Original Article

Knowledge, Awareness, and Vaccination Compliance of Hepatitis B among Para-Medical Students in Tertiary Care Hospital

Alpa S. Patel[1,*], Sangita Rajdev[1], Summaiya A. Mullan[1]

[1]Department of Microbiology, Government Medical College Surat, Surat, Gujarat, India

***Correspondence:** dralpain1@gmail.com

DOI
10.21276/apalm.3781

Article History
Received: 11-12-2025
Revised: 04-02-2026
Accepted: 12-03-2026
Published: 06-04-2026

How to cite this article
Patel AS, Rajdev S, Mullan SA. Knowledge, Awareness, and Vaccination Compliance of Hepatitis B among Para-Medical Students in Tertiary Care Hospital. Ann Pathol Lab Med. 2026;13(4):A192-A196.

Abstract

Introduction: Healthcare professionals are more likely to contract hepatitis B, hepatitis C, and HIV. Hepatitis B is the most dangerous of them and is also quite contagious. One important preventive measure is to be immunized.
Aim & Objective: The purpose of this study is to measure the anti-HbsAb titer among the nursing, laboratory technician, intern and Physiotherapy students of tertiary care hospital. To evaluate knowledge, practice and attitude of them about Hepatitis B & importance of its vaccination.
Materials and Methods: This is a cross-sectional study. A predesigned self-administered questionnaire (via Google form) concerning hepatitis B knowledge and awareness was distributed to all the Para-medical students. The data were collected, tabulated, and analyzed by Microsoft Excel version 10. The results were expressed in numbers and percentages. Anti-HbsAb titers were estimated by Enzyme Immunoassay (ELISA) kit.
Results: Only 76 students voluntarily participated in the study. Majority of the students (77.1%) were aware of HBV infection. Many students knew that blood transfusion (89.4%) and use of contaminated needles and syringes (96%) are major modes of transmission. However, the students had good knowledge about other modes of transmission. More than 50% of the students lacked in their knowledge about clinical features and complications of hepatitis B infection. Majority of students (93.4%) were aware of HBV vaccination. However, 11.8% students did not know their vaccination status, 53.1% students show protective hepatitis vaccine antibody titer after two or three doses of vaccine.
Conclusions: This study found that paramedical students have good knowledge on hepatitis B, still only 14% students are fully vaccinated. Proper documentation of such important event must be there as in cases where they might get exposed to positive cases this information is useful for taking therapeutic decision.

Keywords: blood transfusion; cirrhosis; hepatitis B virus; liver cancer; vaccination

Introduction

One significant public health issue is the hepatitis B virus (HBV). Hepatitis B is a blood borne infectious liver disease caused by the Hepatitis B Virus (HBV). According to WHO estimates, 296 million individuals worldwide have Hepatitis B, 1.5 million have recently contracted chronic Hepatitis B, and 820,000 have died from the disease. HBV can be transmitted from mother to child, through sharps injuries, tattoos, piercings, and contact with contaminated needles, syringes, or sharp objects, as well as through unprotected sexual contact [1].

The pathogenicity of HBV infection is greatly influenced by the host immune response, virus replication, evolutionary dynamics, and environmental factors taken together. On the other hand, the age at which the infection was acquired becomes

a significant factor in chronic HBV infection. Andhra Pradesh and Telangana had the highest rates of Hepatitis B, followed by the states in the Northeastern area, according to the 2021 National Family Health Survey conducted in India [2]. In healthcare settings, healthcare workers (HCWs) are particularly vulnerable to HBV infection. Due to their inexperience, inadequate training, and lack of preventive knowledge, trainees are significantly more at risk of unintended exposure than professionals [3, 4, 5, 6]. If one sustains a needle stick and the source is an infected one, the risk of transmission of HBV per exposure is 37–62% [7].

HCWs may spread HBV to their patients after being infected [8], but transmission is uncommon when proper precautions are taken [9]. The WHO advises HCP to get an HBV vaccination due to their elevated occupational risk [10]. In particular, HBV infection is a disease that can be prevented by vaccination because the hepatitis B vaccine offers more than 96% protection. However, hepatitis B vaccination rates among health care professionals remain below ideal in a number of nations, with poor completion rates of the suggested three-dose vaccine series and infrequent post-vaccination checks for hepatitis B antibody levels [11, 12, 13, 14, 15, 16].

The two main tools for preventing hepatitis B infection are vaccination and using personal protective equipment. The licensed recombinant hepatitis B vaccine is recommended for use by all medical students and healthcare professionals [17]. For best protection, three vaccination doses are advised at 0, 1, and 6–12 months. This research aimed to evaluate the level of awareness regarding hepatitis B infection, vaccination status and Anti HBS titer among Para-medical students.

Materials and Methods

We have conducted a cross-sectional study at Government Medical College Surat. The study group included students of medical & Para-medical courses (laboratory technician-DMLT, Physiotherapy, nursing & intern). The study was approved by the Institutional Research and Ethics Committee, and it was conducted after obtaining necessary informed consent from the students. The approval HREC No. GMCS/STU/RRC-2/ Approval/25680/25.

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 Google form and distributed to all the participants on a prenotified date and time. The reliability statistics Cronbach's Alpha comes in acceptable limits of this questioner. The data were collected, tabulated, and statistically analyzed using Microsoft Excel and Quantitative data were expressed in numbers and percentages. Venous Blood sample is collected using standard precaution in Plain Vaccutes; The serum sample were tested for Anti HBS titer by ELISA technique using kit of DIAPRO (Milano-Italy).

Results

A total of 76 students voluntarily participated in the study. In that 23 are Laboratory technician students (DMLT), 30 are Second year nursing student, 16 are MBBS intern & 7 are second year physiotherapy students. Data regarding knowledge, mode of transmission and awareness of hepatitis B among students of Para-medical are described in Tables 1–4. The statements in Tables 1–3 are reflection of questioner which is been asked to the students. The data reveal that majority (77.1%) of students were aware of hepatitis B among the participants, approximately 94.7% of the participants stated that doctors, medical & Para-medical students are at risk of acquiring hepatitis B from the infected patients. Looking at the current scenario in which they are working, 64.4% students comes in contact with blood or body fluids.

Table 1: Statements regarding overview of hepatitis B and blood-body fluid exposure among paramedical students (n = 76).

Statement	Frequently (several times per week)	Occasionally (1 time/month)/Rarely (<5x a year)
How often do you come into contact with blood or body fluids while working?	49 (64.4%)	27 (36%)
Inserting IV's	36 (47.3%)	40 (52.6%)
Dressing wounds	24 (31.5%)	52 (68.4%)
Blood sample collection	58 (76.3%)	18 (23.6%)

Regarding the modes of transmission of hepatitis B infection, 89.4% and 96% of the students had a correct knowledge that it is transmitted through blood transfusion, and by the use of contaminated syringes and needles, respectively. The knowledge of the students about other modes of transmission such as sexual contact (86%), mother to baby (92%), was remarkably good.

In addition, 83% of the students know that hepatitis B infection is often asymptomatic in majority of the patients. The students' knowledge about chronic complications associated with hepatitis B infection is also mixed as 80.2% students correctly stated that cirrhosis of the liver but 56.5% of the students are unaware about liver cancer as a complication.

Table 2: Statements regarding awareness of transmission of hepatitis B infection among paramedical students (n = 76).

Statement	Yes	No
Blood transfusions.	68 (89.4%)	8 (10.5%)
Unprotected sexual intercourse with an infected person.	65 (85.5%)	11 (14.4%)
Infected mothers to the fetus during labor.	70 (92.1%)	6 (7.8%)
Exposure to blood from a contaminated sharp (i.e., needle stick).	73 (96%)	3 (3.9%)

Approximately four-fifth of the students (93.4%) knew that hepatitis B is a preventable disease. Most of the students have well understood that vaccination (93.4%), and use of sterile needles and syringes (96%) are important preventive measures. But when it comes to taking vaccine, less than half of the participants (42%) stated they had taken vaccine. Of that, only 11 (14.4%) students stated that they are fully immunized with three doses of vaccine.

Table 3: Statements regarding prevention of hepatitis B infection and vaccination status among paramedical students (n = 76).

Statement	Yes	No	Do not know
Hepatitis B vaccination is the most effective way to prevent Hepatitis B infection.	71 (93.4%)	5 (6.5%)	–
Hepatitis B vaccine can be given as post-exposure prophylaxis.	58 (76.3%)	9 (11.8%)	9 (11.8%)
Have you ever been vaccinated against hepatitis B?	32 (42%)	35 (46%)	9 (11.8%)
If yes, how many doses of vaccine have you taken?			
One dose	15 (19.7%)	–	–
Two doses	6 (7.8%)	–	–
Three doses	11 (14.4%)	–	–

Here we have tested all participants for Anti HBsAb titer by ELISA technique. As seen in the below table, those who have two or more doses of vaccine show protective antibody titer. In our study those who have taken only one dose of Hepatitis vaccine have titer < 10 mIU/l. This is unprotective titer, while who has taken two or more doses have protective vaccine titers.

Table 4: Showing comparison of doses of vaccine vs. anti-HbsAb titer of participants.

Doses of vaccine	Anti-HbsAb titer
One dose	< 10 mIU/l
Two doses	> 250 mIU/l
Three doses	> 250 mIU/l

We have calculated P value of Knowledge of virus, Route of transmission & Vaccines to understand the correlation between knowledge and attitude to practice it. We have following results. Details of which is given in Table 5.

Knowledge of virus: The difference in mean scores between the two groups was not statistically significant ($t = 1.534$, $df = 43.161$, $p = 0.132$). This indicates that there was no significant difference in knowledge of the virus between the two groups.

Route of transmission: The independent samples t-test showed no statistically significant difference between the two groups ($t = -1.338$, $df = 74$, $p = 0.185$). Thus, knowledge regarding the route of transmission was comparable across groups.

Vaccines: Similarly, no statistically significant difference was observed between the two groups for knowledge related to vaccines ($t = 1.287$, $df = 74$, $p = 0.202$).

Table 5: Showing t-test value and p-value of three variables: knowledge of virus, route of transmission, and vaccines between positive and negative titer groups.

Variables	Positive (n = 30)	Negative titer (n = 46)	t-test value	P value
Knowledge of virus (Mean $\pm$ SD)	4.07 ± 0.53	3.90 ± 0.32	1.534	0.132
Knowledge of route of transmission (Mean $\pm$ SD)	3.37 ± 0.42	3.49 ± 0.30	1.338	0.185
Knowledge of vaccines (Mean $\pm$ SD)	4.18 ± 0.50	4.05 ± 3.61	1.287	0.202

Across all three domains—knowledge of the virus, route of transmission, and vaccines—no statistically significant differences were observed between the two groups ($p > 0.05$). This suggests that both groups had comparable levels of knowledge in these areas.

Discussion

For healthcare workers, exposure to blood-borne infections including HBV and the human immunodeficiency virus is a serious occupational health risk. Surveys measuring knowledge, attitude, and practice (KAP) are crucial instruments for determining issues, suggesting fixes, and putting policies into action [18]. Lack of general information and awareness regarding HBV infection appears to be a barrier to reaching the WHO's 2030 target of eliminating viral hepatitis [22].

In our study 77.1% participant are well aware about HBV infection. 64.4% students come in contact with blood or body fluids during their clinical postings, which is in line with the results of similar other studies [17, 2]. More than 90% of participants are well aware about modes of transmission of hepatitis B infection. The study done by Venkateswarlu Ketha et al [2] & Manjri Garg et al [23] shows similar results. We can see the similar results in Anti HBS titer, those who all in the range of non-protective titers are vaccine non complaint [24, 25].

Our P value report suggest that even though there is good percentage of students have knowledge about the disease & vaccine but their attitude having complete vaccination is not there. Reasons for such are not fully understood but seems like Complacency, Fear of a low titer result, Lack of incentives or academic credit, Time constraints, Lack of perceived susceptibility at risk, Fear of discrimination of results are shared with others and No symptoms plays the part.

Doing HbsAg titer is recommended after 1–2 months of completing vaccination schedule to document if protective seroconversion is there. Seroconversion occurs in about 95% of young adults. However, among older people ($>$ 60 yrs), the protection is about 65–75%. Protection may last for about 30 yrs or even longer [19]. If anti-HBs is at least 10 mIU/mL (positive), the recipient is immune. No further serologic testing or vaccination is recommended. If anti-HBs is less than 10 mIU/mL (negative), the vaccine is not protected from hepatitis B virus (HBV) infection, and should receive another 2-dose or 3-dose series of HepB vaccine on the routine schedule, followed by anti-HBs testing 1–2 months later. A vaccine whose anti-HBs remain less than 10 mIU/mL after 2 complete series is considered a "non-responder" [20, 21].

First, the sample was collected through convenience sampling, and thus might not accurately represent the population. Second, the study utilized a self report questionnaire that depended on the student's ability to recall, which might have introduced a response bias.

Conclusion

There are about 350 million chronic HBV carriers in the world. The infection can cause both acute and chronic conditions, including as cirrhosis and HCC. By the end of the 20th century, WHO recommended that all countries incorporate the HBV vaccine into their routine infant and childhood vaccination programs [26].

As we look deep into the matter low vaccination compliance among paramedical students could lead to, (1) Increased risk of hepatitis B infection (occupational hazard), (2) Potential outbreaks in healthcare settings (patient transmission risk), (3) Higher risk of chronic liver disease and complications, (4) Increased healthcare costs and burden, (5) Undermined efforts in controlling hepatitis B transmission.

Abbreviations: HBV: Hepatitis B Virus; HCW: Healthcare Worker; KAP: Knowledge, Attitude, and Practice; ELISA: Enzyme-Linked Immunosorbent Assay; DMLT: Diploma in Medical Laboratory Technology; HCC: Hepatocellular Carcinoma; WHO: World Health Organization; Anti-HbsAb: Antibody to Hepatitis B Surface Antigen.

Acknowledgements: None.

Funding: The authors received no financial support for the research, authorship and/or publication of this article.

Competing Interests: The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

References

1. World Health Organization (WHO). Hepatitis B key facts. Available from: https://www.who.int/news-room/fact-sheets/detail/hepatitis-b.
2. Ketha V, Kolli P, Koppolu R, et al. Awareness of hepatitis B infection among second-year undergraduate medical students and their vaccination status. International Journal of Academic Medicine and Pharmacy. 2023;5(5):1138–1141.
3. Dahal K, Rawal L, Shah S, et al. Knowledge, attitude and practice towards hepatitis B vaccination among medical undergraduate students of Maharajgunj Medical Campus in Nepal: a cross-sectional study. Annals of Medicine & Surgery. 2024;86:782–788.
4. Mabunda N, Vieira L, Chelene I, Maueia C, Zicai AF, Duajá A, et al. Prevalence of hepatitis B virus and immunity status among healthcare workers in Beira City, Mozambique. PLoS ONE. 2022;17:e0276283.
5. Hebo HJ, Gemeda 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;2019:9482607.

6. Wijayadi T, Sjahril R, Turyadi, Ie SI, Wahyuni R, Pattelongi I, Massi MN, et al. Seroepidemiology of HBV infection among health-care workers in South Sulawesi, Indonesia. BMC Infect Dis. 2018;18:279.
7. Occupational HBV post exposure prophylaxis. Available from: https://www.hepatitisB.uw.edu/go/prevention-hbv/postexposure-prophylaxis-following-occupational-exposureto-hepatitis-b-virus/core-concept/all.
8. Dolman GE, Koffas A, Phipps E, Kennedy PT. Clinical and occupational health management of healthcare workers living with chronic hepatitis B: UK policy and international comparisons. J Viral Hepat. 2021;28:976–981.
9. Centers for Disease Control and Prevention (CDC). Updated CDC recommendations for the management of hepatitis B virus infected health-care providers and students. MMWR Recomm Rep. 2012;61:1–12.
10. World Health Organization. Table 4: Summary of WHO Position Papers—Immunization of Health Care Workers. Update March 2023.
11. El Bara A, Pivert A, Veillon P, Sang CN, Bollahi M, Abdel K, et al. From national HBV and HDV screenings to vaccination and treatment in healthcare workers: The Mauritanian pilot study. Vaccine. 2021;39:2274–2279.
12. Kisangau EN, Awour A, Juma B, Odhiambo D, Muasya T, Kiio SN, et al. Prevalence of hepatitis B virus infection and uptake of hepatitis B vaccine among healthcare workers, Makueni County, Kenya 2017. J Public Health. 2019;41:765–771.
13. Bilounga Ndongo C, Eteki L, Siedner M, Mbaye R, Chen J, Ntone R, et al. Prevalence and vaccination coverage of hepatitis B among healthcare workers in Cameroon: A national seroprevalence survey. J Viral Hepat. 2018;25:1582–1587.
14. Qin YL, Li B, Zhou YS, Zhang X, Li L, Song B, et al. Prevalence and associated knowledge of hepatitis B infection among healthcare workers in Freetown, Sierra Leone. BMC Infect Dis. 2018;18:1–8.
15. Nayyar C, Saksena R, Manchanda V. Prevalence of transfusion-transmitted viral pathogens among health-care workers and risk mitigation programme in a paediatric tertiary care hospital. Indian J Med Microbiol. 2017;35:296–298.
16. Machange RE, Mosha D, Pyuza JJ, Nyombi BB, Shao ER. Seroprevalence and knowledge of hepatitis B virus infection among laboratory workers at Kilimanjaro Christian Medical Centre in Moshi, Tanzania. East Afr Health Res J. 2017;1:80.
17. Sannathimmappa MB, Nambiar V, Arvindakshan R. Hepatitis B: knowledge and awareness among preclinical year medical students. Avicenna J Med. 2019;9:43–47.
18. Abdela A, Woldu B, Haile K, Mathewos B, Deressa T. Assessment of knowledge, attitudes and practices toward prevention of hepatitis B virus infection among students of medicine and health sciences in northwest Ethiopia. BMC Res Notes. 2016;9:410.
19. Sastry AS, Bhat S. Essentials of Medical Microbiology. 4th ed.
20. Centers for Disease Control and Prevention. Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 2011;60(RR-7).
21. Centers for Disease Control and Prevention. Prevention of hepatitis B virus infection in the United States. Recommendations of the Advisory Committee on Immunization Practices. MMWR. 2018;67(RR1):1–30.
22. Karimi-Sari H, Bayatpoor ME, Aftabi Khotbesara M, Ebrahimi MS, Sattari Z, Sattari P, et al. Knowledge, attitude, and practice of Iranian health sciences students regarding hepatitis B and C virus infections: A national survey. Am J Infect Control. 2017;45:e135–41.
23. Garg M, Sridhar B, Katyal V, Goyal S. Assessment of knowledge, attitude, and practices (KAP) toward hepatitis B infection, its prevention, and vaccination among health care workers. Cureus. 2023;15(5):e39747. DOI 10.7759/cureus.39747.
24. Anand KB, Mohanty S, Mana V. Seroprevalence of Anti HBs titer in health-care workers in a tertiary care hospital in Mumbai. Journal of Marine Medical Society. 2020;22:54–56.
25. Karaivazoglou K, Triantos C, Lagadinou M, Bikas C, Michailidou M, Kalafateli M, et al. Acceptance of hepatitis B vaccination among health care workers in Western Greece. Arch Environ Occup Health. 2014;69:107–111.
26. World Health Organization, Global Hepatitis Programme. Global hepatitis report, 2017. Available from: http://apps.who.int/iris/bitstream/10665/255016/1/9789241565455-eng.pdf.