Original Research Article

Chronic Pathologies Associated with Severe Acute Malnutrition in Children Hospitalised at the Ureni Reference Health Centre in Commune V

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Abstract

Introduction: The objective was to study chronic pathologies associated with severe acute malnutrition in children aged 6 to 59 months hospitalized at URENI. *Methodology*: This was a retrospective, descriptive and analytical study running from January 1 to December 31, 2017. *Results*: During the study period 352 children were hospitalized for severe acute malnutrition at the URENI of the CSREF CV. Among them, 18 presented a chronic pathology, i.e. a frequency of 5.11%. The male gender was predominant, i.e. 61.1% with a sex ratio of 1.57. The 12-24 month age group represented 50% of cases. Thirty-three percent of children had a history of neonatal resuscitation and 16.7% were formerly premature babies. Marasmus was of the severe acute malnutrition type the most represented, i.e. 77.8% of the cases. The association of malnutrition with HIV infection and Cerebral Palsy (CP) were accounted for 27.8% each. More than half of the patients (55.6%) stayed between 15 - 21 days in the structure. *Conclusion*: HIV infection and cerebral palsy constitute the chronic pathologies most associated with severe acute malnutrition in children at the Csref of commune V.
Keywords: chronic pathologies, HIV infection, CSREF CV, Malnutrition.

INTRODUCTION

Malnutrition is a pathological condition resulting from the relative deficiency or excess of one or more essential nutrients, according to the WHO [1]. Malnutrition is a public health problem in most sub-Saharan African countries. In Mali, according to the 2022 SMART nutrition survey [2], 10.8% of children aged between 6 and 59 months suffer from acute malnutrition, including 2.1% in the severe form. Malnutrition is one of the major causes of morbidity and mortality in children under five. In Mali, according to the latest DHS survey, the level of acute malnutrition remains high, with almost one in ten children under the age of 5 (9%) being emaciated or suffering from acute malnutrition (they are too thin for their size) and 3% being severely emaciated. The results also show that 19% are underweight (too thin for their age), including 5% who are severely underweight [3]. The interactions between infections and malnutrition in children have been known for a long time. Inadequate food intake and illness are known to be the immediate causes of malnutrition. Moreover, the interaction between malnutrition and illness tends to create a vicious circle in which malnourished children are less resistant to illness and often fall ill, while illness contributes to worsening malnutrition [2]. The prevalence of malnutrition is influenced by a multitude of factors, including HIV infection and other chronic illnesses. Undernutrition is found in children with cancer, AIDS, renal failure or respiratory failure [4]. The relationship between HIV/AIDS and malnutrition is an example of a "vicious cycle". Food and nutritional support is essential to enable people living with HIV to lead healthy lives for longer and to improve the effectiveness of treatment. Mortality during the first few months of antiretroviral treatment can be two to six times higher in patients suffering from malnutrition, and patients with tuberculosis face similar difficulties. BMI may be associated with eating disorders (child anorexia, merycism), oral-facial dyspraxia and swallowing difficulties, which explains why these children also have stunted growth and nutritional

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disorders [5]. Mali, like other West African countries, has adopted a comprehensive strategy for the management of acute malnutrition. A national protocol for the management of acute malnutrition has been drawn up and nutritional recovery units have been set up throughout the country. The paediatric URENI at the Reference Health Centre in Bamako's Commune V began operating in May 2010.

The aim of this work is to determine the role of chronic pathologies in malnourished children, and to improve their quality of life and care.

METHODOLOGY
Type study
This was a retrospective, descriptive and analytical study from 1 January to 31 December 2017, i.e. 12 months.

Population
All children aged between 06 and 59 months hospitalised for severe acute malnutrition during the study period.

Critères Inclusion
Children aged 06 to 59 months hospitalised in the department for severe acute malnutrition associated with a chronic pathology. The diagnosis of malnutrition was made in children with a P/T < -3 Z score and/or bilateral oedema not related to trauma or an isolated inflammatory process.

Critères for non-inclusion:
1) Children aged less than 06 months and more than fifty-nine months,
2) Children seen in an emergency department for non-hospitalised SAM.
3) Children hospitalised for severe acute malnutrition without chronic pathologies.

Taille sample:
This was an exhaustive sampling of all cases meeting the inclusion criteria during the study period.

1. Data collection
Data were collected using hospital records; on-call and hospitalisation registers; an individual survey form was completed for each patient whom we considered to be a case of severe acute malnutrition associated with a chronic pathology.

2. Data analysis and processing plan
The data were entered on a microcomputer using Epi Info software version 7.2.0.1, then exported to SPSS 22.0 and analysed using both software packages.
For the descriptive aspects of the analysis, frequency distributions were generated for all variables. Variables with little or no information were excluded from the analysis.

The chi2 test or Fischer's exact test were used to compare the proportions of categorical variables.

To search for an association between the dependent variable which was death (yes or no) and a presumed risk factor.

For multivariate analysis, variables with p-values < 0.05 in univariate analysis were selected. Statistical tests giving p-values < 0.05 were considered significant. The analysis report and data processing were entered using Microsoft Word 2013.

3. Ethical considerations
Medical records are analysed in strict confidence. They are returned and filed in the archive room immediately after use. To preserve anonymity, the individual record does not allow the patient to be clearly identified.

RESULTS
During the year, 352 children were hospitalised for severe acute malnutrition at the URENI of the CSREF CV in the Bamako district, including 18 severely malnourished children with a chronic pathology, a frequency of 5.11%. Males accounted for 61.1%, with a sex ratio of 1.57. Mothers aged between 20 and 29 years accounted for 72.2% of cases. A family history of sickle cell disease and heart disease was found in 5.6% of cases each. Thirty-three percent (33.3%) were resuscitated and 16.7% of our children were born prematurely. Exclusive breastfeeding was used in 88.9% of cases. Food diversification was carried out in 83.3% of cases and after 6 months in 60% of cases. Seventy-eight per cent (77.8%) of the children had already been hospitalised. Severe acute malnutrition was the reason for previous hospitalisation in 35.7% of cases. Marasmus was the most common type of severe acute malnutrition, accounting for 77.8% of cases. HIV serology was positive in 27.8% and BMI was 27.8%. Three cardiopathies were found, including two ventricular septal defects (VSD) and one chamber hypertrophy. Sickle cell anaemia major SS was found in 5.6% of cases. More than half of the children (55.6%) spent between 15 and 21 days in hospital. Cure was found in 83.3% of cases. There was a statistically significant association between the chronic pathology found and the notion of resuscitation.

DISCUSSION
1. Frequency and associated pathologies
During the study period, 352 children were hospitalised for severe acute malnutrition at the URENI of the CV reference health centre in the Bamako district, 18 of whom were severely malnourished and presented with a chronic condition, i.e. a hospital frequency of 5.11%. The chronic pathologies encountered during the study period at the URENI were HIV/AIDS, cerebral palsy, congenital heart disease; tuberculosis associated

with HIV infection; tuberculosis; sickle cell anaemia; trisomy; cleft lip and palate respectively in 27.8%; 27.8%; 16.7%; 5.6%; 5.6% 5.6%; 5.6% 5.6%. Some authors report lower frequencies for HIV and higher frequencies for congenital heart disease. Guindo.SO found 13.5% HIV; 18% (tuberculosis, congenital heart disease, cerebral palsy, renal failure) [6]; Traoré.FM who found 17.65% HIV cases; 6.86% (congenital heart

disease, cerebral palsy and others) [7]; Hayet. B et al found 18% congenital heart disease [8]; MaaleJ.B et al found 8.34 vs 0.7 per 100,000 births of heart disease [9]; Diakité.C.O found 13.53% cleft lip and palate[10]; Walton. C found 20% of congenital heart disease [11]; Azema. B found 47.1% trisomy [12]; Ngagne. M et al found 3% HIV [13]; Touraine et al found 1/1500 to 1/2000 trisomy 21 [14].

Table 1: Breakdown of children by associated chronic disease

Associated chronic disease	Frequency	Percentage
HIV	**5**	**27.8**
Cerebral palsy	**5**	**27.8**
Congenital heart disease	3	16.7
Trisomy 21	1	5.6
Sickle cell disease SS form	1	5.6
Tuberculosis with HIV infection	1	5.6
Tuberculosis without HIV infection	1	5.6
Cleft lip and palate	1	5.6
Total	18	100

1. Social and demographic characteristics of the children
Sex :

Males predominated with 61.1% of cases, i.e. a sex ratio of 1.57. This result is comparable to those found by Guindo.SO; Traoré.FM; Jesson, J *et al*., Reynier. V; Hayet, B *et al*., Diakité. CO respectively 57%; 55.80%; 52%; 40%; 58.65% [6, 7, 15, 16, 10]. It could be linked to genetic predispositions making young boys more susceptible to infections [2].

The mean age of our children was 33 months. This result is comparable to that of Sanogo.MY and Diakité.CO; who respectively found an average age of 29 months and 30 months [17, 10]. This could be explained by the susceptibility of children under 2 years of age to infections on the one hand and the lack of supplementation on the other. Children under the age of 2 (6 to 23 months) are more affected by acute malnutrition than older children (24 to 59 months [2].

Parents' occupations :

Children of working-class fathers accounted for 44.4% and 77.8% of housewives. This prevalence could be explained by the lack of a source of income and the decline in families' purchasing power. These results differ from those reported by Guindo.SO, where 25% of fathers were shopkeepers and 74% of mothers were housewives [6].

Parents' level of education

In our study, 72.2% of children had mothers who did not attend school. This result is significantly higher than that of EDS VI, which found that 60% of women of childbearing age had no education [4]. Similarly, we found 38.9% of the children of uneducated fathers, compared with Guindo.SO, which found 40% of uneducated fathers [6]. This could be explained by the fact that his studies all took place in an urban environment and in the same place.

Table 2: Distribution of patients according to mother's occupation and level of education

Profession	Frequency (n=18)	Percentage
Housekeeper	14	77,8
Civil servant	1	5,6
Other	3	16,7
Level of education	Frequency (n=18)	Percentage
Primary	2	11,1
Secondary	1	5,6
Koranic school	2	11,1
uneducated	13	72,2

2. Personal history and eating habits
Personal perinatal history

In our series, 16.7% of our children were born prematurely. This result is lower than that reported by Daou. H who found 27.46% prematurity [18]. The difference may be explained by the fact that his study

focused on children with congenital heart disease from birth to 2 months, which generally affects premature babies. The occurrence of malnutrition could be explained by the fact that half of cerebral palsy occurs in premature infants, and its frequency is greater the lower the gestational age Duperrex. O *et al*., [19]. Thirty-nine

percent (38.9%) presented with perinatal anoxia with resuscitation in 33.3% of cases. These results contrast with those demonstrated by D. Nimaga with 4.93% anoxia and 95.5% resuscitation [20]. Leanness was observed in 39% of children suffering from cerebral palsy compared with only 17.1% of healthy children. This prevalence shows a significant difference between the two groups of children with (p>0.05) Mouilly M *et al.*, [21]. There is a statistically significant relationship between neonatal intensive care and chronic pathologies with p=0.001.

Previous hospitalisation:
77.8% of our children had previously been hospitalised. This result is higher than that of Guindo.SO (33.33%) [6]. The difference could be explained by the number of cases but also by the presence of other chronic pathologies in addition to HIV infection.

Table 3: Distribution of patients according to personal history

Perinatal	Frequency (n=18)	Percentage
Prematurity	3	16.7
Intensive care	6	33.3
Previous hospitalisation	Frequency (n=18)	Percentage
Yes	14	77,8
No	4	22,2
Reason for previous hospitalisation	Frequency (n=14)	Percentage
MAS	5	35.7
Prematurity	2	14.3
neonatal distress	4	28.6
INN	2	14.3
Peritonitis	1	7.1

Mode of feeding:
In our study, 88.9% of children were exclusively breastfed. Our result is similar to that of Sanogo.MY who found 94.44% [17]. This high rate of exclusive breastfeeding is linked to the efforts made to raise public awareness of the benefits of breastfeeding. The occurrence of malnutrition in these children can be explained by the fact that HIV infection is a major global health problem and nutritional disorders are often present in patients living with HIV/AIDS. Nutrition and HIV are closely linked and complement each other Sidibe. S *et al.*, [22]. But also children with congenital heart disease cannot ingest enough nutrients will grow more slowly, and this slower growth sometimes continues throughout childhood. Stunted growth can be attributable to a number of causes: difficulty in obtaining enough calories and nutrients through breastfeeding, drinks and food, lack of energy to eat properly because too much energy is used to keep the heart and lungs working Sidibé S et col [22].

Dietary diversification:
In general, diversification is taking place within the norms because 33.3% of our children were diversified between the ages of 5 and 6 months, but the high rate of malnutrition calls into question the quality and quantity of food administered to children during this period. This can be explained by several factors: parents' low level of education; low household income; traditional beliefs; and food taboos.

In addition to these factors, several authors acknowledge that poor nutritional status is one of the characteristics often associated with sickle cell disease, particularly with the homozygous SS form. It should be noted, however, that growth retardation is more marked at puberty in children with sickle cell disease Shongo.M.YA.P [23].

Vaccination status:
77.8% of our children were fully vaccinated. This indicates good vaccination coverage in the study area. This result is higher than that reported by Diarra C, who found 39.7% [24]. This high rate could be explained by the fact that the population is increasingly aware of the benefits of vaccination.

Forms of malnutrition:
In our study, marasmus accounted for 77.8% compared with 16.7% of kwashiorkor. Marasmus is the most widespread form of protein-energy malnutrition in Africa. Our results are comparable to those reported by Guindo. SO, who found 82.5% cases [6]. This prevalence of marasmus can be explained by low family income and hence low calorie intake.

We did not find a statistically significant link between chronic pathologies and forms of malnutrition (p=0.951).

Table 4: Distribution of patients according to eating habits and type of malnutrition

Type of malnutrition	Frequency	Percentage
Marasmus	**14**	**77,8**
Kwashiorkor	3	16,6
Mixed	1	5,6
Mode of feeding	**Frequency**	**Percentage**
AME	**16**	**88,9**
AM	2	11,1
AA	0	0,0
Diversification	**Frequency**	**Percentage**
Yes	**15**	**83,3**
No	3	16,7

3. Immediate outcome

The outcome of our study was marked by an 83.3% cure rate, 11.1% death and 5.6% referral. This cure rate is higher than that of Traoré. FM [7], which found a cure rate of 45.7%, and a mortality rate comparable to that of FM Traoré [9], which found a rate of 9%. These values are in line with the reference values for the main indicators, with a cure rate of over 75% and a case-fatality rate of no more than 15%.

The improvement in our results could be explained by the setting up of a nutrition unit with an increase in staff, equipment and inputs. These deaths could be caused by a deterioration in the immune system brought about by malnutrition, making the children more vulnerable to infections, but also by the association of chronic pathologies such as HIV/AIDS, congenital heart disease, etc.

There was no statistically significant association between associated chronic pathologies and immediate outcome with p=0.179.

4. Length of stay

In our study, the average length of stay was 14 days, which is higher than the results reported by Guindo.SO and Sissoko.F who found 7.14 ± 3.15 and 7.9 ± 5.7 respectively [6, 25]. This value meets the standards of the reference values for the main indicators with a length of stay of less than 4 weeks. There was no statistically significant association between length of stay and associated chronic pathologies (p=0.616).

CONCLUSION

Chronic disease remains a factor associated with hospitalisation of children at the URENI.

The chronic conditions most frequently seen in children at URENI were HIV/AIDS, cerebral palsy and congenital heart disease. Chronic pathology remains a factor in the onset of severe acute malnutrition, which increases the risk of complications if diagnosis and nutritional recovery are not effectively implemented.

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