

## SHORT ARTICLE

## HBV and HCV in Health care workers and students of a newly established Tertiary care hospital at Rishikesh: Prevalence and immunity status

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### Abstract

**Background:** Hepatitis B and C cause serious infectious disease of the liver which affects millions of people worldwide. More than 2 billion people living today have been infected with Hepatitis B virus (HBV) at some time in their lives and about 350 million people are carriers of the virus. **Aim:** To detect HBV and HCV infection and assess HBV immunity status amongst healthcare workers, medical students and nursing students at AIIMS Rishikesh. **Methods:** 135 participants (Medical faculty, Nursing Faculty, Resident Doctors, laboratory technicians, laboratory attendants, medical and nursing students) were enrolled for the study. Serological tests HBsAg, anti-hepatitis C virus antibodies (anti-HCV), anti-HBs antibodies, were performed. None were positive for HBsAg 1.5% were positive for Anti HCV antibodies and 61.75% had protective levels of antiHBs. **Conclusion:** HBV vaccination and screening for HBV, HCV, and anti-HBs of all HCW and students at time of entry should be done. Yearly screening thereafter should be done to check as follow up. Regular training on HBV vaccination and safe practices should be emphasized at all levels of HCW.

### Keywords

HBV; HCV; Anti HBs; Health care workers

### Introduction

Hepatitis B and C are most common causative agents of chronic hepatitis, which are asymptomatic in most individuals and can lead to liver cell failure and hepatocellular carcinoma. Frequency of exposure of HCW to HBV is influenced by HBV endemicity. Thus, 90% of such HBV infections occur in Asia and Africa. (1)

Hospitals in these countries are overburdened, and HCW provide service to large populations with HBV carrier rates of 5-10%. More than 70% of HCW in hyper or intermediate endemic countries have been reported to have needle stick injuries, with an average of two needle pricks a year and four needle pricks during their active professional life. However, less than 30% of needle stick injuries were reported to appropriate authorities.(2,3,4,5)

The study was planned to help us to detect HBV and HCV infection and also to ascertain the HBV vaccination status

and immune status of healthcare workers, medical students and nursing students. Since AIIMS Rishikesh is an upcoming Tertiary care hospital, there is an urgent need to develop a policy for vaccination, surveillance and post exposure management protocol for not only HBV but other blood borne viral diseases in healthcare workers and students who are at risk for occupational exposures to these infections. This policy would furthermore reduce risk of transmission these infections to not only health care workers but also to patients.

### Aims & Objectives

**Aim:** To detect HBV and HCV infection and assess HBV immunity status amongst healthcare workers, medical students and nursing students at AIIMS Rishikesh.

**Objectives:** To screen for HBsAg and anti HCV antibodies in healthcare workers, medical students and nursing students.

1. To assess Hepatitis B infection status, HBV vaccination and Immunity status.
2. To assess the status of HBV infection and vaccination status amongst healthcare workers.

## Material & Methods

This study was conducted in the Department of Microbiology, AIIMS Rishikesh. Hundred and 135 participants were enrolled for the study. Participants consisted of Medical faculty, Nursing Faculty, Resident Doctors, laboratory technicians, laboratory attendants, medical and nursing students. After obtaining an informed written consent from each participant, they were asked to complete a questionnaire consisting of their age, gender, Hepatitis B vaccination status, their job description, past history of occupational exposure to blood and body fluids and educational level.

Blood sample was drawn from each participant under strict aseptic precautions in a plain vacutainer. Blood was allowed to clot and serum separated and stored at  $-8^{\circ}\text{C}$  until further testing. Serological tests (HBsAg, anti-hepatitis C virus antibodies (anti-HCV), anti-HBs antibodies, were performed using commercially available ELISA kits according to the manufacturer's instructions. Anti-HBs titers of  $>10$  mIU/mL was considered protective. After serological evaluation individual recommendations were made for HBV vaccination. The following policies were drafted:

- Post exposure management for occupational exposures to blood and body fluids which would ensure first aid, prophylactic drugs, active and passive immunization, serological and clinical follow up of affected individual.
- HBV vaccination and screening for anti HBs antibodies titers in all categories of health care workers.

## Results

The overall prevalence of HBsAg and anti HCV in health care workers and students was found to be 0% and 1.5% respectively. (Table 1)

The only student found to be anti HCV positive was in her first semester, and was not vaccinated against hepatitis B and had anti-HBs titers less than 10 IU/L. It is possible that the HCV positivity in this case might be due to unknown risk factors other than those associated with the profession of HCWs. The possibility of a chronic carrier state in this student cannot be ruled out since this was detected within the first semester of her admission in the healthcare setup. One of the resident doctor who was found to be HCV positive gave history of Road traffic accident 7 years back and had received blood transfusion from a private nursing home. He was asymptomatic till now. HCV RNA PCR was done and 50,000 HCV RNA copies/ml were detected and he was put on Daclatasvir and Sofosbuvir for 12 weeks. After completion of course HCV RNA PCR was repeated and no copies were detected. (Table 2)

## Discussion

Prior to the availability of the hepatitis B vaccine, numerous cross-sectional surveys showed that HCWs had a three to five-fold higher seroprevalence of HBV infection than the general U.S. population. Prevalence rates of HBV infection of 13 to 18% have been demonstrated among surgeons and infection rates up to 27% have been demonstrated among dentists and oral surgeons in comparison to about 4% of first-time blood donors. Seroprevalence surveys among hospital-based HCWs in western countries have found rates of anti-HCV similar to (0.5%) or lower than those estimated to occur in the general population. (6)

Since tests for Hepatitis-B surface antigen (HBsAg) and anti-HBs have become available; world-wide studies on healthcare professionals have indicated that the prevalence of HBsAg, HCV and anti-HBs varies from 0-15%, 1-2% and 15-70% respectively. (7,8,9)

India has been categorized as having intermediate endemicity of HBV with 2-4% HBsAg prevalence in general population. Health care workers fall into high risk group, but none were detected in our study population which is in spite of the fact that this group was not fully HBV vaccinated. In a recent study from Mumbai in 2017, out of 1347 hospital staffs, 0.4% were HBsAg positive and 0.1% were anti HCV positive. Only 54% had complete HBV vaccine coverage. (10)

Earlier Indian studies have reported HBV infection rates among HCW to be 10% in 1992, 2.21% in 1998, 1.7% in 2006, 1% in 2008 and 0.4% in 2010. (7,11,12,13,14) This decreasing trend is most probably due to increasing awareness regarding these infections and hepatitis B vaccination.

Out of 37 doctors, 32 were fully vaccinated and only one was a non-responder, in nursing staff out of 18 none had taken HBV vaccination but 38.9 % (7) had protective anti-HBs levels. Six students were fully vaccinated and all had protective levels of antibodies and 5 out of 8 (62.5%) who were partially vaccinated had protective levels of anti HBs, and 50% of students who could remember vaccination status or had no vaccination history had protective levels of anti HBs. Similarly, all lab technicians and attendants who were vaccinated had protective levels of anti HBs and 4 out of 14 (28.6%) who could not give vaccination history had protective levels of anti HBs.

A study in PGIMER Chandigarh showed that majority of the nursing students, i.e. 75.2% (188/250), were not vaccinated or vaccination status was not known. Of the ones who had received a complete course of HBV vaccination, 82.2% (51/62) showed protective levels. The anti-HBs antibody levels in students who were unvaccinated or where vaccination status was not known was 36% (17/47) and 29% (42/141) respectively. As per their history sheets, none of these students had any previous suffering due to hepatitis (14). Hence it can be

deduced that unvaccinated group in our study may have developed the anti-HBs antibody due to subclinical infection/exposure like that noticed by Singh et al (14)

**Conclusion**

HBV vaccination and screening for HBV, HCV, and antiHBs of all HCW and students at time of entry should be done. Yearly screening thereafter should be done to check as follow up. Regular training on HBV vaccination and safe practices should be emphasized at all levels of HCW.

**Recommendation**

1. HBV vaccination policy to be implemented. All non-vaccinated, non-responders, without protective levels of antiHBs should be vaccinated.
2. Screening for HBV, HCV, and antiHBs of all HCW at time of entry should be made mandatory and if no antiHBs is detected vaccination should be done
3. HBV, HCV, and anti HBs levels should be monitored yearly for HCW's.
4. Students should be screened at time of admission to college.
5. PEP policy to be implemented (testing source patient and HCW and administration of PEP drug, Nodal officer –Microbiologist for testing and maintaining Registry, and referral to Physician for medication). Medicine to be kept in Medicine OPD and Emergency.)
6. Regular 6 monthly Training on UWP to all staff and students (funds to be allotted for same).
7. Set up ICTC center- Area, personnel, PEP drugs.

**Limitation of the study**

Screening for anti HBc and HIV antibodies could give additional information

**Relevance of the study**

It shows that HBV vaccination has brought down levels of HBV infections.

**Authors Contribution**

All authors have contributed equally.

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**Tables**

**TABLE 1 HBSAG STATUS IN HEALTHCARE WORKERS**

Category	Total	HBSAg positive	Anti HCV positive	Anti Hbs positive (>10 IU/Lt)
Doctors	37	0	1(2.7%)	32(82.1%)
Nurses	18	0	0	07(38.9%)
Students	60	0	1(1.67%)	34(56.7%)
Lab attendants and Technicians	20	0	0	10(50%)
<b>TOTAL</b>	<b>135</b>	<b>0</b>	<b>2(1.5%)</b>	<b>83(61.5%)</b>

**TABLE 2 RELATION OF PROTECTIVE LEVELS OF ANTI-HBS ANTIBODIES WITH VACCINATION STATUS IN HEALTHCARE WORKERS**

Category	Total Anti Hbs negative	Total	Doctors	Nurses	Students	Lab attendants/ Technicians
		Anti Hbs positive	N= 37	N =18	N=60	N= 20
Completed HBV Vaccination (3 doses)	1	30	23(76.7%)	0	3	4
Completed HBV Vaccination + Booster dose	0	13	9(69.2%)	0	3	1
HBV Vaccination (2 doses)	1	4	0	0	3	1
HBV Vaccination (1 doses)	3	2	0	0	2	0
Non HBV Vaccinated/not known	47	34	0	7	23	4
<b>TOTAL</b>	52	83(61.5%)	32(86.5%)	7(38.9%)	34(56.7%)	10(50%)