



## Prevalence of Anemia in Infants and Children 6 to 59 Months Old Living in the Suburbs of Dakar

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### Abstract

**Introduction:** Anemia is a real public health problem especially in developing countries where the prevalence has an increasing trend despite many advances in prevention, diagnosis and management. The main objective of the study was to determine the prevalence of anemia in children under 5 years old in the semi-urban environment of Dakar.

**Materials and Methods:** This is a prospective, cross-sectional, descriptive and analytical study over a period of 3 months from May to July 2024 in children aged between 6 and 59 months, free of any acute or chronic pathologies, who came for consultation in the structure. Only children whose informed consent was signed and who had a NFS were included in the study.

**Results:** Among the 217 children included, 152 had anemia, representing a prevalence of 70.04%. The mean age of the children was  $25.49 \pm 14.26$  months (2.12 years) with a median of 22.5 months and extremes of 6 and 60 months. Patients aged between 1 and 2 years were in the majority with 35.84% (n = 81) with a male predominance (54.9%) and a sex ratio of 1.21. In 53.8% of cases (n = 121), the mothers had opted for predominantly breastfeeding. Diversification was good in 38.5% of cases (n = 84) and average in 38.5%. Ninety-eight children (46.7%) were weaned before 2 years. The prevalence of anemia was much higher in children not consuming legumes (71.8%), tubers (72.7%), fruits (87%) and animal proteins (83.3%). In our study, 17.2% of anemic patients had poor nutritional status of which 1.6% were severely acutely malnourished according to the MUAC. Growth retardation was noted in 38 patients (25.3%) and 6% had severe growth retardation. In our study, 2% of anemic patients were severely underweight. Factors associated with anemia are age (less than 1 year and between 2-3 years) and moderate growth retardation.

**Conclusion:** Anemia remains a common, multidisciplinary pathology, affecting mainly children under 5 years old in an unfavorable socio-economic context. Microcytic hypochromic anemias being the most frequent, are most often related to an iron deficiency. Supplementation of patients at risk should be systematic.

**Keywords:** Anemia; Children; Malnutrition

### Introduction

Anemia is defined as a decrease in the concentration of hemoglobin in the blood below normal values [1]. It constitutes a public health problem at the global level, affecting two billion people worldwide and it is developing countries that pay the heaviest price with prevalences of around 60% in pregnant women, 50% in children under 4 years old and 45% in school-age children [2,3]. It affects more than 47% of children under 5 years old worldwide

[4]. This rate reaches 64.6% on the African continent or 90 million children. In Senegal, as in most developing countries, anemia is one of the most important public health problems but unfortunately little known or somewhat neglected. The consequences of anemia in children can be a delay in growth and development of their mental faculties and an increase in infectious morbidity. The aim of this study is to determine the prevalence of anemia in children under 5 years of age in semi-urban Dakar in 2024.

## Methodology

We conducted a prospective, cross-sectional, descriptive and analytical study over a 3-month period from May to July 2024. Our study population consisted of children aged 6 months to 59 months who consulted at the Institute of Social Pediatrics of Pikine during the study period. Included were children whose parents consented with signed consent, those whose parents responded to the survey with collection of the blood count and who did not have any common acute infection, underlying chronic disease or circumstances requiring the performance of the blood count (tubes not sent, insufficient samples, etc.). Anemia was defined by a hemoglobin (Hb) level below 11 g/dl and classified according to severity. Socio-demographic, anthropometric and biological parameters were studied. The data were collected on a pre-established questionnaire and entered with the Epi-info software (7.2.2.2) and analyzed with R software version 4.4.1

## Results

During the study period, we collected a total of 227 children with a mean age of  $25.49 \pm 14.26$  months and extremes of 6 and 60 months. Children aged between 1-2 years were the majority with 35.84% (n = 81). There was a male predominance (54.9%) with a sex ratio of 1.21. The socioeconomic level was generally low in 103 children (47.2%) and very low in 22.5% of cases (n = 49). Most of the children (47.1%; n = 104) were first-borns. In 53.8% of cases (n = 121), the mothers had opted for predominant breastfeeding. Diversification was good in 38.5% of cases (n = 84) and average in 38.5%.

Ninety-eight children (46.7%) were weaned before 2 years of age. Regarding the consumption of iron-rich foods: 48.9% of children did not consume legumes, 1.8% of children did not consume cereals, 20.5% of children did not consume tubers, 24.2% of children did not eat vegetables, 11.9% of children did not consume fruits and animal proteins, 8.8% of children did not consume dairy products. The prevalence of anemia in our study population was 70.04%, of which 54.61% (83) had moderate anemia. 17.2% of anemic children had poor nutritional status, of which 1.6% were severely acutely malnourished according to the arm circumference and 3.29% according to the weight/height ratio. Growth retardation was noted in 38 children (25.3%) and was severe in 6% of cases. Anorexia and weight loss were the main signs observed in anemic children with prevalences of 61.02% and 49.15% respec-

tively. In more than  $\frac{3}{4}$  of cases, anemia was hypochromic microcytic (84.87%). Age, height-age index were significantly correlated with anemia. All children with a history of prematurity were anemic. The prevalence of anemia was much higher in children whose mothers practiced predominant breastfeeding, those whose diversification age was less than 6 months with poor diversification in quality, those with a low socio-economic level and those with a weaning age less than 2 years. However, no dietary factor was significantly associated with anemia.

## Discussion

The prevalence of anemia was 70.04%. Compared to national data, this result is superimposable to that found in the EDS-c Senegal 2017 [4] which showed a prevalence of anemia of 71% in the overall population of Senegal for this age group. This prevalence had experienced a decrease between 2010 and 2014, going from 76% to 60%. After 2014, a clear increase was observed ranging from 60% to 71% in 2017 [4]. This prevalence remains high compared to literature data [5-7]. Furthermore, it varied significantly according to age ( $p < 0.001$ ). It was higher in infants under 1 year old (84.85%), decreasing to 70.67% between 1 and 2 years old, with a peak between 2 and 3 years old (77.27%) and becoming lower in children aged 4-5 years old (37.93%). This finding is in agreement with the data from the EDS-c 2017 [4] which showed a prevalence of 74% between 6 and 8 months, a peak of 88% around 12 and 17 months then falling to 52% between 48 and 59 months. Indeed, breast milk, although having a low iron level, has a very high bioavailability, which means that in the first month's breast milk is sufficient to meet the iron needs of children without underlying conditions or pathology. And from 6 months breast milk will no longer be sufficient, hence the interest in good dietary diversification with foods rich in iron. Unfortunately, in developing countries, traditional complementary foods are poor sources of bioavailable iron. Consequently, children from 6 to 18 months are frequently deficient in this mineral [8]. And when weaning age comes, it can be poorly managed due to the poor quality of weaning foods, mainly based on cereals, porridge, and other foods low in iron. The peaks of anemia found in our study correspond to the period of dietary diversification and weaning. It should also be noted that nutrition education programs are often insufficient or do not reach the most vulnerable communities [9-11]. Our results differ from those of Kayembe [5] which noted a higher prevalence in patients aged between 1 and 3 years (48.72%). In the work of Ohene-Agyei [7] just like in Soda's [6], age was significantly associ-

ated with anemia in multivariate analysis. Abedo [8] for his part, he noted that 68.83% of those with anemia were infants under 24 months. These trends are also observed in Kejo’s work [12]. These observations lead us to conclude that the older we get, the less we develop anemia [6]; infants under one year of age being the most exposed. A male predominance was observed in anemic patients with a sex ratio of 1.12. This result is comparable to that of Toure [13] which showed a male predominance of 60.9% with a sex ratio of 1.5 and that of Djiguibe [14] at 56.1% with a sex ratio of 1.5. This can be explained by the fragility of the male sex at birth exposing it more to the risk of malnutrition but also to the risk of developing anemia. In the literature, the socioeconomic level most often comes up as a factor associated with anemia [5,6,14] as found in our study. In the EDS-c 2017 [4], anemia varies according to the

mother’s level of education: 65% of children whose mothers have a secondary or higher level of education have anemia compared to 68% among those whose mothers have a primary level of education and 75% among those whose mothers have no level of education, this confirming our results. Our results are similar to those of the survey carried out by Janvier, *et al.* on malnutrition in children in 10 villages of BANDAFASSI which showed a rate acute malnutrition of 9.3%, chronic malnutrition of 32% and underweight of 29.1% [16]. Another study conducted by Ake-Tano, *et al.* [16] in a national public health institute in Ivory Coast in 2006 found a prevalence of underweight, acute malnutrition and chronic malnutrition of 24.3%, 22.5%, 7.20%, respectively.

**Conclusion**

**Table 1:** Painting I: Socio-demographic characteristics of patients.

Sociodemographic characteristics	Absolute frequency (n)	Relative frequency (%)
Age groups in months (N = 226)		
<12	37	16.4
[12-24 [	81	35.8
[24-36 [	44	19.5
[36-48 [	35	15.5
[48-60]	29	12.8
Sex (N = 226)		
Male	124	54.9
Female	102	45.1
Residence (N = 226)		
Pikine	57	25.2
Outside Pikine	169	74.8
Family environment (N = 219)		
Unfavorable	11	5.0
Moderately favorable	190	86.8
Favorable	18	8.2
Socioeconomic level (N = 218)		
Very low	49	22.5
Down	103	47.2
AVERAGE	52	23.9
Pupil	14	6.4

**Table 2:** Painting II: Distribution of anemic patients according to nutritional status.

Nutritional status	Anemia		P value	GOLD	IC95%
	Yes (n, (%))	No (n, (%))			
Arm circumference			0.151		
MAM	19 (86.36)	3 (13.64)			
MAS	2 (100)	0 (0)			
Normal	107 (68.59)	49 (31.41)			
Weight for Height			0.785		
MAM	23 (69.70)	10 (30.30)			
MAS	5 (83.33)	1 (16.67)			
Normal	124 (70.45)	52 (29.55)			
Size for Age			0.049		
Normal	114 (67.46)	55 (32.54)		Ref	
Moderate growth retardation	29 (87.88)	4 (12,12)		3,498	[1,17-10,44]
Severe growth retardation	8 (61.54)	5 (38.46)			
Weight for Age			0.281		
Moderate underweight	30 (78.95)	8 (21.05)			
Severe underweight	2 (50.00)	2 (50.00)			
Normal	116 (67.84)	55 (32.16)			

Anemia remains a public health problem in the world but particularly in our countries with limited resources. Children aged 6 to 6 months constitute a vulnerable age group. Raising the socio-economic level, practicing exclusive breastfeeding, good management of food diversification are important axes for improving the quality of life of these patients.

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