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Etiological and Evolutionary Profile of Anemia in Patients Hospitalized in the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes

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Abstract

Introduction: Anemia is one of the most common public health problems in the world and affects all ages. **Objective:** To describe the etiological and evolutionary profile of anemia in patients hospitalized in the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. **Methodology:** It was a descriptive and cross-sectional study with retrospective data collection which took place from January 1 to December 31, 2020 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. It covered all anemic patients hospitalized during the study period. **Results:** We identified 91 cases of anemia out of 200 patients admitted to the Unit that is a hospital prevalence of 45.5%. The age group of 26 to 35 years was the most represented, that is to say 29 cases (31.87%) with an average age of 43.55 years ± 17.48 years, the female sex predominated, 51 cases (56.04%) with a sex ratio of 0.78. Housewives represented 41 cases (45.05%). The majority of patients resided in rural areas 48 cases (52.75%). The main manifestations were: asthenia 75 cases (78.02%), vertigo 68 cases (74.72%), dyspnea 62 cases (68.13%), headaches 59 cases (64.83%), palpitations 55 cases (60.44%), conjunctival pallor 53 cases (58.24%), tachycardia 43 cases (47.25%), systolic murmur 18 cases (19.78%)

and IMO 11 cases (12.09%). The associated pathologies were: infected diabetic wounds 25.27%, followed by bacterial pleuro-pneumopathy 18.68%. Biologically, microcytic anemia was the most frequent 49 cases (53.84%), followed by normocytic anemia 35 cases (38.46%) and macrocytic anemia 7 cases (7.7%). Anemia was hypochromic, 53 cases (58.24%) were more encountered compared to normochromic anemia 38 cases (41.76%). The anemia was: severe in 43 cases (47.25%), moderate 29 cases (31.87%) and mild 19 cases (20.88%). Inflammatory anemia is the most common etiological diagnosis in 60% of cases, followed by vitamin B12 deficiency anemia observed in 21% of patients and then blood diseases in 7.33% of cases. The main causes of death were HIV (50%) and kidney failure (33.33%). **Conclusion:** Anemia is a frequent symptom in internal medicine. It constitutes a real diagnostic challenge for the internist and this sometimes in an emergency context. The use of specialized examinations and labile blood products is essential in our hospital.

Keywords

Anemia, Etiology, Evolution, Internal Medicine, Fousseyni Daou Hospital, Kayes, Mali

1. Introduction

Anemia remains a major public health problem in the world, due to its magnitude and severity. It is expressed when the level of circulating hemoglobin in the blood is low. The limits set by the WHO are respectively 12 g/dl in women, 13 g/dl in men, 11 g/dl in pregnant women and 14 g/dl in children [1].

It affects more than 1.64 billion people, or 24.8% of the world's population. The highest prevalence is reported in low- and middle-income countries with an overall frequency above 40% [2].

It is an indicator of undernutrition, poverty and present in parasitized people (helminthiasis: ascariasis, trichocephalosis) [1] [2].

In Mali, data from the statistical directory (Local Health Information System) for 2019 report 51,070 cases of anemia, including 21,376 cases among people aged 15 to 65 and over in first-level health structures; with 707 cases of overall death including 269 deaths among those aged 15 to 65 and over. These data show the extent of anemia in our populations [3].

The consequences of anemia are many and varied. It affects physical growth, cognitive development, reproduction and physical work capacity resulting in decreased human performance [2].

We did not find any work relating to the epidemiological, clinical, biological aspects of anemia in the internal medicine unit of the Fousseyni Daou hospital in Kayes.

Thus, we carried out this work in order to describe these different aspects to contribute to the improvement of the management of anemia.

2. Methodology

It was a descriptive and cross-sectional study with retrospective data collection which took place from January 1 to December 31, 2020 at the Internal Medicine Unit of the Fousseyni Daou Hospital in Kayes. Included were all consenting patients admitted to hospital during the period of our study and presenting with anemia. Hospitalized patients without anemia were excluded from the study.

The diagnosis of anemia was retained when the complete blood count shows a hemoglobin level < 13 g/dl in men and 12 g/dl in women.

The finding of anemia requires the analysis of the following biological parameters:

The mean corpuscular volume (MCV) which makes it possible to separate:
- microcytic anemia (VGM < 80 fl),
- macrocytic anemia (VGM > 100 fl),
- normocytic anemia (80 fl < VGM < 100 fl).

The mean corpuscular Hb content (TCMH): (N: 27 - 32 pg) makes it possible to differentiate hypochromia (TCMH < 27 pg) from normochromia (TCMH ≥ 32 pg).

The mean corpuscular hemoglobin concentration (MCHC) makes it possible to differentiate hypochromia (MCHC < 32%) from normochromia (MCHC ≥ 32%). The CCMH is of less interest than the TCMH.

The rate of reticulocytes which affirms the character:
- Central with a rate of reticulocytes < 120,000/mm^3: non-regenerative anemias.
- Peripheral anemia with a reticulocyte count ≥ 120,000/mm^3): regenerative anemias.

The reticulocyte count was requested in patients with normocytic or normochromic macrocytic anemia.

The myelogram was performed in patients with normocytic or non-regenerative macrocytic anemia after ruling out vitamin B12 or iron deficiency.

A iron balance based on the determination of ferritinemia was requested in patients with hypochromic microcytic anemia but also in certain patients with normocytic normochromic aregenerative.

Inflammatory workup has been indicated in patients with microcytic hypochromic anemia with normal or elevated ferritin levels and in some patients with aregenerative normochromic normocytic anemia.

A vitamin assay (Vit B12 and Vit B9 assay) was performed in patients with aregenerative macrocytic anemia. This assay made it possible to diagnose a vitamin deficiency as follows:
- Vitamin B12 deficiency: vitamin B12 level < 200 ug/L.
- Folate deficiency: folate levels < 5 ug/L).

A haemolysis assessment (malaria test, bilirubin, LDH and haptoglobin) was performed in patients with regenerative normochromic normocytic anemia and in patients with microcytic anemia with a normal ferritin level without inflam-

matory syndrome.

Coombs test: was performed in all patients with autoimmune hemolytic anemia.

The degree of anemia was assessed as follows:

- Severe anemia: hemoglobin level ≤ 6.99 g/dl,
- Moderate anemia: hemoglobin level between 7 and 9.99 g/dl,
- Mild anemia: hemoglobin level between 10 and 11.99 g/dl in women and 10 to 12.99 g/dl in men.

The data was collected on pre-established survey sheets, entered into Microsoft Word 2007 and Excel 2013 and analyzed using Epi Info 7.2.2.6 software.

Information collected from patient records was completely confidential and used for research purposes.

3. Results

We had identified 91 cases of anemia out of 200 patients admitted to the Unit that is a hospital prevalence of 45.5%.

The age group from 26 to 35 years was the most represented in 29 cases (31.87%) (see **Figure 1**) with an average age of 43.55 years ± 17.48 years. The female sex was predominant, 51 cases (56.04%) with a sex ratio of 0.78 (see **Figure 2**). Housewives were the largest group with 41 cases (45.05%) (see **Table 1**).
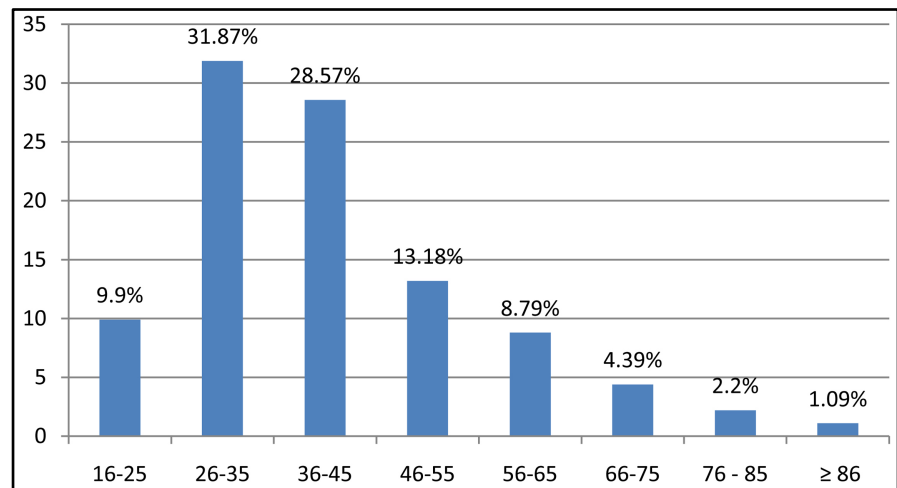

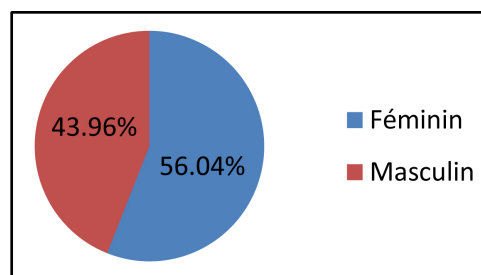**Figure 1.** Distribution of patients according to age.

Figure 2. Distribution of patients by gender.

Most of our patients came from rural areas 52.75% against 47.25% from urban areas (see **Figure 3**).

The main manifestations were: asthenia 75 cases (78.02%), vertigo 68 cases (74.72%), dyspnea 62 cases (68.13%), headaches 59 cases (64.83%), conjunctival pallor 55 cases (60.44%) palpitations 53 cases (58.24%), tachycardia 43 cases (47.25%), systolic murmur 18 cases (19.78%). and OMI 11 cases (12.09%) (see **Table 2**).

Table 1. Distribution of patients by profession.

Profession	Number	Percentage
Household	41	45.05
Farmer	22	24.18
Trader	9	9.89
Shepherd	7	7.69
Saleswoman	5	5.49
Worker	4	4.4
Official	2	2.2
Teacher	1	1.1
Total	91	100

Table 2. Distribution of patients according to clinical signs.

Clinical signs	Number (n = 91)	Percentage
Asthenia	71	78.02
Fear of heights	68	74.72
Dyspnea on exertion	62	68.13
Headaches	59	64.83
Conjunctival pallor	55	60.44
Tachycardia	53	58.24
systolic murmur	43	47.25
Palpitations	43	47.25
Fever	40	43.96
Cough	21	19.78
Abdominal pain	20	21.98
Vomiting	18	19.78
Diarrhea	17	18.68
Peripheral neuropathies	17	18.68
Polyarthralgia	15	16.48
Lower limb edema	11	12.09
Oral candidiasis	6	6.59
Prurigo	6	6.59
Perleche	4	4.39
Jaundice	3	3.29
Hemorrhage	2	2.19

The associated pathologies were: Diabetic wounds 25.27%, followed by bacterial pleuropneumonia 18.68% (Cf. Table 3).

Anemia was microcytic in 49 cases (53.84%), followed by normocytic anemia in 35 cases (38.46%) and macrocytic anemia in 7 cases (7.7%) (see Figure 4).

Anemia was hypochromic 53 cases (58.24%) is more encountered compared to normochromic anemia 38 cases (41.76%) (see Figure 5).

Depending on the severity, the anemia was severe in 43 cases (47.25%), moderate in 29 cases (31.87%), and mild anemia in 19 cases (20.88%) (see Figure 6).

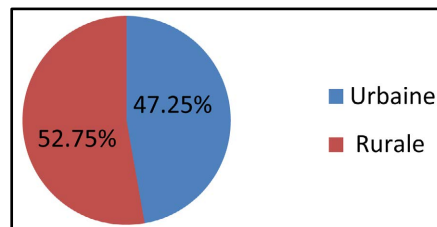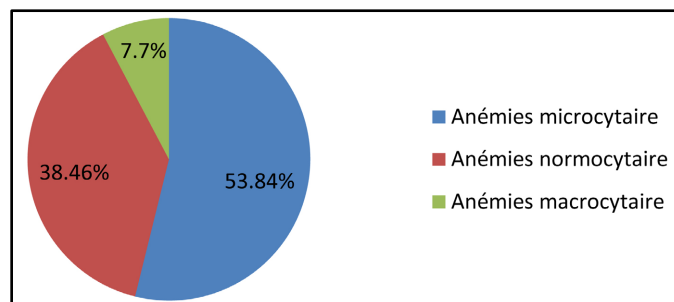**Figure 3.** Distribution of patients by place of residence.

Figure 4. Distribution of patients according to MCV.
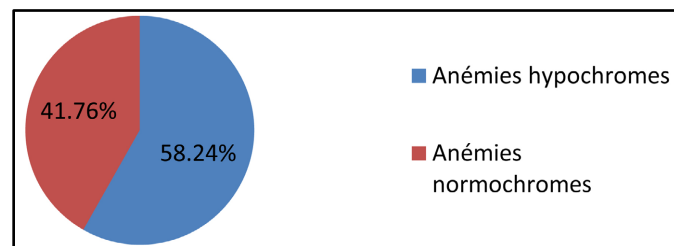

Figure 5. Distribution of patients according to TCMH.
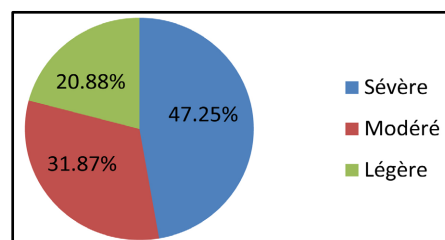

Figure 6. Distribution of patients according to degree of anemia.

The main etiologies of anemia were infections in 67 cases (73.62%) followed by chronic renal failure in 7 cases (7.68%) (see Table 4).

The mean length of hospitalization was 11 days (see Table 5).

The outcome was favorable in 76 patients (83.5), the lethality linked to anemia was 6.6% (see Table 6).

Table 3. Distribution of patients according to associated pathologies.

Associated pathologies	Number (n = 91)	Percentage
Diabetic infected wounds	23	25.27
Bacterial pleuropneumonia	17	18.68
HIV	14	15.38
Chronic renal failure	7	7.68
Sepsis	6	6.58
Pulmonary tuberculosis	4	4.39
Heart failure	4	4.39
Autoimmune diseases	3	3.30
Malaria	3	3.30
stroke	2	2.20
Chronic liver disease	2	2.20
Hematological malignancies	2	2.20
Prostate cancer	2	2.20
Cervical cancer	1	1.10
Hyperthyroidism	1	1.10
Total	**91**	**100**

Table 4. Distribution of patients according to etiology.

Etiologies		Number (n = 91)	Percentage
Infections N = 67 (73.62%)	Diabetic infected wounds	23	25.27
	Bacterial pleuropneumonia	17	18.68
	HIV	14	15.38
	Sepsis	6	6.58
	Pulmonary tuberculosis	4	4.39
	Malaria	3	3.30
Iron deficiency		4	4.40
Chronic renal failure		7	7.68
Vitamin B12 deficiency		2	2.20
Neoplasias		4	4.39
Autoimmune diseases		3	3.30
Chronic liver disease		2	2.20
Hematological malignancies		2	2.20
Total		**91**	**100**

Table 5. Distribution of patients according to length of hospitalization.

Duration of hospitalization	Number	Percentage
1 à 5	7	7.69
6 à 10	29	31.87
11 à 15	34	37.36
16 à 20	16	17.58
21 à 25	3	3.29
26 à 30	2	2.20
>31	0	0
Total	**91**	**100**

Table 6. Distribution of patients according to progression.

Evolution	Number	Percentage
Favorable	76	83.5
Discharges against medical advice	5	5.5
Referred to Bamako	4	4.4
deceased	6	6.6
Total	**91**	**100**

4. Discussion

In our series, we found a hospital prevalence of 45.5%. Faye A [4] had found a prevalence of 32.5%, ZORE S [5] in Bobo Dioulasso had identified 141 cases of anemia in hospitalized patients in 2 months in 2016, El Hioui *et al.* [6] had notified 82 patients with anemia in Morocco. Ali Zinebi *et al.* [7] had listed 150 cases of anemia in 5 years relating to the etiological profile of anemia in an internal medicine department at the Moulay Ismail military hospital in Meknes. Ida Mariane Ngongang [8] in a study on the epidemiological, clinical and etiological aspects of iron deficiency anemia in the internal medicine department of CHU Point-G in Bamako reported a frequency of 63.2%. Momar C. [7] and Penda B. [8] had found a prevalence of 32.5% and 47.15% respectively.

The age group of 26 to 35 years was more represented 31.87%. Zore S [5] had observed a high frequency in the age group of 26 - 35 years at 25%

The average age of our patients was 43.55 years ± 17.48. Faye A [4] had found the average age to be 46 years old. Zore S [5] found an average age of 43.55 ± 17.48 years. For El Hioui [6] *et al.*, the mean age of patients was 41 years ± 18.33. Ali Zinebi *et al.* [7] reported an average age of 48.8 years.

The female sex was predominant, 51 cases (56.04%). Faye A [4] had found (87 men/150 women) that is a sex ratio of 0.72. El Hioui *et al.* [5] found a male predominance of 42 women and 40 men. For Ali Zinebi *et al.* [7] the female predominance was noted in 62.37% with a sex ratio of 1.78. According to Momar C. [7] and Penda B. [8] the sex ratio was 0.720 and 0.96.

Housewives were the largest occupational group 41 cases (45.05%).

For Zore S [5], housewives were the most numerous 52/141. El Hioui *et al.* [6] found that 86% patients were from lower socioeconomic strata.

Most of our patients came from rural areas 52.75% against 47.25% from urban areas. Zore S [5] found 53.19% rural patients and 46.81% urban patients. El Hioui *et al.* [6] had found 61% and 39% respectively. According to Penda B. [8] 28.1% of patients came from urban areas compared to 38.1% of rural patients.

Gastropathy was the most found antecedent 31.87%. Zore S [5] had found that jaundice, hemorrhoids and ulcers were more common with respective rates of: 36%, 33% and 30%.

In our study, the associated pathologies were dominated by diabetic wounds 25.27%, followed by bacterial pleuropneumonia 18.68%. According to Faye A [4] pneumopathies with common or specific germs were the most frequent (16/32). Momar C. [7] reported 27% renal failure, 18% hypertension and 10% diabetes. Penda B. [8] found 66.9% diabetes, 32.3% hypertension.

The main functional signs of anemia were asthenia, which was almost constant, found in 78.02%, dizziness 74.72%, dyspnea 68.13%. Faye A [4] found 97%, 91% and 68% respectively. Zore S [5] had found asthenia 107/141, vertigo 98/141, dyspnoea 96/141. For Ali Zinebi *et al.* [7] asthenia was the first reason for consultation found in 41% of patients followed by pallor. Momar C. [7] reported 97% asthenia, 91% dyspnea and 68% headache.

The physical signs were dominated by conjunctival pallor 60.44%, followed by tachycardia 58.24% and systolic murmur 47.25%. Zore S [5] had found 109/141 conjunctival pallor, 99/141 tachycardia, 88/141 palpitation. Penda B. [8] found 59.1% tachycardia and 35.8% pallor.

In our study, the associated pathologies were: Diabetic wounds 25.27%, followed by bacterial pleuropneumonia 18.68%. For Zore S [5] the infectious pathology was predominant with 46.1%.

The average hemoglobin level was 7.10 g/dl Faye A [4] had found an average hemoglobin level of 7.4 g/dl. For Ali Zinebi *et al.* [7] the average hemoglobin level was 8 g/dl with extremes ranging from 3.4 to 11.4 g/dl.

Biologically, microcytic anemia was the most common form 58.24% followed by normocytic anemia 38.46% and macrocytic anemia 7.7%.

Faye A *et al.* [4] reported 59% normocytic anemia, 38% microcytic anemia and 3% macrocytic anemia. Zore S [5] had found an identical distribution of normocytic and microcytic anemias of 46.10% and 7.8% macrocytic anemia. For El Hioui *et al.* [6], microcytic anemia was more common (39%) followed by macrocytic anemia (37.8%). For Ali Zinebi *et al.* [7] microcytic anemia was more represented in 56% of cases. Momar C. [7] found 38% microcytic anemia and 36% normocytic anemia. According to Penda B. [8] the anemia was normocytic 48.6% and macrocytic 26.1%.

According to our sources, hypochromic anemias were more numerous 58.24%. While normochromic anemia accounted for 41.76%.

Hypochromic microcytic anemias were more frequent 38.46% followed by normochromic normocytic anemias 20.88% and hypochromic normocytic anemias 17.58% then normochromic microcytic anemias 15.38%. El Hioui *et al.* [6] found 31.72% hypochromic microcytic anemias, 19.5% hypochromic macrocytic anemias and 18.3% hypochromic macrocytic anemias and 12.2% normochromic normocytic anemias.

Depending on the degree of severity, 47.25% of patients had a hemoglobin level less than or equal to 6.99 g/dl, 31.87% of cases had a hemoglobin level between 7 and 9.99 g/dl, and 20.88% of patients had a hemoglobin level between 10 and 12.99 g/dl. Faye A *et al.* [4] found 22% deep anemia, 34% severe anemia, 34% moderate anemia, 10% mild anemia Zore S [5] found 44.68% anemia severe 22.7% moderate anemia 32.62% mild anemia. El Hioui *et al.* [6] found 45% hemoglobin level below 6.5 g/dl, 33% hemoglobin level between 8 and 10 g/dl and 22% hemoglobin level between 6.5 and 8 g/dl. Ali Zinebi *et al.* [7] found 20% severe anemia with a hemoglobin level of less than 6 g/dl. According to Penda B. [8] the anemia was mild 75% and moderate 16%.

In our study, the main etiologies of anemia were infections (anemia of inflammatory origin) with a prevalence of 73.62% followed by chronic renal failure 7.68%. For Faye A *et al.* [4] the main etiologies were infections (21%), solid neoplasms (13%), hematological malignancies (13%). Zore S [5] had found that the infectious pathology was predominant (46.1%) followed by haemorrhages (31.21%). According to El Hioui *et al.* [6], the causes were dominated by malnutrition, haemoglobinopathies and numerous infections associated with hygiene. In the study by Ali Zinebi *et al.* [7], iron deficiency anemia was the dominant etiological diagnosis in 60% of cases, followed by megaloblastic anemia observed in 21% of patients and then hemolytic anemia in 7.33% of cases. According to Penda B. [9] the anemias were of origin: infectious 40.46%, cardiovascular 24.12%, neoplastic 12.06%. For Momar C. [10] the etiologies of anemia were: infections 21%, neoplasia 13%, blood diseases 13%, autoimmune diseases 12%.

The average length of hospital stay was 11 days. Faye A *et al.* [4] had found an average hospital stay of 15 days with extremes of 3 and 35 days. Penda B. [9] found an average hospital stay of 11 days. According to Momar C. [10] reported a hospital stay of 15 days with extremes of 3 and 65 days.

During our study, the evolution was favorable in 76 patients (83.5), the lethality linked to anemia was 6.6%. Zore S [5] found 56.16% normal evolution and 14.89% death. Faye A *et al.* [4] found 23% of patients died. Penda B. [9] reported 79.7% favorable outcome and 20.3% lethality. For Momar C. [10] the evolution was favorable in 43% of patients with a lethality of 35%.

The main causes of death were HIV (50%) and kidney failure (33.33%). For Faye A *et al.* [4] the main causes of death were solid cancers and hematological malignancies. For Penda B. [9] the causes of death were infections in 79.7% of cases. According to Momar C. [10] deaths were linked to neoplasia 31% and hematological malignancies 29%.

5. Conclusion

Anemia is a common symptom in internal medicine and is a real challenge for practitioners. The diversity of these etiologies requires a rigorous diagnostic approach. Efficient management necessarily involves a meticulous clinical examination, a hierarchy of complementary investigations and the availability of labile blood products in our hospital.

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Conflicts of Interest

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

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