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## Seroprevalence of viral Hepatitis B in the Marrakech region

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### Abstract

Viral hepatitis B (HBV) is a major public health problem worldwide. Indeed, the World Health Organization (WHO) estimates that more than 2 billion the number of people who have been exposed to this virus, about 30% of the world population, 18% in sub-Saharan Africa and 41% in Asia, of which 5% with chronic infection or 300-350 million. So the HBV prevalence is 5.4% globally, against 1% for the HIV and 3% for hepatitis C. More than 1 million of them die each year complications essentially cirrhosis and hepatocellular carcinoma.

The diagnostic of HBV (recent or chronic infection) relies on research HBs antigen in the serum of patients, it is the witness of a recent or past infection with HBV according to the presence or absence of other serological markers (HBe Ag, anti-HBs Ig and total anti-HBc and anti-HBe antibody IgM) but they do not provide information on the status of viral replication.

The detection and quantification of HBV genome (replication of viral marker) can be performed in serum, liver tissue or in blood mononuclear cells. They typically based amplification methods: Polymerase Chain Reaction (PCR).

The treatment of viral hepatitis B is for patients with hepatitis B associated with viral replication (HBV DNA positive), cytolysis (elevated transaminases) and presence on biopsy of an activity necroinflammatory or significant fibrosis.

Despite the recent antiviral therapeutics, treatment of chronic hepatitis B is difficult and expensive, and the prevention of HBV infection through routine immunization policy and prevention measures currently remains the best option for reducing morbidity and mortality from liver failure and liver cancer.

Morocco is considered far, according to WHO data, such as having an intermediate prevalence of viral hepatitis B.

Currently, few studies relate the epidemiology of hepatitis B (HBV) in Morocco. The objective of this study was the evaluation of the HBV infection prevalence in a Moroccan workers population, and compare with national and international studies.

A total of 20192 individuals were screened for HBsAg. HBV screening was conducted by immunoassay chemiluminescent micro particle (CMIA) PLC (Abbott Architect) and with a prevalence rate of HBsAg estimated at 0.55%.

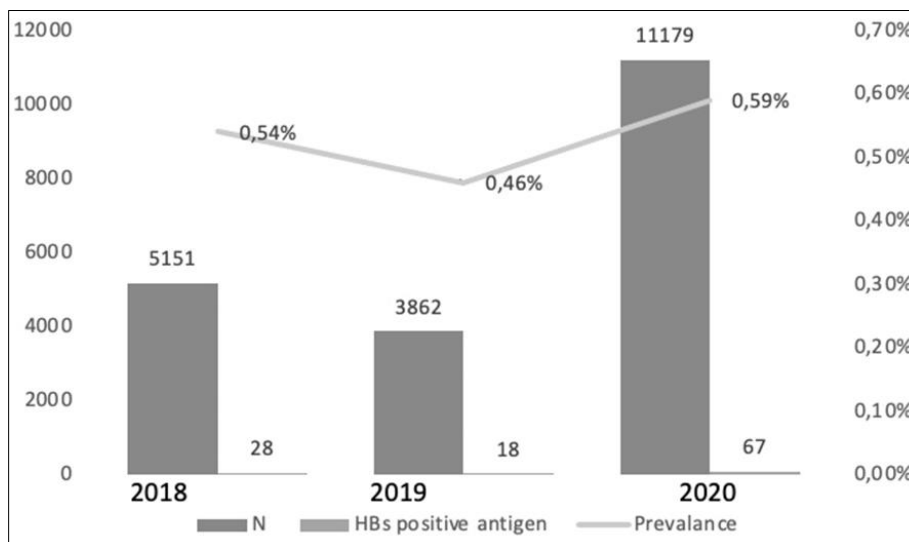
These data are of interest for the diagnosis and prognosis, and therapeutic decision, and can be for the development of an eventual national strategy for the prevention of the transmission of HBV.

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### Graphical abstract



## 1. Introduction

Infection with the hepatitis B virus (HBV) is a major public health problem in the world. 240 million people are chronically infected with HBV worldwide and are at high risk of developing chronic liver disease, namely hepatic cirrhosis, hepatocellular carcinoma and liver failure. They are at high risk of developing severe chronic liver disease; namely, hepatic cirrhosis, hepatocellular carcinoma and liver failure. HBV is one hundred times more contagious than HIV, and can remain stable at 25 C for seven days in dry blood. The virus is found mainly in blood and oozing fluids, while moderate concentrations are found in semen and vaginal secretions, and smaller amounts in saliva, tears and sweat. Morocco is a country considered, according to WHO data, to have intermediate or medium endemicity of hepatitis B. Currently, the epidemiology of HBV is not known with precision in Morocco. Thus, the main objective of this study is to evaluate the seroprevalence of HBV infection in a Moroccan working population in the region of Marrakech.

## 2. Patients and methods

We conducted a retrospective study over 3 years, from January 2018 to December 2020, and included all candidates 20192 recruited in the Royal Armed Forces addressed to the Avicenna Military Hospital of Marrakech for systematic detection of HBsAg.

The samples were collected on a dry tube in the laboratory with an information sheet of age, sex, date and clinical information.

We used as HBV Testing:

- Chemiluminescence microparticle immunoassay (CMIA)
- ELISA testing

## 3. Results

The mean age of the studied population was 20 years, with age ranges from 18 to 23 years. The gender distribution showed a very large male dominance, 20159 men and 33 women.

Of the 20192 samples analyzed, 113 individuals were HBsAg positive, thus an overall HBV prevalence of 0.55%.

Out of 20192 samples analyzed, 113 are HBsAg positive, with a breakdown of the cases and Assessment of HBV seroprevalence by year as follows in figure 1

#### 4. Discussion

Chronic hepatitis B is one of the most widespread diseases in the world, affecting 360 million people. Its distribution is very uneven, with the prevalence varying from 0.1% to 20% depending on the geographical area, thus distinguishing 3 areas with different modes of transmission and risk levels [1],

In Africa, the estimated prevalence is 65 million people in 2007 and an estimated 56-98% of the population has been in contact with HBV [2].

The virological tools useful for the diagnosis, follow-up and treatment of viral infections related to the hepatitis B virus (HBV) are both serological and molecular. In addition to the classical tests for the detection of viral antigens and antibodies to them, new molecular biology techniques now allow a more accurate diagnosis of the disease. More sensitive and precise quantification of viral DNA. New markers, such as the HBV genotype or the profile of amino acid substituents associated with HBV resistance to nucleoside analogues, could also find an indication in clinical practice [3; 4].

Few studies have been done to estimate the prevalence of HBV in Morocco. These studies are old and were conducted among blood donors [5] and health professionals [6], with estimated prevalence of 2.5% and 1%, respectively. Also, two studies were conducted in 2005 and 2009 among patients at risk; the prevalence of HBV infection found are 2% [7] and 15.8% [8], respectively. However, the different groups studied during these studies do not represent the entire Moroccan population. For this reason, the main objective of this study was to estimate the level of HBV infection in Marrakech in a young active population.

The results of the HBs antigen detection performed at the Virological Laboratory of the Avicenna Military Hospital in Marrakech, by the microparticulate immunological test by chemiluminescence (CMIA), show that only 113 people are positive for HBV, that is to say an overall prevalence of 0.55% in the active population. These results place Morocco among the low endemic countries.

The clinical profile of the individuals in our study is not defined: sex, family status, city of origin, occupation, sexual risk, homosexuality, intravenous drug use, history of STIs, dental care, transfusion, dialysis, medical staff, tattooing.

The prevalence rate in this study was 0.55%. This rate is very low compared to national studies: the prevalence of hepatitis B among blood donors in Morocco is 1.34% with a minimum recorded in El Jadida (0.43%) and a maximum observed in Errachidia (2.86%) [9], and 1.66% in a Moroccan working population during a free hepatitis B screening campaign in the following 15 Moroccan cities: Rabat, Sale, Kenitra, Casablanca, Eljadida, Mohammedia, Khouribga, Benslimane, Berrechid, kalaat sraghna, Safi,Settat, Béni Mellal, Marrakech and Agadir [10].

High prevalence is noted in at-risk populations: 4.25% in patients consulting or hospitalized at Cheikh Zaid Hospital in Rabat [11], 2% in hospitalized patients in Casablanca [8].

Morocco is a country considered, according to WHO data, as having an intermediate prevalence of hepatitis B. In addition, the comparative study conducted by André in 2000, between different countries of the world (Middle East, Japan, China, sub-Saharan Africa and North Africa) showed that most African countries, such as Senegal and Egypt, have a high level of endemic except Morocco and Tunisia which are part of the intermediate endemic areas. The results reported in this study show a low incidence of HIV among the active, young Moroccan population, which can be explained by improved health and socioeconomic conditions, STI awareness campaigns and prevention. Currently, Morocco is among the countries that have adhered to the WHO program for vaccination against HBV since 1999. In addition, it has been described that in Morocco, vaccination coverage of children under 1 year of age has increased from 33% in 2000 to 93% in 2005 [13].

The result of our study is in agreement with data reported in Spain, France, and Algeria which show a decrease in HBsAg prevalence due to the improvement of local sanitary conditions and the systematization of hepatitis B vaccination since 2015.

A Spectacular decline in HBV infection rates has also been achieved in Asia-Pacific and sub-Saharan Africa following the introduction of the hepatitis B vaccine into the national immunization program. The rate of infection in these countries has increased from 8% to 1% [14]. Similarly for the United States where the incidence has decreased by 78% between 1990 and 2005 from 8.5 to 1.9 per 100,000 population [15]. The study of HBsAg prevalence by sex has shown a male dominance regardless of age group, due to the large male dominance in the military environment. These results are in

agreement with those obtained by a study conducted in Italy [16]. DNA testing and genotyping was not performed on the serum of patients infected with hepatitis B virus in our study. However, other studies have shown the existence of two types of genotypes in Morocco using the Line Probe Assay (Lipa) based on the principle of reverse hybridization on the sera of infected patients: type D (96.6%) and type A (3.4%) [10]. This result shows that the D genotype dominates in the samples analyzed, which confirms the results found by Kitab et al in 2011 who were able to identify in Moroccans with chronic hepatitis B the presence of the D genotype and the A genotype with, respectively, a prevalence of 90% and 10% [17]. These data are also consistent with the literature which indicates that the D genotype is common in the Mediterranean basin countries [18].

The distribution of HBV types throughout the world is ubiquitous. However, since the genotypes reflect the evolution of HBV, their geographic distribution is not homogeneous. Thus, given the geographical area occupied by Morocco, the A genotypes lead us to explore the hypothesis of a possible importation of the hepatitis B virus from one of the areas where this genotype is dominant.

HBV genotypes have a distinct geographic distribution and influence the clinical outcome of HBP including the risk of HCC [19]. In the literature, the role of A and D genotypes in disease progression remains controversial; some studies have suggested that the D genotype is associated with a more severe course of infection, while others suggest that it progresses more slowly to hepatocellular carcinogenesis [19].

In conclusion, it can be said that it turns out that the genotype has a negligible effect on the evolutionary profile of viral hepatitis B. The influence of HBV genotypes on the response to antiviral treatment has also been studied. A and B genotypes have been associated with a better response to interferon compared to C and D genotypes [20].

## 5. Conclusion

Morocco is located among the countries with medium endemicity by WHO for viral hepatitis B. WHO estimates the prevalence of HBV between 2 and 2.5% in the general population.

According to our study, conducted from 2018 to 2020, HBV seroprevalence in the young working population was estimated at 0.55%.

Screening for hepatitis B should be routine in pregnant women and at-risk individuals. This approach is important for the identification of chronic HBV carriers, which will allow the disease to be detected at an early stage, thus increasing the chances of recovery or stabilization, because many HIV-positive people do not show any symptoms for years, while the virus continues to multiply and induce lesions in the liver, up to a stage of sometimes serious complications that will manifest themselves late. Screening will help prevent further contamination by encouraging individuals identified as carriers of the virus to take steps to prevent the spread of the virus.

## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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