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Prevalence of Severe Anemia among Severe Acute Malnourished Children in the 6-59 Months Age Group at the CRENI of the Aguié District Hospital

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Abstract **Original Research Article**

Anemia among children remains a critical public health issue whether in industrialized or developing countries. The objective of this study is to determine the prevalence of severe anemia among children in the 6-59 months age group hospitalized at the CRENI of the Aguié district hospital. This is a retrospective and descriptive study over a 12-month period on 240 severely malnourished children hospitalized with severe anemia. Our study showed that 240 children had severe anemia, that is to say a prevalence of 10.30%, which was more frequent among children under 24 months of age. Severe anemia was associated with malaria in 74.16% and occurred more in the last quarter of the year, that is to say 81%. We had a successful treatment rate of 92.5% and 7.5% of deaths. There is a pressing need to strengthen the community approach on nutritional advice and early attendance at healthcare facilities to avoid worsening of diseases among children.

Keywords: Niger, Aguié, malnourished children, severe anemia.

INTRODUCTION

WHO has defined anemia as decreased hemoglobin level below the limit values considered normal for the age, sex and physiological condition of the individual. It remains a critical public health issue whether in industrialized or developing countries. One third of the world population is affected by anemia and about 50% of vulnerable people are affected. Africa and Asia are the most affected areas (AG Yessoufou *et al.*, 2015). Anemia is usually typically associated with many pathological conditions. In most cases, severe malnutrition is accompanied by anemia as an inherent part of the reductive adaptation process associated with weight loss and the presence of edema. (Alan J. *et al.*, 2007). SAM (severe acute malnutrition) was defined by a weight/height z-score of less than -2 SD for age and sex or the presence of bilateral lower limb edema (WHO 2015). In Niger, according to the SMART (2021) report, the national prevalence of SAM is 2.7%, which is above the emergency threshold of 2%, in Maradi (Aguié administrative region) the SAM is 3.8% and the prevalence of severe cases of anemia is 4.4% at the national level. Specific data on severe anemia among SAMs in hospitals are rare in Niger in general and have not been found at the Aguié District Hospital, hence the interest of this study on the prevalence of severe anemia among hospitalized SAMs at the CRENI (Centre de Récupération et d'Education Nutritionnel Intensive, in English: intensive feeding and recovery centre) of the Aguié District Hospital.

MATERIALS AND METHODS

Our work was carried out in the CRENI department of the Aguié District Hospital from January to December 2022.The health district of Aguié is located in the region of Maradi, 750 km from Niamey, in south-central Niger (A. Dramé *et al.*, 2007).

The Aguié district hospital is a top-level hospital, the CRENI has 39 beds. It serves as a referral

hospital for 11 IHCs (integrated health centers) in the district. This study is a retrospective and descriptive one. All SAM children aged 6 to 59 months hospitalized at CRENI whose records were complete were included in the study. The diagnosis of SAM was made as per the admission criteria of the national protocol: P/T (Weight / Height) ratio < -3 Z score or PB (mid upper arm) < 115mm or presence of bilateral edema + or ++ and poor appetite and / or Presence of medical complications or Presence of bilateral edema +++ or Kwashiorkor-marasm. (PCIMA NIGER 2016). Weight, height and PB are measured according to national protocol guidelines. To make the biological diagnosis of severe anemia among children, we used the HemoCue Hb 301 hematology analyzer. The laboratory was not able to perform a complete blood count. The diagnosis of severe anemia was made if Hb = < 4 g/dl or Hte ≤ 12% or < 6g/dl with signs of decompensation. (PCIMA NIGER 2016). For the search for associated factor, RDTs for malaria was done according to national guidelines. The parameters studied were: age, sex, residence of patients, hemoglobin level, RDTs for malaria, patient outcome. The study was not conducted until after consent has been received from the Senior physician of the hospital. Data capture and analysis was done on Excel 2019.

RESULTS

Frequency:

Of the 2329 hospitalized SAMs from January to December 2022, the result found that 240 had severe anemia, that is to say a frequency of 10.30%.

Sociodemographic Characteristics:

The study revealed a male predominance with 53%, that is to say a sex ratio of 1.10. The age group between 13 to 24 months was the most represented with 52%.

Table 1: **Distribution according to socio-demographic characteristics**

Socio-Demographic Characteristics	Total Number	Percentage
Age		
6 to 12 months	58	24%
13 to 24 months	124	52%
25 to 59 months	58	24%
Gender		
M	126	53 %
F	114	47 %

The 4th quarter of the year was high hospitalization period, that is to say 81% with a threshold peak in October.

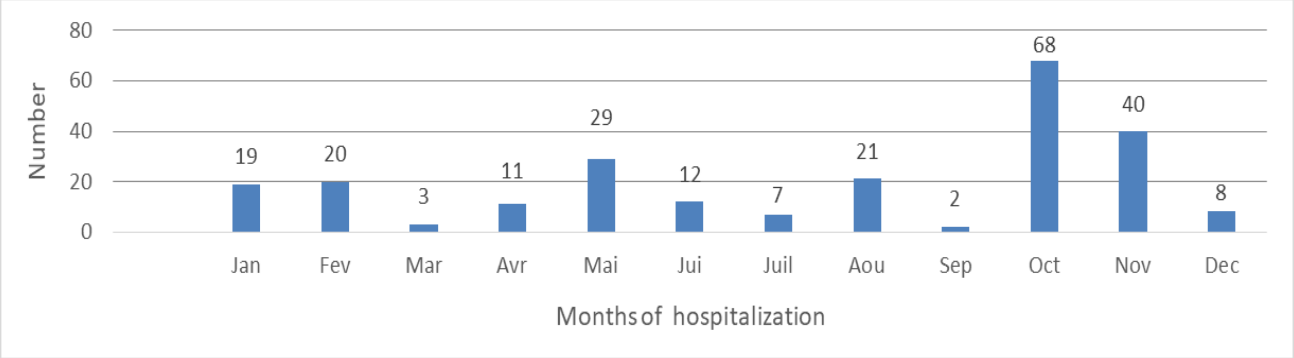

Fig. 1: Distribution according to the hospitalization month

Diagnoses:

In our series, 42% of patients had a hemoglobin level below 4 g / dl and 58 % with a hemoglobin level between 4 to 6g/dl plus signs of decompensation and 71% of patients showed a positive malaria RDT to plasmodium falciparum.

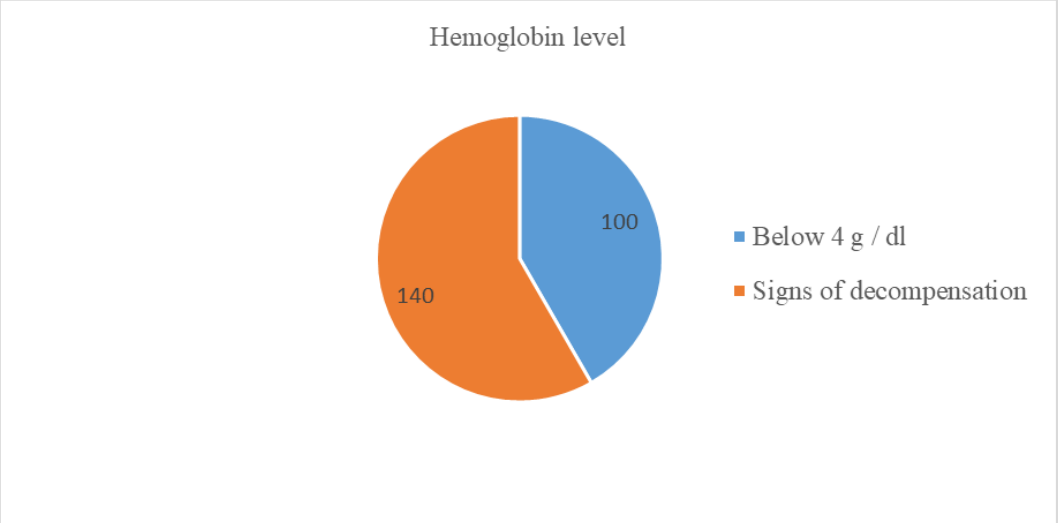

Fig. 2: Distribution according to hemoglobin level

Patients Outcome:

In our study, favorable evolution was noted in 92.5% of the cases and 7.5% of mortality rate.

DISCUSSION

Our study took place over a period of 12 months and aimed to find out the prevalence of severe anemia at the CRENI of the Aguié health district hospital.

Frequency

The present study included 240 patients with severe anemia, out of a total of 2329 from January to December 2002; that is to say a prevalence of 10, 30%.

Our result is lower than that of (NA koné *et al.*, 2021), (AG Yessoufou *et al.*, 2015), who found respectively 13.5% and 55.8% of severe anemia on SAM.

However, other studies that have focused on SAM in a general way and that were not focused on anemia in a global way such as (Emil S *et al.*, 2019), (AS Ourémi *et al.*, 2021), (Bachou *et al.*, 2006) found respectively a rate of severe anemia of 21.1%; 33.77%; 6.5%.

Sociodemographic Characteristics

This study demonstrated that male gender was predominant, that is to say 53%. The result is similar to other studies done by several other authors such as (El Hioui *et al.*, 2009), (Leite *et al.*, 2013) and (Ayoya *et al.*, 2013) who showed that anemia is much more remarkable among boys than in girls.

For instance, in the study of (A.G. Yessoufou *et al.*, 2015), more than half of the children were female 55.8%, but (NA koné *et al.*, 2021) found no difference between the two sexes.

As a result, SAM can affect both sexes equally.

More than half of the children in our series, 52%, were younger than 24 months. Our result is identical to that of (A.G. Yessoufou *et al.*, 2015) who found that 63.7% were less than 24 months old.

Like several other authors (Abdou l *et al.*, 2013), (Nguefack F *et al.*, 2015) noted that the age group of 12 to 23 months was the most represented. This could be explained by the fact that between six and twenty-four months, the body has an increased need for micronutrients and vitamins to develop well and failure to meet these needs may result in these pathologies (El Hioui *et al.*, 2007).

In our series, the majority of cases of patients were reported during the 4th quarter, that is to say 81%.

(NA koné *et al.*, 2021), (Niamoye D *et al.*, 2014) had found the majority of patients in the 3rd quarter (June, July and August).

This situation could be explained by the winter season which is conducive to malaria and the deterioration of the nutritional situation of children.

Hemoglobin level

In our study, 42% of patients had a hemoglobin level below 4 g / dl and 58% with a hemoglobin level between 4 to 6g/dl with signs of decompensation. Our result is higher than that of (Eboua *et al.*, 2017), (AS Oueremi *et al.*, 2021), (NA Koné 2021) who found respectively a hemoglobin level lower than 4 g/dl of 38.2%, 33.77%, 13.5%. This situation can be explained by the nature of our study which only concerned cases of severe anemia.

Pathology Associated with Severe Anemia

In our series, positive malaria test in 74,16% of cases was associated with severe anemia and malnutrition.

Malaria was also associated with severe anemia with a positive malaria test in the study of (N A koné *et al.*, 2021), (B Camara *et al.*, 2010), respectively 26%, 21.6%.

This could be explained by the rural aspect of our study site.

Patients Outcome

In our series, we had a successful treatment rate of 92.5%, this rate is higher than those of (NA koné *et al.*, 2021), (Niamoye D *et al.*, 2014), and (AS Ouéremi *et al.*, 2021) respectively: 73%; 85.9%; 79.22% of successful treatment rate.

We found a death rate of 7.5%. This rate is acceptable according to national protocol standards below (10%) (PCIMA Niger 2016).

This figure is lower than that of (NA koné *et al.*, 2021), (Niamoye D *et al.*, 2014) who found respectively 16%; 7.7% as death rate.

These figures could be explained by the support of a humanitarian partner to the hospital with the total gratitude of the care, providing the mothers with food and the application of treatment protocol by the actors of the system.

CONCLUSION

There is a pressing need to strengthen the community approach on nutritional advice and early attendance at healthcare facilities to avoid worsening of diseases among children.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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