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Study of Severe Acute Malnutrition in Children Aged 0-59 Months Hospitalized in the Pediatric Department of Sikasso Hospital

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Abstract **Original Research Article**

Introduction: Malnutrition is a backdrop on which several infections are grafted. The implementation of WHO guidelines would significantly reduce hospital mortality due to severe malnutrition. General Objective: To evaluate the epidemio-clinical characteristics of severe acute malnutrition in children aged 0 to 59 months in the pediatric department of Sikasso hospital from 2015 to 2019. Methodology: The study was conducted in the pediatric department of Sikasso hospital. It was a cross-sectional study with retrospective data collection from January 2015 to December 2018 and prospective from January 2019 to December 2019, children aged 0 to 59 months hospitalized with a P/T ratio < -3 z score or a MUAC < 115mm or nutritional edema. Results: During the study period we had 11,255 cases of hospitalization including 190 cases of severe acute malnutrition in children aged 0 to 59 months, i.e. a frequency of 1.68%. The average age was 19 months with extremes ranging from 6 months to 48 months. The male sex dominated with 56% of cases with a sex ratio of 1.27. The unfavorable socio-economic conditions in the families were 66.32%. The most frequent reasons for consultations were fever and anorexia, respectively 75.79% and 65.26%. Fever was the most common complication, 76% of cases, followed by anemia and anorexia, respectively 65% and 63%. Malaria was the most associated pathology, 47.43%, followed by cases of gastroenteritis and pneumonia, respectively 20.57% and 17.71%. According to the outcome, 8% of malnourished people died.
Keywords: Malnutrition, child, therapeutic.

INTRODUCTION

In the world, one in 4 children under the age of 5 suffers from malnutrition: one of the leading causes of infant mortality. In recent years, children have faced a range of conflicts and climate disasters that have jeopardized their access to food.

In Mali, nearly a quarter of the Malian population suffers from moderate or acute food insecurity. Furthermore, for the first time in the country, more than 2,500 people are threatened with famine in the Menaka region, affected by the crisis, including many children.

In total, nearly five million children in Mali are in urgent need of humanitarian assistance, particularly in health, nutrition, education and protection, as well as access to drinking water. This figure indicates an increase of at least 1.5 million children in need since 2020.

Generally speaking, poor access to health care and drinking water, lack of hygiene, inappropriate feeding practices especially for infants, children and women, as well as food insecurity represent the main structural causes.

The factors of malnutrition are multiple. Conflicts, climate change, lack of access to drinking water, poverty linked to economic shocks and inequalities are all elements that can lead to food insecurity in vulnerable populations.

Other equally important consequences of malnutrition include increased risk of disease, reduced ability to acquire knowledge, and adverse effects on pregnancy outcomes.

In Mali, malnutrition constitutes a public health problem as in most countries in the Strip.

of the Sahel. It is one of the major causes of morbidity and mortality in children under 5 years old. He is a multifactorial health problem whose causes are the lack of access to healthy food.

quality, care and inappropriate infant and young child feeding practices, poor hygiene and sanitation practices, insufficient access to drinking water and health services.

The various studies carried out since 2010 have made it possible to describe the nutritional situation of the country and show the extent of malnutrition. Malnutrition, especially during early childhood, affects vital functions, particularly cognitive, and contributes to a significant extent to the establishment of poverty through its consequences on the weakening of learning and production capacities.

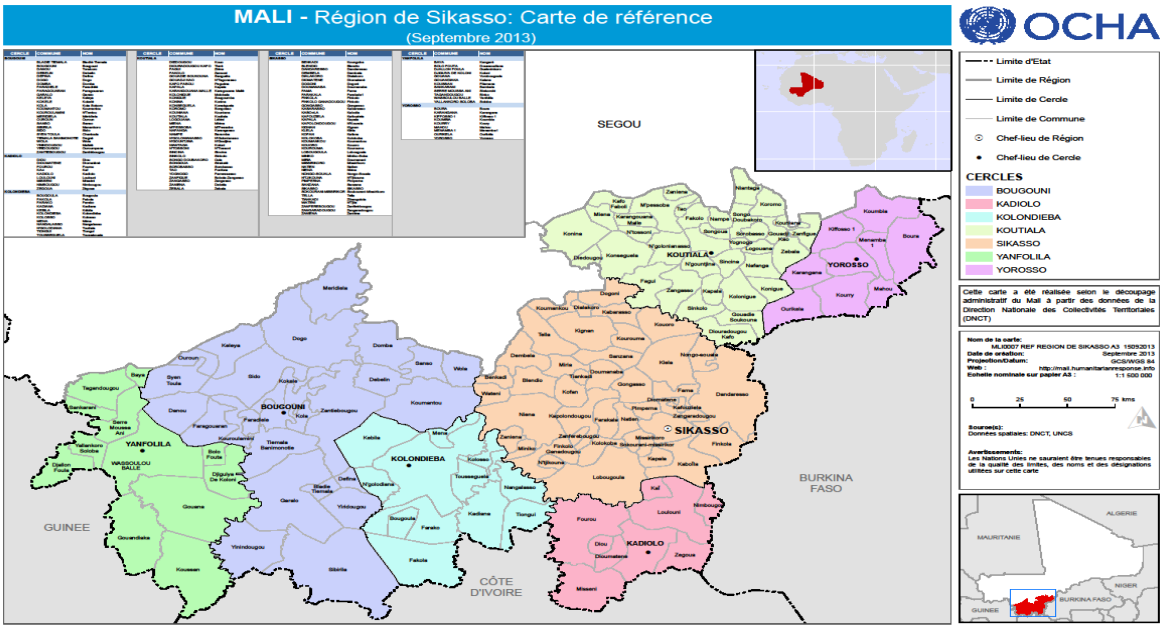
Activities to combat malnutrition (prevention and treatment) are carried out at all levels of the health pyramid with the support of non-governmental organizations (NGOs) on the ground. Mali has reference documents in the field: "Policies, Standards and Procedures in matters nutrition" and "the Integrated Management Protocol for Acute Malnutrition" to harmonize the screening and treatment.

Following these findings, we initiated this study to improve the care of malnourished children.

PATIENTS AND METHOD

The study took place in the pediatric department of Sikasso hospital.

Map of the Sikasso Region:



This was a cross-sectional study with retrospective data collection from January 2015 to December 2018 and prospective data collection from January 2019 to December 2019 carried out on the files of severely malnourished children in the pediatric department of Sikasso hospital. The study focused on all children aged 6 to 59 months hospitalized for severe acute malnutrition in pediatrics with a weight/height ratio <- 3 Zscore or MUAC <115 mm with or without nutritional edema. The data collected were using a pre-established survey form. These data were entered and processed in a computer mode using Microsoft Word 2016, Excel 2016, and SPSS 21 software. Sampling: The sample was exhaustive and concerned all usable files of severely malnourished children. The minimum sample size calculated using Daniel Schwartz's formula is: n = (Zα) 2. $p \times qi2$

- n is our minimum sample size;
- zα is the centered-reduced normal distribution test which is equal to 1.96 at α = 95%
- p is the prevalence of severe acute malnutrition (SAM) in a previous study. According to the SMART Retrospective Nutrition and Mortality Survey, Mali [35] in 2019 the prevalence of severe acute malnutrition (SAM) in children aged 6-23 months was 3.8%.

– it is the precision taken at 5% In numerical application we have: n = (1.96)2 .0.038 x 0.9620.0252 = 156 children. To minimize the possible limits due to non-responses and incomplete responses we will majority this minimum size of 10 or 16 more children thus making a minimum sample size of 172 children.

Anthropometry: weight was measured upon admission and every day using a SECA brand electronic mother/child scale with a capacity of 150 kg and an accuracy of ± 100 g. Height was measured using a Unicef model measuring rod manufactured locally and brachial perimeter (BP) with a Unicef type meter. Edema was sought in both lower limbs. Their presence or absence, as well as anthropometric indices and BP, made it possible to classify and monitor the progress of subjects during hospitalization. The minimum weight of a child with kwashiorkor corresponded to that observed after total melting of edema. We looked for acute and chronic pathologies and described the demographic, clinical aspects as well as the progress during hospitalization.

Research ethics: The study was approved by the ethics committee of Sikasso Hospital. Parental approval was obtained in advance after written or verbal consent. No invasive procedure was performed, and parents were free to refuse without any influence on the follow-up of their children. No parent refused to participate in the study.

RESULTS

Sociodemographic aspects: Frequency: From January 1, 2015 to December 31, 2019, we collected 11,255 children among whom 190 children were diagnosed with SAM with a hospital frequency of 1.68%. All of these children met our inclusion criteria. The average age was 19 months. The male sex dominated 56% of cases with a sex ratio of 1.27. We found more stay-at-home mothers with a rate of 87%; and not educated in 88%. Fathers were farmers in 62.11% of cases, and almost 79% were uneducated. Unfavorable socioeconomic conditions in families were 66.32%. The age of introduction of complementary foods was common between 6 to 11 months in 68.42% with an average of 8 months. The majority of children ate 3 meals a day, i.e. 56.84%.

Clinic: Clinical forms of severe acute malnutrition: For the clinical forms of severe acute malnutrition in our study, marasmus was the majority with a rate of 70%, followed by kwashiorkor 23.68% and the mixed form 6.5%. Reasons for consultation: The most frequent reason for consultation was fever and anorexia, respectively 75.79% and 65.26%. Vaccination according to the vaccination schedule was correct in 51.58% of our patients. Complications associated with malnutrition: Fever was the most common complication, i.e. 76% of cases, followed by anemia, 65%. Associated pathologies: Malaria represented 47.43%, followed by cases of gastroenteritis and pneumonia, i.e. 20.57% and 17.71% respectively.

Biology: Blood sugar: Hypoglycemia in 68 children, i.e. 36%. Thick drop: positive in 83 children, i.e. 43.68%. Outcome: length of stay: was between 7 and 10 days in 50.52% of cases, we obtained 81% improvement, i.e. 154 children who were transferred to URENAS, discharged against medical advice, i.e. 10%, deaths: 8% of malnourished children died, 1% escaped.

Table: Distribution of severely malnourished children according to mothers' characteristics

Characteristics of mothers	Staff		Percentage
Socio-Professional Activity	Housewife	**165**	**86,84**
	Shopkeeper	11	5,79
	Student	8	4,21
	Seamstress	5	2,63
	Teacher	1	0,53
Level of education	Not in School	**167**	**87,89**
	Primaire	13	6,84
	Secondaire	8	4,21
	Universitaire	1	0,53
	Ecole coranique	1	0,53
Marital status	Married	**185**	**97,37**
	Single	3	1,58
	Widow	2	1,05

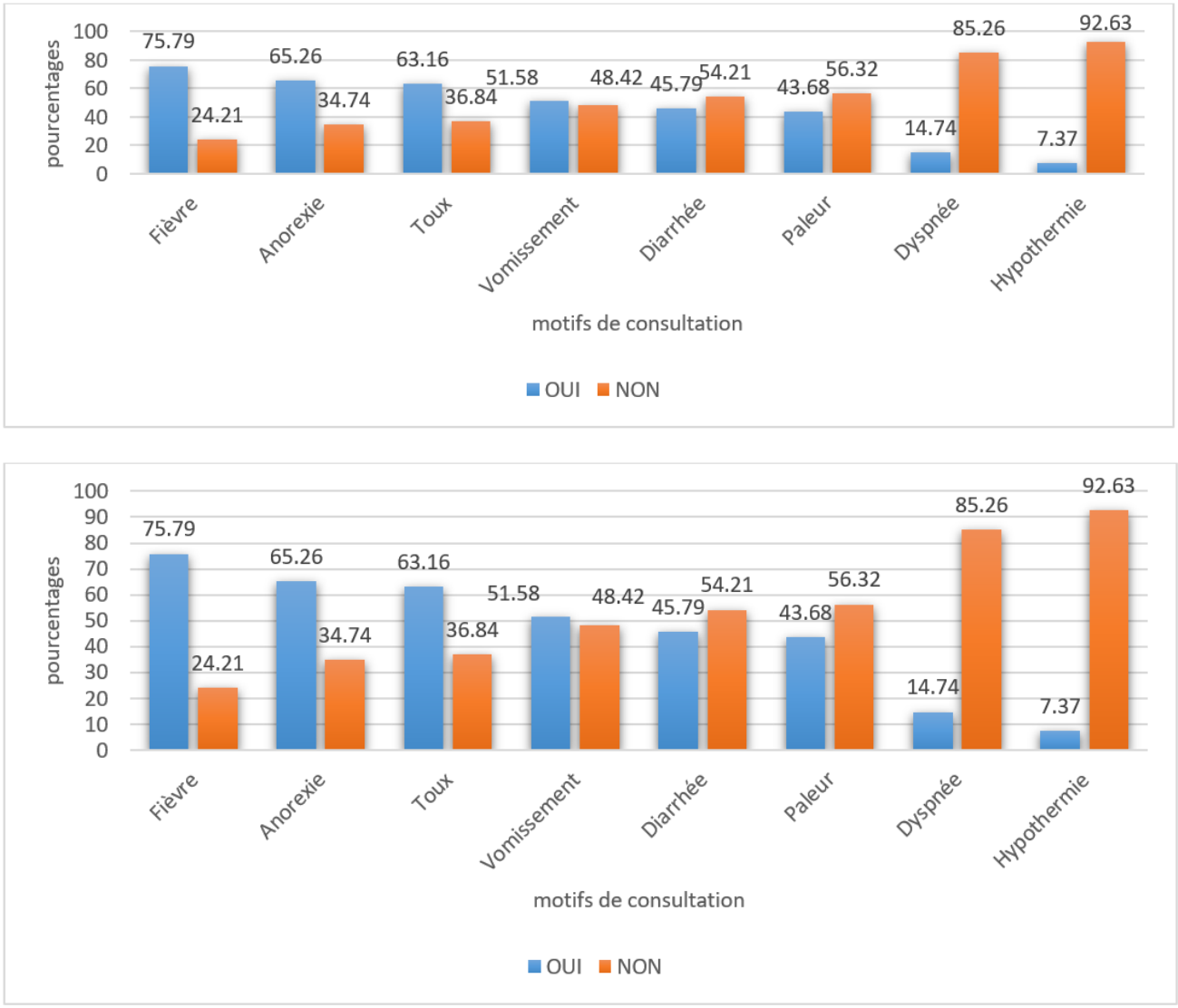


Figure: Distribution of severely malnourished children according to reasons for consultation

COMMENTS AND DISCUSSIONS

Frequency: The EDS VI carried out in Mali in 2018 shows that nearly one in ten children under 5 years of age (9%) are emaciated or suffer from acute malnutrition and 3% are severely emaciated. During our study, we collected 190 cases of severe acute malnutrition, i.e. a frequency of 1.68%. Our results are lower than those of Camara E [4]. ; Maiga B [5]; who had respectively, 2.6%; 17.62%. This could be explained by the absence of systematic screening of malnourished people in the pediatric department of Sikasso hospital during the study period. The average age of our patients was 19 months. Children aged (07 to 12 months) and (13 to 24 months) were the most affected, i.e. 39% and 37% respectively. This finding was reported by Coulibaly Y [6] who found 37% in the 13 to 24 month age group and 28% for the 7 to 12 month age group. Our results are higher than those of BARRY K [7] at INSE Donka Conakry who found an average age of 16.87 ± 16.23 months and Mamadou. Z R in Niger [8] in 2010 who found 31.30% for the age group of 12 to 23 months. The male sex dominated 56% of cases with a sex ratio of 1.27. Our results are similar to those of Camara E [4] 1.19%. This male predominance is also found in Molanga *et al.*, in Congo Brazzaville [9] (57% boys against 43% girls). The fathers of the children were mostly farmers, i.e. 62.11% and 86.84% of the mothers were housewives, this could be explained by the fact that Sikasso is a farming area. These figures are similar to those of Sawadogo A.S [10] who found 88.25% of mothers who were housewives. The age of introduction of complementary foods was common between 6 to 11 months in 68.42% with an average of 8 months. These results are similar to that of Maiga B 66.38% with an average of 8 months. The age of diversification is generally from 6 months within the norms but the rate of severe acute malnutrition calls into question the quality and quantity of food given to children during diversification.

Clinical forms of severe acute malnutrition: for the clinical forms of severe acute malnutrition in our study,

marasmus was the majority with a rate of 70%, followed by kwashiorkor 23.68% and the mixed form 6.5%. Our results are comparable to those of Camara E [4]. The marasmic form 89.13%, against 6.32% of mixed form and 4.35% of edematous form and BARRY K [7] who found 94.3% of marasmic form at the Donka Nutrition Institute in Conakry. Ouédraogo O [11] in Burkina Faso reported 77.97% of cases of marasmus, and supports the data from the literature which finds that the marasmic form is the most frequent. The most frequent reason for consultation was fever and anorexia and cough, respectively 76% and 65.26% 63.16%. Our results are close to Camara E [4] who found fever as the first reason for consultation with 78.26%. SAVADOGO AS [10] reported diarrhea as the first reason for consultation (50.50%). Complications associated with malnutrition: Fever was the most common complication, accounting for 76% of cases, followed by anemia (65%). Maiga B [5] reported the following complications: pneumonia (32.35%), diarrhea/vomiting (28.92%), NGUEFACK F [12] found gastroenteritis (34%), followed by lower respiratory infections, including pneumonia and bronchopneumonia (31%). Associated pathologies: malaria represented 47.43% followed by cases of gastroenteritis and pneumonia or respectively 20.57% and 17.71%, Maiga B [5] pneumonia (32.35%), Diarrhea/ Vomiting (28.92%), We recorded 154 cases of cure or 81%, 19 cases of abandonment or 10%, 15 cases of death or 8%. We have the same results compared to the death rate observed by Maiga B [5] and MBUSA K R [13] respectively 8.9% and 7%. These deaths could be caused by an alteration of the immune system caused by malnutrition, hence a great vulnerability to infections and a late referral of malnourished people which is most often done after the onset of complications. This high dropout rate could be explained on the one hand by the unfavorable socio-economic conditions in families (66.32% for the management of associated pathologies and complications, children in hospital), and on the other hand the cultivation or harvest periods.

CONCLUSION

Malnutrition remains a public health problem despite the creation of a nutrition sub-directorate, a clear protocol for treating malnutrition and free therapeutic milk. Breastfeeding, dietary diversification and especially gradual weaning are still practices to be promoted in health structures.

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