

# Prevalence, Causes, and Characteristics of Anemia in Children Aged 6 to 59 Months at Ebolowa Regional Hospital Center

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## Abstract

**Introduction:** Anemia is a silent and neglected endemic in children. The aim of this study was to determine its prevalence, causes, and characteristics in children aged 6 to 59 months hospitalized at the Ebolowa Regional Hospital Center. **Methodology:** This was a descriptive cross-sectional study conducted from January 01 to December 31, 2023. All patients aged 6 to 59 months hospitalized during the study period and who had undergone a complete blood count (CBC) were included. Patients who had being blood transfused 3 months prior to the study and patients with sickle cell disease were excluded. Data were collected using a standardized form for data collection from patients' medical records. The variables studied were sociodemographic data, clinical data, CBC data. **Results:** A total of 493 patients were admitted during the study period, and 101 had anemia, representing a prevalence of 20.5%. The most represented age group was 24 - 59 months, with 64.36% of cases. Males predominated, accounting for 56% of cases. Fever was the main reason for consultation, accounting for 72% of cases. Among children presenting with anemia, 27% had severe anemia, 34% moderate and 40% mild. Microcytic anemia was present in 67.1% of cases, and malaria was the main cause in 64.7%.

**Conclusion:** The prevalence of anemia remains high in the preschool age group. Malaria was the most common cause of anemia.

## Keywords

Prevalence, Anemia, Children, Ebolowa

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## 1. Introduction

Anemia is defined as a decrease in hemoglobin concentration below the age-, sex- and physiological-standardized limits [1]. It affects all age groups [2], with a predominance of children under 5 and women of childbearing age, making it a public health problem. It is the most widespread form of micronutrient deficiency worldwide [3]. Worldwide, 40% of all children aged between 6 and 59 months are affected by anemia [4]. In Benin, the prevalence of anemia is 58% [5]. A demographic health survey of 11 French-speaking African countries found an anemia prevalence of 72.4% (60.2% - 87.8%) [6]. In Cameroon, 57% of children aged 6-59 months suffer from anemia [7]. The causes of anemia are multifactorial, including iron and micronutrient deficiencies, inflammatory and intestinal parasitic causes, and hereditary diseases. The aim of our study was to determine the prevalence, causes and characteristics of anemia in children aged 6 to 59 months at the Ebolowa Regional Hospital Center.

## 2. Methodology

We conducted a retrospective, descriptive study over a 1-year period from January 01 to December 31, 2023. It took place in the pediatric department of the Ebolowa Regional Hospital Center (CHRE). All patients aged 6 to 59 months hospitalized in the pediatric ward during the study period, who had undergone a complete blood count and whose parents had given informed consent, were included. Sampling was consecutive and non-exhaustive: children with sickle cell disease and those who had been transfused in the last three months were excluded from the study because they already had chronic anemia. Information was collected using a standardized form for data collection from patients' medical records. The variables studied were socio-demographic data (age, sex), clinical data (signs and symptoms), biological values (blood count) and etiological diagnoses. Anemia was defined as a hemoglobin level below 11 g/dL in children 6 to 59 months of age. Mild anemia was characterized by a hemoglobin level between 10.9 and 10 g/dL, moderate anemia by a hemoglobin level between 9.9 and 7 g/dL, and severe anemia by a hemoglobin level below 7 g/dL [8]. Data were entered into a database and analyzed using Excel software. Quantitative variables such as age and blood count data were presented as mean and median, while qualitative variables such as gender and clinical picture were reported as proportions. Data entry controls helped to minimize errors.

### 3. Results

#### 3.1. Prevalence of Anemia in the Pediatric Ward

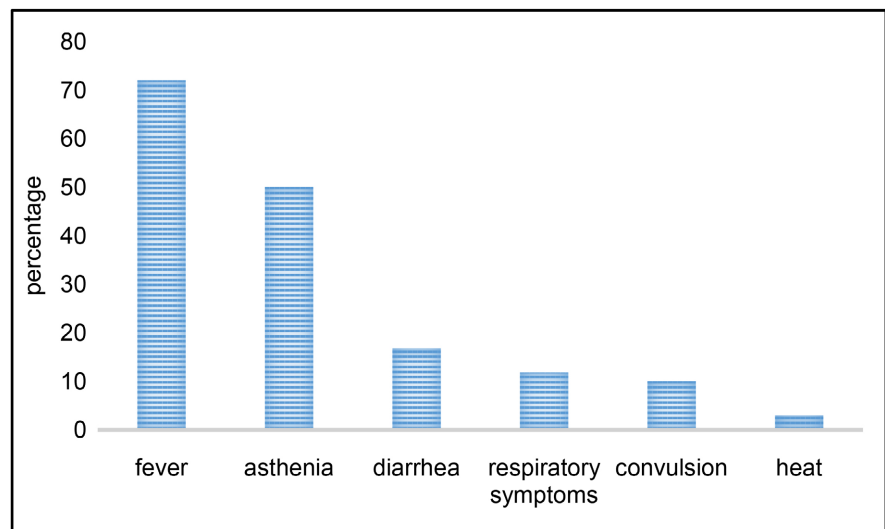
Between January and December 2023, we recorded 493 patients hospitalized in the pediatric ward. Anemia was found in 101 patients, representing a hospital prevalence of 20.5%.

#### 3.2. Socio-Demographic Characteristics

The most represented age group was 24 to 59 months, with 64.36% of cases. Children presenting with anemia were predominantly male (55.45%), with a sex ratio of 1.24.

#### 3.3. Clinical Presentation

The main reasons for consultation among patients with anemia were fever (72%), asthenia (50%), diarrhea (16.8%) and respiratory symptoms (11.8%) (**Figure 1**). Signs associated with anemia were fever, asthenia, dyspnea and convulsions.



**Figure 1.** Main reasons for consulting anemic patients.

#### 3.4. Paraclinical Characteristics

**Table 1** shows the severity of anemia among our studied population with respect to age. Mild anemia was more frequent in all age groups: 14.8% between 6 - 23 months and 24.8% between 24 - 59 months. The characteristics of the various anemias are shown in **Table 2**. Microcytic anemias were more frequent (46.5%), followed by normocytic anemias (34.6%).

#### 3.5. Etiological Diagnosis

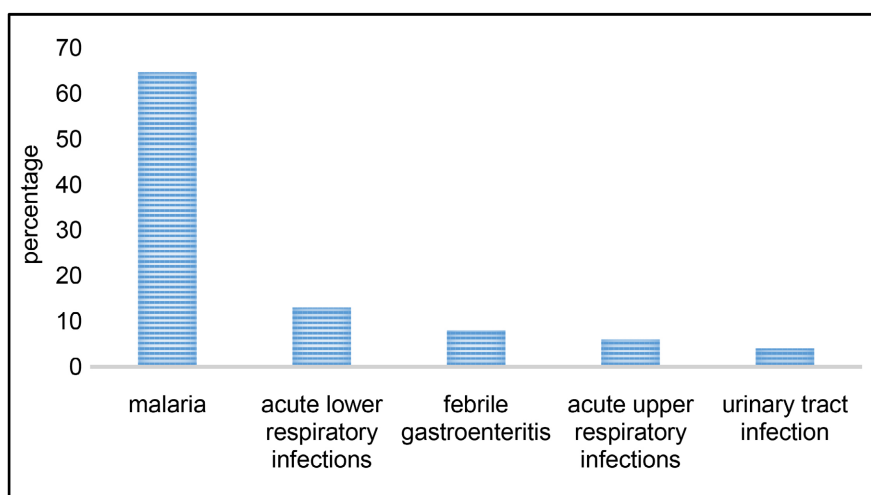
Malaria was found in 64.7% of anemic patients, followed by acute lower respiratory tract infections (13%), febrile gastroenteritis (8%), upper respiratory tract infections (6%) and urinary tract infections (4%) (**Figure 2**).

**Table 1.** Severity of anemia by age group.

Degree of severity	6 - 23 months		24 - 59 months	
	Numbers (N)	Percentage (%)	Numbers (N)	Percentage (%)
Mild	15	14.8%	25	24.8%
Moderate	13	12.9%	21	20.8%
Severe	8	7.9%	19	18.8%

**Table 2.** Characteristics of anemias according to VGM and CCMH.

VGM CCMH	Microcytic		Normocytic		Macrocytic	
	Number	Percentage	Number	Percentage	Number	Percentage
Hypochrome	26	25.7%	18	17.8%	10	9.9%
Normochrome	21	20.8%	17	16.8%	9	8.9%
Total	47	46.5%	35	34.6%	19	18.8%

**Figure 2.** Main etiological diagnoses.

#### 4. Discussion

The prevalence of anemia in our study was 20.5%. This value is much lower than that found respectively by S. Diouf *et al.* [6] (72.4%) and Danielle Kedy Koum [2] (88.5%). This result is also lower than that found by Cameroon's 2018 Demographic Health Survey (DHS) (57%) [9]. This prevalence does not reflect data in the different regions of the country [9] and therefore does not reflect prevalence in the general population. This could be explained by the fact that the study was hospital-based and therefore carried out on a non-representative sample. The children most affected (64.4%) by this anemia were aged over 24 months. Ntsame Owono *et al.* [10] also found a predominance of anemic children aged between 24 and 59 months (40.6%). Our result is contrary to that of Yessoufou *et al.* [11], who

found 63.7% of anemic children aged under 24 months. Similarly, Augustin Tshitadi *et al.* [12] found that 50% of children with anemia in their study were aged under 1 year. Whatever the age, anemia remains a health problem, especially for children under 5 in African and South-East Asian countries, which according to WHO 2025 [4] are the regions most affected by anemia. Fever was the main reason for consultation (72%), followed by asthenia (50%), diarrhea (16.83%) and respiratory symptoms such as rhinorrhea and cough (11.88%). Fever has been found as the main symptom of consultation among anemic children by several authors in the literature (Mekone, Mulugeta) [7] [13]. This may be explained by the fact that fever is a symptom, if not the main infectious sign, in many pathologies. Concerning the characteristics of anemia, the mild form is predominant in our study with 39.6% of cases (14.8% for infants under 24 months and 24.8% for the 24 - 59 months age group). This result is similar to that of EL Hioui *et al.* [1] and Adebo *et al.* [5], who found a predominance of mild anemia with 74.5% and 56.5% respectively. This result could be linked to the increase in cases of mild anemia in the general population. According to Cameroon's DHS 2018 [9], this increase rose from 23% in 2004 to 26% in 2018; While the prevalences of moderate and severe anemias experienced a decline. Classification of anemias according to the mean corpuscular volume and mean corpuscular hemoglobin concentration shows a predominance of microcytic anemias (46.5%), of which 25.7% were microcytic hypochromic. Normocytic anemias followed with 34.6% of cases. This result is similar to that of Augustin Tshitadi *et al.* [12], who found a predominance of microcytic anemias (78%) followed by normocytic anemias (20%). Microcytic anemia results from abnormal hemoglobin synthesis in erythroblasts, and above all from iron deficiency in the synthesis of this hemoglobin [5]. Iron requirements are high in infants after depletion of birth reserves. Deficiency may therefore be due to a lack of supplementation, or to the use of complementary foods. Normocytic anemia is probably due to malaria, which is endemic in the southern region of Cameroon. Indeed, malaria was the most frequent etiological pathology in our study (64.7%). It is responsible for a permanent microhemolysis linked to endemicity, which could explain normocytic anemia.

## 5. Conclusion

Analysis of the results obtained reveals that malaria is the main cause of anemia in our study. The South Cameroon region has a high prevalence of malaria. Children under 5 years and pregnant women are particularly vulnerable. Hence, the need for local policies to intensify the distribution of insecticide-treated mosquito nets to vulnerable groups and rapid diagnosis and free treatment of malaria for children.

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## Authors' Contributions

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4) Analysis: Bilo'o Lydienne Lesly, Ehouzou Mandeng Marcelle Nina, Nyemb Mbog, Atangana Huguette, Veronique Mboua, Bisay Souhe Ulrich, Messakop Yannick, Sap Suzanne.

5) Editing: Bilo'o Lydienne Lesly, Ehouzou Mandeng Marcelle Nina, Nyemb Mbog, Atangana Huguette, veronique mboua, Bisay Souhe Ulrich, Messakop Yannick, Sap Suzanne.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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