

Anemia In A Moroccan Hospital Setting: Case Of Regional Hospital "Idrissi", Kenitra

Mohamed EL Hioui, Ahmed Omar Touhami Ahami, Youssef Aboussaleh, Fatima-Zahra Azzaoui, Hamid Louffi

Abstract: Anemia remains a public health problem in the World. Nationally, more than one third of the women and under five children are affected. Aim: To assess anemia typology of adults in a hospital setting and study the impact of socio-demographic factors on the occurrence of anemia and make a typology using haemogram. Method: Eighty two adult patients (42 women and 40 men) were observed in an internal medical unit in the Idrissi hospital-Kenitra, Morocco. The only inclusion criteria were anemia status (less than 10g/dl Hemoglobin). Results: Level of instruction of patients varies remarkably with age, sex and area of residency. Poverty and inaccessibility to health facilities have an impact on the apparition of anaemia. At the biological aspect, the microcytic anaemia is the frequent form with 39%, while the macrocytic represents 37.8% and normocytic one affects 23.2% of the subjects. According to TCMH levels, hypochromic anemia is found in 63.4% and normochromic in 36.6%. Severe anemia (HB<6.5 g/dL) is the major prevalent form in old as well as young women. Conclusion: Anemia is a frequent affection in this hospital setting. Its severity is associated with weakness of immunity defense and many inherent diseases.

Key word: Anemia, Hemoglobin, Typology, Socio-demography, Hospital, Morocco.

1 INTRODUCTION

Anemia is the most common problem of public health in the world. It is expressed when the circulating hemoglobin in the blood is low. The limits set by WHO are respectively 13 g / dl for men and 12 g / dl for women. Note that the threshold recommended for pregnant women is 11 g / dl. Iron deficiency, folate and vitamin B12 are the main causes for the occurrence of anemia. These deficiencies are defined in terms of age, sex and different specific physiological conditions such as pregnancy (Galacteros et al., 1989). We can classify anemia in several ways. Classification from a physiological point of view on the one hand we note, primary anemia due to decreased production of red blood cells: iron deficiency anemia, megaloblastic anemia (vitamin B12 or folate deficiency) and secondary anemia due to destruction of red blood cells: hemolytic anemia. The consequences of anemia are multiple and varied. They include growth retardation and disruption of mental and cognitive development in children (Harrison 1988; Colomar et al., 1990).

In adults, fatigue and decreased productivity are generally reported (Bailey 1994). This study aims at establishing a profile of anemia in a Moroccan hospital, including internal medicine department of the hospital El Idrissi Kenitra this by: determining the prevalence of anemia in a hospital, and examine the influence of sociodemographic factors, namely, the place of residence, education level, occupation of the emergence and development of anemia. And finally the contribution of hemogram (CBC) in the classification of different types of anemia.

2. SUBJECTS AND METHODS

2.1 Population Study

The prospective study focuses on patients hospitalized in internal medicine in El Idrissi Kenitra Hospital during the period of 6 months. The only inclusion criterion was the presence of anemia (hemoglobin <10 g / dl). 82 patients with anemia were identified. The exclusion criteria are:

- Patients who undergo treatment; martial, vitamin B12 or folate suplémentations.
- A recent blood transfusion.

2.2 Methods

A survey was conducted on patients; the study protocol covers the following points: Identity of each patient (code number, age, sex).

- Geographical origin.
- The professional activity.
- Education,

Each patient was clinically examined in search of signs suggestive of anemia, asthenia, abnormal paleness of the skin and mucosa, dyspnea, palpitation, dizziness, jaundice.

2.3 Biological study

- Blood Collection

The methodology for the study of the blood picture was as follows: the blood is collected in the morning on an empty stomach tube in a container of K2 EDTA (anticoagulant). The tubes have the same number as given in the form of laboratory and questionnaire.

- *Corresponding Author: Dr. Mohamed EL Hioui, Equip of Clinic and Cognitive Neurosciences and Health, Laboratory of Biology and Health, Department of Biology, Faculty of Science, IBN TOFAIL University, Kenitra, Morocco. E-mail: elhioui2000@yahoo.fr*
- *Ahami A is currently Professor in Faculty of Science, University IBN Tofail, Kenitra, Morocco*
- *Aboussaleh Y. is currently Professor in Faculty of Science, University IBN Tofail, Kenitra, Morocco*
- *Louffi H. Is currently Biological pharmacist in the private sector*
- *Azzaoui F-Z is currently postdoctoral researcher in Faculty of Science, University IBN Tofail, Kenitra, Morocco*

- Complete blood count

Blood counts were determined on a counter type PLC (Coulter): This device for automatic hematology manner that provides information on white blood cells, platelets, red blood cells, hematocrit (Ht), the hemoglobin (Hb), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC) and mean corpuscular hemoglobin (MCH). While the blood count was done manually on a fixed smear and stained with May Grunwald Giemsa and was consistently observed under a microscope. In our study, we used the data collected by the NFS hemoglobin; mean corpuscular hemoglobin (MCH) and mean corpuscular volume (MCV), because in the majority of work in the literature, the authors have ignored these three parameters which indicate the presence and characterization of possible anemia. Cutoff values for defining anemia were taken from the following WHO recommendations. Mean Corpuscular Hemoglobin ranges: 27-33pg

MCH (Normal): Normochromic anemia

MCH (Low): Hypochromic anemia

Mean Corpuscular Volume range : 80-98 fl

MCV (normal): Normocytic anemia

MCV (Low): Microcytic anemia

MCV (High): Macrocytic anemia

Indeed anemia in adults is classified by the World Health Organization as: mild (10 to 11.9 g/dl), The lower limit for the hemoglobin (Hb) level in adult was accepted as 13 g/dL. The severity of anemia was classified as mild (Hb > 10 g/dl), moderate (Hb ≤ 10 g/dl), and severe (Hb < 6.5 g/dl). We have not used the slight anemia in our study. These tests were conducted at the medical analysis laboratory (DHL) Kenitra and biology laboratory of El Idrissi hospital Kenitra. For statistical analysis. We divided our study group by sex and age groups. Then we measured the association between potential risk factors and anemia in a logistic regression model using the backward stepwise method (conditional). The results are given in the form of tables and histograms. We adopted a significance level of 0.05.

3. RESULTS

1 -Socio-demographic profile of the patients surveyed

Eighty two adult patients (42 women and 40 men) were selected according to the criteria above. 61% of patients come from rural areas, while 39% are from the urban area. The average age of our patients was 41 ± 18.33 years and extreme 16 and 83 years. However the difference in age distribution between men and women was not statistically significant 40.9 ± 16.87 for women and 41.28 ± 19.97 for men). The distribution of patients by age group identifies three equiprobable classes. The segment of the population consists of workers, peasants and people not practicing any activity represents 99% of the unemployed are more concerned with 86% of all cases.

Table 1: Socioeconomic Characteristics of the Studied Population

Characteristics	Population %
Sex	
Man	49
Woman	51
Age (years)	
16-30	37
31-40	26
>40	37
Education status	
None	85
Primary	10
Secondary	5
Work status	
No	86
Yes	14
Place of residence	
Urban	30
Rural	70

The distribution of patients by sex and age group shows that women and men have pretty anemic loan the same frequencies. The level of education and the daily activities of patients vary dramatically by gender, age and place of residence.

2 -Biological Data

The mean values of the different hematological parameters and their standard error of mean (SEM) are presented in Table 2.

Table 2: Mean Values of the Parameters of the Leukocyteline

Hematological parameters	Total population N=82		p values
	Mean ± SEM	Mean ± SEM	
		Men (40)	Women (42)
Leukocytes (10 ⁹ /l)	6.53 ± 0.72	5.76 ± 0.67	7.25 ± 1.26 p=0.30 (NS)
Neutrophils (%)	51.1 ± 4.0	49.8 ± 2.9	52.3 ± 7.5 p=0.757 (NS)
Eosinophils (%)	2.2 ± 0.3	2.6 ± 0.5	1.8 ± 0.3 p=0.21 (NS)
Lymphocytes (%)	33.4 ± 2.0	37.0 ± 2.4	29.8 ± 3.2 p=0.084 (NS)
Monocytes (%)	5.7 ± 0.4	6.1 ± 0.5	5.3 ± 0.6 p=0.37 (NS)

SEM: Standard error of mean. **S:** Statistically different for p value < 0.05; **NS:** Not statistically significant for p value < 0.05

Table 3: Mean Values of the Parameters of the Erythrocytine

Haematological parameter	Mean \pm SEM		p values
	Total population(82)	Man (40)	
Red blood cells ($10^{12}/l$)	3.0481 \pm 0.12	2.81 \pm 0.15	p=0.07 (NS)
Hemoglobin (g/dl)	6.96 \pm 0.22	6.82 \pm 0.26	p=0.55 (NS)
Hematocrit (%)	24.1 \pm 1.0	22.6 \pm 0.8	p=0.18 (NS)
MCV (fl)	86.5 \pm 2.2	88.6 \pm 3.4	p=0.35 (NS)
MCH (pg)	25.99 \pm 0.7	26.68 \pm 1.06	p=0.35 (NS)
MCHC (g/dL)	29.89 \pm 0.51	30.42 \pm 0.68	p=0.32 (NS)

N: Total number of each subject group; **MCV:** Mean Corpuscular Volume; **MCH:** Mean corpuscular hemoglobin; **MCHC:** Mean corpuscular hemoglobin concentration; **SEM:** Standard error of mean. **S:** Statistically different for *p* value < 0.05; **NS:** Not statistically significant for *p* value < 0.05.

No significant gender difference is noted for leukocyte and erythrocyte parameters.

Table 4: Relationship Between Erythrocyte and Leukocyte Parameters

	Leukocytes (G/D)	Neutrophils (%)
Red blood cells ($10^{12}/l$)	0.059	0.061
Hemoglobin (g/dl)	0.021	0.073
Hematocrit (%)	0.042	0.087

The results in Table 4 show a positive correlation between all parameters except the number of red blood cell-leukocyte series. A correlation ($p < 0.05$) was observed between hemoglobin and leukocytes, even for hematocrit and leukocytes ($p = 0.042$). And an average correlation between red blood cells and neutrophils.

Table 5: Classification of Anemia based on Hematologic Parameters

Hematologic parameters	Category of Anemia	Percent
MCV (fl): Less than 80 80 - 98 >98	Microcytic anemia	39%
	Normocytic anemia	23,2%
	Macrocytic anemia	37,8%
MCH (pg): 27-33 <27	Normochromic anemia	36,6%
	Hypochromic anemia	63,4%
Hb (g/dl): Less than 6,5 6,5 - 10	Severe anemia	45%
	Moderate anemia	55%

MCV: Mean Corpuscular Volume; **MCH:** Mean corpuscular hemoglobin; **Hb:** Hemoglobin

Our results show an average MCH of 25.24 pg with a standard deviation of 5.35 pg. The hypochromic anemia reaches 63.4%, while 36.6% are diagnosed as normochromic anemia. Table 5 shows that the microcytic and macrocytic anemia are the most common with 39% .withal, normocytic anemia come in last place with 23.2%. In our patients (45%) had a hemoglobin level below 6.5 g / dl and 55% of cases have a hemoglobin level between 6,5 and 10 g / dl.

4. DISCUSSION

In Morocco, as in all developing countries, anemia is the most common problem that affects health all age groups of the population, predominantly women and children. Analysis of its evolution in Morocco between 1994 and 2001, however, has limitations because techniques hemoglobin is different. However, we can say that there is a decrease in prevalence among women and children and an increase in men. In this study in a hospital in Kenitra, the study population consists of 51% of women (52% of anemic women from rural areas and 48% of urban origin) and 49% of men (70% rural origin and 30% of urban origin). However it should be noted that 61% of patients come from socio-economic backgrounds particularly unfavorable rural origin, while 39% of patients were from the urban areas where living conditions are better than those in rural areas. Moreover, the last national survey in 2001 showed that the problem of anemia is independent of place of residence (Ministère de la Santé, 2001). The distribution of patients by age showed the same prevalences observed in the age groups 16 to 30 years (37%) and 45 years and over (37%), whereas it is only 29% in the age between 30 and 45 years. However, the distribution of patients by sex and age group shows that women and men have almost the same frequencies. This may be due to chance or to the size of the sample. But women are more likely to be anemic more than men for various reasons: multiparity, multiple pregnancy, menstruation, breastfeeding etc ... however, that net issue was not raised during the investigation for reasons of patient discomfort. The results of the distribution of patients according to employment status, the layer of the poorer population is: workers, peasants and unemployed, they are most concerned

with 86% of patients do not practice any employment, 13% of patients are workers while 1% are middle managers. The worklessness for 48% of women and 38% of anemic men. These results are consistent with those of the Department of Health (2001). Clinical signs most encountered among both men and women regardless of age are: asthenia, abnormal paleness of the skin and mucosa, dyspnea, palpitation, dizziness, and jaundice. The comparison of our results with those of other studies (Henri et al., 1992) revealed the same classic signs of anemia with a variant on the epidemiological and socioeconomic profile of our patients. This anemia is often well tolerated despite its high intensity in most cases. Biologically, this part was conducted in order to identify the interests of the CBC in the classification and treatment of different types of anemia. RBC parameters, including hemoglobin and hematocrit, are positively correlated with leukocyte lineages, especially neutrophils ($p < 0.05$). Indeed, these cells are responsible for immune defense. Severely anemic people have a remarkable power to certain infections, with decreased immunity of patients, these identical to literature results. Anemias are differentiated according to the mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV) and hemoglobin (Hb). The hypochromic anemia is just nearly two-thirds of diagnosed anemia (63.4%). While normochromic anemia represents only 36.6%. The hypochromic anemia is seen in both sexes with a slight increase in women. For cons, the normochromic anemia is somewhat stronger for men and women. No significance between gender and the rate of MCH. These results are consistent with other work (Rokoto et al., 2000). The microcytic anemia are the most common (39%) in our study, these results are consistent with other works (OMS 1992; Abissey et al., 1991), followed by macrocytic anemia (37.8%). To conclude, we can say that the microcytic anemia is the most common type in the Moroccan population anemia (Ministère de la Santé ., 2001). A macrocytosis was found in 58% of older patients over 45 years, this figure is dammed with the results of Djibo (2000), the difference in the values of MCV both sexes is not statistically significant. However, microcytic anemia was observed in a remarkable way in patients less than 30 years and for both sexes. Against the trend by macrocytic red blood cells was found in the elderly. However, thanks to the results of reticulocyte count and bone marrow that can be oriented on the different causes, we conclusions similar to those of the literature (Bernard et al., 1990; Abissey et al., 1991; Zittoun., 1990) that insist on the fact that the macrocytic anemia may be associated with poor bone, a morphologically normal marrow, a dyserythropoiesis or malignant invasion. Indeed, megaloblastosis was noted in 10 patients in our sample, suggesting the diagnosis of pernicious anemia. Almost half of the patients surveyed a hemoglobin level below 6.5 g / dl, these results are consistent with other work (Djibo et al., 1990). This portion of patients hospitalized for a marked anemia (Hb < 6.5 g / dl) can only testify, is the lack of early diagnosis of anemia or the inaccessibility of health services, knowing that these two factors are related to the socioeconomic situation of patients. The distribution of patients by age classes and the hemoglobin supports the hypothesis of a certain increase in the prevalence of very marked anemia (less than 6.5 g / dl) in rather elderly patients (> 45 years). This is consistent with common sense things. In fact, over the age is higher the more competition on the financial resources of patients which could affect the health

status of the patient. The etiological causes are dominated by malnutrition, hemoglobinopathies and many infections associated with health. These etiologies vary by: Age, sex, and socioeconomic status of patients.

5. CONCLUSION

At the end of this work, it emerges that anemia is a real health problem in everyday medical practice. It is also well diagnosed among young people than among older people. Sociodemographic factors play an important role in the onset and progression of anemia. Indeed, it should be noted that age, educational level and employment status of patients act dramatically on the health status of anemic. The socioeconomic status of patients in addition to the lock-in care service plays a role regardless of area of residence.

Acknowledgements

We would like to thank all the patients who participated in this study and medical analysis laboratory (DHL) and biology laboratory of El Idrissi hospital Kenitra.

BIBLIOGRAPHY

- [1]. Galacteros Fr., Goldcher A. 1989. Les anémies hypochromes microcytaires. Encycl Médical (Paris-france), sang., 13003 A10 :. 16p.
- [2]. Harrison K.A. 1988. Severity of anaemia and operative mortality and morbidity: Lancet 1; 1:392-3.
- [3]. Colomar J., Colomar C., Gutierrez D. 1990. Anaemia during pregnancy as a risk factor for infant iron deficiency: report from the Valencia anaemia cohort (VIAC) study. Paediatr Perinat Epidemiol; 4: 196-204. 37.
- [4]. Bailey KV. 1994. Carence en fer et anémie: situation mondiale urgente. Le prescription: 1-16.
- [5]. Ministère de la Santé, Maroc. 2001. Les carences en micronutriments : Ampleur du Problème et stratégies de lutte Programme de lutte contre les troubles dus aux carences en micronutriments.
- [6]. Henri W., Brigitte L. et Girot R. 1992. Les malades du globule rouge. Médecine-Science Flammarion, les éditions INSERN, ; 515 p ; Paris, . p : 129-142.
- [7]. Rokoto Alson O, Ratsitorahina M, Pfister P, Laganier R et Dromigny JD. 2000. Estimation des valeurs normales de l'hémogramme à Madagascar. Arch Inst Pasteur Madagascar :. p. 68-71.
- [8]. Organisation Mondiale De La Santé (O.M.S.). 1992. Les anémies nutritionnelles. Série de rapports techniques. N° 503 Genève. : 6 ; PLO-KOUIF
- [9]. Abissey A, Mignonsin D. 1991. Apport de l'hémogramme dans la classification des anémies. Médecine d'Afrique Noire :. 38 (11)
- [10]. Djibo A, Doudou Hlidou M, Granic G et Degbey H. 2000. Anémie macrocytaires enquête diagnostique a NAIMEY (NIGER) a propos de 85 cas. Médecine

d'Afrique Noire: 47 (6).

- [11]. Bernard J, Levy J et Varet B. 1990. Abrégé d'hématologie. 1 vol, 361 p, 7e édition, masson Ed. Paris, ; p 84-89.
- [12]. Abissey A, Mignonsin D. 1991. Apport de l'hémogramme dans la classification des anémies. Médecine d'Afrique Noire, :. 38 (11)
- [13]. Zittoun R et Zittoun J. 1992; Les anémies mégaloblastiques, In "l'hématologie" de B Dreyfus, 1 vol 3 eme edition; Medecine-Sciences Flammarion, Paris :. p: 523-536.