

# Seroprevalence of Viral Hepatitis Markers B in Secondary School in Abidjan: Advocacy for a Catch-Up Vaccination

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## Abstract

**Aim:** To determine the prevalence of HBs antigen in secondary schools, to appreciate the vaccination coverage of viral hepatitis B and to propose a vaccine catch-up strategy. **Materials and Methods:** This was a prospective cross-sectional study conducted over a two-month period from April 24 to June 24, 2006 among students aged 10 - 15, in two schools (one public and the other private) of the city of Abidjan selected at random. The assay of serum markers of viral hepatitis B of the samples collected after 5 ml peripheral venous sampling was carried out in the viral serology and bacteriology unit of the Pasteur institute of Ivory Coast using the ELISA technique (Enzyme-Linked-Immuno-sorbent-Assay). The ELISA technique is an enzyme immunoassay technique that can detect an antigen or an antibody by highlighting the antigen-antibody reaction. **Results:** Of the 282 students who participated in our study, 5.3% of students (n = 15) were infected with the hepatitis B virus. The majority of students (79.1%, n = 223) did not have no contact with the hepatitis B virus. Only 7.8% (n = 22) of the students were vaccinated against viral hepatitis B. **Conclusion:** The low immunization coverage and the high prevalence of seronegative students reflect the need for a vaccine catch-up policy for adolescents born before the introduction of vaccination against the viral hepatitis B virus in the Expanded Program on Immunization.

## Keywords

Hepatitis B, Prevalence, Vaccination, Catch-Up Vaccination

## 1. Introduction

Viral hepatitis B represents an important cause of morbidity and mortality

worldwide and is a public health problem [1]. In Africa, in south of the Sahara its prevalence is estimated at 3% - 20%; in Ivory Coast prevalence is estimated at 8% - 12% in the general population [2] [3]. Viral hepatitis B, C and D are the leading causes of cirrhosis and liver cancer in Ivory Coast. The low purchasing power of our populations is an obstacle to the management of this affection and its complications. The only way to fight effectively against this disease and its consequences relies on vaccination, but this vaccination against the hepatitis B virus has been introduced in the extended vaccination program in Ivory Coast since 2002. The children involved in our study have not been able to benefit from this program and run the risk of contracting the disease. The aims of this work were to assess the prevalence of viral hepatitis B in secondary school, to appreciate the vaccination coverage of viral hepatitis B and to propose a vaccine catch-up strategy.

## 2. Materials and Methods

This was a cross-sectional prospective study, conducted over a two-month period from April 24 to June 23, 2006, in students aged 10 - 15 years in two schools (one public and the other private) located in two communes of different socio-economic level (low to medium standard for the public school and medium to high standing for the private) of the city of Abidjan and selected at random. The assay of serum markers of viral hepatitis B of the samples collected after 5 ml peripheral venous sampling was carried out in the viral serology and bacteriology unit of the Pasteur institute of Ivory Coast using the ELISA technique (Enzyme-Linked-Immunosorbant-Assay). The ELISA technique is an enzyme immunoassay technique that can detect an antigen or an antibody by highlighting the antigen-antibody reaction.

The parameters studied were: age, sex, prevalence of HBs Ag markers, total anti HBc antibodies, anti HBs antibodies.

Have been declared infected, those with viral markers (HBs Ag, total anti HBc antibodies) were positive and the anti HBs antibody negative.

Have been declared cured, persons had a positivity of anti HBc antibodies, anti HBs antibodies and a negativity of HBs Ag.

Have been declared uninfected and unvaccinated, persons were with negative viral markers (HBs antigen, total anti HBc antibodies, and anti HBs antibodies)

Have been declared vaccinated, persons had HBs antigen negative, total anti HBc antibodies negative and anti HBS antibodies positive.

This study was conducted in accordance with the recommendations in matter of deontology and good practice in epidemiology adopted in 1999 by the association of epidemiologists of the French language and Ivorian regulatory requirements. This protocol was submitted to the opinion of the national committee of ethics of life sciences and health of Ivory Coast (CNESVS).

## 3. Results

A total of 282 students participated in our study, among them, 146 students (88

women and 58 men) came from a public establishment located in the low socio-economic commune. The sex ratio was 0.7 (116 men and 166 women). The average age of the students was 13.11 years with extremes ranging from 10 years to 15 years. **Table 1** summarizes the demographic characteristics of the study population. The majority of students (79.5%, n = 116) of the public institution in the low-socio-economic commune were HVB-negative, immunization coverage was low (6.2%, n = 9), 6 students were infected Hepatitis B virus is 4.1%. **Table 2** shows the distribution of serological data for hepatitis B in the study population.

#### 4. Discussion

In our study, the prevalence of HBs antigen was 5.3%. This average prevalence was close to that found by Migliani at Madagascar (4%) and Said in Tunisia (3.3%) [4] [5]. This same finding was reported by some authors in developing countries where mass vaccination against viral hepatitis B is partially or not yet instituted, so Cisneros-Castolo at Mexico and Gandolfo in Bolivia reported prevalences of 5% and 6.9% respectively [6] [7]. However high rates to ours were

**Table 1.** Characteristics of the 282 students.

Variables	Number (n)	Percentage (%)
<b>Gender</b>		
Male	116	41
Female	166	59
Total	282	100
<b>Socio-economic level</b>		
Low level (public school)	146	51.77
High level (private school)	136	48.23
<b>Age</b>		
Average age: 13, 11 years		
10 - 12 years	91	32.3
13 - 15 years	191	67.7

**Table 2.** Seroprevalence of viral markers of viral hepatitis B among 282 students.

Markers VHB	Number (n)	Percentage (%)
HBs Ag	15	5.3
Anti HBc	37	13.1
Anti HBs	44	15.6
Anti HBc/HbsAg	15	5.3
Anti HBc/Anti HBs	22	7.8
Seronegatives	223	79.1
Immunized	22	7.8

HBs Ag: Hepatitis B Virus Surface Antigen; anti HBc: Hepatitis B Virus Core Antibodies; anti-HBs: Hepatitis B Virus Surface Antibodies.

reported by Rui in Mauritania (13.6%), by Alikor at Nigeria (11%) and by Bougoudogo at Mali (15.8%) [8] [9] [10]. The average rate in our study was still high, compared to data on adolescents in developed countries and other countries where vaccination against viral hepatitis B has been instituted for several years. Gogos, in Greece noted a prevalence of 2.5%, in Italy Bonanni reported a prevalence of 0.9% and at the United States, McQuillan noted a prevalence of 1% [11] [12] [13]. In Brazil, the studies of Tonial *et al.* and Voigt *et al.* carried out in secondary school, among students aged between 10 and 16 years, respectively noted a prevalence of HBs Ag at 0.6% and 0% [14] [15]. This low prevalence in the Brazilian series is explained by the introduction into the official vaccination program, the vaccine against viral hepatitis B for children from 0 to 19 years as well as for pregnant women and at-risk groups. In Ivory Coast the prevalence of HBs antigen is 8% - 12% in the general population, 32.8% in pregnant women and 11.5% in new blood donors [3] [16] [17]. However, the prevalence in our study was not similar to these different prevalences. This difference could be explained on the one hand by the impact of the different campaigns against HIV-AIDS, thus indirectly against HVB and on the other hand by the fact that adults are exposed to all modes of transmission (vertical, horizontal and sexual). Vaccination coverage in our study was 7.8%. this low immunization coverage has been reported by other African authors. Komas in Centrafrica found vaccination coverage of 0% in adolescents [2]. The low vaccination coverage found in our study could be related to a lack of knowledge of the disease by the population. Indeed, a study conducted by Lohouès on the knowledge of viral hepatitis B in secondary school in Abidjan, reveals that although the majority of students were aware of the existence of the disease (79%), this knowledge was insufficient and superficial [18]. The proportion of seronegatives in our study was 79.1%. Rui in Mauritania reported a prevalence lower than ours (32%) [8]. In our study, Davaalkham in Mongolia and Milionis in Greece reported proportions as high as 67.2% and 53% respectively [19] [20]. These uninfected and unimmunized children are potential candidates for subsequent infection when they are older and will have risky activities. Taking into account the hyper-endemic nature of the infection and the relative ignorance of the population about this infection, we propose a mass vaccination catch-up of all preadolescents and adolescents who did not benefit from the extended program of vaccination. This vaccine catch-up in our context of viral hyper-endemicity should be based on a screening strategy based on at least two markers, the HBs antigen and the total anti-HBc antibody.

## 5. Conclusion

The low immunization coverage and the high prevalence of seronegative students who are potential candidates for a subsequent B viral infection indicate the need for a vaccine catch-up policy in adolescents born before the introduction of vaccination against viral hepatitis B in the Expanded Program on Immunization

to reduce the mobility and mortality associated with this infection, which is a public health problem.

### Conflicts of Interest

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

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