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**Original Research Article**

# Anemia in Malagasy hospitalized patients

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## ABSTRACT

**Background:** Anemia is a public health problem with major health consequences. According to the WHO, anemia worldwide is 1.62 billion people (95% confidence interval (CI): 1.50-1.74 billion), which corresponds to 24.8% Of the population (95% CI: 22.9-26.7%).
**Methods:** We studied the clinical and biological data of hospitalized patients who applied for a complete blood count in hematology laboratory of Joseph Ravoahangy Andrianavalona Antananarivo hospital between January and April 2017.
**Results:** Sixty-four percent of hospitalized patients had anemia. Anemia was more common in women. Anemia was encountered mainly in intensive care unit (33.9%) and occurred in perioperative cases in the majority of cases (33.4%).
**Conclusions:** Anemia is a common symptom in hospitals, particularly in intensive care unit. In the Malagasy hospital environment, etiologies are numerous, in particular hemorrhage, sickle cell disease or cancer.

**Keywords**: Anemia, Intensive care unit, Perioperative, Hemorrhage, Sickle cell disease, Cancer

## INTRODUCTION

Anemia is defined as a decrease of hemoglobin level below 13 gm/dL in men and 12 gm/dL in women.[1] According to the world health organization, anemia affects 1.62 billion people (95% confidence interval (CI): 1.50-1.74 billion), which corresponds to 24.8% of the population (95% CI: 22.9-26.7%).[2] In low-income countries like Madagascar, anemia is often linked to iron deficiency.[3] In hospitals, anemia is a common symptom of variable etiologies.[4] In this context, we conducted a study of 769 hospitalized patients to describe the clinical and biological characteristics and etiologies of anemia in hospital.

## METHODS

We studied clinical and biological data of hospitalized patients who applied for a complete blood count (CBC) at the paraclinical training and research unit in hematology of Joseph Ravoahangy Andrianavalona hospital Antananarivo (Madagascar) between January and April 2017. Patients with anemia had been included in the study. Patients whose clinical data (age, gender, reason for the blood count, associated clinical signs) were

misinformed were excluded. For the CBC, the unit has a semi-automaton allowing to count the red blood cells by impedance; hemoglobin, after lysis of red blood cells is transformed into cyanmethemoglobin and the optical density of the solution is read by a spectrophotometer at 540 nm. For erythrocyte constants, mean corpuscular volume (MCV) is directly measured by automaton, but the mean corpuscular hemoglobin (MCH) is calculated as the ratio of hemoglobin to red blood cell count. Thus, blood taken on an EDTA (ethylene diamine tetraacetic acid) tube is passed on the semi-automaton which gives the number of red blood cells, the hemoglobin level and the values of the erythrocyte constants. Anemia was defined as hemoglobin levels below 13 gm/dL in men, below 12 gm/dL in women.[1] Anemia was then classified according to erythrocyte constants values and anemia severity.[5]

## RESULTS

During this period, 1856 CBC were performed in hospitalized patients, 1199 (64.6%) patients had anemia but 769 (64.1%) met the selection criteria of the study.

The patients were between 18 days and 94 years old. The average age was 40.4 years old. Women were the most likely to have anemia.

The average hemoglobin level was 89.4 gm/dL. Hemoglobin level less than 10 gm/L was found in 36.7% of cases but anemia was sometimes very severe with hemoglobin level equal to 1.5 gm/dL. In most cases, the anemia was normocytic (62.2%) normochromic (66.3%) with a mean value of MCV and MCH respectively equal to 81.3 fL and 27.6 pg (Table 1).

**Table 1: Characteristics of anemia (n=769).**

| Characteristics of anemia | N | 100% |
|---|---|---|
| **According to mean corpuscular volume (MCV) (%)** | | |
| Microcytic anemia | 266 | 34.6 |
| Normocytic anemia | 478 | 62.2 |
| Macrocytic anemia | 25 | 3.2 |
| **According to mean corpuscular hemoglobin (MCH) (%)** | | |
| Hypochromic anemia | 259 | 33.7 |
| Normochromic anemia | 510 | 66.3 |

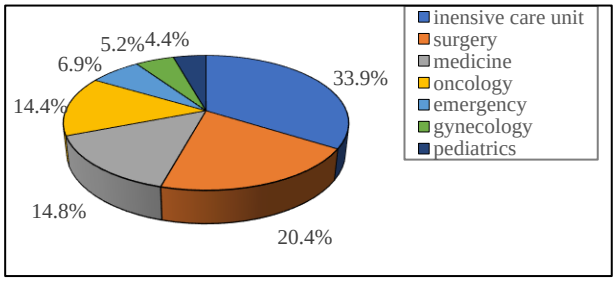


**Figure 1: Anemia distribution according to the care unit.**

Majority of patients came from intensive care unit (33.9%, n=261) (Figure 1). Clinical signs related to anemia were present in 97 (12.6%) patients, while hemorrhage was the reason for requesting CBC in 22.5% (n=171) (Figure 2). In most cases, anemia occurred perioperatively (33.4%, n=257). In addition, 10.5% of patients were admitted for cancerous diseases, including hematological malignancies (n=45) and digestive cancers (n=26) (Table 2) and 17.6% (n=135) were sickle cell patients.

**Table 2 : Cancerous etiology of anemia (n=81).**

| Type of cancer | N | 100% |
|---|---|---|
| **Digestive cancers** | 26 | 32.1 |
| **Gynecological cancers** | 4 | 4.9 |
| **Malignant hemopathies** | 45 | 55.6 |
| **Cancers of nervous system** | 2 | 2.5 |
| **Otorhinolaryngology cancers** | 4 | 4.9 |

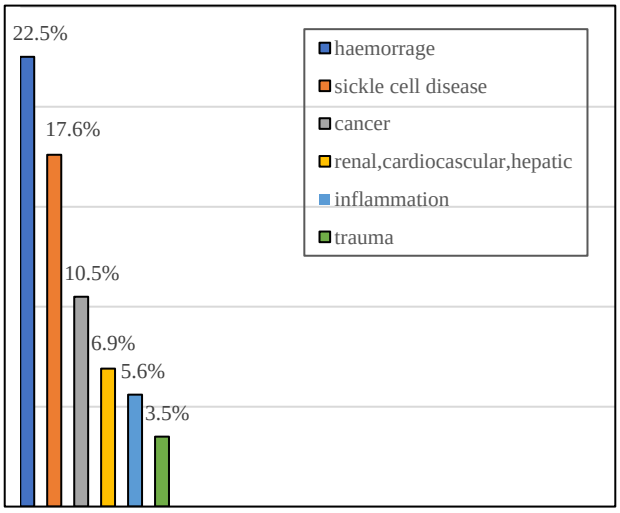


**Figure 2: Main causes of anemia in hospitalized patients.**

## DISCUSSION

We found that anemia is common symptom (64.6%) in Malagasy hospitals. Many studies have shown a high incidence of hospital anemia, which sometimes occurs after admission. An American study showed that anemia occurred in 74% of hospitalized patients from all causes.[4] Other studies have shown similar results of our series with 57.5% hospital anemia cases.[6] A multicentric study involving 977 patients had shown anemia in 74% of patients, who were present at admission in 33% of cases, or who occurred the following days in 41% of cases.[7]

Anemia was more common in women. The Malagasy population is a young, predominantly female population. In women during periods of genital activity, iron deficiency is by far the leading cause of anemia.[8-10] Often, the cause is gynecological or nutritional, digestive causes are less frequent. The gynecological origin first,

because of abundant rules. Nutritional then, because it is extremely common that the daily iron intake does not cover the increase of the needs in a regulated woman compared to a male subject.[11] In addition, this series revealed that majority of anemic patients were hospitalized in intensive care unit. Large-scale studies have shown that anemia is almost constant in patients in intensive care.[12,13] It has been described that in intensive care unit, anemia is more and more marked as hospitalization is prolonged and persists at the exit of the intensive care unit.[1,13,14]

In 33.4% of cases, anemia was found perioperatively, which corresponds to results of a cohort of preoperative and postoperative non-cardiac surgery patients.[15] On the other hand, the occurrence of anemia perioperatively depends on the type of surgery.[10,16,17]

Clinical anemia is inconsistent, it is related to hemoglobin levels and tolerance to anemia. A Senegalese cross-sectional survey found a frequency of occurrence of clinical anemia equal to 13.4% (vs 12.6% for our series).[17]

Anemia is one of the most feared complications in patients with cancerous conditions. Its causes can be multiple and, whatever its severity, the impact on the quality of life of the patients remains major. Hematological malignancies and digestive cancers are the two main cancer pathologies that cause anemia.[19] Studies have concluded that colorectal cancers account for 15-38%, depending on age, of the causes of iron deficiency anemia after 50 years.[9] Anemia in sickle cell disease was relatively common. Indeed, it is a public health problem in Madagascar. A study conducted in 2011 showed that its prevalence was 20%, A study conducted in 2011 showed that its prevalence was 20%, all phenotypes combined.[20] Anemic crisis of sickle cell disease is common and usually secondary to splenic sequestration, erythroblastopenia or hyperhemolysis.[21]

## CONCLUSION

Anemia is a common symptom in hospitals and should be monitored, especially in intensive care unit patients. in Malagasy hospitalized patients, the etiologies are numerous, including hemorrhage, sickle cell disease and cancer. It is a symptom that must not be neglected, as it can be a determining factor in the evolution and prognosis of a pathology.

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