

KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS PREVENTION OF HEPATITIS B INFECTION AMONG MEDICAL STUDENTS

Dr. Naveen Kumar¹, Dr. Yuvanraj^{2*}, Dr. Banu Prakash³, Dr. Shiny Shadonex⁴, Dr. Akash Rahangan⁵, Dr. Yogesh Manickam Dominic Savio⁶

¹Postgraduate, Department of Pharmacology, SRM Medical College Hospital and Research Centre, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu, Tamil Nadu, India. ORCID ID: 0009-0002-9433-0467. Email: nk3357@srmist.edu.in

^{2*}Postgraduate, Department of Pharmacology, SRM Medical College Hospital and Research Centre, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu, Tamil Nadu, India. ORCID ID: 0009-0005-9824-3864. Email: yb9757@srmist.edu.in

³Postgraduate, Department of Pathology, Saveetha Institute of Medical and Technical Sciences, Thandalam, Chennai – 602105, Tamil Nadu, India. ORCID ID: 0009-0006-8767-7111. Email: banuvishnu133@gmail.com

⁴Junior Resident, Department of Anatomy, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India. ORCID ID: 0009-0008-5959-8090, Email: shinyshadonex@gmail.com

⁵Senior Resident, Department of Pharmacology, SRM Medical College Hospital and Research Centre, Faculty of Medicine and Health Sciences, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu, Tamil Nadu, India, ORCID ID: 0009-0009-5384-9001, Email: akashrahangan@hotmail.com

⁶Independent Medical Researcher, Chennai, Tamil Nadu, India, ORCID ID: 0009-0001-8769-5890, Email: dryogeshmanickam@gmail.com

ABSTRACT

Background: Hepatitis B virus (HBV) infection remains a major occupational hazard among healthcare workers and medical students because of frequent exposure to blood and body fluids during clinical training. Adequate knowledge, positive attitudes, and appropriate preventive practices are essential for minimizing occupational transmission and ensuring patient safety.

Objectives: To assess the knowledge, attitudes, and practices regarding prevention of hepatitis B infection among undergraduate medical students and to determine the association of selected socio-demographic factors with knowledge regarding hepatitis B prevention.

Methodology: A hospital-based cross-sectional descriptive study was conducted among 600 undergraduate medical students in a tertiary care teaching institution over a period of six months. Participants were selected using stratified random sampling. Data were collected using a pre-designed, pre-tested, self-administered structured questionnaire comprising socio-demographic details and knowledge, attitude, and practice (KAP) components. Knowledge, attitude, and practice scores were categorized using predetermined scoring criteria. Data were analysed using SPSS version 26.0. Descriptive statistics, Chi-square test, Pearson's correlation, and logistic regression were employed. A p-value <0.05 was considered statistically significant.

Results: Among the 600 participants, 71.0% demonstrated good knowledge, 86.5% exhibited a positive attitude, and 77.0% had good preventive practices regarding hepatitis B prevention. Overall, 73.0% had completed hepatitis B vaccination. Knowledge improved significantly with advancing academic year ($p < 0.001$), and vaccinated students showed significantly better knowledge than unvaccinated students (78.5% vs. 50.6%; $p < 0.001$). Students with family members employed in healthcare also demonstrated significantly higher knowledge (81.6% vs. 66.7%; $p < 0.001$). Significant positive correlations were observed between knowledge and attitude ($r = 0.432$; $p < 0.001$), knowledge and practice ($r = 0.329$; $p < 0.001$), and attitude and practice ($r = 0.518$; $p < 0.001$).

Conclusion: The present study demonstrated satisfactory knowledge, favourable attitudes, and good preventive practices regarding hepatitis B prevention among undergraduate medical students. Nevertheless, deficiencies in vaccination coverage, awareness of post-exposure prophylaxis, and reporting of occupational exposures remain. Strengthening infection-control education, ensuring complete hepatitis B vaccination before clinical postings, and conducting periodic awareness and skill-based training programmes are essential to enhance occupational safety among future healthcare professionals.

KEYWORDS: Hepatitis B; Knowledge; Attitude; Practice; Medical Students; Vaccination; Occupational Exposure; Infection Prevention

INTRODUCTION

Hepatitis B virus (HBV) infection is one of the most important vaccine-preventable infectious diseases and remains a major global public health challenge. HBV is a partially double-stranded DNA virus belonging to the family Hepadnaviridae that primarily infects hepatocytes, leading to acute and chronic hepatitis, cirrhosis, liver failure, and

hepatocellular carcinoma. Chronic hepatitis B continues to contribute substantially to global morbidity and mortality despite the availability of an effective vaccine for more than four decades. The World Health Organization (WHO) has identified viral hepatitis as a priority public health issue and formulated the Global Health Sector Strategy with the objective of eliminating viral hepatitis as a public health threat by 2030 through a 90% reduction in new infections and a 65% reduction in hepatitis-related mortality.[1]

According to the WHO, an estimated 296 million people were living with chronic hepatitis B infection worldwide in 2019, with approximately 1.5 million new infections and 820,000 deaths annually, primarily due to cirrhosis and hepatocellular carcinoma. The WHO also emphasizes that increasing vaccination coverage, improving diagnosis, expanding antiviral treatment, and strengthening infection prevention practices are essential to achieve hepatitis elimination targets.[2]

Hepatitis B virus is transmitted through exposure to infected blood and body fluids, including needle-stick injuries, unsafe injections, transfusion of contaminated blood products, sexual contact, and perinatal transmission. HBV is highly infectious and remains viable on environmental surfaces for prolonged periods. The risk of infection following percutaneous exposure to HBV-positive blood ranges from 6% to 30%, depending on the infectivity of the source patient, making HBV considerably more infectious than human immunodeficiency virus (HIV).[3]

Advances in molecular virology have considerably enhanced the understanding of HBV replication, viral genetics, disease progression, and immune response. These developments have facilitated improvements in diagnostic techniques, recombinant vaccine production, antiviral therapies, and long-term disease control strategies. Nevertheless, chronic HBV infection continues to remain underdiagnosed in many regions because infected individuals often remain asymptomatic until advanced liver disease develops.[4]

Healthcare workers are recognized as one of the occupational groups at highest risk of acquiring HBV infection because of frequent exposure to blood, body fluids, contaminated needles, and sharp instruments during routine clinical practice. Medical students become vulnerable to occupational exposure immediately after entering clinical postings and performing invasive procedures. The Centers for Disease Control and Prevention (CDC) recommends complete hepatitis B vaccination before clinical exposure, documentation of post-vaccination immunity, strict adherence to standard precautions, and prompt post-exposure prophylaxis following occupational exposure.[5]

India is classified as a country with intermediate endemicity for hepatitis B infection, with an estimated prevalence of 2–4%, corresponding to nearly 40–50 million chronic HBV carriers, representing one of the largest HBV-infected populations globally. Hepatitis B remains an important cause of chronic liver disease and hepatocellular carcinoma in the country, thereby posing a significant burden on the healthcare system.[6]

Healthcare workers in India continue to experience occupational exposure to HBV because of accidental needle-stick injuries, incomplete vaccination, under-reporting of occupational exposures, and inconsistent compliance with infection-control practices. Several Indian studies have highlighted the need for strengthening awareness regarding hepatitis B vaccination, standard precautions, and post-exposure management among healthcare personnel and medical trainees.[7]

The introduction of hepatitis B vaccine into India's Universal Immunization Programme has substantially improved population-level protection against HBV infection. However, vaccination coverage among healthcare students entering clinical training remains variable across institutions. Incomplete vaccination schedules and lack of awareness regarding protective antibody status continue to increase occupational susceptibility among medical students.[8]

Unsafe injection practices remain a major source of healthcare-associated HBV transmission worldwide. The WHO estimates that contaminated sharps injuries contribute significantly to occupational hepatitis B infections among healthcare workers, particularly in low- and middle-income countries. Appropriate infection-control measures, including safe injection practices, standard precautions, use of personal protective equipment, proper biomedical waste disposal, and complete hepatitis B vaccination, are highly effective in preventing occupational transmission.[9]

India has strengthened national policies promoting safe injection practices, biomedical waste management, and infection prevention through training programmes and institutional infection-control committees. Nevertheless, effective implementation depends largely on the knowledge, attitudes, and routine preventive practices of healthcare professionals and medical students during their clinical education.[10]

Medical students represent the future healthcare workforce and frequently encounter blood and body fluid exposure during clinical postings, making them particularly vulnerable to HBV infection. Adequate knowledge regarding disease transmission, vaccination schedules, standard precautions, post-exposure prophylaxis, and infection-control measures, together with positive attitudes and appropriate preventive practices, are essential for minimizing occupational risk and ensuring patient safety. Assessment of these components through a Knowledge, Attitude and Practice (KAP) study provides valuable evidence for identifying educational gaps and developing targeted interventions to improve hepatitis B prevention.

Therefore, the present study was undertaken to assess the knowledge, attitudes, and practices regarding prevention of hepatitis B infection among undergraduate medical students, with the aim of identifying deficiencies in awareness and preventive behaviour and providing evidence to strengthen infection-control education, hepatitis B vaccination, and occupational safety programmes.

METHODOLOGY

Study Design

A hospital-based cross-sectional descriptive study was conducted to assess the knowledge, attitudes, and practices regarding prevention of hepatitis B infection among undergraduate medical students.

Study Setting

The study was conducted among undergraduate medical students of a tertiary care teaching hospital attached to a medical college in South India. The institution provides comprehensive undergraduate medical education with exposure to preclinical, paraclinical, and clinical training under a tertiary healthcare setting.

Study Duration

The study was carried out over a period of 6 months.

Study Population

The study population comprised undergraduate MBBS students from the first year to the final year who were enrolled during the study period.

Sample Size

A total of 600 undergraduate medical students participated in the study.

Sampling Technique

A stratified random sampling technique was adopted. Students were stratified according to their academic year, and proportionate allocation was used to ensure adequate representation from each batch. Participants were selected using simple random sampling from the student attendance registers.

Inclusion Criteria

- ☐ Undergraduate MBBS students studying in the institution.
- ☐ Students aged 18 years and above.
- ☐ Students willing to participate in the study.
- ☐ Students who provided written informed consent.

Exclusion Criteria

- ☐ Medical interns.
- ☐ Postgraduate students.
- ☐ Students absent during data collection despite repeated visits.
- ☐ Students who declined participation.
- ☐ Incompletely filled questionnaires

Study Instrument

Data were collected using a pre-designed, pre-tested, structured, self-administered questionnaire adapted from previously validated hepatitis B Knowledge, Attitude, and Practice (KAP) questionnaires with suitable modifications for the study population. The questionnaire was prepared in English, the medium of medical instruction.

The questionnaire consisted of four sections:

Section A: Socio-demographic characteristics

- ☐ Age
- ☐ Gender
- ☐ Academic year
- ☐ Residence
- ☐ Previous hepatitis B vaccination
- ☐ Family member working in the healthcare sector
- ☐ History of needle-stick injury

Section B: Knowledge regarding hepatitis B infection

- ☐ Causative organism
- ☐ Modes of transmission
- ☐ Vaccination schedule
- ☐ Occupational exposure
- ☐ Post-exposure prophylaxis
- ☐ Standard precautions
- ☐ Prevention methods

Section C: Attitude towards hepatitis B prevention

- ☐ Importance of vaccination
- ☐ Universal precautions
- ☐ Infection control
- ☐ Occupational safety
- ☐ Reporting of needle-stick injuries

Section D: Preventive practices

- ☐ Vaccination status
- ☐ Hand hygiene
- ☐ Use of personal protective equipment

- ☐ Safe needle handling
- ☐ Biomedical waste disposal
- ☐ Reporting occupational exposure

Scoring System

Each correct knowledge response was awarded one mark, while incorrect or "Don't know" responses received zero marks. Knowledge scores were classified as:

- ☐ Good: $\geq 75\%$
- ☐ Moderate: 50–74%
- ☐ Poor: $< 50\%$

Attitude was assessed using a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Scores $\geq 75\%$ of the maximum attainable score were considered as positive attitude.

Practice items were scored as:

- ☐ Appropriate practice = 1
- ☐ Inappropriate practice = 0

Participants obtaining $\geq 75\%$ of the maximum obtainable score were categorized as having good preventive practices.

Pilot Study

Prior to commencement of the study, the questionnaire was pilot tested among 30 undergraduate medical students who were not included in the final analysis. Necessary modifications were incorporated to improve clarity and comprehension. The questionnaire demonstrated satisfactory internal consistency with a Cronbach's alpha value of 0.81.

Data Collection Procedure

After obtaining approval from the Institutional Ethics Committee and permission from the concerned authorities, eligible students were approached during their routine academic sessions. The objectives of the study were explained, written informed consent was obtained, and participants completed the anonymous questionnaire independently. Adequate time was provided to complete the questionnaire, and confidentiality was strictly maintained throughout the study.

Study Variables

Dependent Variables

- ☐ Knowledge regarding hepatitis B infection.
- ☐ Attitude towards hepatitis B prevention.
- ☐ Preventive practices regarding hepatitis B infection.

Independent Variables

- ☐ Age.
- ☐ Gender.
- ☐ Academic year.
- ☐ Place of residence.
- ☐ Hepatitis B vaccination status.
- ☐ Family member employed in healthcare.
- ☐ History of needle-stick injury.

Statistical Analysis

The collected data were entered into Microsoft Excel and analysed using IBM Statistical Package for the Social Sciences (SPSS) version 26.0.

Descriptive statistics were presented as frequencies, percentages, mean, and standard deviation. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, wherever appropriate. Correlations between knowledge, attitude, and practice scores were analysed using Pearson's correlation coefficient. Binary logistic regression analysis was performed to identify factors independently associated with good knowledge and preventive practices. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee before initiation of the study. Written informed consent was obtained from all participants prior to enrolment. Participation was voluntary, anonymity was ensured, and all information collected was kept confidential and used exclusively for research purposes. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

RESULTS

Table 1. Socio-Demographic Characteristics Of Participants (N=600)

Variable	Frequency	Percentage
Age (years)		
18–20	246	41.0
21–22	214	35.7
23–24	105	17.5
≥ 25	35	5.8

Gender		
Male	278	46.3
Female	322	53.7
Academic Year		
First	150	25.0
Second	150	25.0
Third	150	25.0
Fourth	150	25.0
Residence		
Urban	370	61.7
Rural	230	38.3
Family member in health profession		
Yes	174	29.0
No	426	71.0
Previous HB vaccination		
Yes	438	73.0
No	162	27.0

Table 2. Knowledge Regarding Hepatitis B Infection (N=600)

Item	Correct n (%)
Virus affects liver	582 (97.0)
Spread through blood	561 (93.5)
Spread by contaminated needles	556 (92.7)
Spread through sexual contact	492 (82.0)
Mother-to-child transmission	463 (77.2)
Vaccine available	548 (91.3)
Three-dose schedule	472 (78.7)
Needle-stick injury transmits HBV	544 (90.7)
Post exposure prophylaxis available	401 (66.8)
Universal precautions reduce transmission	529 (88.2)

Knowledge Score

Category	n	%
Poor (<50%)	58	9.7
Moderate (50–75%)	116	19.3
Good (>75%)	426	71.0

Table 3. Attitude Towards Prevention of Hepatitis B (N=600)

Statement	Agree n (%)
HB vaccination should be compulsory	574 (95.7)
Standard precautions should always be followed	579 (96.5)
Needle-stick injuries should always be reported	546 (91.0)
HB patients deserve equal care	565 (94.2)
Medical students are at occupational risk	553 (92.2)
Infection control workshops should be regular	570 (95.0)
Vaccination should be checked before clinical posting	562 (93.7)

Overall Attitude

Category	n	%
Positive	519	86.5
Negative	81	13.5

Table 4. Preventive Practices (N=600)

Practice	Yes n (%)
Completed HB vaccination	438 (73.0)
Uses gloves during procedures	553 (92.2)
Washes hands before and after patient contact	539 (89.8)
Never recaps needles	486 (81.0)
Reports needle-stick injuries	409 (68.2)
Uses PPE appropriately	518 (86.3)
Participates in infection control training	448 (74.7)

Practice Score

Category	n	%
Good	462	77.0
Poor	138	23.0

Table 5. Knowledge, Attitude and Practice According to Academic Year

Academic Year	Good Knowledge	Positive Attitude	Good Practice
First Year	95 (63.3)	118 (78.7)	92 (61.3)
Second Year	106 (70.7)	127 (84.7)	111 (74.0)
Third Year	109 (72.7)	135 (90.0)	121 (80.7)
Fourth Year	116 (77.3)	139 (92.7)	138 (92.0)

Chi-square

Knowledge $p < 0.001$

Attitude $p = 0.002$

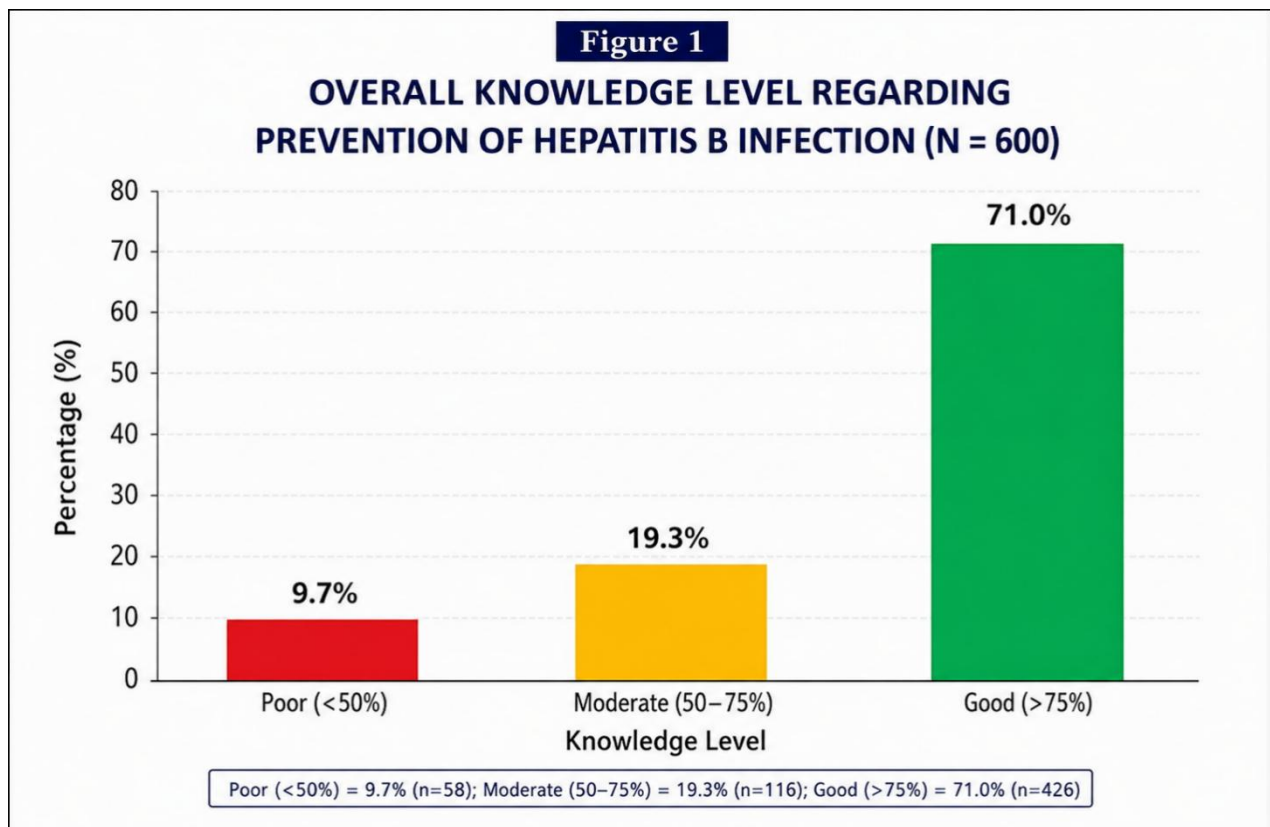
Practice $p < 0.001$

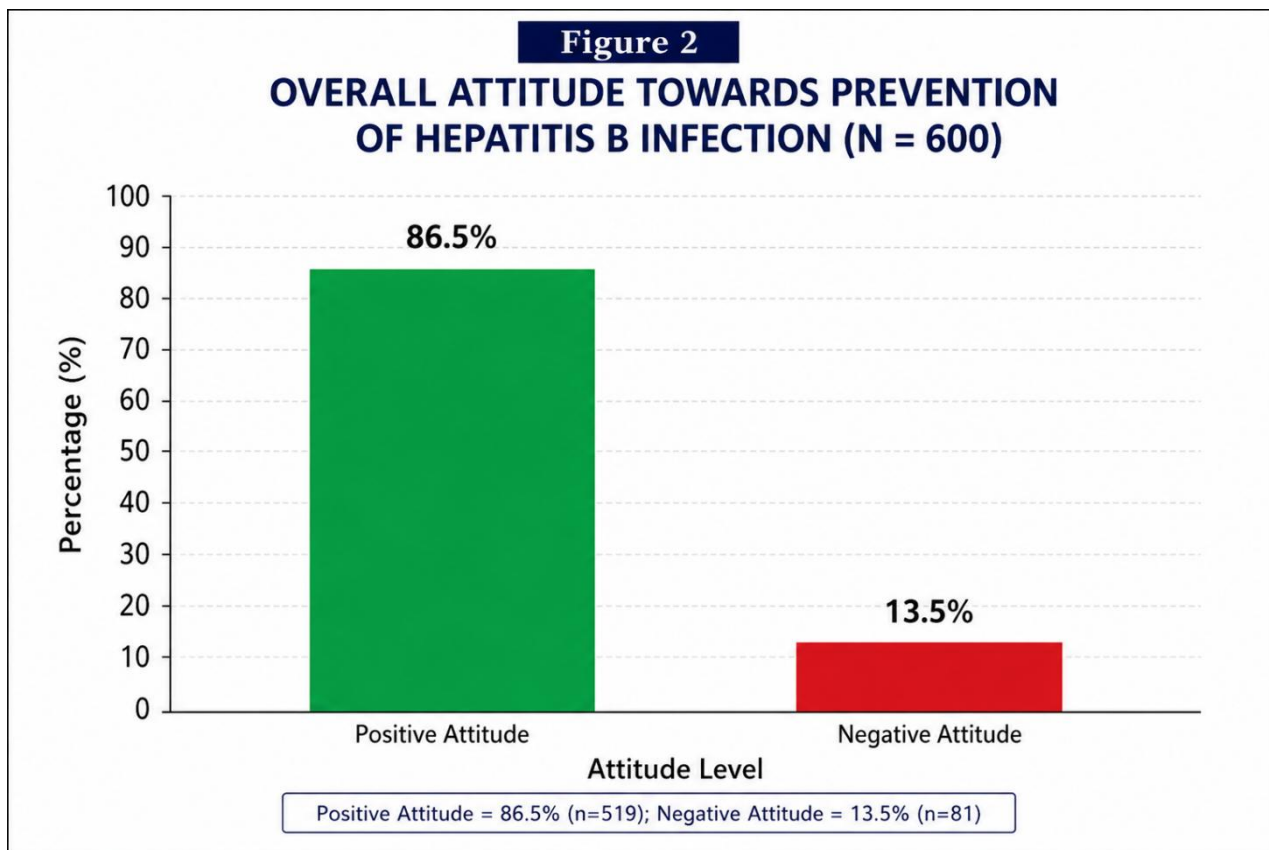
Table 6. Association Between Knowledge and Selected Variables

Variable	Good Knowledge n (%)	χ^2	p-value
Male	194 (69.8)		
Female	232 (72.0)	0.38	0.536
Urban	278 (75.1)		
Rural	148 (64.3)	8.09	0.004*
Vaccinated	344 (78.5)		
Unvaccinated	82 (50.6)	49.62	<0.001*
Family member in healthcare	142 (81.6)		
No family member	284 (66.7)	12.83	<0.001*

Table 7. Correlation Between Knowledge, Attitude and Practice Scores

Variables	Pearson r	p-value
Knowledge vs Attitude	0.432	<0.001
Knowledge vs Practice	0.329	<0.001
Attitude vs Practice	0.518	<0.001





DISCUSSION

The present study assessed the knowledge, attitudes, and practices regarding prevention of hepatitis B infection among 600 undergraduate medical students enrolled in a tertiary care teaching institution. Overall, 71.0% of participants demonstrated good knowledge, 86.5% had a positive attitude, and 77.0% exhibited good preventive practices. Furthermore, 73.0% of students had completed hepatitis B vaccination, knowledge improved significantly with advancing academic year ($p < 0.001$), and positive correlations were observed between knowledge and attitude ($r = 0.432$, $p < 0.001$), knowledge and practice ($r = 0.329$, $p < 0.001$), and attitude and practice ($r = 0.518$, $p < 0.001$). These findings indicate that although awareness regarding hepatitis B prevention was generally satisfactory, important gaps still exist in vaccination coverage and preventive practices, particularly among junior medical students.

In the present study, 71.0% of students demonstrated good overall knowledge regarding hepatitis B infection, while 19.3% had moderate knowledge and 9.7% had poor knowledge. Most participants correctly identified that hepatitis B affects the liver (97.0%), is transmitted through blood (93.5%), contaminated needles (92.7%), and can be prevented through vaccination (91.3%). However, awareness regarding post-exposure prophylaxis remained comparatively lower (66.8%). Similar findings were reported by Alhowaish et al., who observed that approximately 75% of Saudi Arabian medical students possessed adequate knowledge regarding hepatitis B transmission and prevention, although important deficiencies were noted in post-exposure management and vaccination schedules.[11] Likewise, Rathi et al. reported that nearly 70% of Indian medical students demonstrated satisfactory knowledge, with better awareness among students in higher academic years and those previously vaccinated.[12] Comparable observations were reported by Abdela et al., who found that about 69% of Ethiopian medical and health science students had adequate knowledge regarding hepatitis B prevention, while gaps persisted regarding occupational exposure and post-exposure prophylaxis.[13] These findings support the present study and emphasize that although theoretical awareness among medical students is generally good, specific aspects of infection control continue to require reinforcement.

Knowledge regarding hepatitis B prevention has consistently been shown to improve with increasing clinical exposure. In the present study, good knowledge increased from 63.3% among first-year students to 77.3% among fourth-year students ($p < 0.001$). Similar trends were observed by Mesfin and Kibret, who demonstrated significantly higher knowledge scores among senior medical students compared with junior students owing to increased clinical exposure and infection-control training.[14] Likewise, Noubiap et al. reported that senior students exhibited better understanding of hepatitis B vaccination, occupational risks, and needle-stick injury management than students in earlier years of training.[15] These findings indicate that continuous medical education and clinical experience substantially improve awareness regarding hepatitis B prevention.

Vaccination remains the single most effective preventive measure against hepatitis B infection. In the present study, 73.0% of participants had completed hepatitis B vaccination. Although this coverage is encouraging, more than one-quarter of students remained unvaccinated despite being exposed to clinical settings. Similar vaccination coverage (approximately 70–75%) was reported by Pathoumthong et al. among health profession students in Lao People's Democratic Republic, where incomplete vaccination was mainly attributed to poor awareness and limited institutional vaccination programmes.[16] Likewise, Karimi-Sari et al. observed suboptimal vaccination uptake among Iranian health sciences

students despite satisfactory knowledge levels, indicating that awareness alone does not always translate into preventive behaviour.[17] These findings highlight the need for mandatory vaccination policies before commencement of clinical postings.

The present study demonstrated an excellent overall attitude towards hepatitis B prevention, with 86.5% of students showing a positive attitude. More than 95% agreed that hepatitis B vaccination should be compulsory, infection-control workshops should be conducted regularly, and standard precautions should always be followed. Similar observations were reported by Al-Hazmi, who found that nearly 85% of Saudi Arabian medical students exhibited positive attitudes regarding occupational safety and hepatitis B vaccination, although a proportion underestimated their individual occupational risk.[18] The high level of positive attitude observed in both studies reflects increasing awareness regarding occupational health and patient safety among future healthcare professionals.

Preventive practices in the present study were also satisfactory, with 77.0% of participants demonstrating good practice. More than 92% reported regular glove use during procedures, 89.8% practised hand hygiene, and 81.0% avoided recapping needles. However, only 68.2% reported needle-stick injuries appropriately, indicating room for improvement in occupational safety practices. Similar findings were reported by Alqahtani et al., who observed good compliance with infection-control practices among healthcare students but identified deficiencies in reporting occupational exposure and completion of hepatitis B immunization.[19] Likewise, Oliveira and Pontes found that although Brazilian medical students were aware of infection-control recommendations, occupational exposure remained common because of inadequate reporting and inconsistent preventive practices during clinical training.[20]

The present study also demonstrated that knowledge improved significantly with advancing academic year, with first-year students exhibiting the lowest proportion of adequate knowledge and good preventive practices. Similar observations were reported by Giri et al., who found that first-year medical students had significantly lower awareness regarding hepatitis B vaccination compared with senior students because of limited clinical exposure.[21] Comparable findings were described by Vinodhkumaradithyaa et al., who reported that vaccination uptake and awareness increased progressively during medical education following repeated infection-control training and hospital exposure.[22] These findings emphasize the importance of introducing structured hepatitis B education early in the undergraduate curriculum.

Knowledge was significantly associated with hepatitis B vaccination status in the present study, where 78.5% of vaccinated students demonstrated good knowledge compared with 50.6% among unvaccinated students ($p < 0.001$). Similarly, students having family members working in healthcare exhibited significantly better knowledge (81.6% vs. 66.7%; $p < 0.001$). Comparable observations were reported by Paul and Peterside, who demonstrated higher vaccination uptake among students with greater awareness regarding hepatitis B infection and occupational risk.[23] Likewise, Othman et al. reported that previous exposure to healthcare environments significantly improved students' awareness regarding hepatitis B transmission and prevention.[24]

An important finding of the present study was the significant positive correlation between knowledge, attitude, and preventive practices. Knowledge showed a moderate positive correlation with attitude ($r = 0.432$) and practice ($r = 0.329$), while attitude demonstrated the strongest correlation with preventive practices ($r = 0.518$) (all $p < 0.001$). These findings indicate that improving knowledge through structured educational programmes may positively influence both attitudes and preventive behaviour. Similar observations were reported by Al Ghamdi et al., who demonstrated that increased awareness regarding hepatitis B vaccination was associated with better compliance with immunization recommendations and long-term protection among healthcare workers and high-risk populations.[25]

Overall, the findings of the present study suggest that undergraduate medical students possess satisfactory knowledge and favourable attitudes regarding hepatitis B prevention; however, deficiencies remain in vaccination coverage, post-exposure prophylaxis awareness, and reporting of occupational exposures. Strengthening infection-control training, implementing mandatory hepatitis B vaccination before clinical postings, conducting periodic awareness programmes, and reinforcing occupational safety protocols may further improve preventive practices and reduce the risk of hepatitis B transmission among future healthcare professionals.

CONCLUSION

The present study demonstrated that undergraduate medical students possessed satisfactory knowledge (71.0%), highly positive attitudes (86.5%), and good preventive practices (77.0%) regarding prevention of hepatitis B infection. Most students were aware of the major modes of transmission, the importance of hepatitis B vaccination, and adherence to standard infection-control precautions. However, deficiencies persisted in knowledge regarding post-exposure prophylaxis, complete vaccination coverage, and reporting of needle-stick injuries.

Knowledge and preventive practices improved significantly with advancing academic year, indicating the positive impact of clinical exposure and medical education. Hepatitis B vaccination status and having a family member employed in the healthcare sector were significantly associated with better knowledge, emphasizing the influence of previous exposure and health awareness on preventive behaviour. Furthermore, the positive correlations observed between knowledge, attitude, and practice suggest that improving knowledge through structured educational interventions can positively influence attitudes and preventive practices.

Despite encouraging findings, nearly one-fourth of students remained inadequately vaccinated, and a substantial proportion failed to demonstrate optimal occupational safety practices. These findings highlight the continued need for comprehensive infection-control education and institutional support.

Routine hepatitis B vaccination before clinical postings, periodic awareness programmes, hands-on infection-control training, regular assessment of vaccination status, and reinforcement of post-exposure management protocols should be

integrated into undergraduate medical education. Such measures will strengthen occupational safety, reduce the risk of hepatitis B transmission, and contribute to safer healthcare practices among future medical professionals.

REFERENCES

1. World Health Organization. Global health sector strategy on viral hepatitis 2016–2021: Towards ending viral hepatitis. Geneva: WHO; 2016.
2. World Health Organization. Guidelines for the prevention, care and treatment of persons with chronic hepatitis B infection. Geneva: WHO; 2015.
3. Shepard CW, Simard EP, Finelli L, Fiore AE, Bell BP. Hepatitis B virus infection: Epidemiology and vaccination. *Epidemiol Rev.* 2006;28:112-125.
4. Gerlich WH. Medical virology of hepatitis B: How it began and where we are now. *Virol J.* 2013;10:239.
5. Schillie S, Murphy TV, Sawyer M, Ly K, Hughes E, Jiles R, et al. CDC guidance for evaluating health-care personnel for hepatitis B virus protection and administering post-exposure management. *MMWR Recomm Rep.* 2013;62(RR-10):1-19.
6. Puri P. Tackling the hepatitis B disease burden in India. *J Clin Exp Hepatol.* 2014;4(4):312-319.
7. Singhal V, Bora D, Singh S. Hepatitis B in health care workers: Indian scenario. *J Lab Physicians.* 2009;1(2):41-48.
8. Lahariya C, Subramanya BP, Sosler S. Assessment of hepatitis B vaccine introduction in India. *Indian J Public Health.* 2013;57(1):8-14.
9. 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):482-490.
10. Arora NK. Injection practices in India. *WHO South East Asia J Public Health.* 2012;1(2):189-200.
11. Alhawaish MA, Alhawaish JA, Alanazi YH, et al. Knowledge, attitudes and practices toward prevention of hepatitis B virus infection among medical students at Northern Border University, Saudi Arabia. *Electron Physician.* 2017;9(9):5388-5394.
12. Rathi A, Kumar V, Majhi J, Jain S, Lal P, Singh S. Assessment of knowledge, attitude and practices toward prevention of hepatitis B infection among medical students in a high-risk setting. *J Lab Physicians.* 2018;10(4):374-379.
13. 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. *BMC Res Notes.* 2016;9:410.
14. Mesfin YM, Kibret KT. Assessment of knowledge and practice towards hepatitis B among medical and health science students in Haramaya University. *PLoS One.* 2013;8(11):e79642.
15. Noubiap JJ, Nansseu JR, Kengne KK, Ndoula ST, Agyingi LA. Occupational exposure to blood, hepatitis B vaccine knowledge and uptake among medical students in Cameroon. *BMC Med Educ.* 2013;13:148.
16. Pathoumthong K, Khampanisong P, Quet F, et al. Vaccination status, knowledge and awareness towards hepatitis B among students of health professions in Lao PDR. *Vaccine.* 2014;32(38):4993-4999.
17. Karimi-Sari H, Bayatpoor ME, Aftabi Khotbesara M, et al. Knowledge, attitude and practice of Iranian health sciences students regarding hepatitis B and C virus infections. *Am J Infect Control.* 2017;45:e135-e141.
18. Al-Hazmi AH. Knowledge, attitudes and practice of medical students regarding occupational risks of hepatitis B virus. *Ann Med Health Sci Res.* 2015;5(1):13-19.
19. Alqahtani JM, Abu-Eshy SA, Mahfouz AA, et al. Seroprevalence of hepatitis B and C virus infections among health students and healthcare workers. *BMC Public Health.* 2014;14:577.
20. Oliveira LC, Pontes JP. Frequency of hepatitis B immunity and occupational exposure among Brazilian medical students. *Rev Inst Med Trop Sao Paulo.* 2010;52(5):247-252.
21. Giri MR, Panda JK, Sahoo AK. Hepatitis B awareness and vaccination status among first-year medical students. *Int J Community Med Public Health.* 2016;3(2):530-532.
22. Vinodhkumaradithyaa A, Srinivasan M, Sankarasubramanian R, et al. Hepatitis B vaccination among medical students. *Indian J Community Med.* 2008;33(1):67-68.
23. Paul N, Peterside O. Hepatitis B vaccination rate among medical students at the University of Port Harcourt Teaching Hospital. *World J Vaccines.* 2015;5:1-7.
24. Othman SM, Saleh AM, Shabila NP. Knowledge about hepatitis B infection among medical students in Erbil city, Iraq. *Eur Sci J.* 2013;9(3).
25. Al Ghamdi SS, Fallatah HI, Fetyani DM, Al-Mughales JA, Gelaidan AT. Long-term efficacy of the hepatitis B vaccine in a high-risk group. *J Med Virol.* 2013;85(9):1518-1522.