

# Hepatitis B Screening and Evaluation of Hepatitis B Vaccination Status Among Medical Staff at Med VI University Hospital of Marrakech (CHU)

**Amaddah Radia<sup>\*</sup>, Hamraoui Amina, Bahri Raihan, Saffour Hajar, Soraa Nabila**

Department of Microbiology, Mohamed VI University Hospital Center of Marrakech, Marrakech, Morocco

## Email address:

Radiat.sa@gmail.com (A. Radia)

<sup>\*</sup>Corresponding author

## To cite this article:

Amaddah Radia, Hamraoui Amina, Bahri Raihan, Saffour Hajar, Soraa Nabila. Hepatitis B Screening and Evaluation of Hepatitis B Vaccination Status Among Medical Staff at Med VI University Hospital of Marrakech (CHU). *American Journal of Laboratory Medicine*. Vol. 4, No. 4, 2019, pp. 74-78. doi: 10.11648/j.ajlm.20190404.12

**Received:** May 20, 2019; **Accepted:** July 9, 2019; **Published:** July 30, 2019

**Abstract:** The study's aim is to evaluate the vaccination status against viral hepatitis B and the prevalence of HBs antigen in the medical staff of the University Hospital of Marrakech. This cross-sectional survey was conducted at the level of the various hospital services with the medical staff of Med VI University Hospital of Marrakech. A systematic search for the antigen/antibody pair level (Ag HBs/Ac antiHBs) and anti-nucleocapsid antibodies (Ac antiHBc) was performed in every person who participated in this study. A total of 172 doctors participated in the screening; the participation rate was 74%. 93% of the screened physicians were unaware of their serologic status with respect to the hepatitis B virus and 36% were not vaccinated against hepatitis B. The prevalence of HBsAg was 1.7% in our context with only one identified case of cure. As for the risk factors studied. In properly vaccinated doctors, 77% were immunized ( $\geq 100$  IU / l) and this immunization rate was 8% in people who received 2 doses of vaccine. Health personnel constitute a population at risk for both infection and transmission of the Hepatitis B virus. Hence, raising staff awareness and introducing compulsory HBV vaccination for all health professionals is important.

**Keywords:** Health Staff, HBsAg, Mohamed VI University Hospital Center of Marrakech, Vaccination Status

## 1. Introduction

Hepatitis B, with its ubiquitous virus, represents a real problem to public health.

The complications are serious and often late. Once infected, 10% of immunocompetent patients will become chronic carriers. More than half of them will develop cirrhosis or hepatocellular carcinoma [1].

According to the WHO, in 2015, more than 257 million people are chronically infected with the hepatitis B virus. 887000 patients died from Hepatitis B infection. The rate of virus infection varies from a region to another [2]; rates are around 6% in Africa and the Western Pacific. It is 3.3% in the eastern Mediterranean region; in South-East Asia it is 2%, 1.6% in Europe and 0.7% in the Americas.

In Morocco, the estimated number of people infected with the hepatitis B is 2.5% [3]. This percentage could be even higher for some vulnerable groups. Sexual behaviors are the

main risk factors of HBV transmission.

The highest virus concentrations are found in the blood [3], but HBV is also present in sperm and vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, and ascites fluid, even in the absence of blood. HBV is highly infectious and can be transmitted in the absence of blood either through direct contact or through a contaminated object. It remains infectious for up to 7 days in the environment [3, 4]. Because of this high viral load, HBV infections are particularly contagious, 10 times more than the hepatitis C virus and 100 times more than HIV [5]. There are four modes of transmission [5]: parenteral, sexual, maternal-fetal and non-sexual intrafamilial.

Infection with the hepatitis B virus is an infection associated with care but also nosocomial; the doctor may be exposed but may also be the vector. The transmission of caregiver-treated HBV depends essentially on the surgical procedure or care, its duration, its gravity, the occurrence of

intraoperative complication, but also the viremia of the caregiver [6]. The high viremia of the hepatitis B virus causes the presence in the serum of excess viral particles (the HBs antigen). This antigen has allowed an early vaccination approach and prevention against hepatitis B virus infection because of its simplicity and efficacy [2, 7].

In Morocco, vaccination against hepatitis B virus is not mandatory for health staff. The objective of this study is to evaluate the vaccination status against viral hepatitis B and the prevalence of HBs antigen in the medical staff of the CHU (University Hospital) of Marrakech.

## 2. Method

### 2.1. Study Population

This is a descriptive cross-sectional study conducted on 15<sup>th</sup> June 2018 in multiple Hospital departments on the medical staff of the Med VI University Hospital of Marrakech, including anyone present the day of the study having voluntarily agreed to participate in this investigation. Medicine, nursing, pharmacy, physiotherapy and nutrition students were not included in this study.

### 2.2. Methodology

The questionnaires were given by hand, by the first author. Personalized oral information about the purpose of the study and a reminder of the vaccine recommendations of health professionals were made during the distribution. All Sheets have been filled by the person concerned. The following demographic characteristics have been recognized: age, gender, status, origin, specialty, and department.

We have asked to the participants:

- a. if he had a medical history; injections, dental care, surgery, blood transfusion, hemodialysis, pheresis.

- b. if he had risky sexual behavior, the use of drugs.
- c. the notion of accidental exposure to blood, the status of the patient and whether the accident has been declared.
- d. its vaccination status, the regimen followed, the number of doses administered, the date of the last booster and whether it had already benefited from an anti-HBs antibody assay.

Each form is accompanied by a blood sample for serology.

The viral serologies were made at the microbiology laboratory at the Mohamed VI University Hospital Center in Marrakech. A systematic search of the antigen / surface antibody pair (HBsAg / AcantiHBs) with titration and anti-nucleocapsid antibody (AcantiHBc) was carried out in every person who participated in this screening. This research was performed by the Microparticle Chemiluminescent Immunoassay (CMIA) on the Abbott Architect i2000.

## 3. Result

A total of 172 people participated in the screening of a group of 230 doctors present on the day of the survey. The participation rate was 74%. The average age was 29.7 years with extremes ranging from 24 years to 40 years and a sex ratio M / W of 0.7.

### 3.1. Prevalence of HBsAg in Medical Staff Participating in Screening

The prevalence of HBsAg was 1.7% in our context (n = 3).

Vaccination against HBV was found in 63% (n = 110) of the screened staff.

Immunized persons presented 32% of cases (n = 56) and only one case of was found to heal from hepatitis B.

Doctors who did not know their vaccination status accounted for 93% of those participating in the screening.

**Table 1.** Distribution of the Screened Population by Vaccine Status and HBsAg Status (n = 172).

|                            | vaccination status |            |                               | HBS Ag serologicalstatus |          |          |
|----------------------------|--------------------|------------|-------------------------------|--------------------------|----------|----------|
|                            | Non vaccinated     | vaccinated | Incomplete vaccination schema | immunized                | Negative | Positive |
| internal medicinephysician | 12                 | 15         | 18                            | 14                       | 46       | 0        |
| Residentmedicinephysician  | 42                 | 48         | 28                            | 39                       | 118      | 3        |
| specialistdoctor           | 1                  | 1          | 0                             | 3                        | 5        | 0        |

### 3.2. Risk Factors for HBV Infection

As for the risk factors studied, 85% of those surveyed had had at least one blood-exposure accident, and in this case the source patient's serology was sought in only 20% of cases. 1.1% (n = 2) of the doctors had already been transfused,

1.1% had attended pheasants (extracorporeal photopheresis and extracorporeal plasmapheresis).

The risk factors identified in this population were: BEA, dental care, transfusion, and pheresis.

**Table 2.** Risk Factors for HBV Infection Among Medical Staff Participating in Screening.

| Risk factors | Negative Serological HBs Ag status |            | Positive Serological HBs Ag status |            |
|--------------|------------------------------------|------------|------------------------------------|------------|
|              | Number                             | Percentage | Number                             | Percentage |
| BEA          | 144                                | 85         | 3                                  | 100        |
| Dental care  | 95                                 | 54         | 1                                  | 33         |
| Surgery      | 17                                 | 9.8        | 0                                  | 0          |
| Transfusion  | 2                                  | 1.1        | 0                                  | 0          |
| Pheresis     | 2                                  | 1.1        | 0                                  | 0          |

#### Vaccination Status:

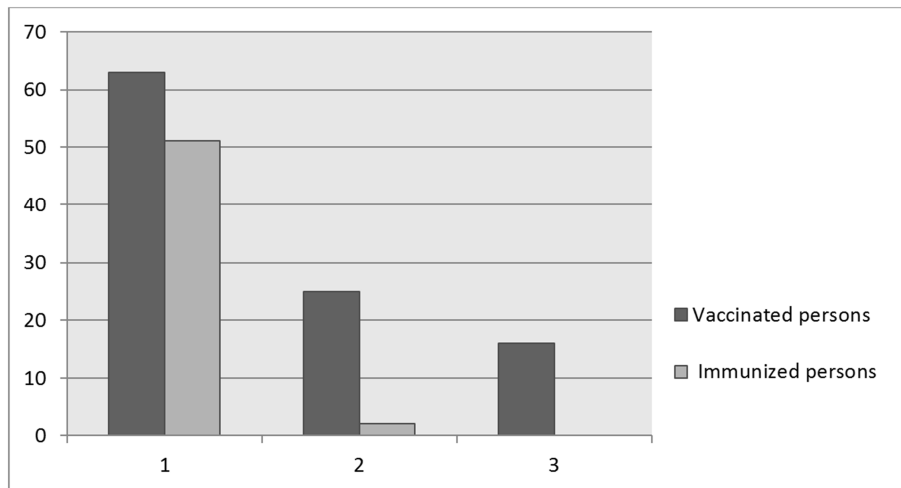
93% of physicians were unaware of their HBV serologic status and 37% were not vaccinated against hepatitis B.

63% of screened participants (n = 110) had received at least one dose of the vaccine and 61% (n = 67) had been correctly vaccinated.

Of those who were vaccinated, 72% had followed the

vaccination schedule of 3 doses administered (0-1 -6) and 23% had followed the 3-dose regimen (0-1-2) with a booster at one year.

For correctly vaccinated individuals (n = 67), 77% were immunized ( $\geq 100$  IU / l) and this immunization rate was 8% in those who received only 2 doses of vaccine.



**Figure 1.** Physician Immunization Rates by Received Vaccine Levels.

## 4. Discussion

The number of participants in this cross-sectional study was 172 people with a participation rate of 74%. The average age was 29.7 years with a sex ratio H / F at 0.7.

93% of the screened physicians were unaware of their serologic status with respect to the hepatitis B virus, which is similar to that of the infectious disease service in Dijon [8] where most of the staff did not know their antibody levels.

Vaccination coverage against HBV is still insufficient, only 38% of the doctors exposed to the risk of infection by this virus received the 3 doses of vaccine; Versus 87% for general practitioners in the Loire department [9], 73% for Belgian doctors, 88% for German doctors and between 80 and 90% for French hospital doctors [10, 11], and 93% health professionals in an infectious disease service in Dijon [8]. This alarming rate is due to lack of knowledge about the virus and the optional nature of vaccination.

The risk for carers to encounter the virus increases with its prevalence among patients, the chronic nature of the infection, the severity of the BEA. In case of exposure, HBV is the most frequently implicated virus because of its high resistance in the external environment and the very high number of virus particles present in the blood [12].

In addition, HBV is present in other biological fluids. In this study, more than 80% of physicians confirmed having had at least one BSE during their lifetime. In France, the annual number of cases of hepatitis B acquired following an EAS has significantly decreased thanks to the legal requirement of immunization and the application of the

standard prevention precautions against EAS [13]. The serology of the source patient was not systematically sought.

Of those who received the 3 doses of vaccine, 77% were immunized with a rate of ACHBs  $\geq 100$  IU / l, This rate was correct because in the adult population, 10 to 15% of people do not develop protective antibodies after vaccination [14] and are consequently not protected against viral infection. After exposure and in the presence of an anti-HBs AC level  $\geq 100$  IU / l, the immune system is able to induce protection in the event of exposure to a wild strain of HBV by an immediate viral neutralization mechanism. But currently it is considered that the immune system, once it has been able to produce protective Ac, will be able, by a mechanism of immune memory [15], to induce protection in case of new contact with HBV, making recalls unnecessary even if the anti-proteases were no longer detectable in the serum [16].

The most followed vaccination schedule was that of 3 doses (0-1-6) (72%) joining the vaccination recommendations of 2011 [17]: "In the general population, a preferential regimen in three injections, which respects an interval of at least one month between the first and second injection and between five and 12 months between the second and third injection ". For 23% of physicians, the adapted pattern was that of 3 doses followed by a one-year recall. This regimen is adopted either in post exposure without serological research of the source patient or in search of a rapidly acquired immunization following a self-awareness. Post-exposure vaccination limits the spread of the virus. In 2016, the High Council of Public Health published a report on post-exposure vaccination [3].

**Table 3.** Indication of HBV serovaccination in case of EAS for non-immunized persons.

| Source person                 | Indications                            |
|-------------------------------|----------------------------------------|
| Positive                      | Immunoglobulins (Ig) HBV + vaccination |
| Unknown: highprevalence group | Immunoglobulin (Ig) HBV + vaccination  |
| Unknown: lowprevalence group  | Vaccination                            |

The prevalence of HBsAg in this study was 1.7%. This prevalence seems low compared to Moroccan data from 2003 [18] where the prevalence was found to be 3.1% among health personnel, and at least one serological marker of HBV was found in 5.1% of health care staff [19]. It might be thought that this decline would be related to vaccination campaigns carried out in hospitals. In Morocco, which is a country classified by WHO among the mid-endemic areas, the prevalence is estimated at 3.3%. This prevalence is higher than the one given by another Moroccan study (*Sbai and all*), it was estimated at 1.66% [20]. In Europe, the prevalence of HBsAg among medical staff varies between 0.3% and 3% [6].

Infection with the hepatitis B virus is a care-associated infection and nosocomial; the doctor may be exposed but perhaps the vector. The transmission of caregiver-treated HBV is reported several times in the literature. Most of these occurred before the availability of hepatitis B vaccination and the reinforcement of universal hygiene precautions, and occurred during BEA followed by contact with the patient's tissue. In cases of high risk of exposure to blood (GHRES) [21], "any invasive surgical procedure involving the digital palpation of the tip of a needle in a body cavity" and "maneuver involving the simultaneous presence of the fingers of a health professional and a needle or other sharp or pointed instrument or object in an anatomical site that does not allow visual or highly confined control" [6].

The risk of caregiver-care transmission depends mainly on the surgical procedure, its duration, its severity, the occurrence of intraoperative complication, but also the viremia of the caregiver; the risk increases from 5% if HBeAg negative to 43% if it is positive [12]. According to the serological status of the staff, in 2003 a group of European and American experts developed a logarithm for the management of infected staff; if the HBeAg is positive, do not practice GHRES or on expert opinion. In the event of negativity of HBeAg, staff are allowed to practice GHRES, but only if the annual viral load of HBV is achieved.

## 5. Conclusion

This cross-sectional survey reports a prevalence of viral hepatitis B of 1.7% among medical staff with vaccine coverage against HBV, which is still insufficient. The majority of screened physicians were unaware of their Human immunodeficiency virus (HIV) status and the most common vaccination schedule was 3 doses (0-1-6).

Health personnel constitute a population at risk for both infection and transmission of the Hepatitis B virus. This survey highlights the underestimation of the risks associated

with the transmission of this virus by medical personnel. Hence, raising staff awareness and introducing compulsory HBV vaccination for all health professionals is important.

## References

- [1] Natural history of infection with hepatitis B virus, Stanislas Pol, Presse Med, Masson, Paris 2006; 35: 308-16.
- [2] The World Health Organisation. <https://www.who.int/fr>
- [3] Post-exposure vaccination: development. Post-exposure prophylaxis for vaccine preventable infectious diseases, É. Canoui a, b, O. Launay a, b, c, Journal of Anti-infectives (2017) 19, 72-88.
- [4] US public health service. Updated US public health guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis. MMWR Recomm Rep Morb Mortal Wkly 2001; 50: 1-52.
- [5] B viral hepatitis, Buffet, Continuing Medical Education, Masson Paris, 2005.
- [6] Medical Fitness of Caregivers with Chronic Hepatitis B Infection, Medical Fitness to Work with Chronic Hepatitis B, P. Krief et al, Archives of Occupational Diseases and the Environment, April 2012.
- [7] Vaccination against hepatitis B, chronic hepatitis B, Françoise Degos, Presse Med., Masson Paris, 2006; 35: 347-52.
- [8] Vaccination coverage of health professionals in an infectious disease service, Vaccination coverage of healthcare professionals in an infectious diseases department, M. Duong, Medicine and infectious diseases 41 (2011) 135-139.
- [9] Vaccination status of general practitioners in the Loire department, France, Vaccination status of family physicians in the Loire district, France, N. Paya, Medicine and infectious diseases 43 (2013) 239-243.
- [10] Semillon P, Gourbin C, Legrand D, Meyer A, Roland M, Paulus D, et al. Assessment of vaccination coverage of general practitioners in the French Community and in the Brussels-Capital Region. Rev Med Brux 2006; 27: 292-302.
- [11] Current vaccination status of healthcare personnel in Brandenburg Saxony and Saxony-Anhalt. Voigt K, Gesundheitswesen 2008; 70: 408-14.
- [12] Exposure at risk of viral transmission (BAE), Occupational and non-occupational exposure to viral risk, M. de Roche et al., The Journal of Internal Medicine 2018.
- [13] Update Standard Precautions. Health Institutions, Medico-Social Institutions, City Care. Hygiene, XXV; 2017.
- [14] Long-Term Efficacy of the Hepatitis B Vaccine in Tunisia, W. Hachfi, Posters / Medicine and Infectious Diseases 46 (2016) 50-57.

- [15] Are immunization booster needed for lifelong hepatitis B immunity? European consensus group on hepatitis B immunity. *Lancet* 2000; 355: 561-5.
- [16] Hepatitis B immunization after the consensus meeting, Françoise Degos, Masson Paris 2005.
- [17] Vaccination Recommendation High Council of Public Health.
- [18] Epidemiology of infection with viral hepatitis B and C, Mrani S, Sakhsokh Y, Gille Y, Baaj A. *Cah Med* 2003; 4 (66): 87-8.
- [19] Assessment of Knowledge, Attitudes and Practices on Blood-Exposure Accidents in Health Care Settings in Morocco, O. Laraqui, O. Laraqui, *Medicine and Disease, Assessing knowledge, attitude, and practice on occupational blood exposure in caregiving facilities infectious diseases* 38 (2008) 658-666.
- [20] Prevalence of hepatitis B virus infection and risk factor assessment in Morocco, Hepatitis B prevalence and risk factors in Morocco A. Sbai et al., *Pathology Biology* 60 (2012) e65-e69.
- [21] F. Lot, in collaboration with GERES. Occupational HIV, HBV, HCV infections in caregivers. The update as of June 30, 2012, accessed on July 13, 2018.