

The Prevalence of Anaemia in Infants and Children Aged 2-59 Months Hospitalised in the Paediatric Ward of the CSREF CII in the District of Bamako

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DOI: [10.36348/sijtcm.2023.v06i04.001](https://doi.org/10.36348/sijtcm.2023.v06i04.001)

Received: 22.03.2023 | Accepted: 28.04.2023 | Published: 05.05.2023

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Abstract

Introduction: Anemia remains a public health problem in both industrialized and developing countries. Developing countries have the highest prevalence, especially in children. The objective of this study was to determine the prevalence of anaemia in children aged 2-59 months in the paediatric ward of the commune II health centre in Bamako. **Methods:** This was a retrospective, descriptive study which took place from 1 January 2017 to 31 December 2018, i.e. a period of 2 years. All children aged 2 months to 59 months hospitalised with clinical anaemia who had a blood count or haemoglobin and/or haematocrit measurement hospitalised in the paediatric ward during the study period were included. Anemia was defined according to WHO criteria. The etiological search was guided by clinical signs and complementary examinations. **Results:** The prevalence of anaemia was 16.63%. The age group 12 to 23 months was the most represented. The children were predominantly male (56%). The anaemia was severe in 50%, moderate and mild in 50%. The anaemia was predominantly microcytic and hypochromic in 68%. Fever was the first reason for consultation in 75% and malaria was the main pathology in 56%. The mortality rate of anaemic patients was 3%. **Conclusion:** Anemia is a real problem among children in commune II. The main etiology was malaria. Strengthening malaria prevention could reduce its incidence.

Keywords: Anemia, Child, Commune II, Bamako, Mali.

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INTRODUCTION

Anemia remains a public health problem in both industrialized and developing countries (Yessoufou *et al.*, 2015). The World Health Organization (WHO) defines it as a medical condition in which the number of red blood cells (i.e. cells containing haemoglobin and carrying oxygen in the blood) is insufficient to meet the body's physiological needs. These requirements vary according to age, gender, altitude, smoking habits and pregnancy status (WHO, 2011). It is a disease with multiple causes, both nutritional (vitamin and mineral deficiencies) and non-nutritional (infections), which frequently occur in parallel (El Hioui *et al.*, 2007). WHO estimates that 42% of children under five and 40% of pregnant

women worldwide are anaemic (WHO, 2023). Developing countries have the highest prevalences, with rates of around 60% in pregnant women, 50% in children under 4 years of age and 48% in school-age children (El Hioui, 2009). In Mali, according to EDSM VI (2018), about eight out of ten children aged 6-59 months (82%) and six out of ten women aged 15-49 years (63%) suffer from anaemia. Overall, between 2001 and 2018, the proportion of children with anaemia has hardly changed; it was estimated at 83% in 2001 and is 82% in 2018. However, it is noted that in the mild form, the prevalence has increased from 18% in 2001 to 25% in 2018. In the moderate form, there is a very slight decrease, from 53% in 2001 to 51% in 2018, and the prevalence of severe anaemia has decreased from 11% in 2001 to 6% in 2018. The objective of this

study was to determine the prevalence of anaemia in children aged 2 to 59 months in the paediatric department of the reference health centre of Bamako's commune II (CSRéf).

MATERIAL AND METHODS

This is a retrospective and descriptive study, which took place from 1 January 2017 to 31 December 2018, i.e. a duration of 2 years. It took place in the paediatric department of the reference health centre in Bamako's commune II. Commune II covers an area of 17 km², i.e. 7% of the total area of the district of Bamako, 267 km². The health district of commune II is divided into 9 health areas: 1 CSRéf, 8 community health centres (CSComs). It is the primary health structure of commune II. All children with clinical anaemia who had a blood count or haemoglobin and/or haematocrit measurement hospitalised in the paediatric ward during the study period were included in this study. The definition of anaemia and its age-related severity was based on the WHO (2015) haemoglobin cut-off levels. The mean corpuscular volume was considered normal between 80 and 100 fl. and the mean corpuscular haemoglobin concentration was normal between 32 and 36 g/dl. The search for the etiology of the anaemia was based on clinical criteria confirmed as far as possible by complementary examinations. For the diagnosis of malaria, a thick blood drop and/or RDT was used. Rapid diagnostic tests for malaria were requested from patients presenting with fever or with a history of fever. Gastroenteritis was diagnosed when there were frequent loose or watery stools (usually 3 or more per day) with or without vomiting. Lower respiratory infections were diagnosed in any child presenting with cough, polypnoea, rales and/or

condensation syndrome. Confirmation by chest X-ray was not routinely done. The diagnosis of severe acute malnutrition (SAM) was made according to the admission criteria of the national protocol: P/T (weight/height) ratio < -3 Z score or BP (brachial perimeter) < 115mm or presence of bilateral oedema + or ++. Weight, height and BP are measured according to the national protocol guidelines. (Haemoglobin electrophoresis was requested if there was a family history or clinical signs suggestive of sickle cell disease (hand-foot syndrome, vaso-occlusive crises etc.). CRP was requested in the event of an inflammatory syndrome with a systemic response (fever, tachycardia, tachypnoea, hyperleukytosis, leukopenia). Ferritin measurement was not possible in the hospital. The variables selected were: Socio-demographic variables (age, sex, origin, period of consultation, mode of admission, socio-economic level, educational level and occupation of mothers), clinical variables (time of consultation, reason for consultation, length of hospital stay), paraclinical variables (haemogram, haemoglobin level, malaria RDT, GE, CRP). The data were entered and analysed on IBM SPSS Statistical software version 12.0 and processed on Word 2007 and Excel 2017.

RESULTS

Out of a total of 836 patients hospitalised during the study period, 139 presented with anaemia, a prevalence of 16.63%. The age group 12-23 months was the most represented with an average of 30 months. The majority of children with anaemia were male (56%), i.e. a boy/girl sex ratio of 1.5. The mothers of the patients in our series were housewives (87%), uneducated (63%) and living in poor socio-economic conditions (78%) (Table 1).

Table 1: Distribution according to socio-demographic characteristics

Socio-demographic characteristics	Frequency	Percentage
Age groups		
2-6 months	18	13
6-11 months	16	12
12-23 months	44	32
24-35 months	25	18
36-60 months		26
Sex		
Male	78	66
Female	61	44
Mother's occupation		
Housewives	121	87
Tradesman	8	6
Other	7	5
Pupils/students	5	4
Civil servants	2	1
Socio-economic condition		
Not very satisfactory	109	78
Satisfied	22	16
Unfavourable	8	6

Sur le plan clinique une géophagie a été retrouvée chez 90 % des patients, un syndrome pied-main dans 2 % Fig. 1. Le diagnostic du paludisme a été majoritairement retrouvé chez les patients 58 %, suivi

de la pneumopathie 17 % et de la malnutrition aigüe sévère 12 %. Les patients étaient majoritairement hospitalisés en octobre, août et novembre respectivement 38%, 23 % et 18 %.

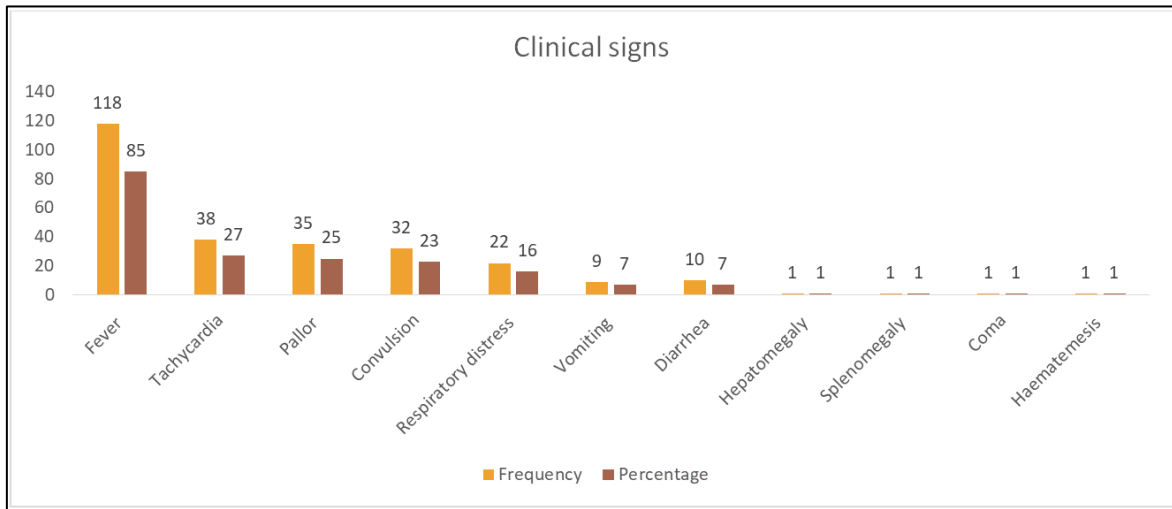


Fig. 1: Distribution by clinical signs

Biologically, anaemia was severe in 50%, moderate in 27% and mild in 23% of patients. The anaemia was predominantly microcytic and

hypochromic in 68% of cases. For diagnostic purposes, RDT and EW were positive in 85% of patients and haemoglobin electrophoresis in 7%.

Table 2: Distribution by hemotological profile

Hematology profile	Percentage
Severe anaemia (<5)	24
Severe anaemia (5-8)*	26
Moderate anaemia (8-9)	27
Mild anaemia (9-11)	23
Microcytic (<80)	91
Normocytic (80-100)	7
Macrocytic (>100)	1
Hypochromic (<320)	92
Normochromic (>=320)	8

*Signs of anaemia intolerance

The evolution was favourable in 94% of the patients hospitalised with 3% of deaths noted and 3% of referrals to the higher level. The reasons for referral

were (lack of blood, at the request of parents, patients with pathological conditions, severely malnourished patients with complications).

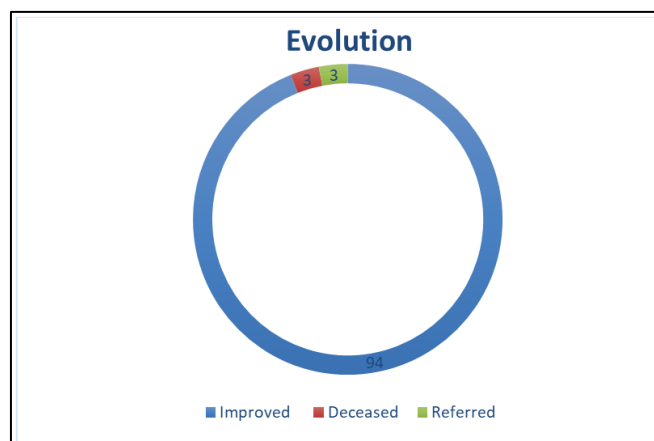


Fig. 2: Distribution of patients according to progress

DISCUSSION

During our study, a number of problems were encountered. Some complementary examinations such as (blood culture, CRP control, blood sugar, ferritinemia, saturation coefficient etc.) could not be carried out because of non-availability at the referral health centre and/or the unsatisfactory socio-economic conditions of the parents. The prevalence of anaemia in our study was 16.63%. Our result is lower than the national prevalence (EDSM VI 2018) 82%, (Danièle KK *et al.*, 2013) 88.5% and (Adégnika AA *et al.*, 2018) 56.47%. This could be explained by the hospital nature of our study. The age group of 12 to 23 months was the most represented 32% with an average of 30 months. Our result is the same as (Adebo *et al.*, 2018) in which more than 2/3 of the patients were less than 24 months old and higher than (Touré A *et al.*, 2012) 28, 4%, but lower than (Danielle KK *et al.*, 2013) 87.3%. In our study, the male sex was the most represented with 56.1% with a ratio of 1.5. Our results are similar to those of (Kadiatou Ba *et al.*, 2022) in commune V, i.e. 52.3%. On the other hand, (Adebo *et al.*, 2018) found a predominance of women with a ratio of 0.90. This could be explained by the fact that gender has no influence on inpatient anaemia. In our series, 87% of the patients' mothers were housewives. In our series, 87% of the patients' mothers were housewives, 63% did not attend school and 78% lived in poor socio-economic conditions. Our results are close to those of (Kadiatou Ba *et al.*, 2022) who found that the vast majority of mothers were housewives (76.7%) and more than half were uneducated (51.5%). This situation is a reflection of the national situation, according to EDSM VI 66% of women are not educated. Fever was the first reason for consultation 75%, followed by tachycardia and pallor. This predominance of fever was found by different authors (Djeutchouang *et al.*, 2010) 74.3%, (Malumba and Muhindo) 85.4%. Clinically, geophagia was found in 90% of patients. Geophagy was associated with anaemia in 67.56% of cases in (MG. SALL *et al.*, 1990). This could be explained by the fact that geophagy is a particular concern of obstetricians and pediatricians who count among their patients a large number of these "earth eaters" without always knowing it (Bart C *et al.*, 2009). The majority of patients were hospitalised in October, August and November respectively 38%, 23% and 18%. Biologically, anaemia was severe in 50%. Our result is higher than those of (Elsie GHS *et al.*, 2020), (ADEBO *et al.*, 2018) and (Adégnika AA *et al.*, 2018) who found 41.08%; 30% and 30% of severe form respectively. This could be explained by the hospital nature of our study and the age range of 2 months to 5 years in our sample. The moderate and mild form was 50%. This is lower than that of (EL Hioui and al.2009) with 74.5%. The anaemia was mostly microcytic and hypochromic 68%. As in (Diagne I, *et al.*, 2010) 78% and (Danièle KK *et al.*, 2013) 48.5%. This majority microcytosis in the patients

of our study could be explained by the study population 2-59 months in whom the need for iron is quite important. Indeed, iron requirements are high in young children especially between 6 and 18 months, once birth iron stores are depleted, children's iron status depends on complementary foods; unfortunately in developing countries, traditional complementary foods are poor sources of bioavailable iron (ADEBO *et al.*, 2018). In our series, malaria was found in the majority of patients (58%) as a pathology associated with anaemia, followed by pneumopathy (17%) and severe acute malnutrition (12%). Our result is similar to that of (Danièle KK *et al.*, 2013) who found malaria as the majority pathology 46.3% as well as (Djeutchouang *et al.*, 2010) 41.2%. In the framework of diagnostic research, RDT and EW were positive in 85% of cases as well as (Adebo *et al.*, 2018) and (Danièle KK *et al.*, 2013) who found malaria as the first pathology associated with anemia. This could be explained by the fact that Mali, like most countries in sub-Saharan Africa, records malaria as the leading cause of mortality and morbidity (EDSM VI 2018). CRP was positive in 82.7% (60.3%) of hospitalised children with anaemia, with this inflammation being significantly more frequent in anaemic children than in non-anaemic children. Haemoglobin electrophoresis 7%. The outcome was favourable in 94% of the hospitalised patients with 3% death and 3% referral to the next level. Our results are close to those of (Kadiatou Ba *et al.*, 2022) who found 88.8% cure and 3% death. Our results could be explained by the efforts made by our governments and their partners in terms of the management and prevention of malaria, which is the primary pathology associated with anaemia in our study. The reasons for referral were (lack of blood, parents' wishes, patients with pathological conditions, severe acute malnutrition with complications).

CONCLUSION

Anemia remains a public health problem in the commune II of the district of Bamako. Reinforcing the fight against malaria, preventing acute malnutrition and systematically screening for sickle cell disease would reduce the incidence of anaemia.

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