Original Research Article

Epidemiological-clinical profiles of severely acutely malnourished children aged 6 to 59 months: cases of the Notre Dame des Apôtres hospital in N'Djamena (Chad)

ABSTRACT

Malnutrition according to the World Health Organization (WHO) is a pathological condition which combines both the deficiency of macroelements and trace elements, with increased susceptibility to infections. This state is manifested clinically by biochemical, anthropometric or physiological analyses. Malnutrition is one of the major causes of child mortality worldwide. It remains a major public health problem. Hence the objective of this work is to seek to determine the epidemiological-clinical profiles of Severely Acute Malnourished at Notre Dame des Apôtres Hospital. This was a prospective, descriptive study spread over 7 months from January 1 to July 31, 2023, including all severely acutely malnourished children with medical complications admitted to the Therapeutic Nutritional Unit. The variables studied were epidemiological and clinical. Data were entered and analyzed using Word 2016, Excel 2016 and SSPS 18.0 software. 1454 children were admitted to the UNT, 1080 cases of wasting, i.e. a frequency of 74.27%, and 90 edematous children, i.e. 6.18% of cases treated at the HNDA. Boys were the most represented with a percentage of 45.04% and a M/F sex ratio of 1.15. The combination of vomiting and diarrhea is the most dominant reason for admission with a percentage of 26.96%. The results of this work show that the clinical situation of malnourished children is strongly linked to epidemiological profiles. The parents of these children are therefore required to respect hygiene rules and the fight against poverty to avoid an increase in the rate of malnutrition.

Key words: Epidemiological-clinical, children, Malnutrition, hospital, N'Djamena.

1.Introduction

Malnutrition according to the World Health Organization (WHO) is a pathological state which combines both the deficiency of macroelement intake(energy nutrients, proteins) and trace elements, with increased susceptibility to infections [1]. Malnutrition is one of the causes of child mortality worldwide. Despite excess food production, malnutrition rates remain very high and constitute a major public health problem [2]. According to estimates from the World Health Organization (WHO), severe acute malnutrition (SAM) affects approximately 16 million children under 5 years of age [3].

In its 2019 report, the FAO notes that between 2017 and 2019, "chronic undernourishment still affects an unacceptable number of people, i.e. 22.8% worldwide. According to estimates, the overwhelming majority, some 850 million people, or just under 15% of the world's population, live in developing countries" [4].

Six (6) million children die each year from causes directly or indirectly linked to malnutrition [5].According to "Médecins Sans Frontières" (MSF), in Africa on average, a child dies of malnutrition every six seconds. It remains a major public health problem in sub-Saharan Africa[6].

In Mali in 2016 the prevalence of acute malnutrition was 11.5% [7]. It varied between 10% to 13% in Senegal, Burkina Faso, Mauritania, Niger and Sudan in 2016. In CAR it was at 1.3% at the end of 2019 [8].

In Chad, the prevalence of Global Acute Malnutrition (GAM) in 2022 was estimated at 8.6%, between 7.9% and 9.4%. This prevalence is below the high threshold of 10% set by the WHO, placing the country in a so-called average (precarious) situation in terms of public health. It decreased significantly by 2.3% compared to that observed in 2021 when it was 10.9% [9].Chad had the 10th highest infant mortality rate in the world in 2005 [10]. Approximately one in seven (7) Chadian children dies before the age of five (5) and more than 322,000 suffer from severe acute malnutrition each year [11].

If not diagnosed and treated early, it causes very serious complications that can lead to death. Respiratory complications, circulatory complications, organ failure are automatically managed[12]. The objective of this study is to describe the epidemiological and clinical characteristics in childrenSevere acute malnutrition aged 0 to 59 months treated at the Notre Dame des Apôtres Hospital in N'Djamena.

2. Patient and Methods

2-1. Study framework

The Therapeutic Nutritional Unit (UNT) of the Notre Dame des Apostles Hospital (HNDA) served as our study setting (figure 1). This hospital is located in the southwest of the city of N'Djamena in15°04'50"East of Longitude and12°05'38"Northof Latitude, at approximately 280 meters above sea level [13]. It is limited to the North by Avenue GoukouniWedeye, to the South by Avenue Maréchal Idriss Deby Itno, to the East by the United States Embassy in Chad and to the West by Avenue Kondol.

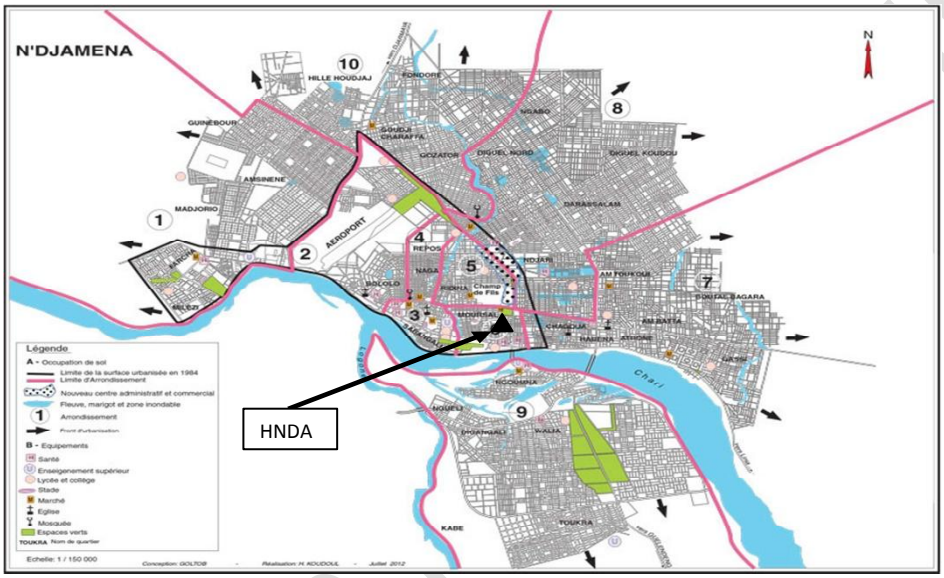

Figure 1: Location of the study framework (HNDA) [14]

2-2.Type and period of study

This was a prospective descriptive study spread over 06 months from January 1 to July 31, 2023.

2-3. Study population

The study concerned all cases of SAM children aged 0 to 59 months with one or more medical complications admitted to the HNDA UNT.

2-4. Data gathering

The collection of our data consisted of systematic recruitment of all patients seen during the period of our study. Data collection was done by interviewing sick guards. The clinical examination, the additional assessment and certain information thus collected were recorded in a previously established data collection sheet.The dependent variable

of this study is the occurrence of severe acute malnutrition in children under 59 months. As part of our study, the WHO 2006 standards were used for classification [15].The independent variables concerned: the characteristics of the child and the parents.

2-5. Data analysis

Word processing and tables were carried out using Microsoft Word software version 2016. Graphs were created using Excel 2016. Data entry and analysis were done using the software SPSS 18.0.

3. Results

3-1. Nutritional status of children

Of the 1454 children aged 06 to 59 months hospitalized; 954 had severe acute malnutrition, i.e. a frequency of 65.61%.

Table I: Percentage of severely acutely malnourished children

Nutritionalstatus	**Effective**	**Percentage (%)**
Severe acute malnutrition	954	65.61
Good nutritionalstatus	500	34.39
TOTAL	**1454**	**100**

3-2. Age and sex of severely acutely malnourished children

The age group of 13 to 24 months was the most represented with 63.96% of cases or 10.66 months on average.

Table II: Distribution of children by age group

Age (months)	**Frequency(in %)**
0 – 12	**15.95**
13 – 24	**63.96**
25 – 36	**11.96**
37 – 59	**8.11**

Figure 2 shows that more than half of severely acutely malnourished children are male (54%).The Sex Ratio was 1.18 with a male predominance.

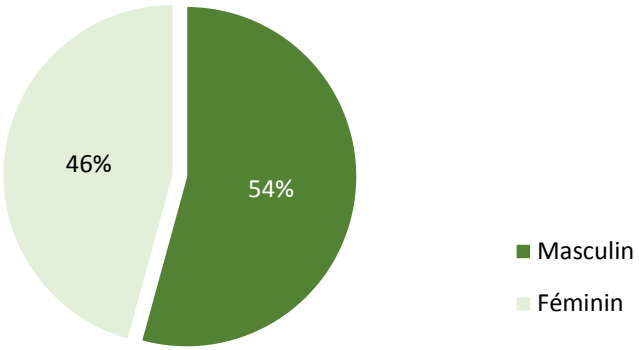

Figure 2: Distribution of children surveyed by gender

3-3. Characteristics of parents of severely acutely malnourished children

Analysis of the survey results shows that more than half of severely acutely malnourished children have farmers and housewives. 57% of parents have married status polygamous.

Table III: Parental characteristics

	Frequency(in %)
Father'sstatus	
Farmer	**63.13**
Moto-Taximan	**14.78**
Official	**22.07**
Mother'sstatus	
Housewife	**52.43**
Street seller	**33.79**
Official	**4.33**
Shopkeeper	**9.45**
Marital status of parents	
Monogamousmarried	**25**
Polygamousmarried	**57**
Widowed/Divorced	**18**

3-4. Types of breastfeeding

Mixed breastfeeding is the type of breastfeeding most common to children with 55% of cases.

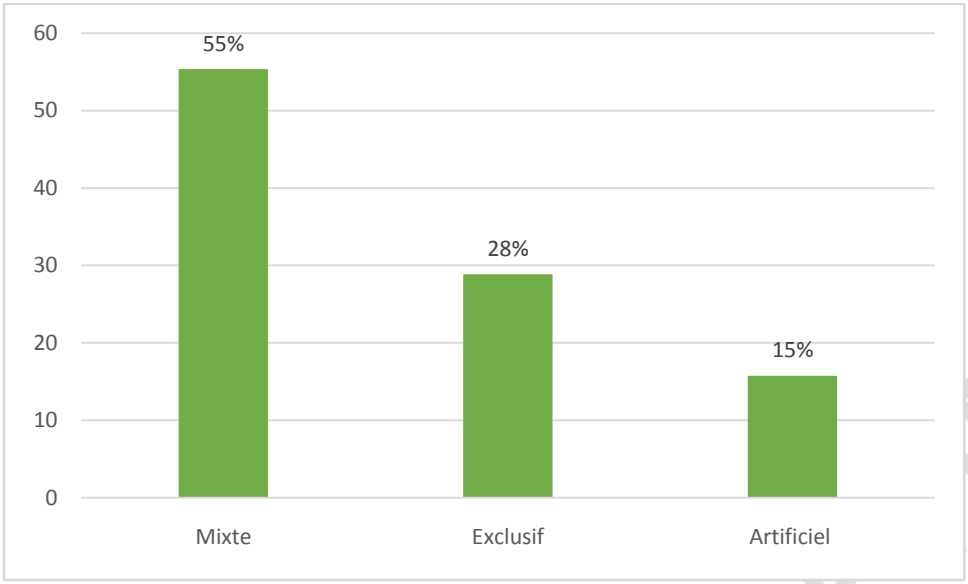

Figure 3: Types of breastfeeding in the first six (06) months

3-5. Type of withdrawal

Up to 76% of our patients were currently breastfeeding.

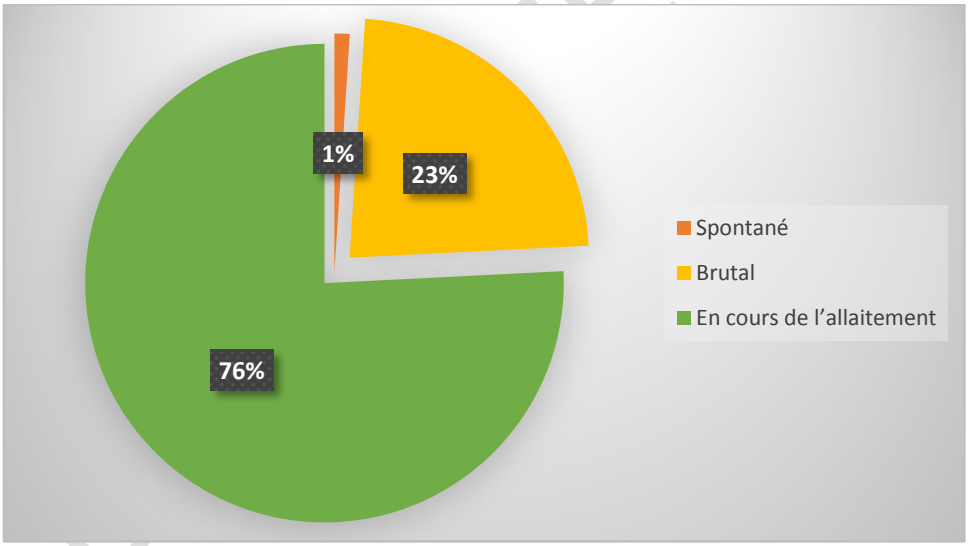

Figure 4: Representation according to types of withdrawal

3-6. Vaccination Status

Most of our patients do not have up-to-date vaccination status with 78% of cases.

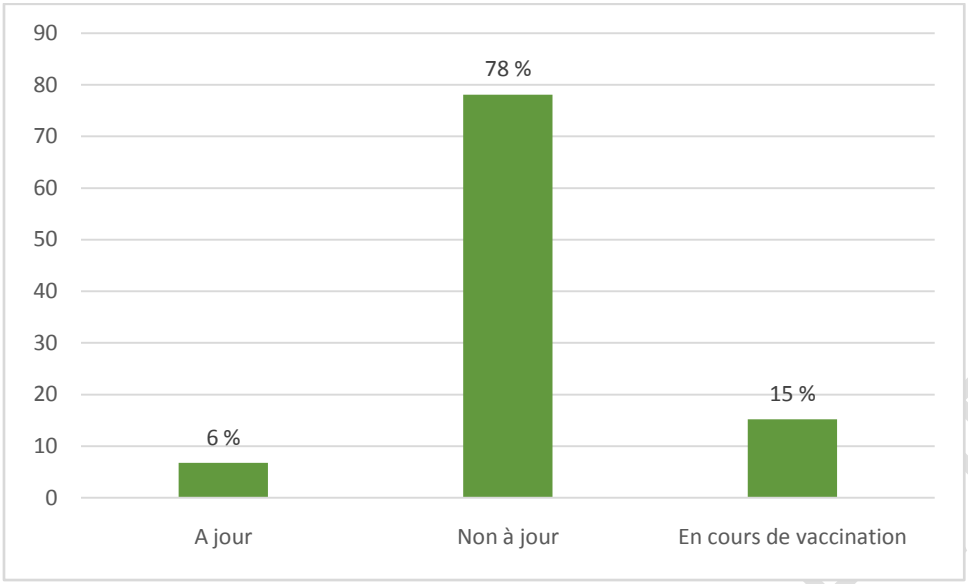

Figure 5: Representation of the vaccination status of children

3-7. Reasons for Consultation

Diarrhea and vomiting were more represented with 26.96% of cases.

Table IV: Distribution of children according to reasons for consultations

Clinical Variables	Frequency	Percentage %
Fever	31	2.13
Vomiting	262	18.01
Diarrhea and vomiting	392	27
Diarrhea	174	11.97
Anorexia	101	6.94
Cough	131	9
Weightloss	189	13
Edema	116	7.97
Seizures	58	3.98
Total	**1454**	**100**

3-8. Associated Pathologies

Gastroenteritis was the most common associated pathology in all children, i.e. 100% of cases, followed by malaria in 70% of cases. Malnourished children with HIV represent 22%, severe anemia 3% and 2% for pulmonary infections.

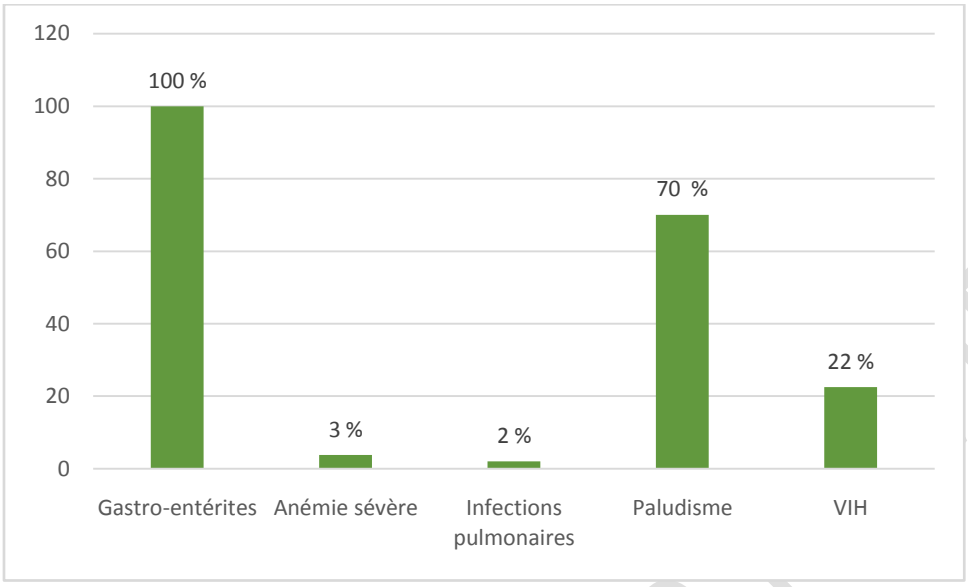

Figure 6: Distribution of children according to associated pathologies

3-9. Traditional treatments

Removal of the uvula is the most used traditional treatment with 71% of cases, force-feeding 13% and 14% for many other practices.

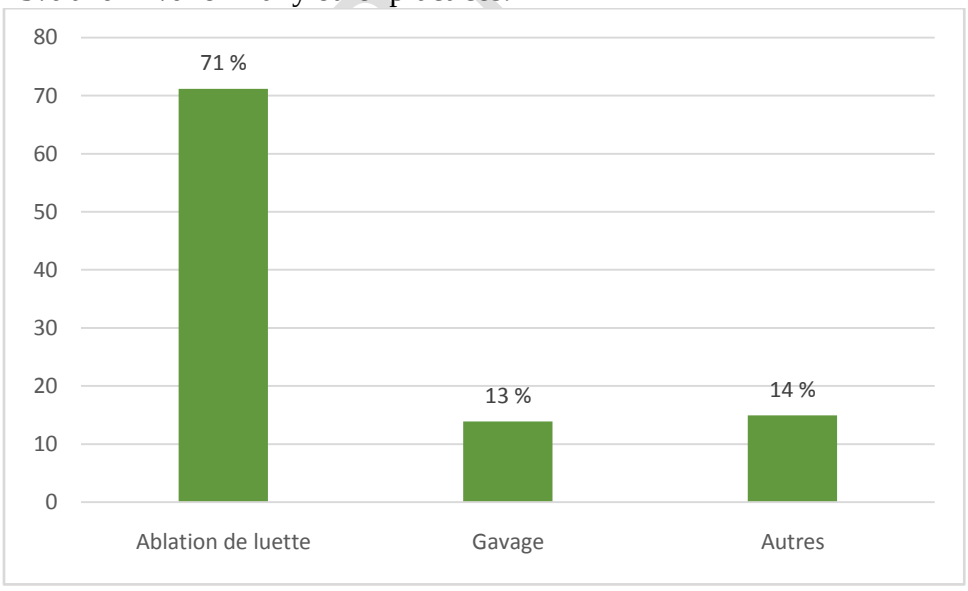

Figure 7: Representation according to the traditional processing mode

4. Discussion

4-1. Epidemiological Aspects

During the study period, 1454 children were admitted to Therapeutic Nutritionnal Unit. Among these children, there were 1080 cases of wasting, i.e. a frequency of 74.27%, 90 edematous cases, i.e. 6.18%, and 50 cases of relapses, i.e. 3.43%, treated at the Notre Dame des Apôtres Hospital. This result is higher than that of the service statistics in 2022 which was 1208 (16.91%). This is probably due to the demographic growth of the population, the cost of living or the increase in pockets of poverty[16].

Regarding the most represented age group, it was 12 to 24 months with 63.96%. This result is comparable to those obtained from BARRY et al. at INSE Donka Conakry whose average age is 16.87 ± 16.23 months [17] and from Mamadou in Mali [18] in 2010 which found 31.30% for the age group of 12 to 23 months and 30.70% from 6 to 11 months. Indeed, this period of life corresponds to the period of weaning of children and transition to family feeding, which for the majority of the time is not carried out under ideal conditions. Which makes this milestone difficult for the child to overcome, thus leading to a disruption of the nutritional balance.

We recorded 665 female cases or 45.73% compared to 789 male cases or 54.26% with a sex ratio of 1.18 for a male predominance. This male predominance is found by several authors [19,20], 76.08% of the malnourished resided in rural areas. MALLE in 2017 [21] in Mali reported that 75.40% of the malnourished came from rural areas, which is comparable to our result. This could be explained by the lack of information on malnutrition, the non-compliance with health and diet measures on the one hand and the low socio-economic level on the other hand because the study proved that 83.76 % of mothers and 22.07% of fathers had a primary school level. This result shows that the majority of parents did not have adequate knowledge about child nutrition,this could promote malnutrition because educationwould help parents identify the factors that promote malnutrition in order to act to avoid it.

The mothers were housewives in 8.45% and 63.13% of the fathers were motorcycle taxi drivers, lower than that of Mamadou in Mali [18] who found 92.1% of the mothers were housewives. In fact, the majority of women do not have other activities that could help the family increase its annual income. The large amounts of annual income could improve food coverage for the whole family, especially children.

4-2. Clinical Aspects

Regarding the mode of breastfeeding, mixed breastfeeding before the age of 6 months was represented in 55.36% of cases, artificial breastfeeding 15.74% of cases and insufficient milk maternal was the most represented cause of non-exclusive breastfeeding followed by maternal illness and ignorance. Doumbia [22] in 2014 in Mali reported that maternal illnesses were the main causes of non-exclusive breastfeeding, i.e. 44.14%.

Breastfeeding should be exclusive until the age of 6 months because breast milk is a living liquid that constantly adapts to the metabolic, nutritional and immunological needs of the child. But during this present study, it is clear that exclusive breastfeeding is poorly represented in a proportion of 28.88% of cases. This percentage depends on the large number of malnourished children.

As for the vaccination situation of children, the study showed that 78.06% of SAM children have their vaccination records not up to date. This makes children vulnerable to certain preventable diseases such as measles and tuberculosis. The combination of diarrhea and vomiting is the first reason for consultation with a percentage of 26.96%. This couple very often drifts due to poor cleanliness during breastfeeding. We must educate mothers about respecting cleanliness when breastfeeding.

During this study, emaciation was the most observed form with 74.34% of cases compared to 19.46% mixed form and 6.18% edematous form. This result is comparable to that ofBARRY et al. [17] who found respectively in Mali, 80.30% of marasmic form and 94.3% of emaciation at the Donka Nutrition Institute in Conakry and corroborate the literature data which stipulates that the marasmic form is the most common.

Speaking of infections in this present study, all malnourished people presented an infection reflected by high CRP and ESR, 70.06% cases of malaria and 3.78% cases of severe anemia. Infection, more often associated with malnutrition, could be explained by the fact that malnutrition could be responsible for a failure of the subject's immune system, which makes it vulnerable to any infection. Antibiotic therapy was systematic in our patients. The national protocol recommends systematic antibiotic therapy to patients suffering from SAM, even if the patient does not present clinical signs of infections because despite the absence of clinical signs, they could suffer from infections.

In our study, pulmonary infections constituted 2.06% of cases, and diarrhea represented 11.96% of cases. This result corroborates with those of other studiespreviouscarried out by several authors [23,24]. This can be explained by the fact that malnutrition is accompanied by immunosuppression which is the cause of various infections (of which pulmonary infections

are the most frequent). According to Beau et al. [25], these medical complications, apparent or not, of a metabolic and infectious nature, are often frequent and are observed in 70% of cases of advanced severe acute malnutrition.

5.Conclusion

The results of this work show that the clinical situation of malnourished children is strongly linked to epidemiological profiles. 63.13% of the fathers were farmers and 65.74% of the mothers had a primary school education. This is what favored certain traditional practices on these children, such as the removal of uvulas in 71% and force-feeding in 13%. Also, it should be noted that exclusive breastfeeding is only observed in 28%, vaccination status is not up to date in 78% and weaning was abrupt in 23% of children in this study. Wasted children represented 74.34%, edematous 6.18% and Mixed form 19.46% during this study.

The statistical processing of our data allowed us to confirm that there is a significant difference between the rate of increase in the number of malnourished people at the same period of the previous year ($p<0.05$).

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