



## EFFECT OF GENDER AND AGE ON THE KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING HEPATITIS B AND C AND VACCINATION STATUS OF HEPATITIS B AMONG MEDICAL STUDENTS OF GANDHI MEDICAL COLLEGE, BHOPAL

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### Abstract

**Objectives:** To assess the level of knowledge, attitude and practices regarding Hepatitis B & C among medical students and to estimate the vaccination status for hepatitis B among the students.

**Methods:** This cross-sectional study was conducted in Gandhi Medical College. Convenient sampling was used to collect the information. Questionnaire regarding awareness about prevention, transmission, diagnosis, treatment and vaccination availability for hepatitis B and C was completed from each individual via peer reviewed google forms. In addition, vaccination status of hepatitis B and the awareness of students regarding post exposure prophylaxis was also documented.

**Results:** A total of 303 students participated in this study. Participants in age group 18-20 years old were 141(46.5%) and the rest were in 21 years old and above. Female participants were 143(47%). 97% of younger age group and 90% of older age group agreed that if someone who appears healthy be a patient. 56% males; whereas only 41% females aware of the CDC guidelines of WHO for health care workers regarding Hep B. 71% males and 82% females agreed if they actively encouraged their fellow medical students to get vaccinated against hep B. 80% males and 89% females gave their opinion that hepatitis B vaccination should be included as a mandatory requirement for medical school admission. 76% participants from younger age group and 85% from older age group said that they ask their hairdresser to use new blades for shaving or hair cutting. 79% males and females responded that they cover any open wounds or cuts to prevent exposure to hepatitis B. 67% males whereas only 20% females responded that they participated in health education program related to Hepatitis B. 59% participants from younger age group and 64% from older age group reported that they were completely vaccinated (3 doses) for hepatitis B. Around 50% of the students reported that they have had needle pricks in their students' career.

**Conclusion:** The overall Knowledge, Attitude and Practices of studied group showed satisfactory outcomes. However, some areas of attitude and practices showed the need to work upon with the students.

## INTRODUCTION

Hepatitis B is a potentially dangerous infection of the liver caused by the hepatitis B virus (HBV). It poses a significant global health challenge, leading to chronic infection and placing individuals at high risk of cirrhosis and liver cancer-related mortality.

Hepatitis B infection is a prominent public health concern worldwide and ranks as the tenth leading cause of death. Over two billion individuals globally show evidence of past or recent HBV infection, with more than 350 million people being chronic carriers of the virus. In India, the prevalence of HBsAg among the general population ranges from 2 to 8%, classifying the country as an intermediate HBV endemic area. India currently represents the second-largest reservoir of chronic HBV infections globally, with an estimated 50 million cases.

In regions with high prevalence, hepatitis B is commonly transmitted from mother to child during childbirth (perinatal transmission) or through horizontal transmission, particularly from an infected child to an uninfected child within the first five years of life.

Hepatitis B can also spread through needlestick injuries, tattooing, piercing, and exposure to infected blood and body fluids, such as saliva, menstrual blood, vaginal fluids, and semen. The virus can also be transmitted through the reuse of contaminated needles, syringes, or sharp objects, both in healthcare settings and the community, as well as among individuals who inject drugs. Unvaccinated individuals with multiple sexual partners are at a higher risk of sexual transmission.

While adult-acquired hepatitis B leads to chronic hepatitis in less than 5% of cases, infection during infancy and early childhood results in chronic hepatitis in approximately 95% of cases. This highlights the importance of prioritizing and strengthening vaccination efforts for infants and children.

The hepatitis B virus can survive outside the body for up to seven days, during which it can still cause infection if it enters the body of an individual who is not protected by the vaccine. The incubation period for hepatitis B ranges from 30 to 180 days. The virus can be detected within 30 to 60 days after infection and may persist, leading to the development of chronic hepatitis B, particularly when transmitted during infancy or childhood.

HBV infection represents a well-known occupational risk for healthcare workers (HCWs), with seroprevalence rates two to four times higher than those of the general population. The risk of HBV infection among HCWs is primarily associated with the extent of blood contact in the workplace and the hepatitis B e antigen (HBeAg) status of the source individual. Studies have indicated that HCWs who experience needlestick injuries with blood containing HBV have a 22-31% risk of developing clinical hepatitis, particularly when the source individual is HBsAg and HBeAg positive. In developing countries, 40-65% of HBV infections among healthcare workers are attributable to percutaneous occupational exposure.

In India, studies have reported a prevalence of 10% in 1992 and 2.21% in 1998 among HCWs. More recently, a tertiary care hospital in Delhi reported a HBsAg positivity rate of only 1% among healthcare workers.

Estimating the hepatitis B vaccine coverage among healthcare workers is necessary to determine the proportion susceptible to HBV infection.

In a study conducted at a tertiary care hospital in Delhi, 55.4% of healthcare workers reported being vaccinated against hepatitis B. However, the specific number of vaccine doses was not explicitly mentioned. Additionally, a recent unpublished study conducted at the All India Institute of Medical Sciences, a premier medical institute in North India, revealed that 52-59% of healthcare workers across different categories had received the hepatitis B vaccine. This indicates a moderately good level of awareness and vaccination programs in Delhi hospitals.

Preventing exposure is the primary strategy for reducing the risk of occupational blood-borne infections among healthcare workers. All necessary measures should be taken to prevent HCWs from acquiring infections. HCWs should be educated about the importance of reporting any occupational exposure and provided with easy access to expert consultants for appropriate counseling, treatment,

and follow-up. Vaccination against HBV and demonstration of immunization before employment are strongly recommended.

Various essential steps can minimize the risk of HBV infection among HCWs, including:

- a) Educating all HCWs about the inherent risks associated with occupational exposure and their prevention.
- b) Encouraging the adoption of standard precautions, use of safety devices, and other personal protective equipment.
- c) Providing education on safer procedures and ensuring proper vaccination for all HCWs.
- d) Establishing post-exposure management protocols in hospital settings for prompt initiation, whenever required. Similar to HIV prophylaxis, a centralized facility for counseling, testing, vaccination, and treatment should be widely publicized, with clear information and contact details displayed prominently throughout the hospital premises and available round the clock.

A designated healthcare provider should be available for urgent referral of HCWs in the event of any exposure. This person would be responsible for managing post-exposure protocols, coordinating vaccination, testing, drug procurement, and facilitating prophylaxis and clinical and serological follow-up. HCWs should be informed in advance about the medico-legal and clinical significance of reporting occupational exposures, the process of reporting, and the appropriate authorities to contact. Medical students, as a group of healthcare workers (HCWs), face a high risk of acquiring and transmitting HBV due to their interactions with patients, blood, and other body fluids in healthcare, laboratory, and public-safety settings. The level of risk varies during their training, with the highest exposure typically occurring during their professional training. As future healthcare providers, medical students have a professional duty to promote public health and prevent the transmission of infectious diseases. By assessing their knowledge, attitudes, and vaccination status related to hepatitis, we can identify areas that require additional training or educational initiatives. This would enable medical students to effectively fulfill their professional responsibilities.

Limited research exists on the prevalence of hepatitis B and the vaccination status among healthcare workers, particularly medical students, in Madhya Pradesh, especially in Bhopal. Therefore, conducting this study is crucial to address the lack of specific data on hepatitis and vaccination status among HCWs in this region. It will contribute to a more comprehensive understanding of the issue and inform future healthcare policies and interventions.

This study aims to empower future healthcare professionals, particularly medical students, with accurate knowledge, positive attitudes, and appropriate practices regarding hepatitis and vaccination. Ultimately, this will benefit patients, enhance public health, and contribute to a more comprehensive healthcare system in Madhya Pradesh, specifically in Bhopal.

## Methods

In this cross-sectional study, we conducted a comprehensive examination among the undergraduate medical students enrolled at Gandhi Medical College in Bhopal. Approval to conduct the survey was obtained through established channels, including clearance from the Scientific and Ethical Committees, ensuring adherence to the research standards.

A convenient sampling technique was employed using Google Forms, facilitating the collection of data through closed-type questions predominantly featuring binary response options such as "Yes" or "No." The duration of the study spanned approximately one month, divided into two distinct phases encompassing data collection and subsequent analysis and interpretation.

Students were approached systematically, and consent was obtained prior to their participation in the study. A meticulously designed questionnaire, pre-formed, pre-tested, and peer-reviewed, was administered via Google Forms and retrieved upon completion. The questionnaire encompassed inquiries pertaining to awareness regarding the prevention, transmission, diagnosis, and treatment of Hepatitis B and C. Additionally, it sought to ascertain participants' vaccination status against Hepatitis B, awareness of post-exposure prophylaxis measures, and observations gleaned during clinical rotations.

For the sake of brevity, responses related to knowledge concerning the transmission, diagnosis, treatment modalities, preventive measures, bedside interactions, and surgical procedures associated with the transmission of the viruses were consolidated into distinct categories. Differentiation was made between the knowledge of Hepatitis B and C transmission, with responses categorized as either affirmative ("Yes") or negative ("No"), or based on the number of correct responses exceeding or falling short of three.

Data management and analysis were performed using Epi Info statistical software, leveraging chi-square testing to ascertain significant differences between independent variables, namely gender and age-group, and responses pertaining to Hepatitis B vaccination, as well as knowledge and attitudes surrounding Hepatitis B and C. Subsequently, the data was meticulously compiled into tabular formats delineating knowledge, attitudes, and practices. Visualization techniques including bar graphs and pie charts were employed to facilitate comprehension and presentation of the findings.

## Results

The total number of participating students were 303 which included 160 male and 143 females. According to age the students were divided with 141 students within range of 18–20-year-olds and 162 students between 21 years and above.

- Causative Organism: 97.5% of students were aware of the causative organism.
- Transmission Methods: 87.5% of students were aware of the transmission methods.
- HBV Transmission: Approximately 78% of males, 82% of females, and 81% of students in both age groups gave the correct response on HBV transmission.
- Awareness of HBV Laboratory Tests: 84% of total students were aware of HBV laboratory tests.
- Knowledge of HBV Curability: 51% of males responded that Hepatitis B was curable to a certain level, while 55% of females were not sure about it.
- Awareness of HBV Complications: 87.5% of students were not familiar with the complications of Hepatitis B.
- Awareness of Post Exposure Prophylaxis: 74.5% of students were not aware of any post-exposure prophylaxis of Hepatitis B.
- Awareness of CDC Guidelines: 56% of males were aware of CDC guidelines for healthcare workers regarding Hepatitis B, compared to 41% of females.
  
- Confidence in Educating Patients about Hepatitis B Vaccination: 68% of males, 71% of females, and 68% of students aged 21 and above were not confident in educating patients.
- Belief in Sufficient Education and Awareness: Around 55% of students believed there is not sufficient education and awareness about hepatitis B and its vaccination among medical students.
- Willingness for Screening and Vaccination: More females (92%) than males (87%) were willing to get screened and vaccinated for Hepatitis B.
- Acceptance of Further Investigations: More than 90% of students agreed for further investigations if found positive for Hepatitis B.
- Personal Habits: None of the students were willing to share needles, toothbrushes, etc.
- Regular Screening for Healthcare Workers: More females (89%) than males (80%) believed that healthcare workers should undergo regular Hepatitis B screening.
- Inclusion of Hepatitis B Vaccination as Mandatory Requirement: More females (89%) than males (80%) believed that Hepatitis B vaccination should be included as a mandatory requirement for medical school admission.
  
- Screening for Hepatitis B or C: On average, 77% of students have not been screened for Hepatitis B or C.
- Vaccination for Hepatitis B: Around 60% of students have not been vaccinated for Hepatitis B.
- Needle Prick Injuries: More males (56%) than females (45%) have had needle prick injuries.

- Personal Belongings: More females (85%) than males (79%) prefer not to share their personal belongings.
- Health Education Participation: More males (67%) than females (20%) have participated in health education programs related to Hepatitis B.

**PART I: KNOWLEDGE**

QUESTIONS	RESPONSES	MALE (160)	%	FEMALE (143)	%	P VALUE	AGE 18-20 (141)	%	AGE 21 AND ABOVE (162)	%	P VALUE
What Is the causative organism of Hepatitis B?	Virus	154	96	141	99	0.93	138	98	160	99	0.542
	Bacteria	3		2			3		2		
What are the methods of transmission of HBV?	More than 3 correct	140	88	127	89	0.724	125	89	142	88	0.788
	Less than 3 correct	20		16			16		30		
Do u think that HBV can affect other organ than Liver?	Yes	129	81	117	82	0.790	112	79	134	83	0.465
	No	31		26			29		28		
Could we prevent HB transmission by?	More than 3 correct	125	78	117	82	0.423	113	80	133	82	0.663
	Less than 3 correct	35		26			28		29		
Can someone who appears healthy be a patient?	Yes	148	93	136	95	0.35	137	97	145	90	0.008
	No	12		7			4		17		
Do you think HBV has laboratory tests?	Yes	136	85	118	83	0.557	120	85	134	83	0.572
	No	24		25			21		28		
Is Hep B curable?	Up to certain level	82	51	65		0.313	67		80		0.745
	Not sure	78		78	55		74	52	82	51	
How familiar are u with the potential complications of the Hep B?	Very familiar	22		19		0.664	17		24		0.483
	Not familiar	138	86	124	87		124	88	138	85	
Is vaccination available for Hep B?	Yes	151	94	135	94	0.99	133	94	152	94	0.854
	No	9		8			8		10		
Are u aware of any post exposure prophylaxis of Hep B?	Yes	47		31		0.126	39		43		0.827
	No	113	71	112	78		102	72	119	73	
Are u aware of the CDC guidelines of WHO for health care workers regarding Hep B?	Yes	89	56	58		0.008	60		85	52	0.084
	No	71		85	59		81	57	77		

**PART II: ATTITUDE**

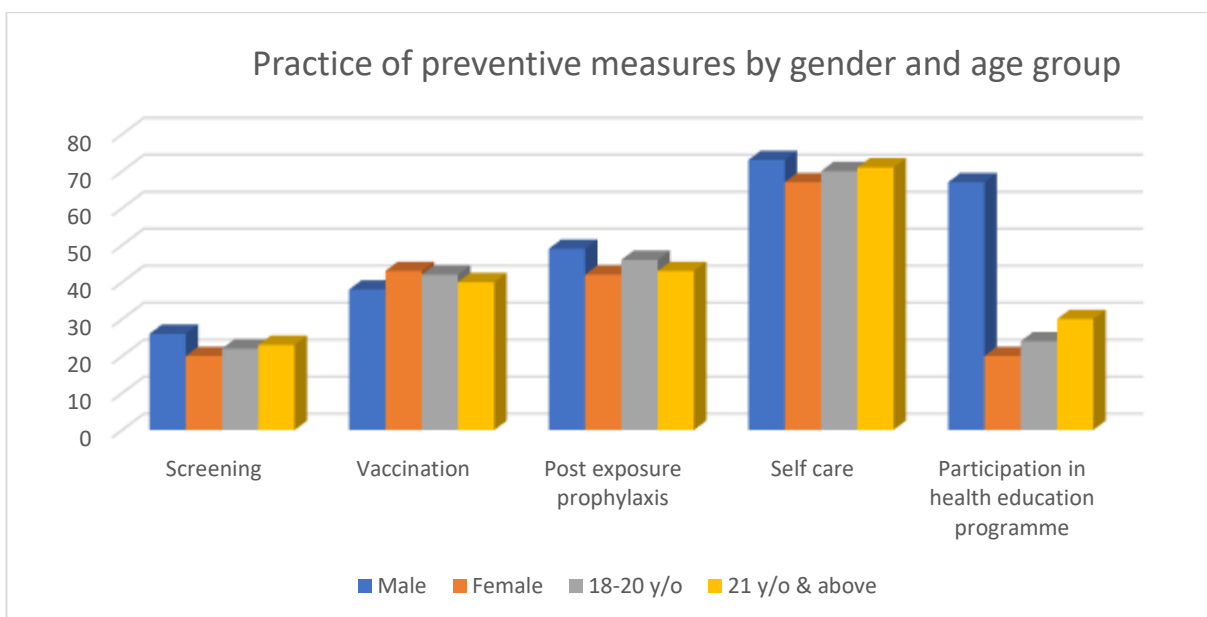
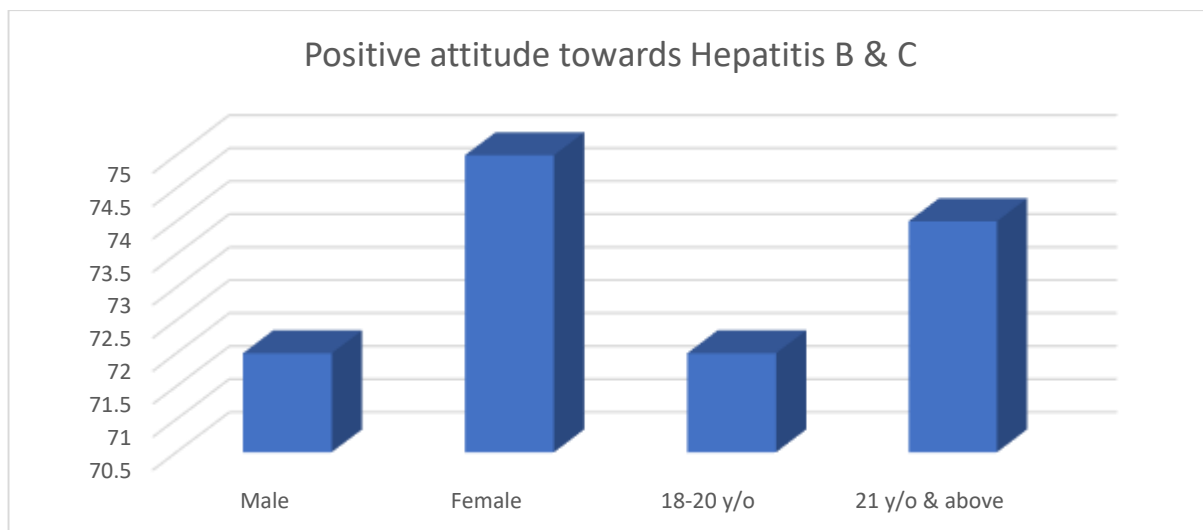
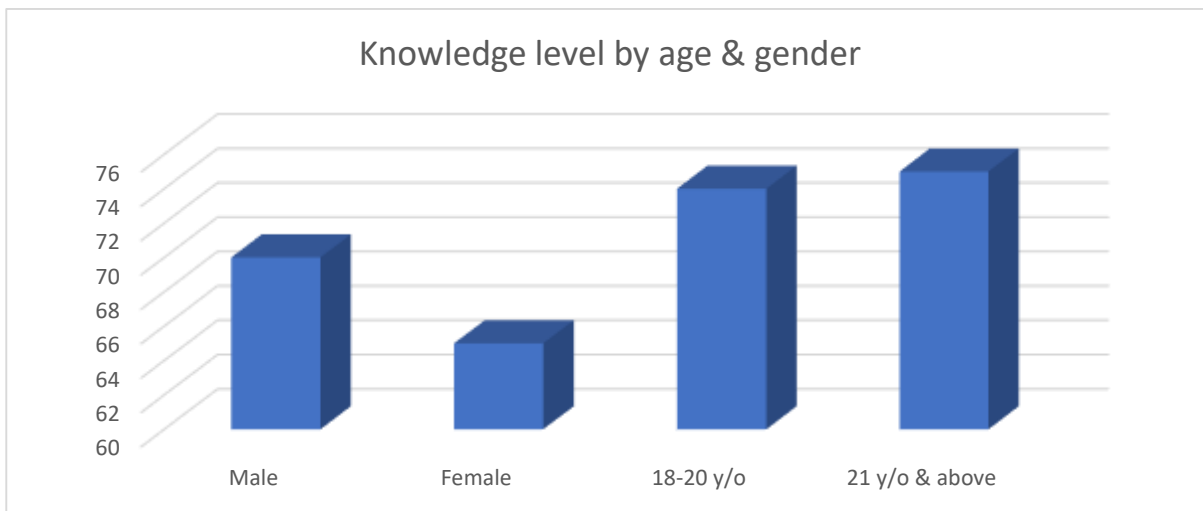
QUESTIONS	RESPONSES	MALE (160)	%	FEMALE (143)	%	P VALUE	AGE 18-20 (141)	%	AGE 21 AND ABOVE (162)	%	P VALUE
How confident are you in educating patients about the importance of hepatitis B vaccination?	Confident	51		41		0.544	40		52		0.481
	Not confident	109	68	102	71		101	72	110	68	
Do you think there is sufficient education and awareness about hepatitis B and its vaccination among medical students?	Yes	72		63		0.868	66		69		0.461
	No	88	55	80	56		75	53	93	57	
Have you actively encouraged your fellow medical students to get vaccinated against hep B?	Yes	114	71	117	82	0.03	101	72	130	80	0.078
	No	46		26			40		32		
After being exposed to any of the possible risk factors, did you consult for any post exposure treatment?	Yes	88	55	82	57	0.681	82	58	88	54	0.45
	No	72		61			59		74		
Are you okay to get screened for hepatitis B?	Yes	139	87	132	92	0.124	121	86	150	93	0.055
	No	21		11			20		12		
Are you okay to get Vaccinated for hepatitis B?	Yes	146	91	136	95	0.187	128	91	154	95	0.143
	No	14		7			13		8		
Are you okay to get further investigations & treatment if found positive for hepatitis B?	Yes	148	93	136	95	0.35	130	92	154	95	0.305
	No	12		7			11		8		
Are you okay to share with others- needles, shaving machines or toothbrushes?	Yes	0		0		N/A	0		0		N/A
	No	160	100	143	100		303	100	303	100	
Do you believe that Health care workers should undergo regular hepatitis B screening as part of their occupational health requirements?	Yes	147	92	132	92	0.889	124	90	152	94	0.227
	No	13		11			14		10		
In your opinion, should hepatitis B vaccination be included as a mandatory requirement for medical school admission?	Yes	128	80	127	89	0.035	121	86	134	83	0.461
	No	32		16			20		28		

**PART III: PRACTICES**

QUESTIONS	RESPONSES	MALE (160)	%	FEMALE (143)	%	P VALUE	AGE 18-20	%	AGE 21 AND ABOVE	%	P VALUE
Have you been screened for Hepatitis-B/Hepatitis-C?	Yes	41		28		0.21	31		38		0.76
	No	119	74	115	80		110	78	124	77	
Are you fully (3 doses) vaccinated for Hepatitis B?	Yes	61		62		0.354	59		64		0.679
	No	99	62	81	57		82	58	98	60	
Have you ever had needle pricks?	Yes	89	56	65	46	0.077	77	55	77	46	0.218
	No	71		78	55		64		85	52	
If yes, did you take any immediate steps to address the situation?	Yes	79		60		0.195	65		69		0.539
	No	81	51	83	58		76	54	93	57	
Do you ask for new syringe before use?	Yes	143	89	132	92	0.378	130	92	145	90	0.419
	No	17		11			11		17		
Do you ask for screening of blood before transfusion?	Yes	137	86	112	78	0.097	113	80	136	84	0.387
	No	23		31			28		26		
Do you ask barber to use new blades for shaving or hair cutting?	Yes	142	89	103	72	0.0002	107	76	138	85	0.04
	No	18		40			34		24		
Do you share personal belongings (razors, towels, tooth brush) with others?	Yes	34		21		0.138	29		26		0.308
	No	126	79	122	85		112	79	136	84	
Do you cover any open wounds or cuts to prevent exposure to hepatitis B?	Yes	127	79	113	79	Less than 0.00001	113	80	128	79	0.807
	No	33		30			28		34		

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Have you ever participated in health education program related to Hepatitis B?	Yes	53	67	29		0.011	34		48		0.281
	No	107		114	80		107	76	114	70	



## Discussion

The findings indicate a high level of awareness among students regarding the causative organism and transmission methods of Hepatitis B and C. Specifically, 97.5% of participants demonstrated awareness of the causative organism, highlighting a strong foundation of knowledge regarding the etiology of these viral infections. Furthermore, a substantial proportion of students exhibited knowledge regarding the transmission methods of Hepatitis B, with approximately 88% of males, 89% of females, and 88% of students across age groups providing correct responses.

However, gaps in knowledge were evident in certain areas, such as awareness of post-exposure prophylaxis and complications associated with Hepatitis B. A significant proportion of students, comprising 74.5%, demonstrated a lack of awareness regarding post-exposure prophylaxis measures, indicating a potential area for educational intervention. Similarly, 87.5% of participants were not familiar with the complications of Hepatitis B, suggesting a need for enhanced education on the long-term consequences of the infection.

Furthermore, gender disparities were observed in knowledge acquisition, particularly concerning familiarity with CDC guidelines for healthcare workers. While 56% of males exhibited awareness of these guidelines, only 41% of females demonstrated similar knowledge. This discrepancy underscores the importance of targeted educational initiatives aimed at addressing gender-specific gaps in Hepatitis B and C awareness.

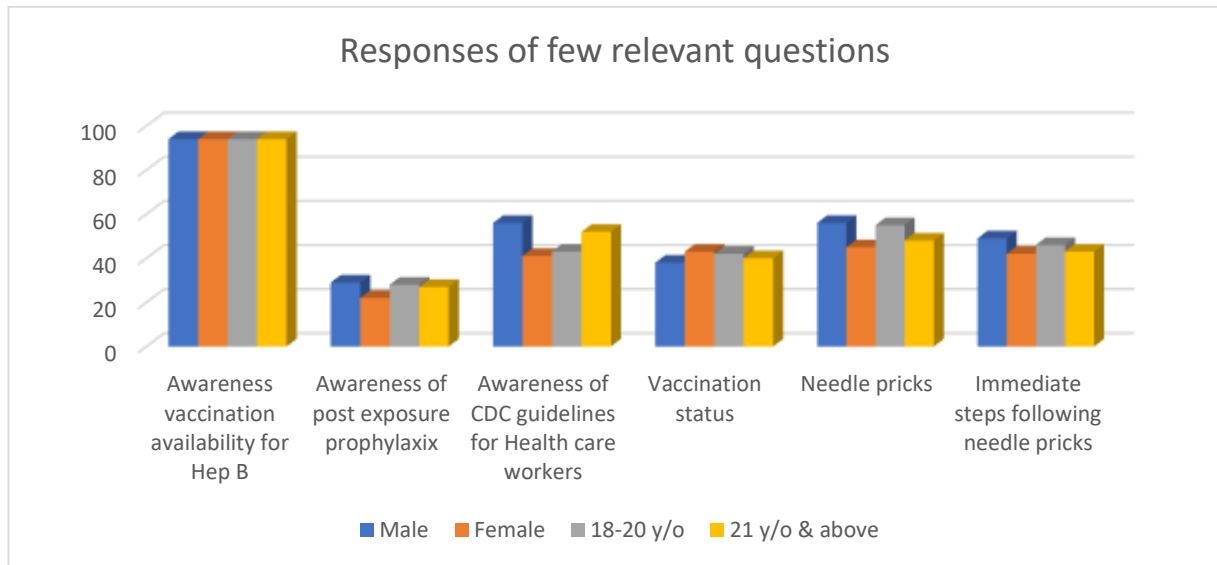
Analysis of attitudes towards Hepatitis B and C revealed nuanced perceptions among students, with notable variations observed across demographic groups. While a majority of participants expressed confidence in their ability to educate patients about Hepatitis B vaccination, significant proportions remained uncertain, particularly among males and older students aged 21 and above. This apprehension may reflect underlying knowledge deficits or insufficient training in patient education techniques, highlighting the need for tailored educational interventions targeting these subgroups.

Furthermore, perceptions regarding the adequacy of education and awareness about Hepatitis B and its vaccination among medical students varied significantly, with approximately 55% of participants expressing concerns about the current level of educational initiatives. This perception was juxtaposed with proactive efforts by students to advocate for vaccination among their peers, underscoring the importance of peer-driven health promotion strategies in fostering a culture of prevention within academic settings.

Gender-based disparities were evident in attitudes towards screening and vaccination, with a higher proportion of females expressing willingness to undergo screening and vaccination for Hepatitis B compared to males. Similarly, a greater proportion of females advocated for the inclusion of Hepatitis B vaccination as a mandatory requirement for medical school admission, highlighting their heightened awareness of the importance of preventive measures in healthcare settings.

Analysis of practices related to Hepatitis B and C revealed several key insights into students' behavior and adherence to preventive measures. Despite high levels of awareness, a significant proportion of students reported limited engagement in screening and vaccination activities, with approximately 77% indicating a lack of screening for Hepatitis B or C and 60% reporting non-vaccination for Hepatitis B. These findings underscore the existence of barriers to healthcare-seeking behavior among students, including logistical challenges, perceived invincibility, and misinformation regarding vaccine safety and efficacy.





Moreover, gender disparities were evident in needle prick injuries, with a higher prevalence observed among males compared to females. This gender-based difference may reflect variations in occupational exposures or risk-taking behaviors, necessitating targeted interventions to promote safe injection practices and minimize the risk of bloodborne infections among male students.

Overall, the findings highlight the multifaceted nature of knowledge, attitudes, and practices related to Hepatitis B and C among students. Addressing knowledge gaps, enhancing patient education skills, and promoting uptake of preventive measures are imperative for mitigating the burden of Hepatitis B and C infections within academic settings and fostering a culture of prevention among future healthcare professionals.

## Conclusion

In summary, our study highlights the need for targeted educational interventions to address gaps in knowledge, attitudes, and practices related to Hepatitis B and C among students. While awareness levels are generally high, there are areas for improvement, particularly in understanding post-exposure prophylaxis and complications of Hepatitis B. Addressing these gaps, along with promoting positive attitudes towards preventive measures and increasing uptake of screening and vaccination services, is crucial for reducing the burden of Hepatitis B and C infections among students and healthcare workers and fostering a culture of prevention within academic settings.

Conflict of Interests: None

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