

## ORIGINAL ARTICLE

# Knowledge and Awareness of the Health Care Workers about the Hepatitis B Infection and their Vaccination Status in a Newly Started Medical College

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## Abstract

**Introduction:** Healthcare workers (HCWs) are at high risk of hepatitis B virus infection (HBI) and so the present study was carried out to assess the knowledge of HCWs in a tertiary care medical college about HBI and hepatitis B vaccine (HBV).

**Methods:** After obtaining approval from Institutional Ethics Committee and informed consent from the study participants, HCWs that included teaching faculty, resident doctors, medical students, nurses, laboratory technicians, administrative staff and support staff (ward boys, attendants and sweepers) were administered a validated questionnaire. Descriptive statistics was applied for the categorical variables and the Chi-square test of association was used to assess the statistical significance of variables.

**Results:** A total of 300 HCWs were recruited for the study. Although, the overall knowledge amongst all the HCWs was found to be 68%, only 35.3% HCWs knew the transmission risk by needle stick injury (NSI). Similarly, only 40% correctly knew the precautions to be taken for preventing an NSI and 17% for the steps to be taken to disinfect a blood splash. Almost 92.7% (278/300) HCWs were aware about the availability of a vaccine, of which only 41% (1123/300) knew that vaccine will not work in case the patient is already infected. When asked about the steps to be taken in case of an NSI in non-vaccinated HCWs, only 54.7% (164/300) replied about treatment with both immunoglobulin and vaccination. A total of 160 (53.3%) HCWs were found to be vaccinated. The most common reason for not taking vaccination included an improper understanding of HBV and the infection it causes.

**Conclusion:** To conclude, the study highlights good knowledge about hepatitis B infection with requirement of more emphasis on the practical aspects of management in a case of NSI/blood splash and can guide to improve the vaccination status and knowledge of HBI amongst HCWs.

transmission is via a needle stick injury (NSI) and through an increased exposure to blood and body fluids.<sup>2,7,8</sup> Prevalence of HBI amongst HCWs due to NSI has been reported being between 1 and 31%, the variability being attributed to differences in the respective diagnostic methods.<sup>5</sup> The WHO has estimated that 3 million NSIs occur every year amongst HCWs, 66,000 (2.2%) of which result in the victim developing serological positivity for HBI.<sup>1,8</sup> The HCWs infected with Hepatitis B while on duty have been reported to be 1% from an Indian study.<sup>5</sup>

HBI can be prevented by an effective vaccination schedule which has an efficacy of upto 95%.<sup>9</sup> India introduced the Hepatitis B vaccine for vaccinating HCWs in 2002, and since then a drastic reduction in the prevalence of HBI was observed.<sup>10</sup> However, there were no standard monitoring procedures for vaccination of HCWs, leading to a poor coverage in this population.<sup>2</sup> Further, the efficacy of Hepatitis B vaccine was adequate only if three doses were administered.<sup>2</sup> Lack of awareness of HBI along with a poor coverage of vaccination program are major hurdles in prevention of the disease amongst HCWs.<sup>2,5,11</sup>

The term HCWs in our study includes not only clinicians, surgeons and medical students but also laboratory personnel, administrative staff, support staff (ward boys, attendants, sweepers). However, the same is not true for a large majority of other similar studies who have focused either on medical students or nurses only.<sup>12-14</sup> Hence, we initiated the present study to assess

## Introduction

Hepatitis B infection (HBI) is a blood-borne viral disease affecting the general population with India being in its intermediate prevalence zone. The prevalence of HBI in the general population varies between 3.1 and 11%<sup>1-3</sup> and nearly a million deaths have been reported annually due to chronic liver disease complicating HBI.<sup>4</sup>

Health care workers (HCWs) have been identified amongst the 'high risk' population for contracting the disease.<sup>1</sup> HCWs are exposed to patients with HBI as well as asymptomatic carriers of the

Hepatitis B virus (HBV) and thus are at higher risk of acquiring the disease. A report has estimated that HCWs are at a four times greater risk for HBI as compared to the general public.<sup>5, 6</sup> Interestingly, surgeons, laboratory staff and staff dealing with hemodialysis are at a greater risk as compared to physicians and dentists.<sup>6</sup>

The most common mode of

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**Table 1: Knowledge of HCWs about Hepatitis B infection.**

Knowledge	Total responses	Correct responses [n (%)]
Hepatitis B is a virus	300	270 (90.0)
Correct knowledge of transmission of infection	5700	4191 (73.5)
HCWs are more at risk of HBV	300	239 (79.7)
Knowledge about signs and symptoms of acute HBI	2100	1294 (61.6)
Awareness about asymptomatic phase of HBI	300	196 (65.3)
Whether treatment available for Hepatitis B infection	300	205 (68.3)
Infective agents of transmission	3000	1842 (61.4)
Precautions to prevent infection	4800	3370 (70.2)
Blood bags are tested for HBV infection	300	255 (85.0)
Chances of transmission by NSI is 30%	300	106 (35.3)
Correct steps known in case of NSI	196	78 (39.8)
Correct steps known in case of blood splash	168	29 (17.3)
Grand total	17764	12075 (68.0)

the knowledge of HBI and HBV in a recently functioning medical college from India.

## Methodology

### Study design and ethics

A cross-sectional, questionnaire-based qualitative study was carried out amongst the health care workers (HCWs) of a newly started medical college in Mumbai between May and September 2016. The study was initiated after the approval from the Institutional Ethics Committee and after obtaining informed consent from the study participants.

### Study participants and study procedure

The following categories of HCWs were included: teaching faculty, resident doctors, medical students, nurses, laboratory technicians, administrative staff and support staff (ward boys, attendants and sweepers).

A structured questionnaire was prepared by the study team - which included two medical students, a microbiologist and a gastroenterologist - and was subsequently administered to the study participants. The questionnaire (Appendix) was validated for content validity and

field validity. Test-retest reliability was assessed using Cohen's kappa coefficient (0.8).<sup>14</sup> The questionnaire had the following themes: demographic and general information of the participants on gender, employment status, year of appointment in the present institute, years of experience at present institution, overall years of experience in the hospital set up/medical field; The second theme was related to the knowledge and awareness of the participant in regards to HBI and the last one was about knowledge about HBV.

### Statistics

Descriptive statistics using proportions was carried out for all the variables. Chi-square test was carried out for association of categorical variables. With a type 1 error of 5%, power of 80% and population size of 1000 and an expected prevalence of 50%,<sup>12</sup> sample size has been calculated to be 280, rounded to 300.

## Results

### Demographics

The validated questionnaire with reliability coefficient of 0.8 (Cohen's kappa co-efficient), was administered to the HCWs. A total of 454 HCWs gave consent for participation and the questionnaire was subsequently provided to them. 66.1% of them (300/454) returned completely filled questionnaires.

Of these 300, 16.0% (48/300) questionnaires were received from faculty teachers, 13.7% (41/300) were resident medical doctors (hereby will be called as residents), 17.3% (52/300) were first year medical students, 13.0% (39/300) were nursing staff, 16.7% (50/300) were laboratory technicians, 12.0% (36/300) were administrative staff and 11.3% (34/300) were support staff.

Of the 300 HCWs, 42.0% (126/300) were men, and the rest 58.0% (174/300) were women with mean (SD) age of 32 (11) years. Amongst the HCWs who were working, 45.0% (135/300) had experience of less than one year, 30.3% (91/300) had experience between one to five years, and 24.7% (74/300) had experience of more than five years in the medical field.

### Knowledge about hepatitis B infection

The overall knowledge amongst all the HCWs was found to be 68.0%.

90.0% of HCWs knew that Hepatitis B is a virus (Table 1). However, correct knowledge about its transmission, risk to HCWs, signs and symptoms, asymptomatic phase, treatment modality, infective agents and preventive measures were found to be slightly above 60%. Surprisingly, only 35.3% (106/300) HCWs knew the chances of HBI transmission by needle stick injury (NSI) to be 30%. Similarly, only 39.8% (78/196) correctly knew the steps to be taken for preventing needle stick injury and 17.3% (29/168) for disinfecting a blood splash.

### Knowledge about modes of transmission and clinical features of HBV

The responses regarding the correct knowledge about the transmission of HBV were given correctly by more than 70% HCWs for all the modes of transmission, except for blood donation (44.0%), contaminated food (62.0%) and contaminated water (62.0%). HCWs were well acquainted with infective agents for transmission of HBI (>60% answered correctly). However, knowledge about saliva being a mode of transmission (36.0%, 108/300); urine not being one (49.7%, 149/300) and for amniotic fluid being one (59.7%, 179/300) (which may not be known to some) was low. Knowledge was found to be better in residents (90.4%) followed by faculty (89.4%) and lowest amongst administrative staff (45.6%) and support staff (37.9%).

Regarding the clinical features of HBI, most of the questions were answered correctly (>70.0%). However, symptoms like diarrhoea (40.0%), breathlessness (53.3%) and the asymptomatic phase (41.7%) were poorly known. Nearly 4/5<sup>th</sup> of the study participants correctly identified the precautions related to blood transfusion and using a condom during sexual intercourse.

### Knowledge about Hepatitis B vaccine

Of the total, 92.7% (278/300) HCWs were aware of the availability of vaccine, of which only 41% (123/300) knew that vaccine will not work in case patient is already infected prior to vaccination.

Although 64.7% (194/300) HCWs had knowledge regarding the number of doses required to constitute a complete course of vaccination, only 32.3% (97/300) HCWs knew about the importance of carrying out the

**Table 2: Occupation-wise distribution of knowledge about HBI and HBV (%)**

	Faculty	Residents	Medical Students	Nurses	Lab technician	Admin staff	Support staff
Over all knowledge about Hepatitis B infection	82.7	82.2	62.4	74.3	74.9	43.6	39.1
Knowledge about mode of transmission	89.4	90.4	69.1	83.4	85.7	45.6	37.9
Knowledge about signs and symptoms of acute infection	75.3	72.8	50.0	65.9	62.9	50.8	51.3
Knowledge about infective agents	78.3	72.4	60.0	67.7	73.0	36.1	28.8
Knowledge about preventive measures	87.2	88.4	67.5	74.5	75.4	44.6	42.8
Correct steps in case of NSI	31.3	31.7	19.2	51.3	38.0	2.8	0.0
Correct steps in case of blood splash	20.8	14.6	3.8	7.7	14.0	2.8	0.0
Knowledge about Hepatitis B vaccine	63.9	59.6	44.9	51.0	56.4	33.6	28.4

subsequent anti-HBs titer test for checking the efficacy of vaccination. The HCWs agreed that there is a need for anti-HBs testing post vaccination (78.7%, 236/300) but almost the same number (83.7%) wanted the test to be done even for the general public, which is not required.

When asked about the precautions and actions to be taken following a needle stick injury (NSI) in an non-vaccinated HCW, only 54.7% (164/300) replied regarding treatment with both immunoglobulin and vaccination. However, when asked if the same incidence occurred with a prior vaccinated HCW, only 18.7% (56/300) replied that there is no need for treatment in regards to hepatitis B.

When asked about the appropriate time for taking vaccination, 67.2% (195/300) responded that the vaccination can be taken anytime whereas 26.9% (78/300) and 5.9% (175/300) said during childhood and during adulthood respectively.

#### Sub-group analyses of knowledge of the study participants

Table 2 lists the differences observed in the proportion of study participants with correct knowledge on various aspects of HBI and HBV. As expected, a statistically significant increase in proportion of overall knowledge of HBI was observed with faculty and resident doctors followed by other streams of participants. However, the knowledge of faculty and residents who are actually been approached for treatment/guidance in case of an NSI/ blood splash was found to be poor (almost less than 30%), the same was nil for support staff and only 2.8% for administrative staff.

#### Vaccination status of HCWs

Of the total, 53.3% (160/300) HCWs

were found to be vaccinated, which includes 83.33% (40/48) faculty; 87.8% (36/41) residents; 32.7% (17/52) medical students; 66.7% (26/39) nurses; 64% (32/18) laboratory staff; 25% (9/36) admin staff and none (0/34) of the support staff.

Of the total, only 17.3% HCWs had got themselves tested for HBI. Only 45.0% (72/160) took the booster dose and only 21.9% (35/160) had tested for anti-HBs titer post vaccination. 40.0% (64/160) were vaccinated 'on the job' whereas 33.1% (53/160) during college. 20% said that they were vaccinated during their childhood while 6.3% (10/160) were unaware when they were vaccinated. 43.7% (131/160) took the complete course of vaccination while 7.7% (23/160) took less than three doses.

#### Motivation factors for vaccination

Of the total, 36.3% (109/300) HCWs responded to the question related to the motivation factor for vaccination of which 33.9% (37/109) replied that they took vaccination as they were aware of HBI while 12.8% (14/109) took due to job related needs and 11.9% (13/109) opined that this was a pre-requisite for their jobs. 10.0% (11/109) said that they had fear of getting infected or they saw a hepatitis B infected patient. Guidance of family members [8.3% (9/109)] and that of a family doctor [5.5% (6/109)], hospital policy and teacher's motivation [3.7% (4/109)] were also motivational factors. 2.8% (3/109) HCWs took vaccination at their vaccination program while another 3 took the vaccination on their own. 0.9% (1/109) each was inspired to take vaccination from reading books, watching television, under influence of peers and informed during an orientation program for MD students. 0.9% (1/109) HCW did not know his/her motivation factor for vaccination.

#### Reasons for not taking vaccination

Of the total, 46.7% (140/300) HCWs provided 174 reasons for not taking vaccination. The most common reason was lack of knowledge of the existence of the vaccine [32.1% (45/140)]. Lack of knowledge of HBI [20% (28/140)] and lack of knowledge of necessity of vaccination [28.6% (40/140)] were also common. The other reasons were a lack of time for vaccination [11.4% (16/140)]; or the conception that the vaccine is only for children [7.1% (10/140)] or that the vaccine is too expensive [7.1% (10/140)].

#### Training program for creating awareness about HBI and HBV

Of the total, 6.3% (18/288) HCWs underwent training related to HBI. 98.3% (283/288) voiced their desire to participate in such training programs.

#### Discussion

This study was carried out in response to the recent decision by the Ministry of Forest, Environment and Climate Change (MoFECC), Government of India of mandatorily monitoring and administering the complete course of hepatitis B vaccination to all HCWs.<sup>15</sup>

The medical college in which the present study was carried out, started in 2015. However, the hospital attached to it was established in 1970. The hospital started out with only 30 beds, but presently boasts a bed strength of 636.

It was observed that 33.9% (154/454) HCWs did not return the questionnaire and thereby declined to participate in the study indicating a lack of knowledge, possibly due to apathy and/or low level of awareness about hepatitis B infection in a proportion of HCWs. Nearly 2/3<sup>rd</sup> of the participants had fair knowledge regarding HBI and 93% were aware of the availability of HBV but only half of them were vaccinated.

Greater proportion of patients with adequate knowledge of HBI was observed in our study compared to previous other studies.<sup>1,7,16</sup> However, we observed a poor understanding of the study participants (particularly supporter staff) regarding the precautions to be taken in case of a NSI and blood splash. This reiterates the need for undertaking training sessions at frequent intervals to sensitize all

HCWs for incorporating a safe practice.

It was also found out that nearly 1/4<sup>th</sup> of the study participants were lacking knowledge of the modes of transmission of HBI which was much lower than the estimates of other studies<sup>17</sup>. This could possibly be due to a misunderstanding between Hepatitis B virus and other hepatitis viruses. Additionally, similar to other studies,<sup>18</sup> saliva was not identified as an infectious sample in our study.

This study highlights that the knowledge of women is significantly higher ( $p < 0.002$ ) than men which is similar to the findings of Ghomraoui *et al*, 2016<sup>19</sup> and Thakur Singh *et al*, 2015.<sup>20</sup> However, Tatsilong *et al*, 2016<sup>16</sup> has shown men to be 3.2 times more knowledgeable than women, while Abiola *et al*, 2016<sup>7</sup> has shown no statistically significant difference between genders. This observation could also be attributed to more number of female nurses participation in this study, who deal with patients with HBI on a daily basis.

It was also found in the present study that a significant difference in knowledge existed between faculty, residents, support staff and administrative staff, as was also observed in other similar studies.<sup>16</sup>

When compared with the years of experience in medical field, surprisingly, the HCWs with less than or equal to one year of experience had more knowledge as compared to other groups. This is contradictory to the findings of other similar studies, which show no significant difference of knowledge between groups with different years of experience in the medical field.<sup>7,16</sup> This could be attributed to recently acquired knowledge of the newly joined HCWs or to better health education in school/colleges or to a wider media related awareness.

It was found in this study that fair knowledge regarding HBV was prevalent amongst HCWs, unlike a recent study from Korea among Family Medicine residents where the authors have reported an appropriate knowledge among just 10% of the study participants.<sup>21</sup> Although fair knowledge of HBV was observed amongst all the study participants, only 50% of treating doctors (faculty and residents) knew about the correct management of NSI in vaccinated, as well as non-vaccinated

HCWs. This is notable, especially because most of the other cadres have reported to be relying on doctors to provide appropriate management of an NSI.

We also observed a low vaccination status of HCWs in the present study, which is similar to the findings of other similar studies.<sup>5,22</sup> The outlined reasons for not vaccinating were also similar to other similar studies.<sup>19,15</sup>

### Strengths and limitations of this study

The present study gives an in-depth view of the existing knowledge and awareness about hepatitis B infection and the present vaccination status of the HCWs thereby giving direction for further planning about training sessions and vaccination program at the institute.

The present study used an extensive validated questionnaire with Cohen's kappa co-efficient of 0.8. This study was carried out in a newly started medical college. All the employees themselves filled the questionnaire, thus reducing the possibility of investigator bias. The participants were from diverse occupational classes thus providing the complete representation of an institution.

### Limitations

We could not highlight the reasons for not knowing the steps of management for NSI/blood splash as we did not expect such poor knowledge for the same.

The education level of the participants was not noted for the present study.

The sample size was not large enough for sub-stratification and post-hoc sub-group analysis.

### Conclusion

To conclude, the study highlights good knowledge about HBI and a need to emphasize on the practical aspects of management in case of NSI/blood splash. This may improve the vaccination status and knowledge of HBI amongst HCWs.

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### Availability of data and materials

Data will be available from the corresponding author upon request.

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