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Contribution to the Improvement of Transfusion Safety: Assessment of the Pre-Donation Hemoglobin Level at the Yamoussoukro Blood Transfusion Center in Cote d'Ivoire

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Abstract

Introduction: Despite the progress recorded at the level of transfusion safety in Côte d'Ivoire, much remains to be done, particularly at the level of the medical selection of blood donors. The objective of the study was to make an assessment of the pre-donation capillary hemoglobin dosage for the year 2020 of the fixed collection, of the Blood Transfusion Center of Yamoussoukro. **Method:** This is a retrospective study that took place at the Yamoussoukro Blood Transfusion Center. The data collection related to all old and new blood donors were deemed suitable for the fixed collection of the year 2020. The method chosen for the pre-donation control is that of the portable hemoglobinometer of the HémoCue® type, more precisely 201+. **Results:** Of the 1160 blood donors in the study, the pre-donation hemoglobin level was not measured in **787** (**67.8**%) subjects of either sex. Of the subjects who had a pre-donation hemoglobin level performed, 97 (26%) blood donors had a sub-standard hemoglobin level, including **15** females and **82** males. **Conclusion:** Pre-donation hemoglobin testing of blood donors is effective in Yamoussoukro. However, efforts must still be made to improve the quality of the blood collected and to protect blood donors.

Keywords

Blood Donation, Medical Selection, Pre-Donation Hemoglobin, Fixed

Collection, Yamoussoukro

1. Introduction

Millions of lives are saved every year thanks to blood transfusions. It is a medical act that consists in giving blood or one of its derivatives taken from a healthy subject called the donor to a sick subject called the recipient [1].

However, the practice of transfusion presents risks for the two subjects involved, which can lead to death. In response to this problem, the World Health Organization (WHO) has identified transfusion safety as a public health issue requiring a high level of priority and has developed a strategy on a global scale [2].

In addition, Principle "6" of the 70th World Health Assembly recommends that prospective and actual donors of human biological materials for medical products be protected to the greatest extent possible from physical and psychosocial risks [3].

As a result of these initiatives, concrete progress has been made in French-speaking Africa in the medical selection of blood donors and the systematization of biological screening for major transfusion viruses [4].

Côte d'Ivoire is not to be overlooked, in fact, in addition to the progress mentioned above, the country has adopted two regulatory texts governing blood transfusion: Decree Number (N˚) 91-653 of October 9, 1991, on the creation and organization of the National Blood Transfusion Center and the law N˚ 93-672 of August 9, 1993, on therapeutic substances of human origin [5].

However, much remains to be done, particularly at the level of medical selection of blood donors: the non-existence of regulations on medical selection, the absence of review on the situation of pre-donation hemoglobin testing in Côte d'Ivoire in general, and specifically in Yamoussoukro.

This study provides an overview of the status of pre-donation hemoglobin testing for the year 2020 of the fixed collection at the Yamoussoukro Blood Transfusion Center.

2. Material and Method

This is a descriptive study that took place at the Yamoussoukro Blood Transfusion Center. The justification for choosing this methodology stems from the review. Indeed, the majority of the studies that we had to analyze are descriptive, as is the case of Tagny Claude Tayou *et al.* in their study on the "Assessment of the first five years" in French-speaking Africa and Malard Lucile *et al.* in their study on the "National analysis of hemoglobin data below 14 gram/deciliter (g/dL) or 13 g/dL of male and female whole blood donors" in 2020 in France.

The data were collected from the PROGESA database of the National Blood Transfusion Center of Côte d'Ivoire on old and new blood donors deemed suita-

ble for the 2020 fixed collection.

The method chosen for the pre-donation control is that of the portable hemoglobinometer of the type HémoCue®, more precisely 201+.

The variables used in our study are age, gender, number of blood donations, and pre-donation hemoglobin level.

Data processing was performed using EXCEL 2013 software.

The study was carried out in accordance with the ethical rules relating to surveys involving human beings in force in Côte d'Ivoire.

3. Result

- **Sociodemographic characteristics and blood donation history**

This study included all blood donors of the fixed blood collection of the Yamoussoukro Blood Transfusion Center in 2020, a total of 1160 subjects, including 1000 men (86%) and 160 women (14%). The distribution of the blood donor population by gender is shown in Figure 1.

This is a young population, with a majority between 25 and 44 years of age (67%). Table 1 presented the distribution of the population according to age and sex.

- **Pre-donation hemoglobin level**

Of the 1160 blood donors in the study, pre-donation hemoglobin levels were not measured in 787 (67.8%) subjects regardless of gender. Of those who had a pre-donation hemoglobin test, 15 females had a hemoglobin level less than 12 g/dL (Table 2) and 82 males had a hemoglobin level less than 13 g/dL (Table 3), for a total of 97 (26%) blood donors (Table 4).

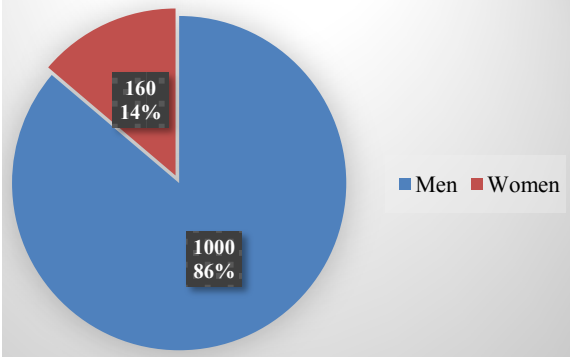

Figure 1. Distribution of the population by gender.

Table 1. Distribution of the population by sex and age.

Gender/Age	18 - 24 years old	25 - 44 years old	45 - 60 years old	Total
Woman	28	103	29	160
Man	163	670	167	1000
Total	191	773	196	1160
Percentage	16%	67%	17%	100%

Table 2. Hemoglobin (HGB) analysis of female blood donors.

	Not done	HGB		Total
		<12 g/dL	≥12 g/dL	
Woman	95	15	50	160
Percentage	59%	9%	31%	100%

Table 3. Hemoglobin (HGB) analysis of male blood donors.

	Not done	HGB		Total
		<13 g/dL	≥13 g/dL	
Man	692	82	226	1000
Percentage	69.2%	8.2%	22.6%	100%

Table 4. Distribution of blood donors according to sex and hemoglobin level.

	M: HGB < 13 g/dL W: HGB < 12 g/dL	M: HGB ≥ 13 g/dL W: HGB ≥ 12 g/dL	Total
Man (M) Woman (W)	82 (22%) 15 (4%)	226 (61%) 65 (17%)	308 (83%) 65 (17%)
Total	97	276	373
Percentage	26%	71%	100%

4. Discussion

This assessment revealed some insufficiencies: the dosage of the pre-donation hemoglobin level is not systematic, the existence of subjects with a pre-donation hemoglobin level below the normal values in blood donors of both sexes.

In this regard, the French-speaking Africa transfusion research group in 2014 [4], in its assessment of the first five years, had found these same insufficiencies, on one hand that the hemoglobin level determination was not systematic; on the other hand that the prevalence of a level below the threshold value had been observed in nearly 20% of cases. Furthermore, Malard *et al.* [6] in their national analysis of data on hemoglobin levels below 13 g/dL or 12 g/dL in male and female whole blood donors in France in 2020, estimated a total of 17.7%, of which 24.4% and 10.7% were in female and male subjects respectively.

The results of this study remain relatively higher than their own, 373 (26%) individuals in total, of which 82 (22%) and 15 (4%) are male and female blood donors, respectively, which shows that efforts must still be made to improve the quality of the blood collected [3] [8] [9], and to protect blood donors [7].

5. Conclusion

This study reveals that the pre-donation hemoglobin level of blood donors is effective in Yamoussoukro. However, efforts must still be made to ensure that all candidates for blood donation can benefit from it and that the threshold value of

the hemoglobin level in these donors is systematically respected during the medical selection process.

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Conflicts of Interest

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

Authors' Contributions

The authors worked as a team from project conception, implementation, and completion.

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