

Awareness About Hepatitis B Virus Infection and Vaccination Among Health Care Personnel at Higher Risk - A Cross-Sectional Study

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Abstract

Background: Hepatitis B is a potentially life-threatening chronic viral infection. It is a well-recognized occupational hazard for health care personnel, but universal precautions and vaccination against Hepatitis B are the sine qua non to prevent this infection.

Objectives: To assess the awareness about Hepatitis B infection and vaccination status among the health care personnel at higher risk.

Settings and Design: Cross-sectional study among health care personnel at risk for exposure to blood and body fluids in a tertiary care hospital.

Subjects and Methods: A total of 288 health care personnel answered a pretested questionnaire on awareness about prevention, transmission and the vaccination status.

Statistical analysis used: Descriptive analysis.

Observations: A majority of the participants (79.16%) were aware of routes of transmission and 277(96.18%) participants were well-aware of preventive measures. Two hundred (69.44%) health care personnel had completed the vaccination schedule for hepatitis B.

Conclusions: Results indicate an overall good knowledge and awareness among health care personnel. Vaccination prevalence among participants was lower than WHO standards.

Keywords: Awareness, health care personnel, Hepatitis B Virus, Hepatitis B vaccine

I. INTRODUCTION

Most patients with chronic Hepatitis B virus (HBV) infection are asymptomatic. Chronic complications like cirrhosis, hepatic failure, and HBV associated hepatocellular carcinoma are the major causes of morbidity and mortality associated with HBV infections [1].

Hepatitis B is a vaccine-preventable disease. W.H.O. recommends three doses of vaccine at 0, 1 month and six months and the coverage targets for hepatitis B vaccination should be at least 95% coverage at the national level, and at least 85% coverage in all districts [2].

Horizontal transmission from HBV infected patient occurs through needle stick/sharp injury or direct spill of blood or body fluids [3–5]. Cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid are also potentially infectious. Saliva and tears are not represented as an occupational risk for HBV infection unless they contain blood [6]. Health care personnel carry a higher risk for this occupation hazard as compared to general population [7]. Studies have shown that the risk of exposure for general dentists is about three to four times greater, and for non-immunized surgical specialists about six times greater than that of the general population [8].

Previous studies have reported the risk of HBV transmission is 30% in susceptible health care personnel without post-exposure prophylaxis or adequate hepatitis B vaccination. This risk is significantly higher than that for hepatitis C virus (0.5%) and for human immunodeficiency virus (HIV) (<0.3%) [9].

Earlier studies have mentioned a comprehensive awareness of hepatitis B infection in more than 70% of health personnel [8, 10-14]. Similar studies among health care personnel have

reported a vaccination coverage ranging from 4% to 93%, many of which were not at par with W.H.O. standards [11, 15-25].

The present study was carried out to assess the awareness about Hepatitis B infection and vaccination status among the health care personnel at higher risk at a tertiary care centre.

II. SUBJECTS AND METHODS

A descriptive cross-sectional study was carried out in a tertiary care hospital. The study included health care personnel working in intensive care units, operation theatres, surgical branches, labour rooms, casualty, and dental professionals.

A predesigned self-administered questionnaire confined to knowledge and awareness regarding hepatitis B, its modes of transmission and prevention, and their vaccination status was prepared in a Microsoft Word document. Institutional Review Board had approved the study. We approached 300 health care personnel, out of which 288 participants completed the questionnaire. The data was organized and statistically analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) software, version 22 IBM Chicago. Quantitative data was expressed in numbers and percentages as shown in table no. 1-4. In the section regarding routes of infection, there were ten questions. Results were assigned into three groups as shown in table no. 2. Results of questions on prevention of infection were assigned into three groups as shown in table no. 3.

Table no. 1: Responses about the hepatitis B virus

Survey Questions About Hepatitis B virus infection	Yes	No	Don't know
Is Hepatitis B a contagious viral infection	264(91.66%)	24(8.34%)	--
Do you think doctors and medical students are at risk of acquiring hepatitis B infection from the patients?	251(87.15%)	24(8.33%)	13(4.52%)
After needle stick injury or sharp injury: - the risk of transmission of HBV is more than that of HIV	173(60.07%)	63(21.87%)	52(18.06%)
Can HBV survive in dried blood	80(27.78%)	95(32.9%)	113(39.24%)
Risk of chronic infection decreases with age	119(41.32%)	126(43.75%)	43(14.93%)
Most patients of chronic HBV	34(11.81%)	205(71.17%)	49(17.02%)

infection are symptomatic	%)	18%)	1%)
Can chronic HBV infection cause cirrhosis	238(82.64%)	44(15.28%)	6(2.08%)
Can chronic HBV infection cause liver cancer	171(59.37%)	82(28.47%)	35(12.16%)
Is HBV infection Preventable	288(100%)	0	0

Table no.2: Knowledge about routes of transmission of the hepatitis B virus

Routes of transmission (10 questions i.e. Contaminated blood, Used syringes and needles, Vertical transmission- mother to foetus, Piercing and tattoos, Contaminated food/water/drinks, Handshake/Hugging, Saliva, Dental procedures, Blood spillage on intact skin, Blood spillage on breached skin)	Correct answers	Observations n=288(100%)
0-3	12(4.17%)	
4-7	48(16.67%)	
8-10	228(79.16%)	

Table no.3 Responses about preventive measures against hepatitis B virus

Preventive measures against infection i.e. sterile gloves, eye-wear, universal precautions, condoms, Oral contraceptive pills, new blades/needles at saloons, Autoclaving, irradiation of blood products, vaccines, boiling.	Correct answers	Observations n=288(100%)
0-3	0	
4-6	11(3.82%)	
7-9	277(96.18%)	

Table no. 4 Awareness about hepatitis B vaccination

Survey Questions About Hepatitis B vaccination	Yes	No	Don't know
Is the vaccination needed only for high-risk groups	182(65.22%)	79(27.43%)	27(9.38%)
Mark the correct vaccine schedule as	255(88.54%)	33(11.46%)	0

per W.H.O.			
Is booster needed	160(55.55%)	93(32.30%)	35(12.13%)
Is antibody titre needed before booster and for post-exposure prophylaxis	61(21.18%)	139(48.26%)	88(30.55%)
Mark the correct safe titre level (mIU/ml)	60(20.83%)	140(48.62%)	88(30.55%)

Observations:

There were 201 men and 87 women. About one-third of participants (102) belonged to the age group 20-30 yrs. There were 104 medical consultants, 54 dental consultants, 88 postgraduate trainees, 26 nurses, and 16 interns.

The responses for questions about the Hepatitis B virus and disease are shown in table no 1.

Two hundred twenty-eight (79.16%) participants had answered correctly for most of the questions on transmission. Two hundred seventy-seven (96.18%) participants had answered correctly for most of the questions on prevention.

Seventy-nine (27.43%) participants opined that the Hepatitis B vaccine is for everyone and not restricted for the high-risk population. One hundred eighty-two (65.22%) participants thought that vaccination is only for high-risk populations.

Most of the participants (88.54%) had marked the correct vaccination schedule. Seventy-nine (27.42%) participants mentioned that booster is administered at five years after completion of the vaccination. Sixty (20.83%) participants agreed that antibody titre of 10 mIU/ml is considered adequate.

Only 200 (69.44%) participants had completed the three doses of vaccination. Only 80 participants had taken booster dose. Twenty-nine participants were marked as partially vaccinated because they had received one dose or two doses or did not remember their status. Fifty-nine (20.49%) participants had never been vaccinated.

III. DISCUSSION

Knowledge about the virus and the disease:

A comprehensive review of responses to different questions in table 1, we found that 76.21% of participants had good knowledge about the virus and the disease, and 79.16% of participants had good knowledge of routes of transmission. Collective awareness was about 77.69%. These results are

more or less akin to most of the earlier studies [8, 10–14] and higher than Yuan et al. (45.17%) [15].

We observed that 79.16% of participants knew about the routes of transmission. We compared our finding with studies like Saini et al. (88%), Punde et al. (average 67.89% in dental professionals), and Jaquet et al. (66.1%) [8,16,17].

In our study, 251(87.15%) participants were aware that being a health care personnel puts them at risk of acquiring HBV infection. We compared this finding with the study conducted by Akibu et al. where 75.9% of participants had emphasized upon this fact.¹⁸ In a study by Feleke et al., about 63% of participants perceived that they are not at risk for hepatitis B as against 8.33% in our study [19].

In our study, 173 (60.07%) participants knew that the risk of HBV transmission after needle-stick injuries is higher than that of HIV. Shindano et al. had observed in his study that only 8.3% of participants were aware of this risk [20].

Fattovich et al. had observed that approximately 90% of infants and 25%–50% of children between ages 1 and 5 years would have chronic HBV infection. By contrast, about 95% of adults would recover from HBV infection and would not have chronic infection [26]. Only 119 (41.32%) participants in our study were aware of this age-related finding.

HBV can survive outside the body for at least seven days and still be capable of causing infection [27]. Only 80 (27.78%) participants in our study were aware that the virus could survive in dried blood.

Awareness about Precautions and Prevention:

In our study, 277 (96.18%) participants exhibited good knowledge about prevention and universal precautions. In a study conducted by Hebo et al., 189 (82.2%) respondents had good knowledge about standard precautions [12].

Vaccination coverage:

The vaccination coverage in our study (69.44%) was lower than W.H.O. standards. If we add up complete and partial vaccination, then 229 (79.54%) participants in our study had received at least one dose. These results are quite similar to Punde et al. (77%), Paya et al. (87%), Jaquet et al. (71.4%), and Simard et al. (75%), Topuridze et al. (12% for physicians and 54% for nurses) Ziraba et al. (6.2%), Feleke et al. (4%) [16,17,19,21–24]. The common reasons identified for incomplete vaccination were missing or forgetting the date of the third dose, change of workplace which was conducting the course of vaccination, and never asking what to do on missing a dose.

Titre and booster:

In our study, sixty participants knew that minimum safe titre levels of antibody are 10 mIU/ml. Different studies have mentioned that antibody titre will remain at an adequate level in the majority of participants for a prolonged duration [7,28,29]. Bruce et al. had concluded that protection from the vaccine continues out to 30 years and ≥94% of the participants had evidence of protection (anti-HBs ≥10 mIU/mL or response to a booster dose of vaccine) [28].

In our study, 61(21.18%) participants opined that antibody titre is needed before booster and for post-exposure prophylaxis. Sahana et al. had concluded in their study that estimation of antibody titres after 5 and 10 years would determine the need for a booster dose which can be mandatory at least for health care personnel [7].

IV. CONCLUSION

Though the awareness about virus and vaccine were adequate, the vaccination prevalence could not achieve the W.H.O. standards.

The only safe strategy against the high prevalence of hepatitis B is prevention by employing universal precautions and vaccination. Health care personnel are a well-identified approachable group and developing regulations to vaccinate all health workers is an effective strategy to protect this high-risk group. A well - aware health care personnel who has completed his vaccination makes a considerable impact on social mobilization.

We also recommend the need for medical education modules and surveys at different levels of health care delivery systems to ensure optimum vaccine coverage by all caretakers, especially those at high risk.

Conflict of interests: none to declare.

Authors' contributions: Abhijit Rayate and Nikhil Barhate contributed to the idea behind the manuscript, structure of questionnaire and collection of the data. Abhijit Rayate, Nikhil Barhate and Udaykiran Bhalge contributed to analysis of the data. Shree Dhotre, Pradnya Dhotre, Ajay Gavkare, Abhijit Rayate, and Basavraj Nagoba contributed to the literature search, revising the questionnaire, writing the paper, and modification of content and final approval of the draft.

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REFERENCES

- [1] McMahon BJ. The natural history of chronic hepatitis B virus infection. *Hepatology* 2009;49:S45–55.
- [2] World Health Organization. Hepatitis B Control Through Immunization: A Reference Guide. *Hepat B Control Through Immun* 2014;5:13–62.
- [3] 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;48:482–90.
- [4] Elmukashfi TA, Ibrahim OA, Elkhidir IM, Bashir AA, Elkarim MAA. Hazards Analysis, within Departments and Occupations, for Hepatitis B Virus among Health Care Workers in Public Teaching Hospitals in Khartoum State; Sudan. *Glob J Health Sci* 2012;4:51–9.
- [5] Ibrahim N, Idris A. Hepatitis B Awareness among Medical Students and Their Vaccination Status at Syrian Private University. *Hepat Res Treat* 2014;1–7.
- [6] Centers for Disease Control and Prevention. Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis. Vol. 50, MMWR. Recommendations and reports : Morbidity and mortality weekly report. Recommendations and reports. Atlanta: CDC; 2001. p. 1–52.
- [7] Sahana H V., Sarala N, Prasad SR. Decrease in Anti-HBs Antibodies over Time in Medical Students and Healthcare Workers after Hepatitis B Vaccination. *Biomed Res Int* 2017;2017:1–5.
- [8] Saini R, Saini S, Sugandha R. Knowledge and awareness of Hepatitis B infection amongst the students of Rural Dental College, Maharashtra, India. *Ann Niger Med* [Internet]. 2010;4:18.
- [9] Centers for Disease Control and Prevention. Exposure to Blood: What Healthcare Personnel Need to Know. Centers for disease control and Prevention. Department of Health and Human services, CDC; 2003. p. 10.
- [10] Sannathimmappa M, Nambiar V, Arvindakshan R. Hepatitis B: Knowledge and awareness among preclinical year medical students. *Avicenna J Med* 2019;9:43.
- [11] Dayyab FM, Iliyasa G, Ahmad BG, Bako AT, Ngamariju SS, Habib AG. Hepatitis B vaccine knowledge and self-reported vaccination status among healthcare workers in a conflict region in northeastern Nigeria. *Ther Adv Vaccines Immunother* 2020;8:1–11.
- [12] Hebo HJ, Gameda DH, Abdusemed KA. Hepatitis B and C Viral Infection: Prevalence, Knowledge, Attitude, Practice, and Occupational Exposure among Healthcare Workers of Jimma University Medical Center, Southwest Ethiopia. *Sci World J* 2019;1–11.
- [13] Ali A, Khan S, Malik S, Haris Iqbal M, Aadil M. Comparison of Knowledge and Attitudes Regarding Hepatitis B among Healthcare Professionals in Pakistan. *Cureus* 2017;9:1–10.
- [14] Aroke D, Kadia BM, Anutebeh EN, Belanquale CA, Misori GM, Awa A, et al. Awareness and Vaccine Coverage of Hepatitis B among Cameroonian Medical Students. *Biomed Res Int* 2018;1–6.
- [15] Yuan Q, Wang F, Zheng H, Zhang G, Miao N, Sun X, et al. Hepatitis B vaccination coverage among health care workers in China. *Chemin I, editor. PLoS One* 2019;14:e0216598.
- [16] Punde PA, Punde S. Comprehensive Survey to Study Awareness, Knowledge and Attitude Towards HIV/AIDS and Hepatitis B Amongst Dental Professionals Working in Rural India. *J Maxillofac Oral Surg* 2014;13:483–7.
- [17] Jaquet A, Wandeler G, Tine J, Diallo MB, Manga NM, Dia NM, et al. Prevention and Care of Hepatitis B in Senegal; Awareness and Attitudes of Medical Practitioners. *Am J Trop Med Hyg* 2017;97:389–95.
- [18] Akibu M, Nurgi S, Tadese M, Tsega WDi. Attitude and Vaccination Status of Healthcare Workers against Hepatitis B Infection in a Teaching Hospital, Ethiopia. *Scientifica (Cairo)* 2018;2018:1–8.
- [19] Feleke BE. Low coverage of hepatitis B vaccine and determinants among health professionals working in Amhara regional state hospitals, Ethiopia. *J Public Health Africa* 2016;7:533:50–4.
- [20] Shindano TA, Bahizire E, Fiasse R, Horsmans Y. Knowledge, Attitudes, and Practices of Health-Care Workers About Viral Hepatitis B and C in South Kivu. *Am J Trop Med Hyg* 2017;96:400–4.
- [21] Paya N, Pozzetto B, Berthelot P, Vallée J. Statut vaccinal des médecins généralistes dans le département de la Loire, France. *Médecine Mal Infect* 2013;43:239–43.
- [22] Simard EP, Miller JT, George PA, Wasley A, Alter MJ, Bell BP, et al. Hepatitis B Vaccination Coverage Levels Among Healthcare Workers in the United States, 2002–2003. *Infect Control Hosp Epidemiol* 2007;28:783–90.
- [23] Topuridze M, Butsashvili M, Kamkamidze G, Kajaia M, Morse D, McNutt LA. Barriers to Hepatitis B Vaccine Coverage among Healthcare Workers in the Republic of Georgia: An International Perspective. *Infect Control Hosp Epidemiol* 2010;31:158–64.
- [24] Ziraba AK, Bwogi J, Namale A, Wainaina CW, Mayanja-Kizza H. Sero-prevalence and risk factors for hepatitis B virus infection among health care workers in a tertiary hospital in Uganda. *BMC Infect Dis* 2010;10:1–12.

- [25] Diesner SC, Peutlberger S, Voitl P. Vaccination status of resident pediatricians and the potential risk for their patients - a cross-sectional questionnaire study in pediatric practices in Vienna. *BMC Pediatr* 2019;19:153.
- [26] Fattovich G, Bortolotti F, Donato F. Natural history of chronic hepatitis B: Special emphasis on disease progression and prognostic factors. *J Hepatol* 2008;48:335–52.
- [27] Bond WW, Favero MS, Petersen NJ, Gravelle CR, Ebert JW, Maynard JE. Survival of Hepatitis B Virus After Drying and Storage for One Week. *Lancet*. 1981;317:550–1.
- [28] Bruce MG, Bruden D, Hurlburt D, Zanis C, Thompson G, Rea L, et al. Antibody Levels and Protection After Hepatitis B Vaccine: Results of a 30-Year Follow-up Study and Response to a Booster Dose. *J Infect Dis* 2016;214:16–22.
- [29] Chaturanga LS, Noordeen F, Abeykoon AMSB. Immune response to hepatitis B vaccine in a group of health care workers in Sri Lanka. *Int J Infect Dis* 2013;17:e1078–9.