are now the main risk factors behind the global burden of disease and death for children under 5 (PELLETIER, 2017). In the Republic of Mali, according to the 2018 Demographic and Health Survey VI (EDSM-IV), the prevalence of stunting varies from 15% of children under 5 years old in Bamako to 33% in the Gao region. Overall, 9% of these children are emaciated and 19% are underweight (EDSM-VI, 2018). In the Republic of Guinea, the 2018 Demographic and Health Survey V (DHS-V) showed that across the country, 30% of children suffer from chronic malnutrition, 9% are wasted, and 16% are underweight. Underweight is much more prevalent in rural areas than in urban areas (18% versus 12%) (DHS-V Guinea, 2018). The Boké and Kankan regions respectively 20% followed by that of Labé with 19% are the most affected by this form of malnutrition and only 51% of children aged 6 to 9 months receive, in addition to breast milk, complementary foods (EDS -V Guinea, 2018).

Children suffering from severe acute malnutrition (SAM) have a higher risk of dying from common childhood illnesses such as diarrhea, pneumonia and malaria (Rice et *al.*, 2018). And in most cases, MAS is accompanied by anemia which is an inherent part of the reductive adaptation process associated with weight loss, the presence of edema and childhood morbidity (PELLETIER, 2017). Taking into account the above, within the framework of promoting good feeding practices in children in order to contribute to the reduction of malnutrition in all its forms, the choice of this work entitled: Evaluation of the nutritional profile and hemato-parasitology of children aged 6-24 months received in consultation at the Saint Gabriel Dispensary in Matoto is justified.

2. Methodology

The city of Conakry is the capital of the Republic of Guinea. The Republic of Guinea is a country located in West Africa and covers an area of 245,857 km² . It is bordered to the west by the Atlantic Ocean and shares its borders with six countries: Guinea-Bissau to the northwest, Senegal to the north, Mali to the north and northeast, Ivory Coast to the east, and Liberia and Sierra Leone to the south (INS Guinea, 2015). This is a real study in the village of Conakry, capital of the Republic of Guinea, the Saint Gabriel Hospital of the Matoto commune and the Biochemistry laboratory of the University of Gamal Abdel Nasser on the staff's service to our here This is a prospective and descriptive cross-sectional study aimed at recording epidemiological, anthropometric, hematological and nutritional variables, which lasted three months from June 3rd to September 3rd, 2024. The chantillon is a simple machine and the tail of the chantillon is very beautiful in the Schwartz formula. It is included in our children's studies that children have been receiving for 6-24 months for a consultation at the Saint-Gabriel Hospital in the Matoto community.
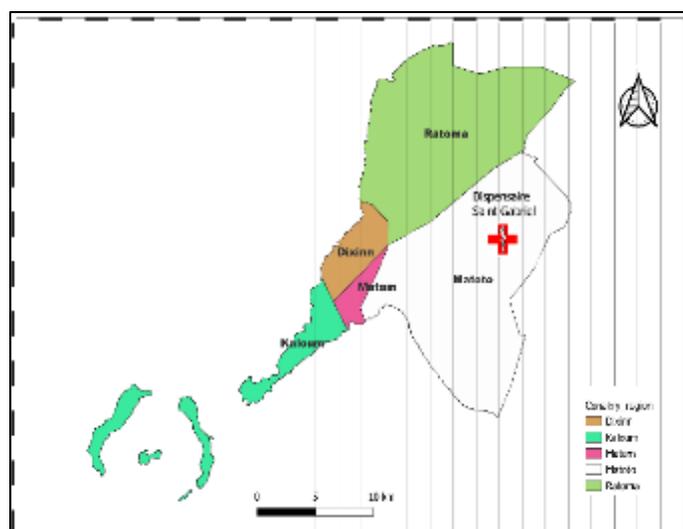

Figure 1 Conakry plan and ban: [13].

2.1. Variables

Anthropometric variables (mid-upper arm circumference, weight, height), Clinical variables (nutritional edema), Epidemiological variables (Age (mothers and children), Sex (children), Residence (mothers and children), Socio-professional category (mothers or caregivers), Marital status (mothers or caregivers), Level of education (mothers or caregivers) Biological Variables (Hemoglobin, CBC, GE)

2.2. More than the Data collection

For the collection, a collection of donation files must be sent back to the consultation register and entered into the home with other people.

2.3. Sampling Techniques

The performance of the sanguine that is performed by the vein puncture and the sanguine is received in the EDTA tube, the dosage of the glycemia, the hemoglobin and the protein on it realizes in a better day

2.4. Ethical considerations.

Each patient's consent is requested before any questionnaire is administered, the rationale for the work is explained to them beforehand, and they are reassured of anonymity in the return of the data.

2.5. Data Processing Analysis

Data entry and analysis were performed using ENA software version November 2011 and SPSS software version 22.0 and Excel 2019.

2.6. Limits and different contents

We ask our people to find out what is difficult to do here:

- Certain children are present with the great wealth of children who abandon their families or children;
- Difficulties in communication with certain things that do not speak in French.

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3. Results and Discussion

This work was part of a prospective descriptive study aimed at evaluating the impact of malaria on nutritional and hematological parameters in children aged 6-24 months admitted to the Saint Gabriel Dispensary in Matoto. Our results are presented in tables and figures, which have been commented on and discussed in light of available literature.

Table 1 Distribution of children according to age

No.	Age (months)	Number	Percentage
1	6 to 11	191	64%
2	12 to 24	109	36%
	Total	300	100%

This table shows us that 64% of the children were in the 6-11 month age group. This high proportion of children in this age group reflects the fact that it marks the beginning of food diversification.

Our results are lower than those found by (Diouf et al., 2019) in Senegal where 70% of children started food diversification between 6 and 11 months.

Table 2 Distribution of children according to sex.

No.	Sex	Number	Percentage
1	Male	150	50%
2	Female	150	50%
	Total	300	100%

We can see from this table that it had a balance between male (50%) and female (50%) sexes, indicating a homogeneous distribution between the sexes.

Our results are close to those reported by (Kouadio et *al* ., 2018) in Ivory Coast, where 49% of children were male and 51% were female.

Table 3 Distribution of children according to their nutritional profile based on (Z-score and edema) by sex.

No.	Sex	Total children	Severe acute malnutrition (< -3 z-score)		Moderate acute malnutrition (≥-3 < -2 score)		Normal state (≥ -2 z-score)		Edema (%)	
			N	%	N	%	N	%	N	%
1	M	150	60	40%	70	47%	20	13%	0	0%
2	F	150	69	46%	61	41%	18	12%	2	1%
Total		300	129	43%	131	44%	38	13%	2	1%

This table shows that over 85% of cases are acute malnutrition in its various forms (43% severe acute and 44% moderate acute). Severe acute malnutrition is more prevalent among girls (46%) than boys (40%), while moderate acute malnutrition was higher among boys (47%) compared to girls (41%).

Our results are similar to those found by (Kimani -Murage et *al.* , 2013) in Kenya where 45% of severe acute malnutrition was in girls.
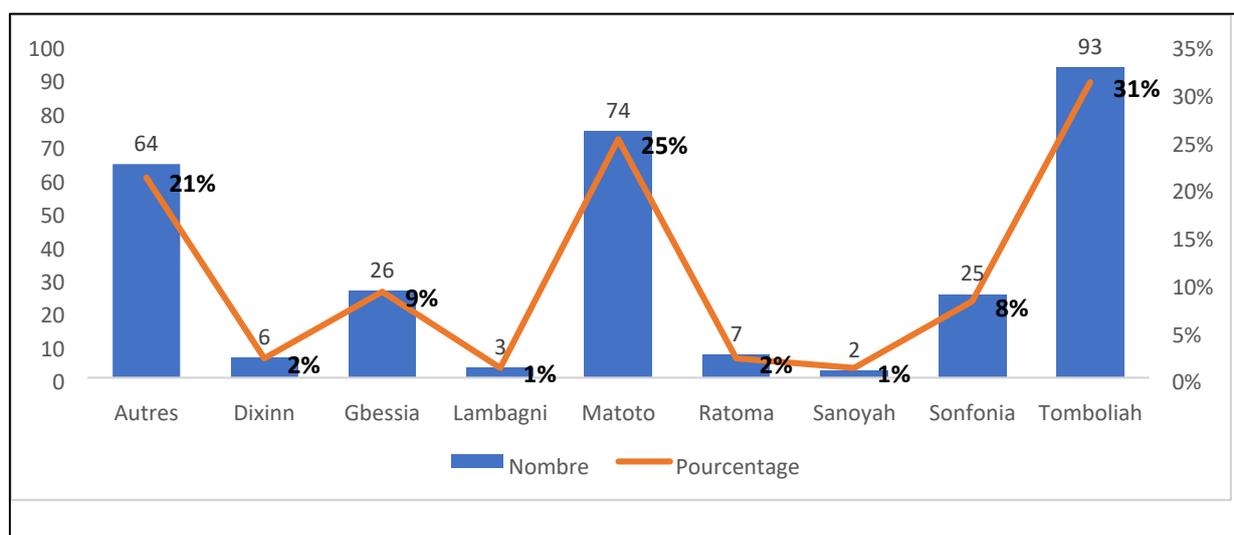

Figure 2 Distribution of mothers according to residence (municipality)

This figure shows that 31% of the mothers resided in the urban commune of Tombolia, followed by Matoto with 25%. Our results are superior to those found by Bangoura M. in Guinea where children residing in the commune of Matoto were the most numerous with 48% of cases.

Table 4 Distribution of mothers according to age.

No.	Mother's age	Number	Percentage
1	<=19	16	5%
2	20-39	281	94%
3	40-49	3	1%
	Total	300	100%

This table reveals that 94% of the mothers were aged between 20 and 39, which translates to this being the most reproductively active age group for mothers.

Our results are superior to those reported by (Appiah et *al* ., 2019) in Ghana where 92% of mothers were in the 20-39 age group.
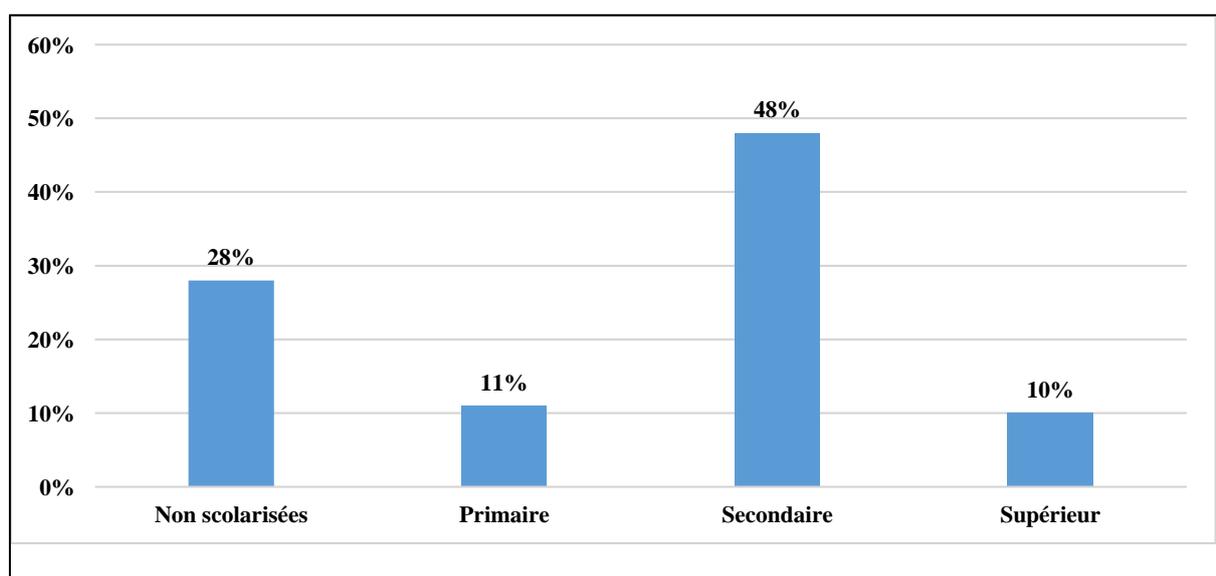

Figure 3 Distribution of mothers according to education level.

This figure shows that 48% of mothers had a secondary education. This highlights a positive impact on mothers' understanding of best practices for feeding children.

Our results are superior to those of (Ogunlesi et *al* ., 2014) in Nigeria where 46% of mothers had a secondary education level.

Table 4 Distribution of mothers according to marital status

No.	Marital status	Number	Percentage
1	Married	255	85%
2	Bachelor	45	15%
	Total	300	100%

This table indicates that the majority of mothers (85%) were married, while 15% were single. This fosters family support for childcare.

These results are similar to those found by (Mensah & Garti , 2016) in Ghana with 88% of mothers were married.
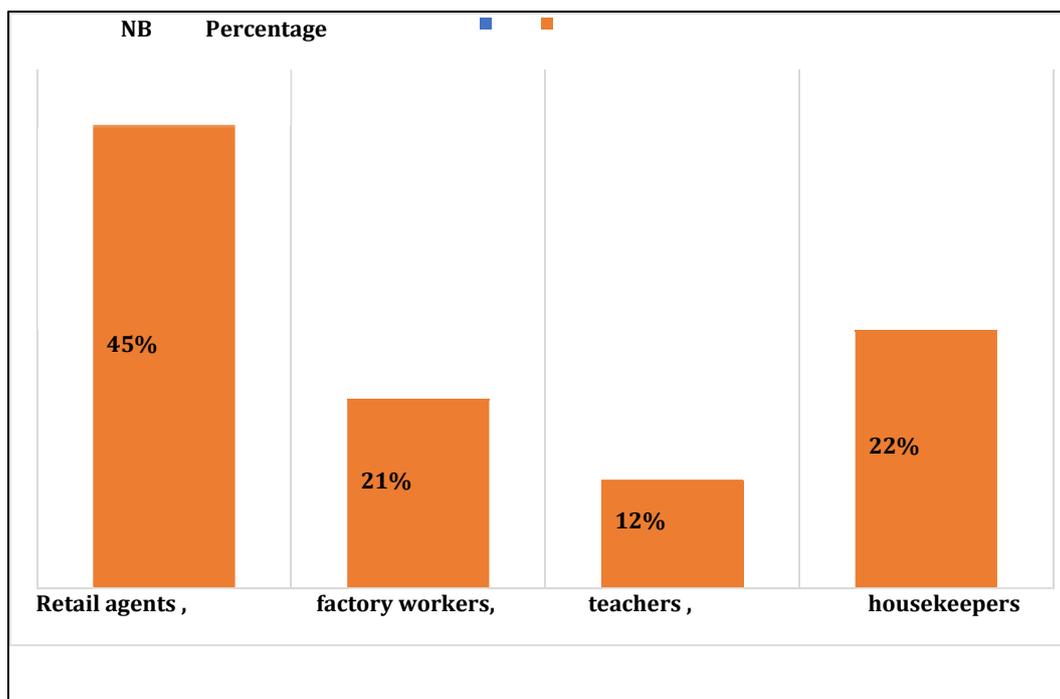
Figure 4 Distribution of mothers according to socio-professional status

We observe from this figure that the majority of mothers surveyed, at 45%, were sales agents, followed by housewives (22%) and factory workers (21%). This reflects a population largely active in the informal sector.

Table 5 Distribution of moderate acutely malnourished children according to hemoglobin level

No.	Hb levels	Number	Percentage
1	Moderate anemia	4	3%
2	Subclinical anemia	29	22%
3	Severe anemia	-	-
4	Normal	98	75%
	Total	131	100%

This table highlights that 75% of children with moderate acute malnutrition had normal hemoglobin levels. However, 22% suffered from subclinical anemia.

Our results are superior to those of Diop et *al* . (2020), in Senegal, who found 70% of children with moderate acute malnutrition had normal hemoglobin levels.

Table 6 Distribution of children with severe acute malnutrition according to their hemoglobin level in children with severe acute malnutrition.

No.	Hb levels	Number	Percentage
1	Moderate anemia	99	76%
2	mild anemia	30	23%
3	Severe anemia	-	-
4	Normal	2	2%
	Total	131	100%

This table shows that 76% of children with severe acute malnutrition suffered from moderate anemia and 23% from subclinical anemia, which confirms the severity of severe acute malnutrition with the risk of anemia.

These results are lower than those reported by Touré (2021) in Mali where 80% of children with severe acute malnutrition had moderate anemia.

Table 7 Distribution of MCV rates in moderate acutely malnourished children.

No.	VGM fl.	Number	Percentage
1	Microcytic anemia	51	39%
2	Normocytic anemia	80	61%
3	Macrocytic anemia	-	-
	Total	131	100%

Based on this table, we observe that 61% of children suffering from moderate acute malnutrition presented with normocytic anemia and 39% with microcytic anemia. This reflects a nutritional deficiency.

Our results are lower than those of the study conducted by Adou (2019) in Burkina Faso which found that 65% of moderate acutely malnourished children had normocytic red blood cells.

Table 8 Distribution of MCV rates in children with severe acute malnutrition.

No.	VGM fl.	Number	Percentage
1	Microcytic anemia	33	25%
2	Normocytic anemia	98	75%
3	Macrocytic anemia	-	-
	Total	131	100%

This table shows that 75% of patients with severe acute malnutrition had normocytic anemia, while 25% presented with microcytic anemia. This indicates complex nutritional deficiencies in iron, folic acid, and vitamin B12.

These results are superior to those found by Agossou (2018) in Benin where 70% of children with severe acute malnutrition presented with normocytic anemias.

Table 9 Distribution of malaria rates among moderate acutely malnourished children.

No.	GE	Number	Percentage
1	Negative	96	73%
2	Positive	35	27%
	Total	131	100%

Based on this table, we observe that 27% of children with moderate acute malnutrition tested positive for malaria, indicating weakened immunity due to malnutrition, while 76% tested negative for malaria.

Our results are comparable to those found by Koulibaly (2020) in Ghana, where the malaria rate was 25% among children with moderate acute malnutrition.

Table 10 Distribution of malaria rates among children with severe acute malnutrition.

No.	GE	Number	Percentage
1	Negative	100	76%
2	Positive	31	24%
	Total	131	100%

This table illustrates that 24% of children with severe acute malnutrition were infected with malaria. This confirms the impact of severe acute malnutrition on vulnerability to infections.

These results are similar to those observed by Kouassi (2019), in Ivory Coast where 25% of children with severe acute malnutrition had malaria.
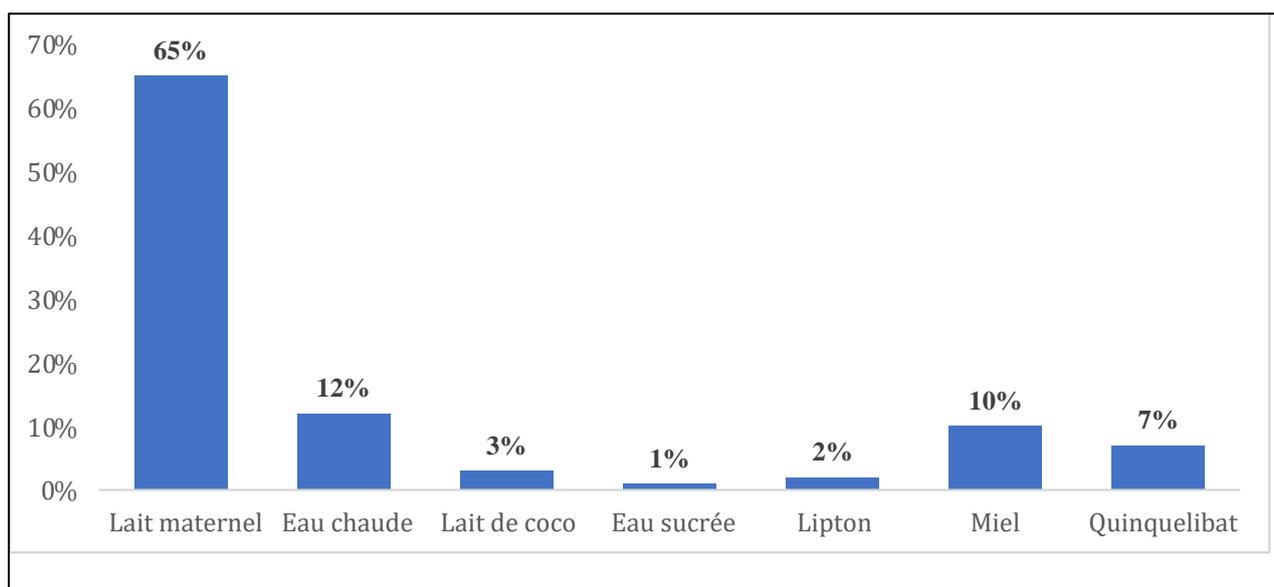

Figure 5 Distribution of children according to the first food received at birth.

This figure indicates that 65% of children received breast milk as their first food from birth, but a proportion of 12% received warm water (12%).

Our results are lower than those of the study conducted by Sethi et *al* . (2013) in India, which showed that 70% of children received had breast milk as their first food from birth.

Table 11 Distribution of children according to the start of breastfeeding after birth (0 – 6 months).

No.	Beginning of breastfeeding	Number	Percentage
1	Less than 1 hour	**141**	**47%**
2	1 hour later	159	53%
3	Days later	-	-
	Total	**300**	**100%**

This table shows that 47% of children were breastfed less than one hour after birth, while 53% started being breastfed one hour after.

These data are higher than those of Subedi et *al* . (2014) in Nepal where 35% of mothers start breastfeeding less than 1 hour after birth.

Table 12 Distribution of children according to the duration of breastfeeding.

No.	Duration	Number	Percentage
1	6 months	136	45%
2	Less than 6 months	7	3%
3	6-8 months	156	52%
	Total	300	100%

This table highlights that 52% of mothers had exclusively breastfed their children for more than 6 months, while 45% had exclusively breastfed for 6 months. This indicates a relatively good breastfeeding practice.

Our data are significantly higher compared to those of Cissé et *al.*, (2017) in Senegal, with 39% of mothers practicing exclusive breastfeeding up to 6 months.

Table 13 Distribution of children according to foods received in addition to breast milk.

No.	Type of meal	Number	Percentage
1	Cereal	296	99%
2	Milk	2	1%
3	Egg	2	1%
	Total	300	100%

This table shows that 99% of children received only cereals as a complementary food, indicating an insufficient practice of dietary diversification.

Our results are superior to those reported by Ouédraogo et *al* ., (2020) in Burkina Faso, where 82% of mothers introduced cereals as a complementary food.
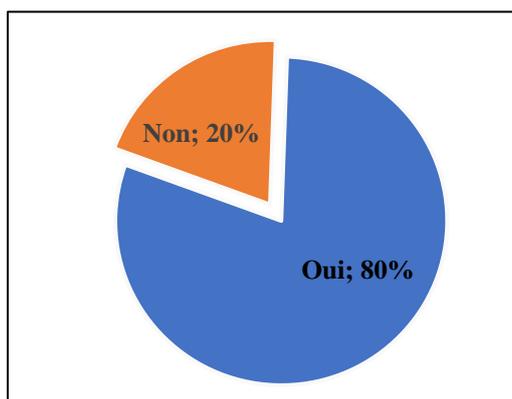

Figure 6 Distribution of mothers according to knowledge of food diversification**.**

We can see from this figure that the majority of mothers (80%) were familiar with food diversification, which is favorable for a healthy introduction of solid foods.

Our data are significantly higher than those found by Kulwa et al., (2018) in Tanzania, with 65% of mothers familiar with food diversification.

Table 14 Distribution of children according to the number of breastfeedings in addition to porridge.

No.	Frequency	Number	Percentage
1	Less than 10 times	38	13%
2	More than 10 times	261	87%
3	Others	1	0%
	Total	300	100%

This table indicates 87% of mothers breastfed their children more than 10 times a day in addition to porridge, which indicates a good practice of complementary feeding.

Table 15 Distribution of children according to the age of lactation.

No.	Lactation period	Number	Percentage
1	Less than 1 year	2	1%
2	1 year	22	7%
3	2 years	**276**	**92%**
	Total	**300**	**100%**

This table highlights that 92% of mothers stopped breastfeeding their children at the age of 2, which indicates that weaning practices are acceptable.

Our data are higher than those reported by Addo et *al* ., (2019) in Ghana, with 70% of mothers ceasing breastfeeding at 2 years.

Table 16 Distribution of children according to the frequency of daily meals.

No.	Meal frequency	Number	Percentage
1	twice	12	4%
2	3 times	249	83%
3	4 times	38	13%
4	Plus, 4 times	1	0%
	Total	300	100%

This table reveals that 83% of children received three (3) meals per day, which is relatively good.

These results are superior to those of Traoré et *al* ., (2020) in Mali, where 76% of children received three meals a day.

4. Conclusion

This work, which was part of a prospective and descriptive cross-sectional study aimed at evaluating the nutritional and hemato-parasitological profile of children aged 6-24 months seen in consultation at the Saint Gabriel Dispensary in Matoto, allowed us to reach the following conclusion: In terms of socio-demographics, there was parity between the two sexes (50% each), while 64% of the children were between 6 and 11 months old. 31% of the children came from the commune of Tombolia, followed by Matoto with 21%. The majority of the mothers were aged between 20 and 39, with a secondary education level, most of them either (48%), commercial agents (30%) or housewives (22%). The children surveyed received only cereals as a supplementary food in 99% of cases, which explains their lack of knowledge and practice regarding dietary diversification. This could contribute to nutritional deficiencies in these children.

- 43% of children have severe acute malnutrition
- 44% acutely moderately malnourished.

This malnutrition affects girls more in terms of severe acute malnutrition (46%) and boys more in terms of moderate acute malnutrition (47%), which indicates specific vulnerabilities according to sex.

Hematological analyses reveal a rate of 76% of moderate anemia in children with severe acute malnutrition, indicating deficiencies in essential micronutrients. Furthermore, at the parasitic level, malaria affects 24% of severely acutely malnourished children, which denotes the weakening of immunity due to malnutrition making these children more susceptible to contracting parasitic diseases and constitutes an additional risk to their overall health. In summary, this research highlights acute malnutrition and poor dietary diversification practices. These findings call for improved dietary diversification practices and nutritional and educational support strategies for mothers to strengthen the health and development of young children.

Compliance with ethical standards

Disclosure of conflict of interest

With the registration of this article, our Mohamed BANGOURA, on men's phones, realize a collection of research, analysis, and redaction in a consent form.

Statement of informed consent

We remind all participants and parents for the necessary time to study.

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