



Original Research Article

Awareness and vaccination status of Hepatitis B among health care workers in a tertiary care teaching hospital of Central India

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ABSTRACT

Objective: Healthcare workers (HCWs) are at high risk for Hepatitis B virus (HBV) infection. This study aimed to assess awareness about HBV and its vaccination status among HCWs working in our hospital.

Materials and Methods: Randomly selected HCWs, with equal representation from 5 different groups, viz. consultants, resident doctors, nurses, technicians and house-keeping staff were included. Pre-validated questionnaires, focused on testing elementary knowledge about the virus and its vaccine, were used. HBV vaccination coverage was assessed through personal interview and review of records, if available, and reasons for incomplete vaccination or no vaccination were recorded.

Results: Among the 150 HCWs recruited, significant difference in knowledge of HBV and its vaccination was observed among the different strata of HCWs. While consultants were best informed about the virus and the vaccine, awareness was generally poor among the housekeeping staff. Though majority of HCWs (62.67%) reported receiving all 3 doses of HBV vaccine, documentation of the same was maintained by only 30.67% of the participants. The main reason for incomplete vaccination was the long time gap between the doses (40%), while the main reason for not getting vaccinated was lack of awareness about its need (28%).

Conclusion: Our study identifies the gap areas in achieving the goal of 100% coverage of HBV vaccination among HCWs. We find that attitudinal changes and sustained awareness campaigns are input to achieving this goal even when employer-mandated supplies are available in the hospital. Maintenance of documentation of vaccination and estimation of anti-HBs titers are other deficient practices that need to be implemented in hospitals.

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1. Introduction

Hepatitis B virus (HBV) is highly infectious and causes serious health problems worldwide. The major complications of chronic HBV are cirrhosis and hepatocellular carcinoma.¹ Health Care workers (HCWs) are at high occupational risk of HBV infection owing to increased chances of percutaneous and mucosal exposure to infected blood and body fluids.^{2,3} HBV-infected HCWs also pose a potential risk for patients as there is documented

risk of HBV transmission to patients from treating doctors or medical staff.⁴ According to WHO, 5.9% of HCWs are exposed annually to HBV infections, corresponding to about 66,000 HBV infections in HCWs worldwide.⁵ The risk of developing clinical hepatitis is reported to be from 1-6% to 22-31% among HCWs who sustained injuries from HBV contaminated needles.^{6,7}

Even though there are infection control practices and administration of hepatitis B immune globulin following suspected exposure to reduce the risk of HBV transmission, none have been as effective as active immunization with hepatitis B vaccine.^{8,9} There is a need to vaccinate all HCWs with 3 doses of vaccine at 0, 1, and 6

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months as a matter of policy and provide post exposure prophylaxis after having significant exposure to patient's blood¹⁰ Reports from India indicate that only 16-60% of HCWs have received complete HBV immunization. Though paramedics have a higher risk of HBV transmission, their HBV vaccination coverage is relatively lesser than that of doctors.^{10,11}

Awareness and knowledge about HBV and Hepatitis B vaccine is of paramount importance in the prevention of HBV related infection among HCWs. Even though, the vaccine is readily available, vaccination coverage and knowledge about the virus is deficient among many HCWs. In a study conducted in Nepal, it was found that 4% and 61% of HCWs were unaware of the fact that hepatitis B and hepatitis C can be transmitted by needle-stick injuries respectively. Only 60% of HCWs had been vaccinated against hepatitis B. Seventy four percent of subjects had history of needle-stick injuries, but only 21% reported the injuries to the hospital authority.¹² For any institute, baseline information on vaccination status of HCWs and their awareness level about the HBV and its prophylaxis constitute the basis for health care policies related to biosafety.

Considering the professional hazard of HBV infection across all categories of HCWs and in view of the potential utility of Hepatitis B vaccination in preventing the life-threatening complications of this infection, we decided to undertake a gap analysis to assess the awareness level of a randomly selected group of HCWs working in a tertiary care teaching institute of Central India regarding the various aspects of HBV infection and prevention. The secondary objective of our study was to ascertain the extent of vaccination coverage among the HCWs. Our study assumes significance in identifying the bottlenecks that impair 100% vaccination coverage among HCWs, even following implementation of employer-mandated provision of vaccine supplies for HCWs.

2. Materials and Methods

This institutional cross-sectional study was conducted over a period of two months to assess elementary information regarding hepatitis B virus and vaccination coverage among HCWs in a tertiary level teaching hospital in central India employing approximately 600 HCWs at the time of study.

All HCWs working in the institute constituted the study population. Those HCWs (consultants, resident doctors, nurses, technicians and house-keeping staff) who were involved in direct health care service for clients and patients were included in this study. Medical/nursing students and known HBV positive HCWs were excluded from the study. Sample size of the study was determined using Ope Epi tool version 3.01 considering population size 600, confidence level 95%, design effect 1 and hypothesized % frequency of outcome factor in the population 50% \pm 5.¹³ Adding 10%

non-response rate, the final sample size estimated was 143. Therefore, a total of 150 HCWs with equal representation of 30 participants from each of the above-mentioned 5 groups were recruited for the study. Simple random sampling technique was used to select eligible study participants from the list of HCWs of the institute.

Pre-validated, self administered questionnaire both in English and local language Hindi was used to collect data from HCWs. The questionnaire consisted of five important components as follows

1. Knowledge of HCWs about general concepts regarding HBV virus and its transmission and prevention
2. Knowledge of HCWs about hepatitis B vaccine need, indications, dosage and monitoring of response
3. Hepatitis B vaccination status of HCWs
4. Reason for incomplete vaccination
5. Reason for non vaccination. The completeness of questionnaires was checked every day by supervisors and investigators on each day of data collection. After checking for consistency and completeness, the supervisors submitted the filled questionnaires to the principal investigator. Data procured via the filled questionnaires was entered in MS Excel and then was analyzed using software SPSS ver. 20.0. Descriptive statistics such as frequencies (percentage) were calculated.

Permission to conduct the study was obtained from the Institutional Human Ethics Committee. Written consent was taken from the study participants. Confidentiality and privacy were maintained throughout the study period. Each questionnaire was number-coded and had no personal identifier.

3. Results

3.1. Knowledge of HCWs about HBV and its transmission and prevention

Among all HCW recruited, most correct responses were obtained by consultants (92.3%). Awareness and knowledge about HBV was least among the house-keeping staffs (6.1%) who are the most vulnerable group [Figure 1].

3.2. Knowledge of HCWs on HBV vaccine needs, indications, dosage and monitoring of response

Knowledge about all aspects of HBV vaccine is lowest among house-keeping staff. Alarming, the medically trained HCWs like doctors, nurses and technicians were found to be wanting in knowledge about certain aspects of HBV vaccination like the need for the booster doses, strategy in case of vaccine schedule interruption and about response monitoring of HBV vaccine [Figure 2].

3.3. Hepatitis B vaccination status of HCWs

Vaccination coverage was poor among the house-keeping staff (26.67%) followed by technicians (56.67%) and nurses (66.67%). Documentation of HBV vaccination was a deficient practice. Interestingly, documentation of the vaccination status was better among resident doctors than consultants. Estimation of AntiHBs titre was a generally non-existent practice [Table 1].

3.4. Reason for incomplete vaccination

Main reasons for incomplete vaccination reported were due to long time gap between the doses (n= 18; 60%) followed by unavailability of time for complete vaccination (n=5; 16.6%) [Figure 3].

3.5. Reason for non vaccination

Among the 26 (17.33%) non vaccinated participants, main reasons reported were either vaccination not required for prevention of HBV (n=9; 28%) or no idea about vaccination (n=8; 25%). Other reasons were unavailability of time for complete vaccination, no idea about HBV infection and fear of needles [Figure 4].

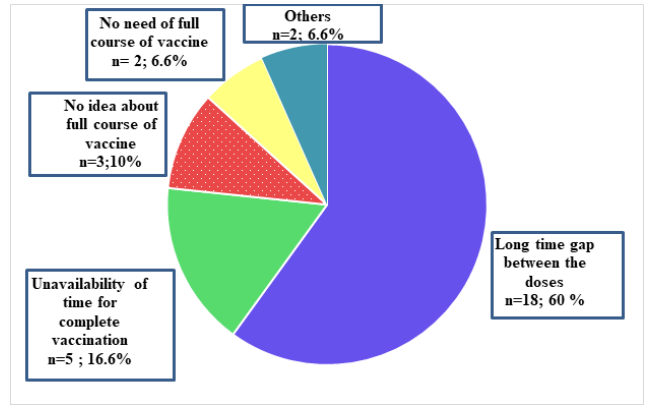


Fig. 3: Reasons for incomplete vaccination among HCWs

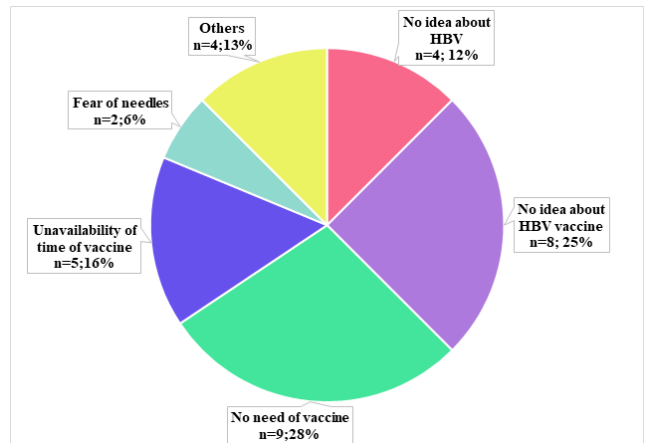


Fig. 4: Reasons for non-vaccination among HCWs

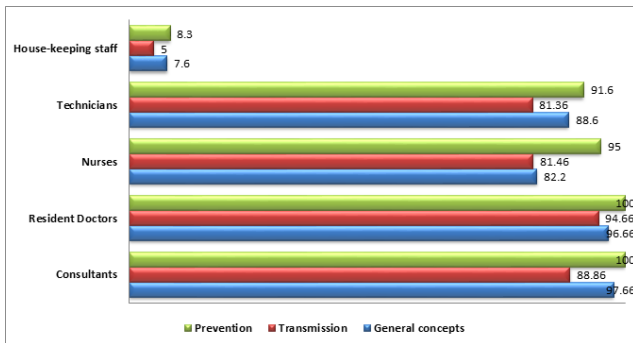


Fig. 1: Correct responses for Hepatitis B virus related questions

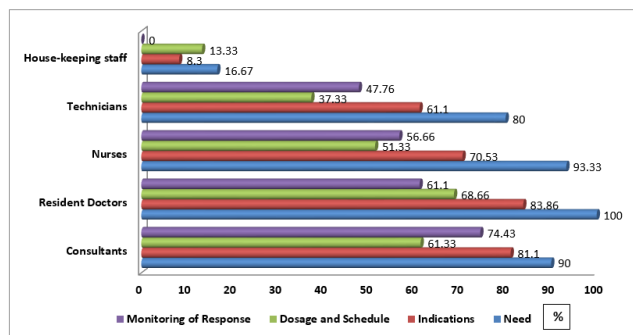


Fig. 2: Correct responses for Hepatitis B virus vaccine related questions

4. Discussion

Among all the groups enrolled in the present study, consultants achieved the highest number of correct results and least correct responses were obtained from house-keeping staff [Figure 1]. Similar findings were observed by Bello FM et al.¹⁴ and K Dev et al.¹⁵ who also reported maximum knowledge about HBV among consultants and least among house-keeping staff. As a whole, adequate knowledge of HBV was observed in greater proportion of study participants as compared to previous other studies.^{16,17}

It was found in the present study that a significant difference in knowledge existed between doctors, nurses and other support staff as was also observed in other similar studies.^{15,18} [Figure 2]. The answers to some questions revealed a gap in knowledge like indication of vaccine in already HBV infected persons, the need of booster dose, the need to restart vaccination if interrupted and awareness about post vaccination antibody testing. This reiterates the need for undertaking regular training sessions to sensitize all HCWs regarding the deadly virus and its prevention.

Table 1: Vaccination status of HCWs

	Consultants n (%)	Resident Doctors n (%)	Nurses n (%)	Technician n (%)	House-keeping staff n (%)	Total n (%)
Completely Vaccinated	26(86.67%)	23(76.67%)	20(66.67%)	17(56.67%)	8(26.67%)	94(62.67%)
Unvaccinated	3(10%)	1(3.33%)	2(6.67%)	5(16.67%)	15(50%)	26(17.33%)
1 dose of vaccination	0	0	3(10%)	1(3.33%)	2(6.67%)	6(4%)
2 doses of vaccination	1(3.33%)	6(20%)	5 (16.67%)	7 (23.33%)	5 (16.67%)	24(16%)
Vaccination received and documented	6(20%)	19(63.33%)	14(46.67%)	3(10%)	4(13.33%)	46(30.67%)
Anti HBs antibody checked	1(3.33%)	0	0	0	0	1(0.67%)

62.67% HCWs participated in the study received all 3 doses of HBV vaccine, 16% participants received 2 doses of vaccine, 4% participants received only one dose and 17.33% were unvaccinated [Table 1]. As per WHO estimates, HBV vaccination coverage among HCWs varies from 18% (Africa) to 77% (Australia and New Zealand).¹⁹ A similar study conducted at Jodhpur reported that 49.6% of HCWs were fully vaccinated, 4.3% partially vaccinated and 46.12% were unvaccinated.¹³ The current study showed around 62.67% of vaccination coverage which is better than most parts of the country^{11,20} but still is too low to be acceptable as it poses risk of HBV to both the patient and HCWs in any hospital. In the present study, maximum vaccination coverage was found among the consultants (86.67%) and least among the house-keeping staff (26.67%) [Table 1]. Similar findings were reported by Batra V et al.¹³ The difference in pattern of such vaccination in various groups of HCWs probably lies in their level of education and knowledge regarding HBV and vaccination which has also been found in this study. Since housekeeping staff handle body fluids, soiled linen and biomedical waste management on a daily basis, they are at the highest risk for acquiring HBV infection. Therefore, there is a need of targeted training regarding safe work practices at the frequent interval and HBV vaccination especially for this group of HCWs.

It was observed that documented evidence of vaccination was available with only 30.67% of the vaccinated participants [Table 1]. As per CDC guidelines,¹ proper documentation of vaccination is important as HCWs with written documentation of receipt of a properly spaced 3-dose series of HBV vaccine AND a positive anti-HBs can be considered immune to HBV and require no further testing or vaccination as a part of post exposure prophylaxis. Among the participants, post vaccination anti HBs antibody report was available with only 1 doctor [Table 1]. Pre-exposure anti-HBs antibody testing may be recommended for all previously vaccinated HCWs who were not tested 1 to 2 months after the third dose. Vaccinated HCWs in certain settings with greater risk of exposure could benefit from pre-exposure serologic testing. Moreover, the testing also gives idea about the non responder which is defined as a

person with anti-HBs <10 mIU/mL after ≥6 doses of HBV vaccine.¹

In a similar study conducted by Abidi et al.,²¹ the major reasons for incomplete vaccination were reported as lack of time lack of time for vaccination, not been offered a chance for vaccination, no need of vaccination etc. which are in concordance with the present study [Figure 3]. The HCWs who received two doses and even more of those who received only one dose of the vaccine are at risk of acquiring HBV. This message must clearly delivered to HCWs and there should be no misconceptions regarding HCWs having full protection with less than three doses even with demonstrated evidence of immunity through antibody level assessment.¹

Among the 26 (17.33%) non vaccinated participants, main reason was marked as no need of HBV vaccination followed by no idea about vaccination [Figure 4]. In a similar study conducted by Aaron D et al.²² common reasons for non-vaccination among HCWs were reported as they had not been offered a chance for HBV vaccination, they were very careful and observed standard precautions while at work and there was not enough awareness concerning access to HBV vaccination. This highlights the importance of not only HBV vaccination awareness among HCWs but also repetitive emphasis on this matter.

In the present study, first-hand information was gathered via self-administered questionnaires for HBV infection and its vaccination status. The study has covered the important aspect of HBV vaccination documentation that was not studied before. Our study has certain limitations. Because of the small sample size and the cross-sectional nature of the survey, we were not able to confirm the definitive cause-and-effect relationship. Since the vaccination status was assessed through self-provided information and since the record of vaccination documentation was not available with most of the participants, it may prone to recall bias. Vaccination does not always translate into immunity. Therefore, coupling this study with an assessment of anti-HBsAb titres would have helped to inform policy change.

5. Conclusions

The present study identifies the gap areas in achieving the goal of 100% coverage of HBV vaccination among HCWs. We find that attitudinal changes and sustained awareness campaigns are input to achieving this goal even when employer-mandated supplies are available in the hospital. Maintenance of documentation of vaccination and estimation of anti-HBs titers are other deficient practices that need to be implemented in hospitals.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. CDC Guidance for Evaluating Health Care Personnel for Hepatitis B Virus Protection and for Administering Postexposure Management. *MMWR Morb Mortal Wkly Rep.* 2013;62(RR10):1–19.
2. Shiao J, Guo L, McLaws ML. Estimation of the risk of bloodborne pathogens to health care workers after a needlestick injury in Taiwan. *Am J Infect Control.* 2002;30(1):15–20. doi:10.1067/mic.2002.119928.
3. Public US, Service H. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis. *MMWR Recomm Rep.* 2001;50:1–52.
4. Roggendorf M, Viazov S. Health care workers and hepatitis B. *J Hepatol.* 2003;39(1):89–92. doi:10.1016/s0168-8278(03)00313-1.
5. Prüss-Ustün A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med.* 2005;48(6):482–90. doi:10.1002/ajim.20230.
6. Werner BG, Grady GF. Accidental hepatitis-B-surface-antigen-positive inoculations: Use of e antigen to estimate infectivity. *Ann Intern Med.* 1982;97:367–9.
7. Lauer JL, Drunen NV, Washburn JW, Balfour HH. Jr Transmission of hepatitis B virus in clinical laboratory areas. *J Infect Dis.* 1979;140:513–6.
8. Colin W, Edgar P, Lyn F, Anthony E, Beth E. Hepatitis B Virus Infection: Epidemiology and Vaccination. *Epidemiol Rev.* 2006;28(1):112–25.
9. Rasoul GMA, El-Bahnasy RE, Michael AA, Hendy OM, Ahmed AR. Hepatitis B Viral Markers and Vaccination Status among Health Care Providers in Menoufia Governorate. *Egypt J Occup Med.* 2010;34(2):267–79. doi:10.21608/ejom.2010.726.
10. Duseja A, Arora L, Masih B. Hepatitis B and C Virus-prevalence and prevention in health care workers. *Trop Gastroenterol.* 2002;23:125–26.
11. Sukriti, Pati NT, Sethi A, Agrawal K, Agrawal K, Kumar GT, et al. Low levels of awareness, vaccine coverage, and the need for boosters among health care workers in tertiary care hospitals in India. *J Gastroenterol Hepatol.* 2008;23(11):1710–5. doi:10.1111/j.1440-1746.2008.05483.x.
12. Gurubacharya DL, Mathura KC, Karki DB. Knowledge, attitude and practices among health care workers on needle-stick injuries. *Kathmandu Univ Med J.* 2003;1(2):91–4.
13. Batra V, Goswami A, Dadhich S, Kothari D, Bhargava N. Hepatitis B immunization in healthcare workers. *Ann Gastroenterol.* 2015;28(2):276–80.
14. Bello FM, Anne CP, Musa KA. Health Workers' Knowledge, Attitude and Practice towards Hepatitis B Infection in Northern Nigeria. *Int J Caring Sci.* 2016;9(3):939–54.
15. Dev K, Sunil KS, Abhay G, Gajanan K, Akash S, Bisure K. Knowledge and Awareness of the Health Care Workers about the Hepatitis B Infection and their Vaccination Status in a Newly Started Medical College. *J Assoc Physicians India.* 2018;66(12):27–30.
16. Abeje G, Azage M. Hepatitis B vaccine knowledge and vaccination status among health care workers of Bahir Dar City Administration, Northwest Ethiopia: a cross sectional study. *BMC Infect Dis.* 2015;15(1):30–5. doi:10.1186/s12879-015-0756-8.
17. Alkandari A, Aljodar S, Albahhouh HA, Makboul G, El-Shazly M. Knowledge, Attitudes and Self-Reported Behavior of Primary Health Care Workers for Hepatitis B and C Virus and other Health Care Associated Infection. *Greener J Med Sci.* 2013;3(1):18–31.
18. Tatsilong H, Noubiap JN, Nansseu JRN, Aminde LN, Bigna JJR, Ndze VN, et al. Hepatitis B infection awareness, vaccine perceptions and uptake, and serological profile of a group of health care workers in Yaoundé, Cameroon. *BMC Public Health.* 2016;16(1):706. doi:10.1186/s12889-016-3388-z.
19. Prüss-Ustün A, Rapiti E, Hutin Y. Estimation of the global burden of disease attributable to contaminated sharps injuries among health-care workers. *Am J Ind Med.* 2005;48(6):482–90. doi:10.1002/ajim.20230.
20. Kumar KKA, Baghal PK, Shukla CB, Jain MK. Prevalence of hepatitis B surface antigen among health care workers. *Indian J Comm Med.* 2000;25:93–5.
21. Abidi TF, Ahsan SJ, Fatima N. Hepatitis B vaccination coverage and immunization status among health care workers in Punjab and Islamabad, Pakistan. *SAJEM.* 2018;1(1):16–21.
22. Aaron D, Nagu TJ, Rwegasha J, Komba E. Hepatitis B vaccination coverage among healthcare workers at national hospital in Tanzania: how much, who and why? *BMC Infect Dis.* 2017;17(1):786. doi:10.1186/s12879-017-2893-8.

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