Scientific Research Publishing

Open Journal of Gastroenterology, 2025, 15(7), 360-366
https://www.scirp.org/journal/ojgas
ISSN Online: 2163-9469
ISSN Print: 2163-9450

Factors Associated with the Seroprevalence of Hepatitis B Virus Infection among Military Personnel in the Bouaké Region (Côte d'Ivoire)

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How to cite this paper: Ake, A.F., Kone, A., Diakite, M., Diomande, B., Koffi, O.C., Ahamadou, O.D., Brou, J.-M., Konate, A., Diallo, A. and Okon, J.-B. (2025) Factors Associated with the Seroprevalence of Hepatitis B Virus Infection among Military Personnel in the Bouaké Region (Côte d'Ivoire). *Open Journal of Gastroenterology*, **15**, 360-366.
https://doi.org/10.4236/ojgas.2025.157033

Received: June 13, 2025
Accepted: July 11, 2025
Published: July 14, 2025

Abstract

Background and Aims: The objective of this study was to determine the seroprevalence of hepatitis B virus (HBV) infection and to identify associated risk factors among military personnel stationed in the Bouaké region. **Methods:** This was a cross-sectional descriptive and analytical study conducted from September 2021 to March 2022 at the ENSOA in Bouaké. A total of 227 consenting military personnel were included. Sociodemographic and occupational data, risk behaviors, hepatitis B vaccination history, and HBV serological status (via blood sampling) were collected and analyzed. Comparisons between variables were performed using the chi-square test, with a significance level set at $p < 0.05$. **Results:** The mean age of the soldiers was 32.2 years. The sample included 200 men and 27 women. Most were single (78.9%) and had less than 10 years of service (65.6%). Eleven soldiers reported being vaccinated against hepatitis B. The HBs antigen seroprevalence was 5.29%, predominating among soldiers older than 30 years ($p = 0.002$), single ($p = 0.017$), with over 10 years of service ($p = 0.007$), and who had served on missions ($p = 0.018$). **Conclusion:** Hepatitis B is relatively frequent in the military region of Bouaké, particularly among soldiers over 30 years old, single, with over 10 years of service, and who have served on missions.

Keywords

Hepatitis B, Seroprevalence, Military Personnel, Bouake

1. Introduction

Hepatitis B virus (HBV) remains a major public health issue worldwide. In 2022,

the World Health Organization (WHO) estimated that approximately 254 million people were living with chronic hepatitis B, with 1.2 million new infections each year. This infection causes nearly 1.1 million annual deaths, mainly due to severe complications such as cirrhosis or hepatocellular carcinoma [1].

Côte d'Ivoire is classified as a high-endemicity zone, with an estimated prevalence between 8% and 12% [2]-[4]. Military personnel are among the at-risk groups due to their frequent mobility, young age (often sexually active), and involvement in potentially risky missions (e.g., caring for the wounded, exposure to blood, transfusions, etc.).

Despite this high exposure, few studies have focused on the epidemiology of HBV in this specific population in Côte d'Ivoire [5]. This study, therefore, aims to determine the seroprevalence of hepatitis B virus infection and to identify associated risk factors among members of the National Armed Forces of Côte d'Ivoire stationed in the Bouaké region.

2. Patients and Methods

This was a single-center, cross-sectional, descriptive, and analytical study. It was conducted from September 2021 to March 2022 at the National School for Active Non-Commissioned Officers (ENSOA) in Bouaké. Included were all military or gendarmerie personnel stationed in a unit of the Armed Forces of Côte d'Ivoire in Bouaké who gave informed consent. Civilian personnel and non-consenting military personnel were excluded.

2.1. Study Protocol

This study benefited from the work of the PNLHVi (National Program for the Fight Against Viral Hepatitis) as part of a hepatitis B awareness and screening campaign, from which we inherited the data. The study took place in two phases (clinical and biological).

Clinical phase: Questionnaires were used to collect information on socioprofessional characteristics (age, sex, unit, qualifications, years of service, number of missions inside and outside the country), medical history (transfusions, unprotected sex), and hepatitis B vaccination status. A person was considered vaccinated if they had received three doses of the vaccine.

Biological phase: A 5 to 8 ml venous blood sample was taken and stored in a dry tube, then transported in a cooler at 15˚C - 20˚C to the Diagnostic and Research Center for AIDS and other infectious diseases at CHU Treichville. The samples were centrifuged at 3000 rpm for 10 minutes. HBs antigen and total anti-HBc antibodies were detected using ECL sandwich technique with the COBAS system, and samples were aliquoted for storage (Serotec) pending result validation.

2.2. Statistics

The data collected from the survey forms were recorded and then analyzed using SPSS software version 20.0. A comparison of the observed proportions was per-

formed using either the Chi-square test or Fisher's exact test; the p-value (significance threshold) was considered significant if it was less than 0.05.

2.3. Ethics

The study received ethical approval from the appropriate committee and from commanders of military units in Bouaké. The study protocol was explained to military personnel, and oral informed consent was obtained. The questionnaire was completed anonymously.

3. Results

The study involved 227 military personnel from the Bouaké military region. The average age was 32.2 years (range: 20 to 54). The participants included 10 enlisted soldiers, 214 non-commissioned officers, and 3 officers. The sex ratio was 7.4. Soldiers with less than 10 years of experience were most represented (65.6%), and 79% were single. Eleven participants (4.85%) reported full vaccination. HBs antigen was positive in 12 soldiers (5.29%), and anti-HBc antibodies were positive in 43.6% of cases (Table 1).

Table 1. General characteristics of military personnel.

	Number (n)	Percentage (%)
Sex		
Male	200	88.1
Female	27	11.9
Age Group		
[20 - 30 years[	116	51.1
[30 - 40 years[	63	27.7
40 years and over	48	21,2
Professional Category		
Non-commissioned officers	214	94.3
Enlisted personnel	10	4.4
Officer	3	1.3
Professional Experience		
<10 ans	149	65.6
[10 - 20] years	69	30.4
>20 years	9	4.0
Marital Status		
Married	48	21.1
Single	179	78.9
Reported Being Vaccinated Against HBV		
Yes	11	4.85
No	216	95.15
HBsAg Positive	12	5.29
Total anti-HBc Antibodies Positive	99	43.61

Significant factors associated with HBsAg positivity included age over 30 (p = 0.032), being single (p = 0.027), more than 10 years of service, and having completed missions inside the country (Table 2).

Table 2. Factors associated with HBsAg positivity among military personnel.

	HBsAg Positive	HBsAg Negative	p
Sex			
Male	11	189	1
Female	1	26	
Age			
Age< 30 years	1	118	0.002
Age ≥ 30 years	11	97	
Marital Status			
Married	3	47	0.017
Single	36	141	
Professional Experience			
<10 years	3	135	0.007
≥10 years	9	78	
Subjects declared vaccinated against hepatitis B			
Yes	12	190	0.43
No	0	25	
Risky Sexual Behavior			
Yes	1	11	0.48
No	11	204	
Mission Performed			
Yes	10	104	0.018
No	2	111	

4. Discussion

This study aimed to evaluate HBV prevalence and associated risk factors in a military population in Côte d'Ivoire. Military personnel are typically considered at-risk for viral infections due to mobility, potential blood exposure, and risky sexual behavior. Our study population consisted mainly of young men, similar to findings from studies conducted in Benin and Senegal [6] [7].

Vaccination coverage remains low: only 4.85% reported receiving the full three-dose vaccine regimen. This confirms results from Diop in Senegal and Assi in Côte d'Ivoire, who also reported low vaccination rates [5] [6]. In Côte d'Ivoire, the lack of a national policy for vaccinating at-risk personnel likely explains this low coverage. Consequently, hepatitis B vaccination in high-risk professions depends on

individual initiative [5]. In countries with such policies, like the United States, more than 65% of firefighters are vaccinated against hepatitis B [8]. Approximately 40% of participants had anti-HBc antibodies, indicating prior exposure to HBV, as is common in most African high-endemic countries [9] [10].

The 5.29% HBsAg prevalence found in our study is similar to that of other occupational categories in Côte d'Ivoire [11], the region [12], and some developing countries [13] [14]. However, it is lower than previously reported rates among Ivorian soldiers in 2008 and 2012 (15%) [5] [15]. This may be due to the younger age of the population studied, who could have benefited from infant vaccination introduced in 2001 [16]. Indeed, 52.4% of the soldiers in our study were under 30. Further studies could assess protective antibodies (anti-HBs) to evaluate the real effect of vaccination in this group.

Other factors significantly associated with HBsAg positivity were over 10 years of service, participation in missions, and being single. These findings show that the military profession remains at risk for HBV infection. Risky behaviors like unprotected sex, sharing sharp objects, and blood transfusion were also linked to HBV infection in other regional studies [6] [7] [17] [18].

5. Study Limitations

This study had some limitations. Only soldiers who gave informed consent were included, possibly introducing selection bias. As a cross-sectional study, it cannot establish causality between risk factors and HBV infection. Furthermore, only a univariate analysis was conducted, which did not account for potential confounding factors. Nevertheless, it provides an overview of hepatitis B among soldiers in Bouaké and highlights determinants that may contribute to infection.

6. Conclusion

Hepatitis B is relatively frequent in the Bouaké military region, with a prevalence of 5.23%. It predominantly affects soldiers over 30, single, with more than 10 years of service, and who have completed missions within the country. These factors should be considered in designing better HBV screening and prevention strategies for the armed forces.

Conflicts of Interest

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

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