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Profile of Anemia at the Children of 0 to 59 Months Tidy to the General Hospital of Reference of Kabondo in Kisangani City, D. R. Congo

[1] Aimée Charlotte O Osako, [2] Joseph-Désiré Oleko WA Oleko
[1] School of Public Health, Faculty of Medicine, University of Kinshasa P.O. BOX 190 Kin, D.R. Congo
[2] Institute Superior of the Medical Techniques of Tshumbe P.O. BOX. 64 Tshumbe, D.R. Congo

Corresponding Author: **Joseph-Désiré Oleko WA Oleko**

Abstract

The majority of people in developing countries live in total poverty. Severe anemia is an important risk factor for infant mortality and constitutes a public health problem. In most cases, it requires urgent medical care through blood transfusions with a very high hospital bed occupancy rate. This cross-sectional study aims to determine the anemia profile of children aged 0 to 59 months treated at the Kabondo General Reference Hospital during the year 2022.

From the consultation register of the general reference hospital of Kabondo, pediatric department, 272 cases had been recorded and on the basis of the selection criteria, 74 cases were retained. At the end of our investigations, we observed: Severe anemia represents a significant morbid burden with a hospital prevalence of 27.2%, especially in children aged 12 to 23 months (22.9%), predominantly female (55.4%). The clinical signs were dominated by digestive disorders (95.9%) and fever (70.3%). 83.8% of cases were cured against 10.8% death. These results confirm the effectiveness of case management by antianaemics at 95.9% and by antibiotic therapy at 70.3%. This study provides more technical information on the patterns of case management of anemia in children of poor parents living in urban areas.

1. Introduction

According to the World Health Organization (WHO), anemia is the most frequent public health problem in the world, and affects all ages [1–3]. Two billion people in the world are affected and developing countries pay the heaviest price with prevalence of around 60% in pregnant women, 50% in children under 4 years old and 45% in school-age children [4, 5, 6]. Severe anemia is a medical emergency which, in the majority of cases, requires blood transfusion sanctions, the highest rates of which are found in sub-Saharan Africa [7] was 15.7% in 1999 in the general referral hospital of Kinshasa and 7% in the general referral hospital of Kabondo [8].

The burden of malarial anemia is very high in Africa where mortality is very high among children [9]. If anemia issues are not sufficiently addressed in the child survival agenda, it will be difficult for the Millennium Development Goals (MDGs) to be achieved. Because of multiple reasons ranging from infections to enzymatic (G6PD) and micronutrient deficiencies, including intestinal parasitosis [10].

The situation is aggravated by the context of HIV infection. In fact, HIV contributes to 45% of deaths of children with severe anemia. According to several studies, malaria is one of the main causes in areas of hyper endemicity. Severe anemia is one of the 15 severity criteria for malaria formulated by the WHO. With or without fever, children with moderate or severe anemia are mainly recruited among those in whom parasitaemia is high, compared to children without plasmodium [11].

In the Democratic Republic of Congo, the decrease in the number of malaria cases paralleled the decline in the rate of severe anemia. It represented 17% of hospitalizations in patients treated for malaria. Severe anemia is the consequence of a lack of correct management of simple cases of malaria. The risk of developing the signs of severity as defined by the WHO for untreated malaria varies from 30 to 80%. The physiopathological mechanism is the destruction of erythrocytes or dyserythropoiesis associated with certain etiological factors [12].

Promoting a national health policy of iron supplementation and the fight against malaria would reduce the incidence of severe anemia and, therefore, deaths. In addition, improving access to quality care remains essential. This study essentially aims to determine the profile of anemia in children aged 0 to 59 months treated at the Kabondo General Reference Hospital during the year 2022.

2. Study Area and Method
Study Area
This survey took place at the Kabondo General Reference Hospital, in its pediatric department from February 8 to 18, 2023. This health structure serves a total population of 176,621 inhabitants located in the city and suburb of Kisangani. It has a capacity of 161 assembled beds, including 26 for the surgery department, 26 for gyneco-obstetrics, 38 for maternity, 28 for internal medicine, 27 for the pediatrics department and 16 for the emergency department.
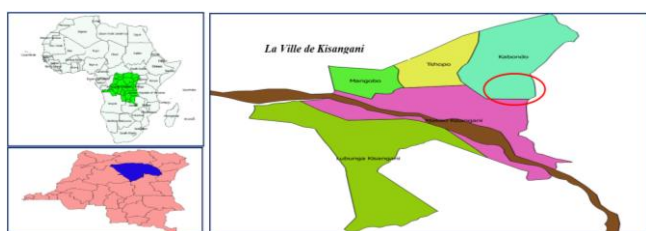

Fig 1: Location of the Kabondo GRH in the city of Kisangani, D.R. Congo

Study Methodology
Out of 3641 cases recorded in the pediatric department at the Kabondo general reference hospital during our study period, we were interested in 486 cases who met the inclusion criteria: children under 5 years old, treated for anemia in pediatric department with a complete file and, with the non-inclusion criteria: anemic children over 5 years of age treated in the pediatric department, who do not have a complete file or children with sickle cell disease.

Type of Study
Our study is descriptive cross-sectional.

Study Parameters
- Frequency of anemia in relation to other pediatric pathologies;
- Ages
- Gender;
- Clinical signs;
- Complications;
- -Supported;
- Exit mode.

Analysis and Interpretation
To analyze and interpret our data, we grouped them in different tables and calculated the percentage according to the following formula:

$$\% = fo \times 100/N$$

3. Results
From the consultation register of the pediatric department of the Kabondo General Reference Hospital, 486 cases were retained in our investigation according to the inclusion and non-inclusion criteria set in our study.

Age of Cases Investigated
Table 1 shows us that 38.8% of cases were aged 0 to 11 months and the low representativeness is between the age group of 48 to 59 months, i.e., 9.7% of cases retained.

Table 1: Distribution of anemic children treated by age

Age in months	Number	%
0-11	189	38.9
12-23	94	19.3
24-35	73	15.0
36-47	83	17.1
48-59	47	9.7
Total	486	100.0

Prevalence of Anemia
Fig 2 gives the hospital prevalence of anemic children aged 0 to 5 years was estimated at 13.3%.
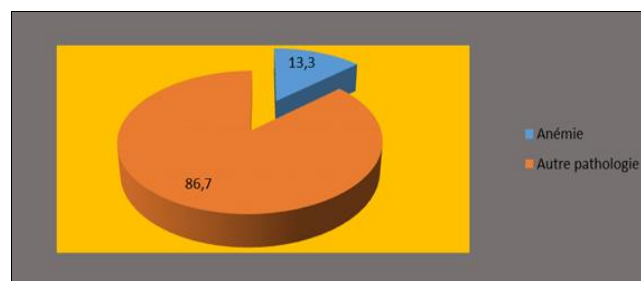

Fig 2: Distribution of children treated by pathologies in the pediatric department

Sex
The data in Fig 3 tell us that the majority of children under examination were female, i.e., 57.5% of cases. That is, a girl/boy sex ratio is 1.4.
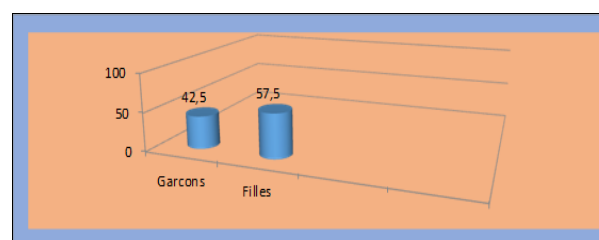

Fig 3: Distribution of anemic children treated by gender

Clinical Signs
The results in Table 2 break down the cases of anemia according to the frequency of clinical signs: the highest is 40.3% of children presenting with fever and the lowest, that of respiratory disorders with 7.5%.

Table 2: Distribution of anemic children treated according to clinical signs

Clinical signs	Number	%
Fever	196	40.3
Asthenia	76	15.7
Digestive disorders	127	26.1
Respiratory disorders	36	7.5
Pallor	40	8.2
Others	11	2.2
Total	486	100.0

Clinical Assumptions

The results in Fig 3 give the various clinical hypotheses, the most frequent of which is mild anemia with 59.7% and the lowest is severe decompensated anemia with 6.7% of cases retained.
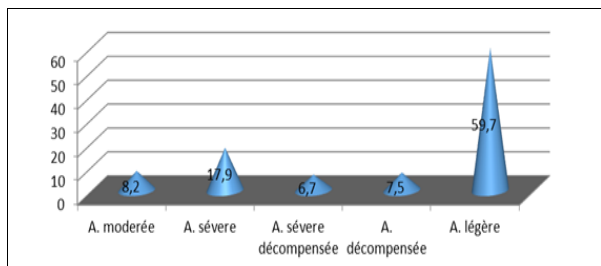

Fig 3: Distribution of children treated according to clinical hypotheses

Complications of Anemia

More than half of the anemic children treated and retained had presented no complications, i.e., 58.2% and 35.0% of cases with convulsion, according to Table 3.

Table 3: Distribution of anemic children treated according to complications of anemia

Complications	Number	%
None	283	58.2
Convulsion	170	35.0
Others	33	6.8
Total	486	100.0

Medical Management of Anemia

The management of anemic children was made up of anti-anemics (95.9%) and antibiotics (70.3%) of the cases selected, according to Table 4.

Table 4: Distribution of anemic children treated according to the medical management of global cases

Support	Number	%
Antibiotic therapy	342	70.3
Antipyretic	138	28.4
Transfusion	184	37.8
Métroclopramide	92	18.9
Antianaemics	466	95.9
Others	79	16.2

Exit Mode

94.1% of anemic children aged 0 to 5 years treated and cured at the Kabondo General Reference Hospital according to Table 5.

Table 5: Distribution of anemic children treated according to discharge modality

Output mode	Number	%
Heal	457	94.1
Death	19	3.9
No available	10	2.0
Total	486	100.0

4. Discussions

The results of our study show that anemia remains a major public health problem in the city of Kisangani (12.9%). Despite the many efforts made by specialized programs for the promotion of child health. This situation may persist due to insufficient meetings with the communities on the warning signs of this disease.

The analysis of the various tables shows the inadequacy in the implementation of interventions in the fight against the main causes of anemia and its deaths. In addition, the various factors such as geographical, financial and drug accessibility as well as the preference of the parents would have influenced the use of this structure for the medical management of cases. The Kabondo General Reference Hospital is a first-degree reference structure. However, this does not explain the number of deaths related to anemia, which requires that other interventions be put in place to manage severe anemia in a critical situation, most of whom die on admission. The causes of severe anemia are multifactorial in developing countries [10]. Its high frequency remains coincided with the end of the rainy season observed in the city of Kisangani, the field of our study. As in the present study, several authors have incriminated malaria as the main etiology [13]. In Ghana, for example, the rate of anemia was high (22.1%) during the rainy season and corresponded to the high transmission of malaria [14]. The city of Kisangani is located in the equatorial region where it rains ¾ of the year, the multiplication of mosquitoes and the continuous transmission of malaria becomes endemic and seasonal.

A study carried out in the city of Yaoundé in 2008, among children aged 5 to 10 years, concluded that sickle cell disease and malaria played a key role in the occurrence of anemia [15]. Malaria represented 71.58% of etiologies in 2003. The rate of severe anemia would be higher in our study, if we had included sickle cell patients. High parasitaemia has been shown to be associated with anemia and a high mortality rate in this group of patients. Other authors, on the other hand, believe that there is an overestimation of malaria in febrile patients residing in areas of low malaria transmission. Indeed, they did not find a significant difference between severe anemia in patients with or without plasmodium in the blood. We observed that children aged 12 to 23 months and those aged 24 to 47 months are more affected by anemia but with a female predominance (57.5%). Fever (40.0%) and digestive disorders (26.1%) were the main clinical signs recorded in our surveyed subjects.

In Gabonese children, the age group from 1 to 11 months had a high risk of presenting severe anemia of malaria origin. On the other hand, those over six years of age were likely to have severe anemia of etiology other than malaria. The risk of severe malaria-related anemia was high in 1-year-old infants during high-intensity transmission and in 2-year-old infants during low-intensity transmission. Anemia is thus considered a useful indicator for estimating the disease burden of malaria in areas of high endemicity [16].

Some children would be carriers of asymptomatic anemia. A study carried out among Tanzanian children made it possible to find in the community children who had a low hemoglobin level, that is to say < 8 g/dl and < 5 g/dl respectively in 87%, 39 % and 3% children. The authors called it "silent anemia." Moreover, even when the symptoms appeared, they did not always point to the severity of the pathology [17]. In southern Cameroon, overall the prevalence of anemia was high (47%) in infants under six months. In Nigeria, it affected 4.16% of children aged 7 months to 12 months. Under these conditions, the occurrence of acute events such as malaria and bacterial

infections would precipitate the already weakened hematological status in these children. Concerning care, antianaemics (95.9%), antibiotics (70.3%) and transfusion (37.8%) were used more. These led to 94.1% of cured without any complications (58.2%); apart from convulsion (35.0%).

In Cameroon, almost all of these cases of severe anemia were transfused, the blood transfusion rate was 87% [7]. Blood transfusion is a protection against certain deaths. This life-saving measure is not always easy to implement in everyday practice, nor is it devoid of reaction risks and disease transmission [18]. In fact, difficulties arise in relation to the availability of blood. In quality and quantity; the search for certain infectious agents is not systematic. In Tanzania, severe anemia would have exposed approximately 19,000 children who survived through blood transfusion to HIV [13]. Some post-transfusion septic states would be the consequence of bacterial contamination of transfused blood. In fact, the bacteria were isolated in 8.8% of whole blood bags intended for transfusion in Kenya. Its popularization is generally prohibited even in critical situations by certain authors, its benefit being very limited. Blood transfusion should be reserved for cases where severe anemia is accompanied by signs of intolerance such as respiratory distress and especially at the start of hospitalization. Considering its potential risk, it is important to fight against all the factors that predispose to anemia. Emphasis is placed on the beneficial effect of treating uncomplicated malaria to prevent severe forms and anemia of malaria origin. Some studies have demonstrated the protective effects of intermittent preventive treatment using ACTs on malaria and anemia [19].

In the Democratic Republic of Congo, the national strategic plan for the fight against malaria emphasizes the promotion of the use of insecticide-treated mosquito nets (MII), the distribution of which is ongoing throughout the territory. Since 2010, the government has offered free ACTs for the treatment of uncomplicated malaria in children under 5 years old. These measures would make it possible to remove certain barriers (geographical, financial, medicinal) to access to care. Unfortunately, their application would be ineffective due to the limited accessibility of ITNs and the myth surrounding their use. Indeed, a small proportion of children under five slept under ITNs according to the results of the DHS DRC II.

As for the deaths occurring in anemic patients (10.8%), three "delays" in question would be avoided. The first concerns the identification of the depth of the palmar pallor and certain signs of severity by the parents or the health worker. The second is the urgency of decision-making and consultation or referral to an appropriate health facility. Finally, the blood transfusion decision based on clinical evidence in appropriate time and conditions. The strategy of "Integrated Management of Childhood Illnesses" in its community component strengthens the capacities of parents and families to be able to implement the first two points. In order to improve the sensitivity of this strategy, some authors recommend that the search for anemia take into account conjunctival pallor, grunting and palmar pallor.

Malnutrition is also a key factor contributing to malaria morbidity and anemia. The malaria control program alone could not have a significant impact without the nutrition program. In addition, primary prevention of iron deficiency anemia and malaria would substantially reduce deaths related to anemia in young children living in malarial areas [10].

However, our evaluation has some limitations. The study was based in the hospital whose population studied would not be representative of the city of Kisangani, but for reasons of geographical, financial and preferential accessibility, this choice was essential. The presumptive aspect of the diagnoses recorded in the context of this study is also another major element to take into account, some of our patients had known defects (Hb SS, lymphoproliferative disease). We did not take sickle cell patients into account in our analyses, due to the complexity of the pathophysiology of anemia in this area. Also patients treated in the emergency department were not taken into account because of the less certain management of their files. Nevertheless, this study has the advantage of providing basic elements that can constitute a database for previous work on this theme.

5. Conclusion and Recommendations
5.1 Conclusion
This descriptive cross-sectional study used the documentary technique to collect information. To compare our results with previous work, we used the percentage calculation. At the end of our investigations, we reached the following main results:
1. Severe anemia represents a significant morbid burden in our context, i.e., a hospital prevalence of 19.3%;
2. Children aged 0-11 months and those aged 12-23 months accounted for 38.9% and 12.3% of cases respectively;
3. Female children were more affected with 55.4% of cases, i.e., a girl/boy sex ratio of 1.4;
4. The clinical signs were dominated by digestive disorders (26.1%) and fever (40.3%);
5. 59.7% of subjects treated had mild anemia and 17.9% of cases had severe anemia;
6. Apart from convulsion (35.0%), we noted 58.2% of cases without complications;
7. The management was made of antianaemics (95.9%) and antibiotic therapy (70.3%) of treated cases;
8. We recorded 94.1% of cases released cured against 3.9% of deaths.

5.2 Recommendations
1. We formulate the following recommendations in order to contribute to the health promotion of our children in the city of Kisangani:
2. Strengthen community awareness on the use of health services at the first signs of illness.
3. Effectively implement the government policy of free ACTs for children and the use of insecticide-treated mosquito nets in order to significantly reduce the incidence of malarial anemia.

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