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Infectious Markers in Blood Donors at the Fixed Blood Collection of the Yamoussoukro Blood Transfusion Center in Côte D'ivoire

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ABSTRACT

Introduction: Despite the progress made in blood safety, blood transfusion-related infections remain a concern in view of these national statistics.
Aim of the Study: To determine the seroprevalence of infectious markers transmissible by blood transfusion in blood donors at the Yamoussoukro Blood Transfusion Center.

Method: This is a retrospective study that took place at the Yamoussoukro Blood Transfusion Center. The data were collected from all old and new blood donors deemed suitable for the fixed collection of the year 2020. ELISA tests were used to screen for HIV antibody, HBsAg and HCV antibody; syphilis screening was done using the VDRL (Venereal Disease Research Laboratory) test.

Results: All 1160 blood donors of the fixed blood collection in 2020, no positive results for the different blood-borne diseases were recorded. On the other hand, one doubtful result and two unperformed tests were observed for each infectious marker.

Conclusions: The seroprevalence of infectious markers in blood donors is very low in fixed collection at the Yamoussoukro Transfusion Center.

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Introduction

Blood transfusion is a life-saving substitution therapy. However, its practice is not without risk of undesirable effects that can even lead to the death of the recipient [1]. Indeed, it exposes recipients to a risk of transmission of infectious agents transmissible by blood, despite the progress made in transfusion safety [2].

Despite advances in transfusion safety, transfusion-related infections remain a concern [3, 4].

Indeed, according to the World Health Organization (WHO) in 2018, the prevalence of transfusion-transmitted infections in donated blood would be much lower in high-income countries than in low- and middle-income countries below [5, 6]. Indeed, the seroprevalence of HIV, hepatitis B, hepatitis C, and syphilis was 0.002%, 0.02%, 0.007%, and 0.02% in high-income countries, respectively; and 0.70% 2.81% 1.00% 0.90% in low-income countries [5].

Several studies in Africa reveal the high frequency of infectious agents among blood donors. A study conducted in the Democratic Republic of Congo in 2013 revealed a prevalence of HIV infection of 2.8% among blood donors; those of viral hepatitis B and C were 4.5% and 0.7% respectively [7].

Côte d'Ivoire, like many African countries, is still performing all the tests recommended by the WHO (HIV, HBsAg, HCV and VDRL) [8]. According to Konan, the seroprevalence of HIV, hepatitis B, hepatitis C and syphilis in 2020 at the national level was 7.2%, 6.0%, 1.8% and 0.1% respectively [9].

In view of these worrying national statistics, the need to carry out a preliminary study in Yamoussoukro, the political capital of Côte d'Ivoire, was deemed appropriate to determine the seroprevalence of infectious markers transmissible by blood transfusion among blood donors in to identify specificities.

Materials and Methods

This is a retrospective descriptive study that took place at the Yamoussoukro Blood Transfusion Center. The justification for the choice of this methodology comes from the literature review. Indeed, the majority of the studies we had to review are retrospective, as is the case of YACOUBA NIANGALY, in his article on "seroprevalence of viral markers in blood donors at the Koro Reference Health Center from 2016 to 2019 (about 1359

cases)" and of Konan Sidoine and al. in their publication on "seroprevalence of HIV, Hepatitis B, Hepatitis C and Syphilis at the Abidjan NBTC from january 2018 to december 2020 (Ivory Coast)".

The data were collected on all old and new blood donors deemed fit in 2020 at the fixed blood collection only. According to the literature review, the data from the mobile blood collection is patchy compared to that of the fixed blood collection, as noted by Legbedji Kock A. and al in their article "Seroprevalence of viral hepatitis B and C, 2017-2020".

The data were collected from the PROGESA database of the National Blood Transfusion Center of Côte d'Ivoire.

The biological analyses were performed using the ELISA technique for HIV antibody, HBsAg, and HCV antibody testing; and the VDRL test for syphilis testing.

The variables used are: age, sex, number of blood donations, infectious biological markers: HIV, HbsAg, HCV and VDRL.

The Data processing was performed using EXCEL 2013 software. The study was conducted in accordance with the ethical rules for surveys involving human beings in force in Côte d'Ivoire.

Results

• Social and Demographic Characteristics, Blood Donation History

This study focused on all blood donors from the fixed collection, having attended the Yamoussoukro Blood Transfusion Center, from January to December 2020. 1160 subjects including 1000 male subjects (86%) for 160 female subjects (14%).

Moreover, it is a young population whose age is mostly in the 25 to 44 years range **(67%)** and who reside mainly in the city of Yamoussoukro, 1011 blood donors, or **87%**.
The blood donations of the fixed collection in 2020, were provided by 695 **(60%)** subjects who made more than three donations, regular donors.

• Seroprevalence of Infectious Markers

Among the 1160 blood donors of the fixed blood collection in 2020, no cases of positive results for transfusion-transmissible diseases were recorded. However, for each infectious marker, one doubtful result and two tests not performed were observed.

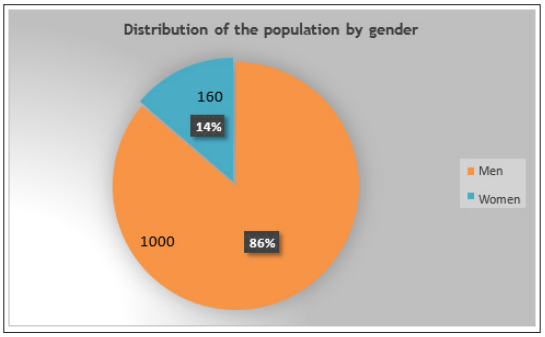

Figure 1: Distribution of the population by gender

Table 1: Distribution of the population by gender and age

Sex / Age	Distribution of the population by gender and age			Total
	18 - 24 years old	25 - 44 years old	45 - 60 years old	
Women	28	103	29	160
Men	163	670	167	1000
Total	191	773	196	1160
Percentage	16%	67%	17%	100%

Table 2: Distribution of the population by place of residence

Distribution of the population by place of residence		
Location	**Number**	**Percentage**
Yamoussoukro	1011	87%
Abidjan	68	6%
Rest of the country	81	7%
Total	1160	100%

Table 3: Distribution of the population by gender and number of donations

Distribution of the population by gender and number of donations					
Gender	**Not stated**	**1st donation**	**2 to 3 donations**	**>3 donations**	**Total**
Woman	0	63	33	64	160
Male	5	272	92	631	1000
Total	5	335	125	695	1160
Percentage	0%	29%	11%	60%	100%

Table 4: Results of the biological analyses of the blood sample

Biological analysis results				
	HIV	**HCV**	**VDRL**	**HBsAg**
Positive	0	0	0	0
Negative	1157	1157	1157	1157
Doubtful	1	1	1	1
Not done	2	2	2	2

Discussion

Apart from the errors that could occur during the biological analyses, we find the results very satisfactory: 1157 (0.99%) negative results out of 1160. Indeed, in the literature we have not yet recorded such progress. Indeed, Konan recorded among blood donors in 2020 at the national level: 7.2%, 6.0%, 1.8% and 0.1% respectively as seroprevalence of HIV, hepatitis B, hepatitis C and syphilis [8]. As for Legbedji who conducted a study on the seroprevalences of viral hepatitis B and C from 2017 to 2020 in Yamoussoukro, she found respectively as seroprevalences for viral hepatitis B and C: 11.7% and 4.3% [10]. For these two studies, it is important to specify that the data concerned two types of collection: fixed and mobile. This could explain the significant differences observed.

In addition, the proportion of regular donors is slightly higher than the national average, Kouamenan S. et al, reported that 55% of blood donors were regular in 2018. The 2019 activity report recorded 59.34% [8, 11].

In view of the above, the only difference in approach between these two studies is that the data here were only for fixed blood collection donations. This type of collection could have a beneficial effect on the reduction of infectious risk and the retention of blood donors [12].

It would be necessary to conduct an in-depth study of the two types of blood collection practiced in Côte d'Ivoire in order to find new ways to improve blood safety.

Conclusion

The fixed blood collection would help reduce the risk of infection and increase the fidelity of blood donors at the Yamoussoukro Blood Transfusion Center.

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