

Prevalence of HBs Antigen, and HCV and HIV Antibodies in a Young Male Population in Cameroon

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Abstract

Introduction: According to WHO estimates, 57% of cases of liver cirrhosis and 78% of primary liver carcinoma are caused by a hepatitis B or C virus. This study aimed to assess the prevalence of these diseases and HIV among a young male population, according to region. **Methods:** This was a descriptive cross-sectional study conducted from 17 February to 31 March 2014 in the ten administrative regions of Cameroon. The study included male subjects of Cameroonian nationality aged at least 18 and at most 23, and living in the regions concerned. It excluded subjects that did not match the age, gender, and nationality criteria. For each subject, 10 ml of blood was collected in a dry tube. After centrifugation at 3000 RPM for 5 minutes, the serum was collected for the detection of viral infections. For subjects that tested positive, a confirmatory test was conducted. **Results:** In total, 4367 subjects were selected, with an average age of 20.46 (+/- 1.17) years. The prevalence of hepatitis B virus stood at 13.01% (with 95% CI: 12.03% - 14.05%). That of viral hepatitis C was 0.30% (95% CI: 0.17% - 0.52%). Co-infection with hepatitis B and C viruses was 0.05% (95% CI: 0.01% - 0.18%). The prevalence of HIV infection was 1.01% (95% CI: 0.74% - 1.36%). **Conclusion:** The overall prevalence of HBsAg in the population of young males is high. It tallies with the early vertical and horizontal modes of transmission that prevail in our environment.

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Keywords

Hepatitis B Virus, Hepatitis C Virus, HIV Infection, Young Male Population, Cameroon

1. Introduction

Chronic viral hepatitis is a global public health concern. In fact, two billion people worldwide are infected with hepatitis B virus, over 350 million suffer from chronic liver disease, including 60 million in Africa, and, every year, between 500,000 and 700,000 people die there from [1].

The World Health Organization (WHO) estimates that 57% of cases of liver cirrhosis and 78% of primary liver carcinomas result from a hepatitis B or C virus [1].

In Cameroon, according to a review of literature published between 1985 and 2014 concerning studies on sentinel populations (blood donors, pregnant women, health workers, Pygmies), prevalence ranges between 6.1% and 25.3% [2] [3] for hepatitis B virus (HBV), and 0.6% and 21% for hepatitis C virus (HCV) [4] [5].

There is little epidemiological data on the general population for HBV and HCV infections.

This study sought to determine the prevalence of these diseases and HIV in an apparently healthy male population aged 18 - 23 years in the 10 regions of Cameroon.

2. Patients and Methods

This was a descriptive cross-sectional study conducted from 17 February to 31 March 2014 in the ten (10) administrative regions of Cameroon. The study included male subjects of Cameroonian nationality aged at least 18 and at most 23, and living in the regions concerned. It excluded subjects that did not meet the age and residence criteria as well as those who were not of Cameroonian nationality. The subjects were selected among young volunteers in a screening survey as part of the implementation of a program to fight against viral hepatitis. Sampling was consequential. The study was conducted in the chief town of each administrative region of Cameroon. For each subject, 10 ml of blood was collected in a dry tube. After centrifugation at 3000 RPM for 5 minutes, the serum was collected for the detection of viral infections. A rapid diagnostic test (TROD) (the One Step HBsAg rapid test of Inter China Chemical Ltd.) was performed for qualitative detection of HBsAg, and then an ELISA confirmatory test (ELISA HBsAg Kit of CTK Biotech, San Diego, California) was conducted for those that tested positive in the first assay. For HCV infection, a TROD (HCV cassette strip of Runbio Biotech Co. Ltd, Guangdong, China) was first performed, then an ELISA confirmatory test (HCV Ab ELISA kit of Runbio Biotech Co. Ltd, Guangdong, China) was conducted for those who tested positive in the first assay. For the human immunodeficiency virus (HIV), a test was performed to detect anti-HIV 1/2 Ab (Alere Determine TM HIV 1/2 of Orlando, Florida), then a second test (ELISA Genscreen TM ultra HIV Ag-Ab Bioo-Rad, Marnes-la-Coquette, France) was carried out to detect viral antigens in the sera of the subjects that tested positive in the first assay.

All the subjects screened were informed of the results by mail. Those who tested positive were referred to a gastroenterologist for follow-up. Those who tested negative were urged to get vaccinated against the hepatitis B virus and counselling sessions on the other viruses were organized in each region. The survey protocol was approved by the National Ethics Committee.

The data was keyed in and analysed using Epi Info 6.04 software and Excel 2007. As for the quantitative variables, averages and their standard deviations, as well as medians and their interquartile ranges (IQR), were calculated. The proportions of qualitative variables with their confidence intervals (CI) at 95% were determined.

To examine the relationship between two discrete variables, we used Pearson's chi-squared test (χ^2) and calculated the related risks, as well as Yates' correction and Fisher's exact test for small numbers, for a significance level set at 5%.

3. Results

In total 4367 male subjects were selected, with an average age of 20.5 \pm 1.8 years (Table 1).

Table 1. Distribution of subjects according to region (n = 4367).

Regions	Number of candidates	Percentage	95% CI
South West	196	4.49%	[3.90% 5.16%]
North West	349	7.99%	[7.21% 8.85%]
Adamawa	400	9.16%	[8.33% 10.06%]
Littoral	298	6.82%	[6.10% 7.62%]
Far North	539	12.34%	[11.39% 13.36%]
Centre	594	13.60%	[12.61% 14.66%]
North	497	11.38%	[10.46% 12.37%]
West	596	13.65%	[12.65% 14.71%]
East	400	9.16%	[8.33% 10.06%]
South	498	11.40%	[10.48% 12.39%]

The overall prevalence of HBsAg carriers was 13.01% (95% CI: 12.03% - 14.05%). That of anti-HCV antibodies was 0.30% (95% CI: 0.17% - 0.52%).

The highest prevalence rate for HBV was recorded in the Far-North Region where 22.82% of the 539 subjects tested were infected, followed by the North region with 21.53% (n = 497), the East with 14% (n = 400), and the Adamawa with 12.75% (n = 400). The region with the lowest prevalence rate is the South with 5.22% (n = 498) ($p < 0.001$).

As for HCV, the highest prevalence rates were recorded in the East, Adamawa, and North Regions with 1% (n = 400), 0.75% (n = 400), and 0.60% (n = 497) respectively. The lowest prevalence rates recorded were in the South, West, Far-North, Littoral, and South-West Regions with 0% ($p = 0.0434$).

The highest prevalence rate for HIV was recorded in the East Region, where 3.50% of subjects were infected (n = 400), as compared to 0.00% for the Littoral (n = 298) and North-West (n = 349) regions ($p < 0.001$) (**Figure 1**).

Co-infection with hepatitis B virus and hepatitis C virus was 0.05% (95% CI: 0.01% - 0.18%). The prevalence of HIV infection was 1.01% (95% CI: 0.74% - 1.36%).

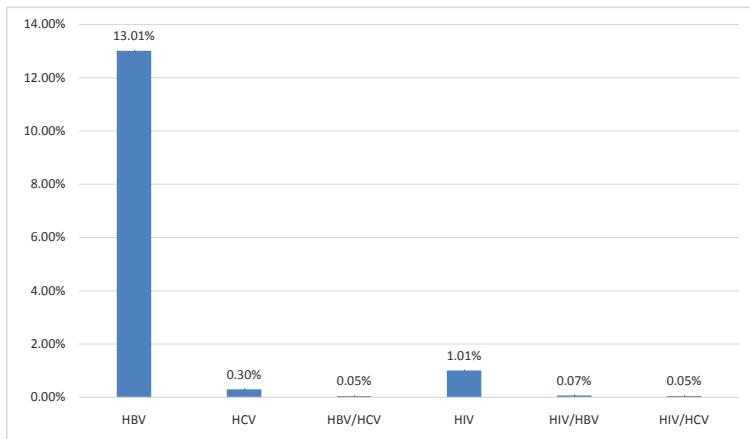
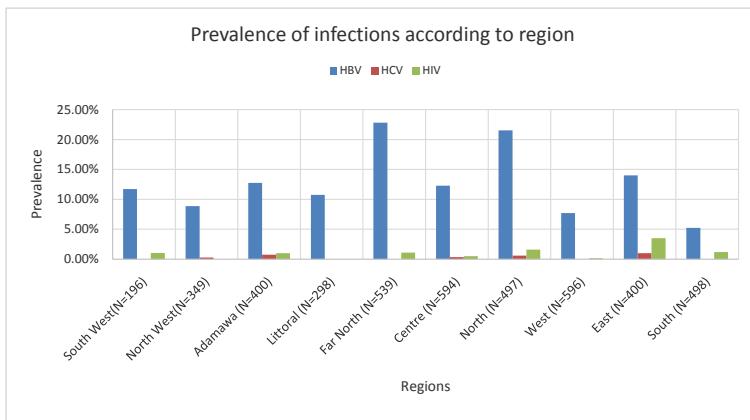
Figure 2 shows region-specific prevalence of HBV, HCV, and HIV infections in 10 regions of Cameroon.

4. Discussion

Most epidemiological studies conducted in Cameroon on the prevalence of viral hepatitis were carried out on target populations. This study stands out in that it was conducted at the national level on apparently healthy individuals in each of the country's 10 regions.

The overall prevalence of HBsAg in this study was 13.01%. It fell within the wide range of prevalence rates recorded in a literature review of various studies conducted in Cameroon on target populations and ethnic groups between 1985 and 2014, with values ranging from 0.7% in a study conducted in 2013 by Rey Cuille *et al.*, [6] within a population of primary school children in 2013, to 25.3% in a study conducted in northern Cameroon by Garrigue *et al.*, in 1985 [7]. A study conducted on blood donors at the University of Douala in 2009 by Mogtomo *et al.*, found a HBsAg carrier prevalence ranging between 6.1 and 16% [8]. Studies targeting pregnant women found prevalence rates ranging between 7.7% and 20.4% [9] [10]. A study conducted in 2013 by Ngo Sack *et al.* among children suffering from sickle cell anaemia at the Yaounde Central Hospital found a prevalence rate of 6.48% [11]. In some ethnic groups, such as the Baka pygmies, the prevalence rates found ranged between 9.4% and 14.2% [12] [13]. However, these studies only targeted certain geographic regions and social groups. They were not representative of the general population. To the best of our knowledge, this study, although it focuses on young adult males only, is the first in Cameroon to describe a healthy population of individuals that comes close to the general population.

Anti-HCV antibodies were found in 0.3% of the subjects in our population, a prevalence rate which, accord-

**Figure 1.** Prevalence of hepatitis B and C viruses, HIV, and co-infections.**Figure 2.** Geographical distribution of HBV, HCV and HIV infections in Cameroon.

ing to a review of literature published between 1992 and 2014 [14] [15], is lower than those found in most studies conducted on target populations in Cameroon. The said studies estimated the prevalence rates to be between 0.6% to 21%. In Egypt, the prevalence rate varies between 5.9% and 26.5% [16]. The rate recorded in our study could be due to the age group chosen, that is males aged below 25. This result is similar to those obtained in 29 surveys in sub-Saharan Africa published by Madhava *et al.* in 2002 that showed that prevalence tended to increase with age. Thus, the specific median prevalence among subjects under 20 years was 1.3% (22 studies, range: 0% - 11%), between 20 and 40 years was 3% (29 studies, range: 0% - 28%), and among those over 40 years was 12% (29 studies, range: 0% - 55%) [17]. This increase in prevalence with age indicates that the risk of HCV transmission increases over time, and is strongly linked to the use of inadequately sterilized reusable equipment [16].

The rate of co-infection with HBV and HCV in our study population was 0.05%, which is lower than the 0.21% reported by Fouelifack *et al.* in a study conducted in 2012 among blood donors at the Yaounde University Teaching Hospital, and close to the result obtained by Noubiap *et al.* (0.01%) in 2013 among blood donors in Edea. It is also lower than that recorded in viral hepatitis treatment centres in France [14] [15] [17]. This result could be due to the fact that our sample population was relatively young.

In this study, prevalence of HBV infection per administrative region was highest in the Far North Region, followed by the North and East Regions with 22.82%, 21.53%, and 14% respectively. These results differed from those obtained by Ducancelle *et al.* in 2013 in the North among pregnant women (20.4%) and those obtained by Fouopouapouognigni *et al.* in the East, in 2011, among the Baka and Bakola Pygmies (11.8%). We recorded the lowest prevalence rate in the South Region, followed by the West with 5.22% and 7.72% respectively.

These results were different from those obtained by Kurbanof *et al.* in 2005 in a population of pygmies and Bantu in the South (9.4%) [9] [12] [14]. These differences are due to the age distribution in the samples, given that our study population was the youngest.

In this study, we found a significant difference in prevalence of HBV infection between regions, a difference which is due to the existence (in the North, Far North, and East Regions, as compared to the rest of the country) of risk factors outlined in the 2011 Demographic and Health and Multiple Indicator Survey (DHS-MICS). Such risk factors include: illiteracy, low level of exposure to the media, polygamy and multiple sex partners, ineffective use of condoms, lack of prenatal care, and the practice of some traditional rites and beliefs [16].

For HCV and HIV infections, the highest prevalence rates recorded in this study were in the East Region, followed by the Adamawa Region. This is due to population movements in these regions, which border countries at war.

5. Conclusion

The overall prevalence of HBsAg in the young male population is high. It tallies with the early vertical and horizontal modes of transmission that prevails in our environment. However, there are regional differences that are partly due to the intermixing of populations in the sub-region. There is need to develop national hepatitis B and C control strategies through the Extended Programme on Immunization and make antiviral and antiretroviral therapies available.

Participation of the Authors

Dominique Noah Noah: design, drafting, and monitoring;

Firmin Ankouane Andoulo: literature review;

Brice Valery Moussima Esoh: Recruitment of test subjects and monitoring of work in the laboratory;

Goeges Nko'Ayissi: statistical analysis;

Servais Albert Fiacre Eloumou Bagnaka: literature review and proofreading;

Magloire Biwole Sida: general supervision.

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