

Prevalence of Diabetes among Blood Donors in Côte d'Ivoire

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Abstract

Diabetes is a major public health problem due to its growing prevalence and socio-economic impact. According to the International Diabetes Federation (IDF), this pathology is the leading non-infectious epidemic affecting humanity, with a worldwide prevalence of 463 million diabetics in 2019. According to the 2017 PREVADIA survey, the prevalence of diabetes in Côte d'Ivoire was 6.2% among people aged 20 to 79 [1]. In 2018, out of 4527 new cases in diabetes and hypertension clinics (CDH), diabetes recorded the highest incidence, with 41.42% [1]. In view of the above, this study was carried out to determine the prevalence of diabetes in a population of blood donors, with a view to contributing to their motivation and loyalty. This cross-sectional survey took place on July 29, 2023, in the Abobo commune in the Autonomous Region of Abidjan. It involved 86 subjects deemed suitable for blood donation. Data on sociodemographic and anthropometric characteristics, medical, surgical and family history, biological parameters for diabetes screening, information on blood donation, and exclusion factors for blood donation were collected from two questionnaires: the diabetes screening questionnaire and the blood donation form. Information on the biological qualification of the blood collected was gathered from the E-PROGESA database of the Centre National de Transfusion Sanguine de Côte d'Ivoire (CNTSCI). Blood glucose screening was performed using the On Call® Plus blood glucose meter. Data processing and analysis were performed using SPSS 26 software. The results showed that of the 86 subjects deemed suitable for blood donation, 9 had pre-diabetes, and 6 had diabetes, giving a prevalence of 7%. There was no association between diabetes and gender, age group, BMI, blood type or number of blood donations.

Keywords

Blood Donation, Diabetes, BMI, Viral Hepatitis, HIV, Ivory Coast

1. Introduction

Diabetes is a major public health problem due to its growing prevalence and socio-economic impact. According to the International Diabetes Federation (IDF), diabetes is the number one non-infectious epidemic affecting humanity, with 463 million diabetics worldwide in 2019. If this trend continues between now and 2045, there will be 700 million diabetics [2]. The latest IDF Diabetes Atlas shows that the global prevalence of this disease is 10.5% and that almost half (44.7%) of adults are undiagnosed [3].

In the same dynamic, in Africa, there will be an increase of 143%, *i.e.*, 19 million in 2019, 27 million by 2030 and 47 million by 2045 [2]. According to the 2017 PREVADIA survey, the prevalence of diabetes in Côte d'Ivoire was 6.2% in people aged 20 to 79 [3]. In 2018, out of 4527 new cases in diabetes and hypertension clinics (CDH), diabetes recorded the highest incidence, with 41.42% [1].

Furthermore, Halimi S. has shown in her work that changes in eating habits could lead to an explosion in the number of diabetic patients in our hospitals [4].

In view of the above, this study was carried out to determine the prevalence of diabetes in a population of blood donors, with a view to contributing to their motivation and loyalty.

2. Materials and Methods

The data in this study come from a cross-sectional survey conducted in July 2023, during a blood drive coupled with diabetes screening in the commune of Abobo.

It involved 86 subjects, representing all the donors deemed suitable for that day's blood donation. These individuals did not know their diabetes status.

The data were collected from two questionnaires, one administered during the diabetes screening and the other using the blood donation form. These questionnaires were used to obtain the respondents' consent and to collect data on socio-demographic and anthropometric characteristics, medical, surgical and family history, biological parameters for diabetes screening, information on blood donation and factors precluding blood donation.

Information on the biological qualification of the blood sampled was collected from the E-PROGESA database of the Côte d'Ivoire National Blood Transfusion Center (NBTCCI).

Blood glucose screening was performed with the capillary blood glucose meter, On Call® Plus.

Serological assays were performed at the laboratory of the Côte d'Ivoire National Blood Transfusion Center using the ELISA technique for HIV, hepatitis B and C, and the LATEX test for syphilis.

Data processing and analysis were carried out using SPSS 26 software. For bivariate analysis, we used the chi-square test of association at the 5% significance level. The chi-square test was chosen because of the nature of the cross-tabulated variables, which are all qualitative or categorical.

3. Results

1) Description of subjects screened

A total of 86 subjects deemed suitable for blood donation were screened, including 9 individuals with pre-diabetes and 6 with diabetes, representing prevalences of 10% and 7% respectively (**Figure 1**).

There were 52 males and 34 females, with an average age of 36.9 years.

In addition, 26.7% of subjects had a family history of diabetes (**Table 1**) and 22% were obese (**Table 2**). 71% of blood donation applicants were new donors; 48.8% were group O positive.

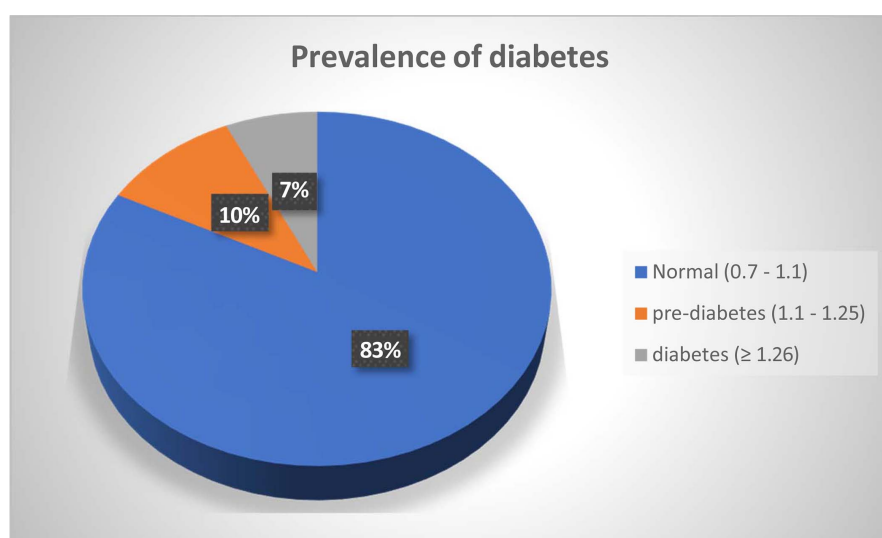


Figure 1. Prevalence of diabetes.

Table 1. Distribution of subjects according to family history of diabetes.

Family history of diabetes	Frequency	Percentage
OUI	23	26.7%
NON	63	73.3%
TOTAL	86	100.0%

Table 2. Distribution of subjects by Body Mass Index (BMI).

BMI	Frequency	Percentage
Moderate malnutrition	6	7%
Normal weight	41	48%
Overweight	20	23%

Continued

Obesity	13	15%
Severe obesity	6	7%
TOTAL	86	100%

2) Prevalence of HIV and viral hepatitis B and C

The prevalence of HIV and hepatitis B and C was 1.2%, 4.7% and 3.5% respectively (**Table 3**).

Table 3. Distribution of subjects according to the prevalence of infectious markers.

	Blood donation			Prevalence
	Positive	Negative	Workforce	
HIV	1	85	86	1.2%
Viral hepatitis B	4	82	86	4.7%
Viral hepatitis C	3	83	86	3.5%
Syphilis	0	86	86	0%

3) Distribution of diabetes according to the different characteristics of the subjects.**Table 4.** Distribution of subjects by gender, age group, BMI and blood type.

		Diabetes				Percentages	p
		Workforce	Diabetes no	Pre-diabetes	Diabetes yes		
Gender	Male	52	43	5	4	7.7%	0.91
	Female	34	28	4	2	5.9%	
Age range	18 - 24	20	16	3	1	5.0%	0.432
	25 - 44	40	36	2	2	5.0%	
	>45	26	19	4	3	11.5%	
BMI	<18.5	6	5	1	0	0.0%	0.109
	18.5 - 25	41	37	3	1	2.4%	
	25 - 30	20	15	1	4	20.0%	
	>30	19	14	4	1	5.3%	
Blood types	A+	22	18	2	2	9.1%	0.765
	B+	18	14	3	1	5.5%	
	AB+	3	2	0	1	33.3%	
	O+	42	36	4	2	4.8%	
	B-	1	1	0	0	0.0%	
The number of blood donations	1 donation	61	52	7	2	3.3%	0.243
	2 - 3 donations	15	11	1	3	20.0%	
	>4 donations	10	8	1	1	10.0%	

Bivariate analysis showed that there was no association between diabetes and gender, age groups, BMI, blood groups or number of blood donations (**Table 4**).

4. Discussion

The study has certain limitations, notably population size and sampling. However, it shows that the prevalence of diabetes (7%) is significantly higher than that of the 2017 PREVADIA survey: 4.2% [3]. This could be explained, on the one hand, by the limitations of this work and, on the other, by the study period marked by significant changes in dietary habits, a finding also made by Halimi S. [4].

This situation is worrying when we consider the prevalence of pre-diabetic subjects, which stands at 10%.

Of course, no association between diabetes and demographic, anthropometric or biological characteristics was found in the study.

However, the situation is different in the literature. Bener U. *et al.* found that ABO antigens were associated with diabetes mellitus in a population of 2148 subjects [5]. As for Konan Y.E. *et al.*, they showed that age, lifestyle, snacking, familial diabetes and high blood pressure were identified as associated factors in undiagnosed diabetes [6].

In addition, the presence and importance of certain risk factors should be highlighted, notably a family history of diabetes found in 26.7% of subjects, as well as overweight and obesity (22%). Indeed, according to Sidibé *et al.*, who found a prevalence of overweight among diabetics of 49.74% in their study, overweight and obese subjects are most at risk of developing type 2 diabetes [7] [8].

In terms of blood donation history, the majority of diabetics (5 out of 6 diabetics) and pre-diabetics (7/9) were irregular donors (1 to 3 donations), mainly first-time donors. More robust studies will be able to improve on these results.

Although diabetes is not an absolute contraindication to blood donation [9] [10], the results of the present study shed light on certain realities, more specifically, the significant proportion of undiagnosed diabetes specifically in the blood donor population, but also in the general population.

5. Conclusion

Although diabetes is not an absolute contraindication to blood donation [9] [10], the results of the present study shed light on certain realities. This study highlights the problem of diabetes screening in the Ivorian population in general and among blood donors in particular. It would, therefore, be necessary to implement strategies to reduce the proportion of undiagnosed diabetes in the blood donor population in order to help motivate them and build up their loyalty.

Conflicts of Interest

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

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