

# Prevalence of Hepatitis B and C Virus in Health Care Personnel in Ibn Sina Hospital, Rabat, Morocco

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## Abstract

Risk of infection by hepatitis B (HBV) and C (HCV) viruses remains a permanent problem, not only for health care workers but also for patients. It is often a major public health concern in low incomes countries. The aims of this study were to determine seroprevalence of viral hepatitis B (HBV) and C (HCV), frequency occurrence of blood exposure accidents (BEA) and identify key risk factors for infection among 601 health care workers of Ibn Sina Hospital in Rabat. In this study nineteen health personnel (3.16%) were HBsAg positive and fifteen (2.50%) were anti-HCV antibodies positive. The seropositivity to hepatitis B and C in the surgical department respectively was 4.22% and 3.45%. Nurses were the most affected by hepatitis virus infections. We noticed that HCV came first with a prevalence of 4.44%. The seropositivity reached its acme within the health staff having practiced for more than 20 years, hepatitis C coming first with a prevalence of 4.27%. Globally, 34 health care personnel are positive for HBV or HCV, 32 among them were victims at least once of blood exposure accident (BEA) while practicing. The needlestick represented 81.25% of the BEA type. Prevalence of hepatitis B and C serologic markers in health care workers in our Hospital outnumbered that of the general population. Nurses, surgery department personnel and the professional having worked for a long time were the main factors behind the high risks of infections.

## Keywords

Hepatitis B Virus, Hepatitis C Virus, Blood Exposure Accident

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## 1. Introduction

The risk of infection with infectious viruses from viral hepatitis B (HBV) and C (HCV) among health care per-

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sonnel is a major public health issue, especially in low incomes countries. Indeed, care providers are exposed to different types of infections where one of the main germ reservoirs may be the patient. The infection can be directly transmitted by the patient or indirectly through contact with blood, body fluids or equipments [1].

In the literature, the prevalence of viral hepatitis B and C markers among health staff vary according to authors and countries. In Morocco, no prevalence study of hepatitis B and C among health personnel has been published yet.

The aims of this study were to determine seroprevalence of viral hepatitis B (HBV) and C (HCV), frequency occurrence of blood exposure accidents (BEA) and identify key risk factors for infection among health care personnel of Ibn Sina Hospital in Rabat.

## 2. Material and Methods

Ibn Sina Hospital is a university center in Rabat capital city of Morocco, where exercises 1189 health care workers. During the first trimester of 2010, the Bacteriology-Virology Laboratory of Ibn Sina Hospital in Rabat conducted a cross-sectional, descriptive and seroepidemiologic study of viral hepatitis B and C among volunteer health care workers (units agents, nurses, laboratory technicians, doctors and administrators,) working in different units. After they agreed, the persons included in this study were sampled and responded to a confidential questionnaire which aimed to identify:

- Sociodemographic data: age, sex, unit, occupational category, seniority;
- History data of blood exposure accident (BEA): their types, frequency, declaration;
- Vaccination status data against hepatitis B virus.

Search for surface antigen (HBsAg) and HCV-Ab was performed by ELISA technique (reagent: Monolisa<sup>®</sup> HBV BIO-RAD and reagent: Murex anti-HCV ABBOTT<sup>®</sup> Version 4.0 “ELISA 4th generation”). Positive results were confirmed by a second test AxSYM, Abbott Diagnostics (AxSYM HBsAg V2 and AxSYM HCV 3.0). All tests were realized according to the recommendations of the manufacturers.

## 3. Results

Among 1189 hospital employees, 601 (50.54%) agreed to participate to this study. They were 242 (40.26%) men and 359 (59.74%) women; the mean age was 42.30 years (range 22 to 59). The distribution of health care personnel according to their social data is reported in **Table 1**. HBsAg was positive in 19 cases (3.16%) and HCV-Ab were positive in 15 cases (2.50%). No HBV-HCV coinfection was detected.

According to unit, the highest seroprevalence of HBsAg and HCV-Ab was seen in surgical units (respectively 4.22% and 3.45%), where all categories were affected, except administrators group. Nurses were the occupational category the most infected with those viral infections, especially with HCV (4.44%). However, the difference between the different occupational category was not significant ( $p > 0.05$ ). The mean age of HBsAg positive staff was 41 years with a sex ratio of 0.58 (7H/12F) and that of HCV-Ab positive staff was 43.5 years with a sex ratio of 0.87 (7H/8F). Infection with either hepatitis viruses B or C reached its peak after 20 years of seniority. HCV-Ab were at first rank with a rate of 4.27% and was not detected among the staff under 10 years of seniority. On the other hand, HBsAg, although reaching its maximum after 20 years of practice (3.92%), was detected regardless the seniority, even in those having worked for less than 5 years (2.70%) (**Table 1**).

During this study, among 34 hepatitis B and C seropositive health care staff, thirty-two cases (94.12%) had at least one blood exposure accident (BEA) during their careers, much more than among staff negative for HBV or HCV markers (406 of 567; 71.6%) reported a BEA ( $p < 0.01$ ). Among infected staff, bites by dirty needles represented 81.25% of all type of accidents involving exposure to blood (BEA), far above cuts (12.4%) and eye projections of blood (3.12%) and blood on an open wound (3.12%). Reporting of BEA by staff is very rare. Only 2 of 32 (6.25%) declared the BEA among which a nurse who contracted HCV by needlestick contaminated with a patient infected by HCV.

## 4. Discussion

In our hospital, the prevalence of HBsAg (3.16%) and HCV-Ab (2.50%) is more important than the general population of Morocco (1.81% for HBV [2] and 1.58 for HCV [2]) and blood donors (0.95% for HBV [2] and 0.9% to 1.2% for HCV [2]-[4]), which means that the risk of infection with viral hepatitis B or C in our hospital

**Table 1.** Frequency of HBsAg and anti-HCV among health care personnel according to their socio-professional data.

Risk factors	Number of personnel	HBsAg+		P	Anti-HCV+		P
		Number	%		Number	%	
<b>Sex</b>				NS			NS
Male	242	07	2.90		07	2.80	
Female	359	12	3.40		08	2.20	
<b>Age groupe (years)</b>				NS			NS
20 - 29	47	01	2.12		00	00	
30 - 39	116	04	3.44		01	0.86	
40 - 49	235	09	3.82		05	2.12	
>50	203	05	2.46		09	4.44	
<b>Unit</b>				NS			NS
Surgery	261	11	4.22		09	3.45	
ICU	63	02	3.18		00	00	
Laboratory	95	03	3.16		02	2.10	
Medicine	114	02	1.76		03	2.63	
Radiology	46	01	2.17		01	2.17	
Administratif sector	22	00	00		00	00	
<b>Occupational category</b>				NS			NS
Doctors	147	04	2.72		00	00	
Nurses	248	10	4.03		11	4.44	
Laboratory technicians	58	02	3.45		01	1.72	
Duty officers	126	03	2.38		03	2.38	
Administrators	22	00	00		00	00	
<b>Years in occupation</b>				NS			NS
<5	37	01	2.70		00	00	
5 - 10	101	03	2.97		00	00	
10 - 20	182	04	2.19		03	1.64	
>20	281	11	3.92		12	4.27	
<b>TOTAL</b>	601	19	3.16		15	2.50	

NS: Not significant.

is actually increased. The comparison with the population of healthcare workers in other countries has shown that the prevalence of HBsAg found in our institution is similar to that found in Egypt [5] and Nigeria [6] and still higher than that found in Mexico [7], Turkey [8] and Japan [9], whereas it is lower than those reported in Uganda [10], Syria [11] and Singapore [12] (Table 2). This high prevalence of HBsAg could reflect a failure in the vaccination despite the vaccination campaign against hepatitis B carried out among health care personnel. Indeed, this vaccination policy that began in 1996 in Rabat does not reach its aims since only 20.1% of the staff was vaccinated in 2001 [13] and 30.2% according to Djeriri in 2005 [14]. In our study only 34.77% of the staff was correctly vaccinated. Indeed, during this study, many members of the nursing staff reported that the vaccination scheme was not always respected. It seems that if all 3 injections were necessarily carried out, the time between these three injections was not fully respected. Furthermore, the monitoring of the immunization response by quantification of anti-HBs was performed in only 5.32% of vaccinees. The vaccination protocol recommended by WHO is an injection at month 0, 1 and 2 with strict time limits of 30 days, since there is approximately 10% of non-or poor responders [1]. O. Laraque *et al.* found that post-vaccination serology (detection of anti-HBs antibodies) at the University Hospital of Rabat has been achieved in only 1.8% of vaccinees [3].

**Table 2.** HBsAg and anti-HCV seroprevalence among health care personnel in other countries.

Study	Number of personnel	HBsAg+	Anti-HCV+
Uganda 2003 [10]	311	8.9%	ND
Syria 2001 [11]	189	6%	3%
Singapore 1988 [12]	693	4.5%	ND
Egypt 1989 [5]	765	3.2%	ND
Nigeria 2005 [6]	325	3.2%	ND
Turquie 2004 [8]	595	2.7%	5.4%
Japan 1997 [9]	1638	1.1%	2.8%
Mexico 2006 [7]	376	00%	0.8%
South Africa 2002 [19]	402	ND	1.8%
Tunisia 2005 [16]	885	ND	1%
Germany 1991 [17]	1018	ND	1.2%
Australia 1990 [20]	294	ND	2%
Italy 2004 [22]	511	ND	3.8%
Hungary 2001[15]	477	ND	2.7%
Spain 1993 [21]	784	ND	2%
America 1993 [18]	1677	ND	1.4%

ND: Not determined.

The prevalence of HCV-Ab of 2.50% found among 601 health care personnel from our institution is similar to that found in Syria [11], Hungary [15] and Japan [9], but higher than that recorded in Mexico [7], Tunisia [16], Germany [17], America [18], South Africa [19], Australia [20] and Spain [21] (0.8% to 2%). This seroprevalence is still lower than that found in Italy [22] and Turkey [8] (Table 2). The high prevalence of HCV-Ab and HBsAg seropositivity in the surgical units joined many French studies in which the surgery units were leading with a rate of 30% [23]-[25]. In Turkey, Kosqeroqlu, N. *et al.* [8] have noticed that 59.4% of health care personnel seropositive for hepatitis B or C belong to surgical units.

The analysis of seropositivity to HBV and HCV markers according to the age showed a higher seroprevalence of HCV in our care staff after 50 years with a rate of 4.44%, while for Ag HBs the highest prevalence was found between 40 and 49 years (3.82%). HBsAg was detected in all age groups in contrast with HCV-Ab that were detected only above 30 years old and especially above 40 years old, as reported in other countries. Mihály *et al.* [15] found that the seroprevalence of HCV-Ab increases with age, from 0% at 21 years to a maximum reached above 50 years. Proietti L *et al.* [26] in southern Italy found that the seroprevalence of antibodies to HCV was the highest in an age above 45 years. The low seroprevalence of HCV-Ab in the youngest in our study reflects what is described in the same age groups from young recruits from the army (0.35%) [27].

Nurses were the most affected by those viral infections, especially by HCV with a seroprevalence of HCV-Ab of 4.44%. The significant prevalence of nursing staff found in our study corroborates the majority of the literature [8] [15] [16] [23] [28]. The population concerned is the one with an important volume of work and high risk care actions: phlebotomy, arterial, muscle and intravenous injections, sutures, wound dressings and especially recapping needles which is the action during which occurs the majority of BEA.

The seroprevalence of infection with either HBV or HCV among health care personnel reached its peak in staff with a seniority above 20 years, the HCV is in first place with a rate of 4.27% and is not among the staff who are under 10 years of occupation, unlike the HBV where the risk exists regardless of seniority, ranging from 2.70% for less than 5 years of professional occupation to 3.92% beyond 20 years of practice. In Turkey, Kosqeroqlu, N. *et al.* [8] have noticed that the lowest seroprevalence of hepatitis B or C is for a period of occupation between 0 and 5 years and the highest is between 16 and 20 years.

The epidemiological profile of BEA reported in our study is similar to that already described in other studies where needlestick injuries accounted for the majority of BEA: 75% by GERES [29], 88% for the committee against the nosocomial infections of Hôpital Ibn-Roshd of Casablanca [13], 80% in Paris-Nord [30], 73% in

Ivory Coast [31], 86.2% in Japan [32] and 60% in France [29]. The rate (94.12%) suffered high BEA personnel infected in our series has corroborated the data from the literature: 93% in Nigeria [28], 82% in the (Nord-Pas-de-Calais) France [25] and 78% in Chile [33].

## 5. Conclusions

The prevalence of serological markers of viral hepatitis B and C in our hospital personnel exceeds that of general population. Nurses, surgery personnel, operating rooms and seniority were main risk factors for these infections.

The respect of universal health precautions by the medical staff as well as the establishing of a correct vaccination scheme against viral hepatitis B are urgently required to decrease the risk of infection with hepatitis B and C viruses and protect the medical staff in Morocco.

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