



Knowledge, attitude and practice towards Hepatitis B vaccination among medical undergraduate students of Maharajgunj Medical Campus in Nepal: a cross-sectional study

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Background: The rate of Hepatitis B virus (HBV) infection among health professionals is about 2–10 times higher than that of the general population since, they are more prone for exposure to infected blood and body fluid and contaminated needles and syringes. The risk of accidental exposure among the medical students is even higher due to their non-experience, insufficient training and lack of preventive knowledge. The objective of this study is to assess knowledge, attitude, and practice of medical students towards Hepatitis B.

Methods: A cross-sectional study design was conducted among 206 medical undergraduate students from May 2022 to July 2022. A pretested self-administered questionnaire was used to collect data regarding knowledge, attitude, and practice towards Hepatitis B vaccination. Non-probability convenience sampling was used to collect data. Descriptive analysis was done by calculating frequency and percentages of categorical variables. χ^2 test was used to determine the association between categorical independent variables and categorical dependent variables.

Results: Among 206 students, 93.7% of them had good knowledge and 98.5% had good attitude. The practice was low with only 35% having safe practices. Similarly, only 46.6% of medical students were completely vaccinated. 23.8% had done Hepatitis B testing. Students who had encountered Hepatitis B patients during their posting were 51.9%. There was significant association of sociodemographic variables with knowledge, attitude and practice towards Hepatitis B vaccination.

Conclusion: Although, the knowledge and attitude towards Hepatitis B vaccination is high, the practice levels are very low. This indicates need for immunizing medical students against Hepatitis B and reforming training curriculum more focusing on preventive practices against HBV.

Keywords: attitude, Hepatitis B, knowledge, medical undergraduate students, practice, vaccination

Introduction

Hepatitis B virus (HBV) is a serious public health problem. WHO has estimated that worldwide 296 million people are living with Hepatitis B, 1.5 million people were newly infected with chronic hepatitis B with 820 000 deaths^[1]. HBV is contagious which spread from mother to child transmission, sharps injuries,

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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Annals of Medicine & Surgery (2024) 86:782–788

Received 31 October 2023; Accepted 15 December 2023

Published online 3 January 2024

<http://dx.doi.org/10.1097/MS9.0000000000001658>

HIGHLIGHTS

- The risk of accidental exposure among the medical students is even higher due to their non-experience, insufficient training and lack of preventive knowledge.
- The knowledge and attitude towards Hepatitis B vaccination is high, the practice levels are very low.
- There was significant association of sociodemographic variables with knowledge, attitude and practice towards Hepatitis B vaccination.
- The findings of this study highlighted that there is a critical need for immunizing medical students against Hepatitis B, Hepatitis B virus testing and reforming training curriculum more focusing on occupational risk.

tattooing, piercing, and also with exposure to infected blood and body fluids, contaminated needles, and syringes or sharp objects and unprotected sexual intercourse^[1].

Healthcare workers (HCWs) are at high risk of HBV infection in the healthcare settings. The risk of unintentional exposure among the trainees is even higher than professional due to their non-experience, insufficient training, and lack of preventive knowledge^[2]. If one sustains a needle stick and the source is an

infected one, the risk of transmission of HBV per exposure is 37–62%^[3].

HBV infection can be prevented by adhering to universal precautions measures like wearing protective barriers like gloves, proper sterilization of medical equipment, proper hospital wastes management system, and vaccination^[4–6]. WHO has recommended vaccination to people who are at occupational risks of HBV infection^[7]. Despite of high occupational risk among health professionals, the WHO estimate showed that HBV vaccination coverage worldwide in the context of HCW is low^[7]. Similarly, the government of Nepal also lacks program to vaccinate high risk population like healthcare workers and medical students^[8].

Knowledge, attitude, and practices study measures key knowledge, feelings, tendencies, or skills which shared among group of people on particular issues. It has been used as a useful study tool to design public health policies by taking into account the awareness, beliefs, and health seeking behaviour of the at-risk population. Studies on the current knowledge, attitude, and practice of Hepatitis B vaccination among medical students in the nation are few, despite the high risk among this population. Therefore, the aim of this study is to assess the Knowledge, Attitude and Practice of the undergraduate students towards Hepatitis B vaccination. We present the following article in line with the STROCSS criteria^[9].

Methods

Study design, tools and technique

A descriptive cross-sectional study was conducted to measure the knowledge, attitude, and practice towards Hepatitis B vaccination among medical undergraduate students. A pretested self-administered questionnaire was used for data collection from May 2022 to June 2022. The questionnaire was distributed among the students in their classroom in the presence of researcher. The questionnaire was adopted from the study done by Bhattarai *et al.*^[10].

Study subjects and participants

Medical undergraduate students who were willing to participate in the study were included in the study. Medical undergraduates who did not give informed consent were not included in the study. At least 40% of the study population from the selected medical college to answer the questionnaire.

Ethical approval and participant's consent

Ethical approval was obtained from the research ethics committee of the Institutional Review Committee (IRC)[Approval number: 475^[6–11] E² 078/079]. Written informed consent was obtained from the study participants for the use of anonymous personal and clinical data in research. Confidentiality of the information was maintained thoroughly by de-identification.

Outcome measurement and variables

The dependent variable was knowledge, attitude, and practice regarding breast self-examination, while the independent variables were sociodemographic characteristics. The questionnaire consisted of three sections (10 items on knowledge, 10 items on attitude, and 6 items on practice). All questions were closed-ended with answer options “Yes” and “No”. Each correct

response was scored as 1 mark and incorrect response was scored zero. Hence, knowledge score of maximum 10 points was designed. The scores were then converted into percentage and was graded as good or adequate for participants who scored greater than or equal to 50% and poor when less than 50%. Similarly, for attitude and practices, participants who scored greater than or equal to 50% were classified as having positive attitude and safe practices, respectively, and less than 50% as having negative attitude and poor practices. This criteria was validated and has been taken from the study of Bhattarai *et al.*^[10].

Sample size and sampling

Non-probability convenience sampling was used for collection of data.

The current cross-sectional descriptive study was conducted on 206 medical students.

Here,

n = sample size

Z = statistic for the level of significance (for 95% CI $Z = 1.96$)

P = expected prevalence = 50% = 0.50

d = margin of error = 0.05

Therefore, sample size = $(1.96)^2 \times 0.5 \times 0.5 / 0.05^2 = 384.16$ –384

adjusted sample size = $(S) \sqrt{1 + [(S - 1) \setminus \text{population}]} = 206$

Statistical analysis and software

Data was entered in Microsoft excel version 2019 and data analysis was performed on IBM- Statistical Package for the Social Sciences (SPSS) version 21. Descriptive analysis was done by calculating frequency and percentages of categorical variables. χ^2 test was used to determine the association between categorical independent variables and categorical dependent variables. P value less than 0.05 was considered significantly associated.

Results

Sociodemographic characteristics

A total of 206 medical students of Maharajgunj Medical Campus were included in the study. The age of the participants ranged from 18 to 30 years with a mean of 22.73 ± 1.969 years. 138 (67%) were male and 68 (33%) were female. About ethnicity, Brahmins/chhetri were 139 (67.5%) and Janajati were 36 (17.5%). Majority 156 (78.2%) had received at least 1 dose of Hepatitis B vaccination while only 96 (46.6%) had completed it. Only 49(23.8%) had tested for Hepatitis B. Information related to sociodemographic characteristic are shown in Table 1.

Knowledge regarding Hepatitis B vaccination

Majority,192 (93.2%) had good knowledge, followed by 14 (6.8%) had poor knowledge. Almost all 202 (98.1%) medical students had this knowledge that Hepatitis B virus can be acquired through needle stick injury. Majority 195 (94.7%) students knew about effective Hepatitis B vaccine but only 170 (82.5%) knew its recommended schedule. Its effectiveness was known to 179 (86.9%) but only 131 (63.6%) knew that it could provide protection for at least 20 years. Post-vaccination test is necessary to detect the immunization status and the value must be greater than 10IU/ml were known to 151 (73.3%) and 178

Table 1
Sociodemographic variable

Age (in years) [19–26]	22.73 ± 1.969 Frequency, n (%)
Ethnicity	
Brahmin/chhetri	139 (67.5)
Janajati	36 (17.5)
Dalit	2 (1)
Madhesi	27 (13.1)
Others	2 (1)
Sex	
Male	138 (67)
Female	68 (33)
Year of study	
1st year	48 (23.3)
2nd year	31 (15)
3rd year	37 (18)
4th year	49 (23.8)
5th year	41 (19.9)
Tested for Hepatitis B	
Yes	49 (23.8)
No	157 (76.2)
Encountered Hepatitis B patients in posting	
Yes	107 (51.9)
No	99 (48.1)

(86.4%), respectively. Information related to knowledge about Hepatitis B vaccination are shown in Table 2.

Attitude regarding Hepatitis B vaccination

Most of the respondents 203 (98.5%) had positive attitude whereas only 3 (1.5%) had negative attitude regarding about Hepatitis B vaccination. Almost all 201(97.6%) medical students felt that they need to be protected against Hepatitis B and considered it was a safe vaccine. Almost all students 203 (98.5%) believed that vaccination must be compulsory to all medical students. Majority comprising of 198 (96.1%) respondents think medical students should be vaccinated within 1 year of joining medical school and were willing to receive or complete their Hepatitis B vaccination if not vaccinated or incompletely vaccinated. Information related to attitude towards Hepatitis B vaccination are shown in Table 3.

Table 2
Knowledge towards Hepatitis B Vaccination

Variables	Correct response, n (%)	Incorrect response, n (%)
Hepatitis B virus can be acquired through a needle stick injury	202 (98.1)	4 (1.9)
Hepatitis B Virus is not spread by hand shaking	191 (92.7)	15 (7.3)
Hepatitis B is 50–100 times more infectious than HIV	159 (77.2)	47 (22.8)
There is effective vaccine for hepatitis B	195 (94.7)	11 (5.3)
Hepatitis B vaccine dosing 0, 1, 6 months: 3 doses	170 (82.5)	36 (17.5)
Complete dose of Hepatitis B vaccine is 95% effective	179 (86.9)	27 (13.1)
It provides protection for at least 20 years	1319 (63.6)	75 (36.4)
A patient who has fully recovered cannot infect others	147 (71.4)	59 (28.6)
Post-Hepatitis B vaccination test is necessary	151 (73.3)	55 (26.7)
For protection against Hepatitis B, one needs antibody titre of > 10 IU/m	178 (86.4)	28 (13.6)

Practice regarding Hepatitis B vaccination

Regarding practice towards Hepatitis B vaccination, 134 (65%) respondents had poor practice. Only 47 (22.8%) respondents had screened for Hepatitis B infection in the past. Complete doses of 3 vaccines were received by only 96 (46.6%) medical students. Among the respondents, only 19 (9.2%) checked their immune status post-vaccination (Table 4). Only 72 (35%) had safe practices while majority 134 (65%) had poor practices. Information related to practice of Hepatitis B vaccination are shown in Table 4.

Association of knowledge, attitude and practice with Sociodemographic variables

There was statistically significant association of age, year of medical school, residence,

Age, year of medical school, place of residency, Hepatitis B testing, and exposure with Hepatitis B patients were statistically significantly correlated with knowledge of the Hepatitis B vaccination (P value < 0.005).

A considerable positive attitude towards the Hepatitis B vaccination was seen in those who had received the vaccination (P value < 0.005).

Those who had tested positive for Hepatitis B, had interacted with Hepatitis B patients, received the Hepatitis B vaccination and year of medical school was substantially connected with practice towards Hepatitis B vaccination (P value < 0.005).

Information related to association of knowledge, attitude and practice with sociodemographic variables is summarized in Table 5.

Discussion

Our study displayed that more than 90% of students had good knowledge and attitude. Despite this fact, the safe practice was only performed by 35% and only 46.6% had been fully vaccinated. Similarly, 51.9% had exposure to Hepatitis B patients during their posting. Such inadequate practice of Hepatitis B vaccination might lead to accidental exposure to Hepatitis B. Since, the knowledge and attitude of medical students were good in almost all of them, this can be a good environment to improve practice. In the same way, there was significant association of sociodemographic variables with knowledge, attitude and practice towards Hepatitis B vaccination.

Table 3
Attitude towards Hepatitis B vaccination

Attitude		
Variables	Positive attitude, n (%)	Negative attitude, n (%)
Will you be at risk as you work?	185 (89.8)	21 (10.2)
Do you feel you need to be protected against Hepatitis B infection	201 (97.6)	5 (2.4)
Is Hepatitis B vaccine safe?	201 (97.6)	5 (2.4)
Trust efficacy of Hepatitis B vaccine	194 (94.2)	12 (5.8)
Hepatitis B vaccination should be made compulsory in medical school	203 (98.5)	3 (1.5)
If vaccine provided by free from medical school, more HCW will be vaccinated	190 (92.2)	16 (7.8)
Regular vaccination campaigns must be conducted in medical schools	203 (98.5)	2 (1.5)
Medical students should be vaccinated within 1 year of joining school	198 (96.1)	8 (3.9)
Willing to receive or complete their Hepatitis B vaccination	198 (96.1)	8 (3.9)
Willing to recommend Hepatitis B Vaccination to medical friends	203 (98.5)	2 (1.5)

HCW, healthcare worker.

About half of the medical students had encountered Hepatitis B patients during their posting which shows significant risk among medical students. This finding suggests to strengthen health education on universal safety precaution which play important role in prevention of infection in medical students. Yet, when compared to the findings of Vietnam where 94.3% students had been exposed to Hepatitis B patients, the rate in this study is lower^[11]. Similarly, only 49 (23.8%) had tested for Hepatitis B. This is similar to the study of Ibrahim *et al.*^[12] of Syria, where only 16.4% students had gone through the test of HBV. However, this is much lower than in the study of Nguyen and colleagues in Vietnam and Vasantha and colleagues in India where 84.2% and 79.5% had tested for HBV, respectively^[11,13].

The results of this investigation displayed that majority 192 (93.2%) had a good level of knowledge. Since, they are students of medical faculty so, they are expected to have good knowledge which is coherent in this study as well. These results were similar to the study by Bhattarai *et al.*^[10] which revealed 95.6% of participants had good knowledge about Hepatitis B vaccination among clinical medical students of Nepal. Similarly, in study of Demiss and colleagues among health science students of Ethiopia and Jacob and colleagues among medical students of India, showed that 80.1% and 79.1% had good knowledge towards Hepatitis B^[14,15]. But in contrary to these, in the study by

Massaly and colleagues only 27% of medical students of Senegal had good knowledge about Hepatitis B vaccination^[16]. Though, most of the students have good knowledge on many components, only 77.2% knew Hepatitis B is 50–100 times more infectious than HIV, 73.3% thinks post-vaccination test is necessary and 63.6% knew Hepatitis B vaccination provide protection for at least 20 years. 94.7% knew that hepatitis B vaccine is effective; however, only 82.5% knew its correct schedule. This is comparable to the findings of study by Vasantha and colleagues (79.5%), Abdela and colleagues, (81.7%), Noubiap and colleagues, (89.5%) and Jayakiruthiga and colleagues, (82.5%)^[13,17–19]. This highlights the comparatively low level of knowledge on important components of Hepatitis B vaccination which seek prompt awareness among them.

The current study demonstrated that 203 (98.5%) of the students had positive attitude towards hepatitis B vaccination. The positive attitude in this survey could be due to the majority of respondents in this study had good knowledge which might have benefited from their academic education. This is considered a good environment to improve practice. This is similar to the study by Bhattarai and colleagues in Nepal, Jacob and colleagues and Chhabra and colleagues in India where 97.1% , 84.3% and 80.6% of medical students had a positive attitude towards Hepatitis B vaccination, respectively^[10,14,20]. The percentage of students with a positive attitude in this survey is comparatively high than the medical students of Senegal where only 32.4% medical students had positive attitude^[16]. In the current study almost all the students had positive attitude in all components.

Majority 134 (65%) students had poor practices. Since most of the respondents in this study had good knowledge and attitude about Hepatitis B vaccination, preventive practices were expected to be followed by majority of them. This finding is similar to the study by Bhattarai and colleagues in Nepal and Jacob and colleagues in India where poor practices were seen in medical students^[10,14]. However, in a study by Mubaraki and colleagues among dental undergraduates of Saudi Arabia and Sivaanusuya and colleagues in India found 77% and 76.59% having safe practices towards Hepatitis B^[13,21]. Better strategies are needed to translate the level of knowledge and attitude into better preventive practices by medical students. Though 78.2% students had received at least one dose of hepatitis B vaccine only 46.6% received all three

Table 4
Practice towards Hepatitis B vaccination

Practice		
Variables	Safe practice, n (%)	Unsafe practice, n (%)
Have you screened for Hepatitis B	47 (22.8)	159 (77.2)
Have you participated in any educational program or campaign on Hepatitis B	67 (32.5)	139 (67.5)
Received Hepatitis B vaccine (at least once)	161 (78.2)	45 (21.2)
Received complete Hepatitis B vaccine	96 (46.6)	110 (53.4)
Screened for Hepatitis B just before vaccination	59 (28.6)	147 (71.4)
Checked immune status (Anti HbS) after vaccination	19 (9.2)	187 (90.8)

Table 5
Association of knowledge, attitude and practice with sociodemographic variables

Variable	Knowledge			Attitude			Practice		
	Good, n (%)	Poor, n (%)	P	Positive, n (%)	Negative, n (%)	P	Safe, n (%)	Unsafe, n (%)	P
Sex									
Male	127 (92.02)	11 (7.98)	0.340	136 (99.4)	2 (0.6)	0.990	44 (31.9)	94 (68.1)	0.625
Female	65 (95.6)	3 (4.4)		67 (98.5)	1 (1.5)		24 (35.3)	44 (64.7)	
Age in years									
Less than 20	7 (70)	3 (30)	0.00	10 (100)	0	0.880	5 (50)	5 (50)	0.322
20–25	179 (94.2)	11 (5.8)		187 (98.4)	3 (1.6)		60 (31.6)	130 (68.4)	
More than 25	6 (100)	0		6 (100)	0		3 (50)	3 (50)	
Marital status									
Married	4 (100)	0	0.585	4 (100)	0	0.806	0	4 (100)	0.156
Unmarried	188 (93.06)	14 (6.94)		199 (99)	3 (1)		68 (33.6)	134 (66.3)	
Education									
1st year	41 (85.4)	7 (14.6)	0.006	46 (95.8)	2 (4.2)	0.286	8 (16.7)	40 (83.3)	0.00
2nd year	26 (83.9)	5 (16.1)		30 (96.8)	1 (3.2)		3 (9.7)	28 (90.3)	
3rd year	36 (97.3)	1 (2.7)		37 (100)	0		9 (24.3)	28 (75.7)	
4th year	49 (100)	0		49 (100)	0		28 (57.2)	21 (42.8)	
5th year	40 (97.6)	1 (2.4)		41 (100)	0		20 (48.8)	21 (51.2)	
Ethnicity									
Bhramin/chheteri	128 (92.1)	11 (7.9)	0.827	139 (100)	0	0.122	139 (100)	0	0.122
Janajati	35 (97.2)	1 (2.8)		34 (94.4)	2 (5.6)		34 (94.4)	2	
Dalit	2 (100)	0		2 (100)	0		2 (100)	0	
Madhesi	25 (92.6)	2 (7.4)		26 (96.3)	1 (3.7)		26 (96.3)	1 (3.7)	
Others	2 (100)	0		2 (100)	0		2 (100)	0	
Residence									
Urban	157 (95.2)	8 (4.8)	0.026	163 (98.8)	2 (1.2)	0.557	57 (34.6)	108 (65.4)	0.347
Rural	35 (85.4)	6 (14.6)		40 (97.6)	1 (2.4)		11 (21.6)	30 (73.2)	
Tested for Hepatitis B									
Yes	49 (100)	0	0.030	48 (98)	1 (2)	0.696	34 (69.4)	15 (30.6)	0.00
No	143 (91.1)	14 (8.9)		155 (98.7)	2 (1.3)		34 (21.7)	123 (78.3)	
Received Hepatitis B vaccine									
Yes	146 (94.8)	8 (5.2)	0.116	153 (99.4)	1 (0.6)	0.096	61 (39.6)	93 (60.4)	0.00
No	46 (88.5)	6 (11.5)		50 (96.2)	2 (3.8)		7 (13.5)	45 (86.5)	
Encountered Hepatitis B patients									
Yes	105 (88.2)	2 (11.8)	0.003	106 (99.1)	1 (0.9)	0.516	50 (46.7)	57 (53.3)	0.00
No	87 (87.9)	12 (12.1)		97 (98)	2 (2)		18 (18.2)	81 (81.8)	

Bold value indicates statistically significant *P* value.

doses. Hepatitis B vaccination was implemented in 2002. Since, most of the students were born before 2002, so most of them have not received timely birth dose. So, medical colleges need to evaluate student's immunity and provide vaccine to unvaccinated before they enter clinical posting in teaching hospital. The finding is similar to the study of Alhwaish and colleagues in Saudi Arabia and Jacob and colleagues in India^[14,22]. However, this is very less when compared to the findings of Upadhyay and colleagues in Malaysia, Bhattarai and colleagues in Nepal, Nguyen and colleagues in Vietnam and Sivaanusuya and colleagues in India^[8,11,13,23]. The practice of testing for antibodies for confirming immunization post-vaccination was even very low among the medical students. Among the respondents in the current study, only 9.3% had checked their immune status post-vaccination. It was similar to the study by Bhattarai and colleagues and Chhabra and colleagues^[10,20]. Only, 22.8% had screened for Hepatitis B which is less than the studies by Fortes and colleagues (55.6%), Alhwaish and colleagues (56.5%) and Vasantha and colleagues^[13,16,22].

The results from the study could be helpful for the concerned stakeholders and curriculum maker in making efforts to protect

the students from Hepatitis B. We suggest concerned authorities to conduct Hepatitis B campaigns to increase awareness on preventive practices and vaccination which can be highly useful in increasing practice levels among medical students against Hepatitis B. Medical students are at more risk to accidental exposure to HBV because of insufficient training and lack of preventive knowledge. They are the source of valid information for general public and play an important role in developing health and preventive system, very few studies have been conducted to assess the knowledge, attitude and practice regarding Hepatitis B vaccination among medical students.

Our study also had some limitations. The data were collected by self-report, which may be a source of bias. Since this study was limited to only medical students of one medical colleges, the sample size is relatively small so, the result cannot be generalized; hence, it is recommended to conduct further studies using larger samples at various medical institutions. Similarly, estimation of testing and vaccination coverage were based on reported response and it could not be validated. Despite the limitations, the results of this study demonstrated the urgent need for medical students to receive an HBV test, be immunized against Hepatitis

B, and have their curriculum revised to place a greater emphasis on occupational risk.

Conclusion

In the current study, almost all the students had good knowledge and attitude; however, only few performed safe practice against HBV. The findings of this study highlighted that there is a critical need for immunizing medical students against Hepatitis B, HBV testing and reforming training curriculum more focusing on occupational risk.

Recommendation

We recommend to conduct more intensified educational programs among medical university students particularly focusing on preventive practices and providing vaccination free of cost to all medical students on admission by medical colleges.

Ethical approval

Approval for this study was obtained from the Institutional Review committee (IRC), Institute of Medicine, Nepal (Reference number 475^[6-11] E2 078/079).

Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Source of funding

187 \$ was received for the study by Nepal Health Research Council as a grant for this study.

Author contribution

K.D. designed the study. K.D., M.D. and L.R. wrote the original manuscript. G.S, S.S. and K.D. reviewed and edited the manuscript. G.S. and K.D. reviewed and edited the manuscript. K.D. and S.S. did the data analysis. K.D. and L.R. were involved in the data collection. All the authors reviewed and edited the manuscript. G.S. supervised the research. All authors have read and agreed to the final manuscript.

Conflicts of interest disclosure

There are no conflicts of interest.

Research registration unique identifying number (UIN)

researchregistry9647.

Guarantor

Krishna Dahal.

Data availability statement

The required data can be accessed from the corresponding author.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Acknowledgements

The authors acknowledge Nepal Health Research Council for providing 187\$ as a grant.

References

- [1] Hepatitis B. <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>
- [2] Rogers B, Goodno L. Evaluation of interventions to prevent needlestick injuries in health care occupations. *Am J Prev Med* 2000;18:90–8.
- [3] Medical Management of Exposures: HIV, HBV, HCV, Human Bites, and Sexual Assaults. <https://www.bop.gov/resources/pdfs/exposures.pdf>
- [4] Rachiotis G, Goritsas C, Alikakou V, *et al.* Vaccination against hepatitis B virus in workers of a general hospital in Athens. *Med Lav* 2005;96:80–6.
- [5] Hutin Y, Hauri A, Chiarello L, *et al.* Best infection control practices for intradermal, subcutaneous, and intramuscular needle injections. *Bull World Health Organ* 2003;81:491.
- [6] Molinari JA. Infection control: Its evolution to the current standard precautions. *J Am Dent Assoc* 2003;134:569–74.
- [7] Global hepatitis report, <https://www.who.int/publications/i/item/global-hepatitis-report-2017>
- [8] Bhattarai S, Smriti KC, Pradhan PMS, *et al.* Hepatitis B vaccination status and Needle-stick and Sharps-related Injuries among medical school students in Nepal: A cross-sectional study. *BMC Res Notes* 2014;7:774.
- [9] Mathew G, Agha R. for the STROCSS Group. STROCSS 2021: Strengthening the Reporting of cohort, cross-sectional and case-control studies in Surgery. *Int J Surg* 2021;96:106165.
- [10] Bhattarai S, Gyawali M, Sapkota S, *et al.* Knowledge, Attitude and Practice of Hepatitis B Vaccination among Clinical Medical Students at a Medical College in Nepal. *Eur J Med Sci* 2020;2.
- [11] Nguyen TTL, Pham TTH, So S, *et al.* Knowledge, attitudes and practices toward hepatitis b virus infection among students of medicine in Vietnam. *Int J Environ Res Public Health* 2021;18:7081.
- [12] Ibrahim N, Idris A. Hepatitis B awareness among medical students and their vaccination status at Syrian Private University. *Hepat Res Treat* 2014;2014:1–7.
- [13] M C VM, S S. Knowledge attitude and practice on prevention of hepatitis B infection among medical students of a tertiary care centre in Tamil Nadu, India. *Int J Res Med Sci* 2020;8:492.
- [14] Jacob A, Joy TM, Mohandas S, *et al.* Assessment of knowledge, attitude, and practice regarding hepatitis B among medical students in a private medical college in Kochi. *Int J Community Med Public Health* 2019;6: 1938.
- [15] Demiss W, Seid A, Fiseha T. Hepatitis B and C: seroprevalence, knowledge, practice and associated factors among medicine and health science students in Northeast Ethiopia. *PLoS One* 2018;13:e0196539.
- [16] Fortes Déguénonvo L, Massaly A, Ngom Gueye N, *et al.* Assessment of knowledge, attitudes and practices of medical students regarding hepatitis B infection at a Private University of Medicine in Senegal. *J Infect Dis Epidemiol* 2019;5.
- [17] Abdela A, Woldu B, Haile K, *et al.* 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.
- [18] Noubiap JJN, Nansseu JRN, Kengne KK, *et al.* Occupational exposure to blood, hepatitis B vaccine knowledge and uptake among medical students in Cameroon. *BMC Med Educ* 2013;13:148.
- [19] Jayakiruthiga S, Rajkamal R, Gopalakrishnan S, *et al.* Knowledge, attitude and practices concerning hepatitis B infection, among medical students in urban area of Chennai, Tamil Nadu. *Int J Community Med Public Health* 2018;5:3635.

- [20] Chhabra D, Mishra S, Gawande K, *et al.* Knowledge, attitude, and practice study on hepatitis B among medical and nursing undergraduate students of an apex healthcare institute at Uttarakhand foothills: a descriptive analysis. *J Fam Med Prim Care* 2019;8:2354.
- [21] Mubarak MGY, Alamir SAH, Qohal MMM, *et al.* Relation between knowledge, attitude and practice of hepatitis B among Dental Undergraduates in the Kingdom of Saudi Arabia. *J Contemp Dent Pract* 2019;20:1447–55.
- [22] Alhowaish MA, Ali Alhowaish J, Hamoud Alanazi Y, *et al.* Knowledge, attitudes and practices toward prevention of hepatitis B virus infection among medical students at Northern Border University, Arar, Kingdom of Saudi Arabia. *Electron Phys* 2017;9:5388–94.
- [23] Upadhyay D, Manirajan Y, Iqbal M, *et al.* A survey on medical, dental, and pharmacy students' knowledge, attitude, and practice about hepatitis B infection in a private medical University of Malaysia. *J Res Pharm Pract* 2020;9:128.