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Epidemiological Prevalence Of Viral Hepatitis And HIV Infection Among Volunteer Blood Donors In Kinshasa

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Abstract – The objective of this work was to determine the epidemiological profile and the seroprevalence of hepatitis B and C infections as well as that of HIV among volunteer donors of the National Blood Transfusion Center of Kinshasa. To achieve this, a prospective, epidemiological and descriptive study was undertaken at the laboratory department of the National Blood Transfusion Center in October 2019, by collecting 464 donors who attended the CNTS during the period from November 24 to December 23, 2019. Profiles The epidemiological incidence rates of HBV, HCV and HIV were respectively 11.4% 95% CI [10.6% 34.0%]. 401 subjects or 86.4% were male against 63 subjects or 13.6% female.

Keywords – Seroprevalence; Epidemiological profiles; VH; HCV; HIV.

I. INTRODUCTION

Over the past twenty years, safety in blood transfusion has made great progress with regard to infectious and immunological risk. According to Congolese legislation on blood transfusion, screening for hepatitis is one of the mandatory tests on donated blood. Infections caused by the hepatitis virus constitute a major public health problem throughout the world [1].

People carrying the hepatitis virus are exposed to the risks of its becoming chronic with the occurrence of complications such as cirrhosis and hepatocellular carcinoma. According to estimates by the World Health Organization (WHO), approximately 2 billion people live with HBV, of which 240 million are carriers of chronic hepatitis B and between 500,000 and 700,000 people die each year due to HBV. HBV infection. Nearly 170 million people are chronic carriers of HCV and more than 350,000 people die each year from HCV-related liver disease [2].

Epidemiological surveillance of these infections in voluntary blood donors makes it possible to monitor the prevalence and identify the main means of combating and preventing their dissemination through transfusion. The aim of this work is to assess the prevalence of viral markers in voluntary blood donors [4].

In developed countries, hepatitis A, B and C viruses cause approximately 90% of cases of acute hepatitis. Hepatitis D, E and G viruses are also responsible for hepatitis. Non-viral hepatitis, mainly caused by the ingestion of toxic products for the liver, can also be the result of diseases affecting the liver, such as hepatic steatosis (fatty liver) and autoimmune hepatitis (hepatitis of obscure origin , which is characterized by the production of autoantibodies) [5].

In Canada, hepatitis C is the most common viral hepatitis: each year, it affects about 45 people out of 1,000,001. As for hepatitis B, it affects about 3 Canadians out of 100,000 and hepatitis A 1.5 out of 1000001.41.

In France, 367,000 people are infected with HCV, of which 232,000 are suffering from chronic hepatitis C. There are between 2,700 and 4,400 new infections and 3,600 deaths per year. 43% of people infected with the hepatitis C virus are unaware that they are carriers of the virus.

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Viral hepatitis is much more common in non-industrialized countries. Hepatitis A is endemic in Africa, some South American countries and Asia. The same goes for hepatitis B. Indeed, in most countries of sub-Saharan Africa and Asia, where more than 8% to 10% of the population is a carrier of hepatitis B, it represents the one of the leading causes of adult mortality (liver cancer or cirrhosis). The hepatitis C virus affects nearly 3% of the world's population [6].

In Africa, the prevalence of this infection is the highest in the world: it exceeds 5%. Public health authorities struggle to control viral hepatitis, which often goes undetected for years. Before a diagnosis is made, the infection may not only have caused serious damage to the body, but also spread to other people [7].

In the Democratic Republic of Congo, for lack of recent epidemiological studies concerning the general Congolese population, we only have WHO estimates according to which the seroprevalence of hepatitis A, B and C would vary from 1% to 2.4% [8].

Viral hepatitis is mainly transmitted through the blood. The prevalence of hepatitis B and C are difficult to estimate because it occurs without apparent signs in a high proportion of cases, which tends to underestimate the real figures, except in studies based on anti-antibody serology. hepatitis on all blood donations. A quarter of hepatitis is due to transfusions of blood products carried out before 1992 (blood, red blood cells). But for a large number of those who were contaminated during transfusions before 1992 and who are not screened; the disease may continue to progress [9].

This study has transdisciplinary aspects, which is why we will use two approaches:

- The qualitative approach which concerns observation and investigation to see how the target population behaves;

- The quantitative approach which consists in analyzing the samples collected from the target population in the laboratory.

Both approaches will allow us to compensate for the limitations on either side of gathering information about our subject. This thesis presents the analysis of epidemiological data on cases of declared Hepatitis and HIV at the level of the laboratory service of the national blood transfusion center of Kinshasa, during the period from 2018 to 2019.

II. Materials And Methods

To achieve this, we will proceed with a prospective and analytical study based on the analysis of blood serum samples from donors from the National Center for Blood Transfusion.

These samples were analyzed for the search for markers of infection by hepatitis viruses and those of HIV using serological techniques. Thus we present the laboratory equipment and reagents used in this research:

1. Material

- ✓ Micropipette;
- ✓ stopwatch;
- ✓ Tip;
- ✓ Marker;
- ✓ Worksheet

2. Reagents

- ✓ SD BIOLINE HCV and Alère test kit determines AgHBS
- ✓ Buffer

Statistical analysis

After data collection, the data were encoded in an Excel software database (Microsoft Offices, version 2010), then processed and analyzed using the Statiscal Package for Social Sciences (SPSS) software, version 21.0. The usual statistics were calculated with Excel. The descriptive results and the analyzes of the inferential statistics were made using SPSS software.

Biological data were compared using the T-Student test for paired samples. The significance threshold of 5% or 0.05 was set to conclude the existence of a significant difference.

III. RESULTS

The results of this study are presented in the form of tables and figures. They are classified into three categories. The first describes the socio-demographic characteristics, the second is that of the epidemiological profiles and the third presents the inferential analyses.

3.1 Socio-demographic characteristics

Table I. Distribution of subjects according to their socio-demographic characteristics

Variables	Modalities	(n=464)	(%=100)
Sex	Femine	63	13.6
	Male	401	86.4
Age range	[15-20[	9	1.9
	[20-45[	368	79.3
	[45-65[	87	18.8
Marital status	Married	169	36.4
	Single	295	63.6
Religion	Others	27	5.8
	Catholic	100	21.6
	Kimbanguist	19	4.1
	Muslim	22	4.7
	Protestant	42	9.1
	Awakening	254	54.7
Occupation	Informal	80	17.2
	Private	154	33.2
	Audience	89	19.2
	No occupation	141	30.4

Table I shows that of the total of 464 study participants, 401 or 86.4% were male compared to 63 or 13.6% female. The most represented age group was that of 20 to 44 years with 368 cases out of 464 or 79.3%. While the least represented segment is that of 15 to 19 years with 9 cases out of 464 or 1.9%. That of 45 to 65 years old was made up of 87 people out of 464, or 18.8%. The majority of participants were single 295 for a total of 464 or 63.6% while the married portion was 169 out of 464 or 36.4%. The religion most practiced by the was that of revival churches with a workforce of 254 people out of 464 or 54.7%. In second place comes the Catholic Church with 100 cases out of 464 or 21.6%. Most of the people in this study worked in the private sector, 154 out of 464 or 33.2%.

3.2. Results of epidemiological profiles

In this section, the results are presented, according to the epidemiological profile of hepatitis B, hepatitis C and HIV viruses.

Table II. Epidemiological profiles of subjects

Profiles		n	%
Serology	**HepB**	53	11.4
	HepB&C	1	0.2
	HepC	13	2.8
	Negative	352	75.9
	HIV/HepB	2	0.4
	HIV+	43	9.3
	Total	**464**	**100.0**

Table II shows that 352 samples examined out of 464, i.e. 75.9%, were negative. While the hepatitis B serology was positive in 53 cases out of 464 or 11.4%. Positive HIV cases were represented 43 times out of 464 or 9.3%. There were 2 cases of co-infection of HIV and hepatitis B, then 1 case of co-infection of hepatitis B and C out of 464, i.e. 0.2%.

3.3 Inferential analyzes

The inferential analyzes of this study included two aspects including bivariate and multivariate analyses. These results are as follows:

The age of people not infected for the three diseases was compared and the latter shows that the subjects tested negative are on average younger than those tested positive for hepatitis (33.1 ± 10.3 years), HIV (35.4±11.7 years) and (36.8±9.7 years). But without statistically significant difference (p=0.59). This could be explained by the fact that the participants in this study were all adults, one of the conditions required to be a blood donor.

Subjects with a surgical history were more frequent in the group of subjects tested positive for HIV/AIDS (30.2%) against 7.2% in the group of subjects tested positive for hepatitis. This frequency was 23.6% among the seronegative. The difference was therefore statistically significant (p=0.004). The HIV contaminations would therefore have taken place during the surgical operations. We should have discussed these results with so many others, but we could not find the published ones.

The risk of being infected with HIV/AIDS is multiplied by 1.03 after each birthday of the donors in the study (a statistically significant relationship, (OR: 1.03 [1.003–1.065]). These data corroborate with those of S. Ba et al in 2017 who found that HIV infection was associated with age in the prison environment.Moreover, multiple sexual partnerships multiplied by 2.24 the probability of contracting HIV/AIDS (OR: 2.24 [1.10–4.56]) This observation is made by many authors [10].

Multivariate analyzes found that, other things being equal, if the age of the donors increases by one year, the risk of contracting HIV/AIDS increases by 13% (ORa: 1.13 [1, 11-1.17]). On the other hand, the age of the donors does not influence hepatitis (ORa: 1.01 [0.16-1.12]). We have not found an explanation for this discrepancy between HIV and hepatitis.

By adjusting for the other factors, single people had a four times greater probability of catching viral hepatitis than married people (ORa: 3.9 [1.9-8.1]). On the other hand, the risk of contracting HIV/AIDS is 0.5 times less among single people than married people (ORa: 0.5 [0.2-091]). The explanation for the four times higher probability of encountering hepatitis B in single people than in married people can be found from the mode of transmission of hepatitis which is generally linked to contact with all liquids. Indeed, for example, single people are more inclined to frequent makeshift restaurants where hygiene conditions are not taken into account compared to married people who generally eat at home. Independently of other factors, the probability of contracting hepatitis is 3.1 times higher in subjects working in the public sector than in others (ORa: 3.1 [1.1-8.5]), the same explanation provided above could be valid.

We also note that public sector workers were 12.6 times more likely to contract HIV than others. Promiscuity in the workplace, a probable cause of multiple sexual partners, would be the basis of the high frequency of HIV seroprevalence among donors working in the public sector.

IV. CLOSING

The objective of this work is to determine the epidemiological profile and the seroprevalence of hepatitis B and C infections as well as that of HIV among volunteer donors of the National Blood Transfusion Center of Kinshasa.

To achieve this, a prospective, epidemiological and descriptive study was undertaken at the laboratory department of the National Blood Transfusion Center in October 2019, by collecting 464 donors who attended the CNTS during the period from November 24 to December 23, 2019.

Concerning the socio-demographic results, on the one hand the distribution according to sex showed that out of the total of 464 donors participating in the study, 401 or 86.4% were male against 63 or 13.6% female. On the other hand, the most represented age group was that of 20 to 44 years with 368 cases out of 464 or 79.3%. While the least represented segment is that of 15 to 19 years with 9 cases out of 464 or 1.9%. That of 45 to 65 years old was made up of 87 people out of 464, or 18.8%.

The epidemiological profiles regarding the incidence rates of HBV, HCV and HIV were 11.4%, respectively; 0.116% and 0.34%.

Results of analyzes of inferential statistics show that single donors had a four times greater probability of catching viral hepatitis than married donors. On the other hand, the risk of contracting HIV/AIDS is 0.5 times less among single people than married people. Statistical comparisons also indicate that surgical history was more frequent in the group of subjects tested positive for HIV/AIDS (30.2%) against 7.2% in the group of subjects tested positive for hepatitis. The risk of being infected with HIV/AIDS is multiplied by 1.03 after each birthday of the donors taking part in the study and the workers in the public sector were more infected than those in the private sector. These results confirm, in part, the hypothesis that sociocultural factors are involved in the carriage of hepatitis B and C as well as HIV in donors from the National Blood Transfusion Center.

Finally we can make some recommendations:

To the Ministry of Health:

- Improve performance in promoting blood donation;
- Increase the number of donors by 10% by developing external collections;
- Activate the planning bodies, update the needs assessment system and review the organization and data recording system of transfusion centres;
- Organize workshop seminars for the improvement of transfusion techniques for the benefit of the medical and paramedical staff of the various transfusion centres;
- Develop quality assurance and annual audit;
- Remedy the dysfunctions of national laboratories to make them profitable;
- strengthen the haemovigilance system in place.

To the researcher:

- ✓ The continuation of epidemiological studies evaluating the evolution of the epidemic in the population and in certain subgroups (drug addicts for example);
- ✓ Epidemiological surveillance of hepatocellular carcinoma;
- ✓ Improved statistics on the causes of death will make it possible to assess the future course of the disease and its complications.

These studies will constitute a basis for reflection making it possible to orient and give priority to therapeutic or preventive medical actions and to evaluate their effectiveness, in a context where the financial resources of our country must be distributed for multiple pathologies whose treatment charge is more and more expensive.

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