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Seroprevalence of Infectious Markers in Blood Donors at the Dioila Reference Health Center, Mali, 2023-2024

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ABSTRACT :

Introduction : Transfusion safety is essential for the prevention of transfusion-transmissible infections, including Hepatitis B and C infections, HIV infection, and syphilis. Little information is available regarding these transmissible infections among blood donors at the Dioila Reference Health Center. Our objective was to determine the seroprevalence of infectious markers among blood donors at the Dioila Reference Health Center from 2023 to 2024. **Materials and methods:** This was a cross-sectional study on blood donor data recorded in the laboratory register of the Dioila reference health center over the period 2023-2024. The analysis was carried out using Epi Info 7.2.6 software. **Results:** A total of 2,930 blood donors were registered in Dioila. Males were the majority, representing 91% of cases with a sex ratio of 9.6. The 18-27 age group was predominant, accounting for 40.5% of donors. The mean age was $30.7 \text{ years} \pm 9.6$. The highest prevalence of hepatitis B was 4.7%, followed by hepatitis C at 0.3%, HIV at 0.1%, and syphilis at 0.1%. **Conclusion:** The seroprevalence of infectious markers in blood donors remains a concern, especially for hepatitis B. Raising public awareness about voluntary blood donation remains a challenge in order to improve transfusion safety.

KEYWORDS: Seroprevalence, donor, blood, transfusion, Dioila.

I. INTRODUCTION

Blood transfusion is the transfer of blood, or one of its derivatives, from a healthy person (donor) to a sick person (recipient) [1]. Transfusions are performed for various reasons: to improve oxygen-carrying capacity, to restore the amount of blood in the body (blood volume), and to correct clotting disorders [1]. However, transfusions present some risks for the recipient: allergic reactions, fever and chills, transfusion of too large a volume of blood, and bacterial and viral infections [1]. The World Health Organization (WHO) recommends routine screening for infections in all blood donations before use [2]. It is mandatory for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis and is carried out according to a system meeting quality requirement [2]. According to the WHO, globally, the proportions of transfusion-transmitted infections vary considerably, with the lowest proportions observed in developed countries and the highest in developing countries [3]. This prevalence in blood donations in high-income countries is 0.002% for HIV, 0.02% for HBV and Syphilis, and 0.007% for HCV [2,3]. In contrast, in low-income countries, it is 0.70% for HIV, 2.81% for HBV, 1.00% for HCV, and 0.90% for Syphilis [2, 3]. In contrast, in low-income countries, the prevalence is 0.70% for HIV, 2.81% for HBV, 1.00% for HCV, and 0.90% for syphilis [2, 3]. In Senegal, the prevalence of HBsAg carriage is estimated at 15% of the general population, while that of HIV is 0.5% in the general population [4]. According to a study conducted at the regional blood transfusion center in Sokodé, Togo, the specific prevalences were 4.88%, 0.78%, 0.1%, and 0% for hepatitis B, hepatitis C, HIV, and syphilis, respectively [5]. In Mali, a study conducted at the National Blood Transfusion Center (CNTS) in Bamako among blood

donors, published in 2019, found the prevalence of HIV, HBV, and HCV to be 2%, 18.1%, and 3%, respectively [6]. In Dioila, according to a thesis study carried out by CAMARA and collaborator, the seroprevalence of infectious markers was 0.30%; 6.60% and 0.40%, 0.60% respectively for HIV, HBV, HCV and Syphilis[7]. The work we will carry out at the Dioila Reference Health Center (CSRÉf) has the main objective of determining the seroprevalence of the following infectious markers: HIV, hepatitis B and C and Treponema pallidum in blood donors.

II. MATERIALS AND METHODS

2.1. Study framework: Dioila has an area of 7256 square kilometers (Km²) and a population of 430,078 inhabitants in 2025. The Dioila health district is located in the Koulikoro health region. It is bordered to the north by the district of Fana, to the south and west by the district of Bougouni (Sikasso health region), and to the east by the districts of Fana and Kignan (Sikasso region). It covers one referral health center (CSRÉf) with a functional laboratory, ten rural communes, and 36 functional health areas, six of which have medical facilities.

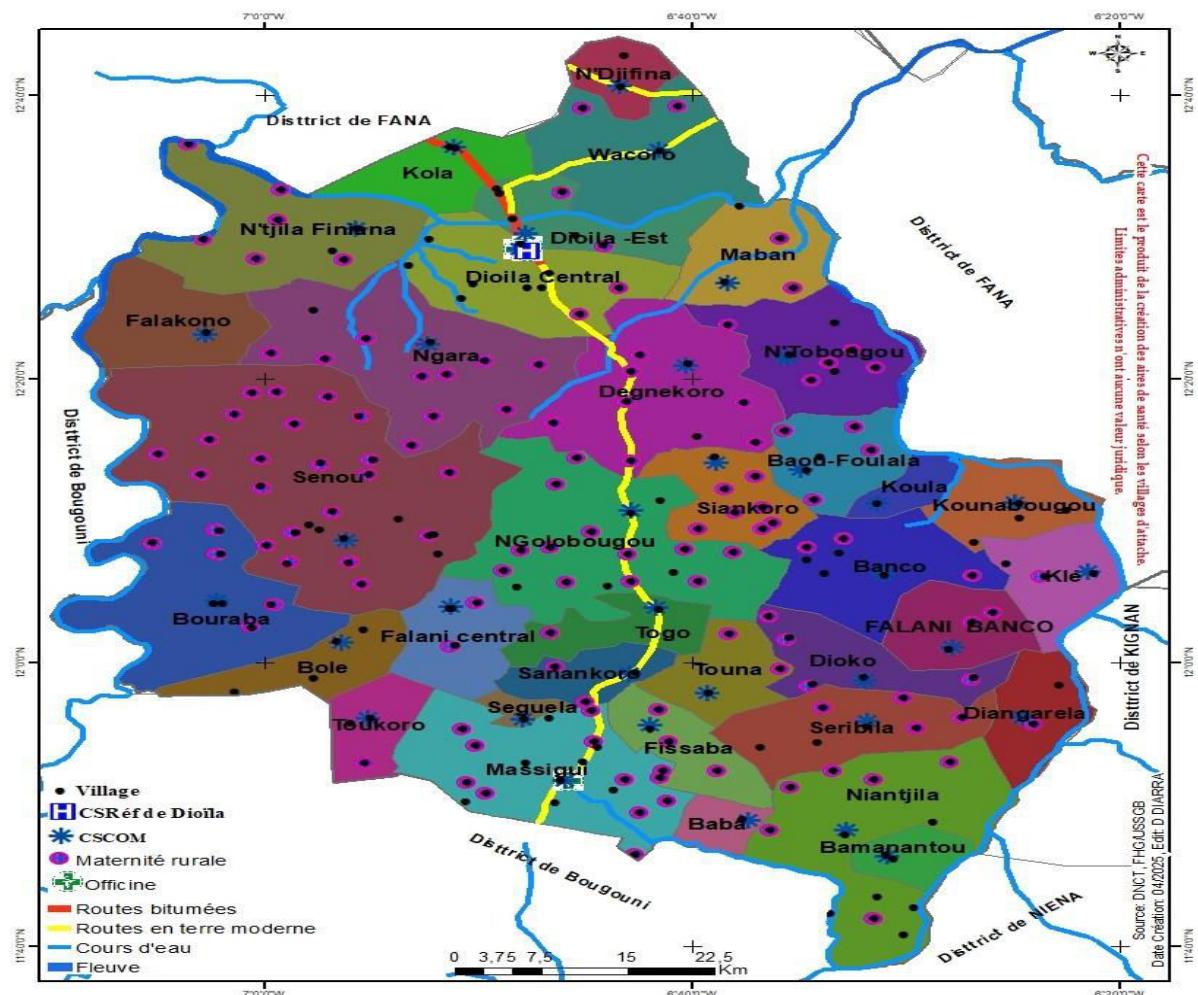


Figure 1: Map of the Dioila health district, 2025

2.2. Study type: We conducted a descriptive cross-sectional study.

2.3. Study period: The study was conducted between October and November 2025. It covered data from January 2023 to December 2024.

2.4. Study population: This included donors registered in the blood donor registries of the Dioila Reference Health Center (CSRÉf) laboratory.

2.5. Inclusion and exclusion criteria:

2.5.1. Inclusion criteria: All blood donors registered in the Dioila CSRÉf laboratory registry whose HIV, HBV, HCV and Syphilis status items were correctly filled in from January 2023 to December 2024 were included in this study.

2.5.2. Exclusion criteria: Not included in this study were all blood donors registered in the Dioila CSRÉf laboratory register with missing information in the items corresponding to HIV, HBV, HCV and Syphilis status from January 2023 to December 2024.

2.6. Sampling: This involved exhaustive sampling of all blood donors registered in the Dioila Reference Health Center (CSRÉf) laboratory registry.

2.7. Data Collection and Management: Data collection was carried out through a review of the Dioila Reference Health Center's blood donor registry.

2.8. Variables studied: The variables of interest were established based on specific objectives: sex, age, blood group/Rh factor, and donor status.

2.9. Data management and analysis plan: Data from the laboratory's donor registry were recorded in an Excel spreadsheet. For the descriptive analysis, we calculated the mean and standard deviation for quantitative variables and the frequency for qualitative variables.

Ethical and professional considerations: We obtained approval from the local health authorities. Information relating to the identity of the donors was not taken into account. The data was compiled and stored on a computer used only by the administrator. This computer is password-protected.

III. RESULTS

Our study included 2,930 blood donors, of whom 154 (5.3%) were infected. Males were predominant, representing 91% of cases, with a sex ratio of 9.6. The 18-27 age group was the most frequent, accounting for 40.5% of cases. The mean age was $30.7 \text{ years} \pm 9.6$.

Family donors were the most numerous, representing 84.9% of the total. The prevalence of hepatitis B was the highest at 4.7%. It was 0.3% for HBV, 0.1% for HIV, and 0.1% for syphilis.

Table I: Distribution by age group of blood donors in the Dioila Reference Health Center, 2023-2024

Age group/year	Frequency	Percent
18 - 27	1188	40,5
28 à 37	943	32,2
37 à 48	546	18,6
47 à 57	169	5,8
≥ 58	29	1,0
Unknown	55	1,9

The 18-27 age group was the most frequent, representing 40.5% of cases.

Table II: Distribution of blood donors by blood type/Rh factor in the Dioila Reference Health Center, 2023-2024

Blood group	Rhesus	
	Negative n (%)	Positive n (%)
A	17 (5.8)	492 (16.8)
AB	2 (0.7)	66 (2.3)
B	37 (1.3)	737 (25.2)
O	97 (3.3)	1482 (50.6)
Total	153 (5.2)	2777 (94.8)

Blood type O and Rh positive were the most represented, at 50.6%.

Table III: Distribution according to HIV, hepatitis B and C, and syphilis seroprevalence among blood donors at the Dioila Reference Health Center, 2023-2024

Status	VHB	VHC	VIH	Syphilis
Positive n (%)	137 (4.7)	10 (3.4)	4 (0.1)	3 (0.1)
Negative n (%)	2793 (95.3)	2920 (99.6)	2926 (99.9)	2927 (99.9)

The prevalence of hepatitis B was the highest, at 4.7%.

Table IV: Distribution by sex of HIV, hepatitis B and C, and syphilis cases among blood donors at the Dioila Reference Health Center, 2023-2024

Sex	VHB n (%)	VHC n (%)	VIH n (%)	Syphilis n (%)
Male n (%)	126 (92,0)	10 (100,0)	4 (100.0)	3 (100.0)
Female n (%)	11 (8,0)	0 (0,0)	0(0.0)	0(0.0)

Males predominated in all cases.

Table V: Distribution of HIV, hepatitis B and C, and syphilis cases among blood donors at the Dioila Reference Health Center, 2023-2024, according to donor type

Status	VHB n (%)	VHC n (%)	VIH n (%)	Syphilis n (%)	Total n (%)
Voluntary donors	20 (14.6)	3 (30.0)	2 (50.0)	0 (0.0)	25 (16,2)
Family donors	117 (85.4)	7 (70.0)	2 (50.0)	3 (100.0)	129 (83,8)

Family donors were the most affected, representing 83.8% of cases.

IV. DISCUSSION

In our study, males were in the majority (91%), with a sex ratio of 9.6. GOITA et al. at the Sikasso Hospital in Mali in 2019 also observed a male predominance, with 94.36% male donors [8]. The same was true in the study by Bawè LD and colleagues in Sokodé (Togo) in 2023, which found that 84.5% of the participants were men [9]. The 18-27 age group was the most frequent, representing 40.5%. The mean age was $30.7 \text{ years} \pm 9.6$. This result is similar to that of Habibou Sarr et al. in Ziguinchor (Senegal) in 2021, where the 18-27 age group was the largest at 55%, with a mean age of 30 years [4]. In the study by Bah et al. at Nianankoro Fomba Hospital, Ségu (Mali) in 2019, the mean age was $31.21 \pm 8.7 \text{ years}$ [10]. Blood supply is largely provided by family donors (85%). Family donors also predominated in the study by Katile et al. in Kayes (Mali) in 2018, accounting for 95.5% of cases [11]. This high prevalence could be explained by increased parental awareness of the need for and benefits of blood donation. The prevalence of hepatitis B was the highest, at 4.7%. It was 0.3% for HCV, 0.1% for HIV, and 0.1% for syphilis. Our results were similar to those of Bawè LD et al in Sokodé (Togo) in 2023 in whom the specific prevalences of the markers were respectively 4.88%; 0.78%; 0.1% and 0.0% for hepatitis B, hepatitis C, HIV and syphilis [9]. These figures are lower than those of Habibou Sarr et al. in Ziguinchor (Senegal) in 2021, who found that 10.5% of blood donors were carriers of hepatitis B, 0.38% were HIV-positive, 0.08% had anti-HCV antibodies, and 0.04% had syphilis [4]. In a study conducted in Timbuktu in 2024 by Kassambara et al., the seroprevalence of HBV was 6.20% and that of HCV was 0.6% [12].

V. CONCLUSION

The prevalence of infectious markers among blood donors remains a concern. Screening for infections (HBV, HCV, HIV, and syphilis) remains essential in blood donors to prevent transmission during blood product transfusions. Their prevalence in the Dioila Reference Health Center (CSRÉ) was determined, and donor characteristics were recorded. Raising public awareness about voluntary blood donation remains a challenge.

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