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## Hepatitis B vaccination status and knowledge, attitude, and practice regarding Hepatitis B among preclinical medical students of a medical college in Nepal --Manuscript Draft--

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<b>Full Title:</b>	Hepatitis B vaccination status and knowledge, attitude, and practice regarding Hepatitis B among preclinical medical students of a medical college in Nepal
<b>Short Title:</b>	Knowledge, attitude, and practice regarding Hepatitis B among medical students
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<b>Keywords:</b>	Attitude; Hepatitis B; Knowledge; Medical students; Nepal; Practice; Vaccination
<b>Abstract:</b>	<p><b>Background</b></p> <p>Hepatitis B imposed a major public health problem with an increased risk of occupational exposure among health care workers. Medical students are also at increased risk due to a lack of mandatory vaccination programs and accidental needle stick injuries during clinical years. This demands the need for Hepatitis B vaccination of medical students before they enter clinical years. This study was conducted to determine the Hepatitis B vaccination status along with the knowledge, attitude, and practice regarding Hepatitis B among preclinical medical students of a medical college in Nepal.</p> <p><b>Materials and Methods</b></p> <p>This descriptive cross-sectional study was conducted among first and second-year medical students of a medical college in Kathmandu, Nepal from 6<sup>th</sup> July to 14<sup>th</sup> July 2020. The whole sampling technique was used. Data were collected using a pretested, self-administered questionnaire which was mailed to individuals and analyzed in the statistical package for social sciences version-22.</p> <p><b>Results</b></p> <p>A total of 181 students participated in the study out of 198, giving a response rate of 91.4%. Among the study participants, only 67 (37%) were fully vaccinated against Hepatitis B while 71 (39.2%) were never vaccinated. For the majority (74.6%) of the non-vaccinated participants, the main reason for not getting vaccination was a lack of vaccination programs. Regarding the knowledge, attitude, and practice, half the study participants (n=92, 50.8%) had good knowledge, attitude and practice regarding hepatitis B. The median knowledge, attitude and practice score towards Hepatitis B were 61.00 (57.00-66.00), 20(18.00- 21.00) and 21(19.00- 23.00) respectively.</p> <p><b>Conclusions</b></p> <p>The majority of preclinical medical students were not fully vaccinated against Hepatitis B and only half of them, having acceptable knowledge, attitude and practice towards hepatitis B, which makes them vulnerable to hepatitis B during clinical years. This might represent the scenario of not only Nepal but South Asian countries and creates an alarm to taking the vaccination programs seriously. Since the majority of the non-vaccinated participants responded unavailability of vaccination program as the main cause, we strongly recommend the provision of the Hepatitis B vaccination program to the pre-clinical medical students so that they will be protected when they enter clinical training.</p>
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1 **Hepatitis B vaccination status and knowledge, attitude, and practice regarding Hepatitis B**  
2 **among preclinical medical students of a medical college in Nepal**

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## 13 Abstract

## 14 Background

15 Hepatitis B  posed a major public health problem with an increased risk of occupational exposure  
16 among health care workers. Medical students are also at increased risk due to a lack of mandatory  
17 vaccination programs and accidental needle stick injuries during clinical years. This demands   
18 need for Hepatitis B vaccination of medical students before they enter clinical years. This study  
19 was conducted to determine the Hepatitis B vaccination status  along with the knowledge, attitude,  
20 and practice regarding Hepatitis B among preclinical medical students of a medical college in  
21 Nepal.

## 22 Materials and Methods

23 This descriptive cross-sectional study was conducted among first and second-year medical  
24 students of a medical college in Kathmandu, Nepal from 6<sup>th</sup> July to 14<sup>th</sup> July 2020. The whole  
25 sampling technique was used. Data were collected using a pretested, self-administered  
26 questionnaire which was mailed to individuals and analyzed  the statistical package for social  
27 sciences version-22.

## 28 Results

29 A total of 181 students participated in the study out of 198, giving a response rate of 91.4%. Among  
30 the study participants, only 67 (37%) were fully vaccinated against Hepatitis B while 71 (39.2%)  
31 were never vaccinated. For the majority (74.6%) of the non-vaccinated participants, the main  
32 reason for not getting vaccination was a lack of vaccination programs. Regarding the knowledge,



33 attitude, and practice, half the study participants (n=92, 50.8%) had good knowledge, attitude and  
34 practice regarding hepatitis B. The median knowledge, attitude and practice score towards  
35 Hepatitis B were 61.00 (57.00-66.00), 20(18.00- 21.00) and 21(19.00- 23.00) respectively.

## 36 Conclusions

37 The majority of preclinical medical students were not fully vaccinated against Hepatitis B and only  
38 half of the students having acceptable knowledge, attitude and practice towards hepatitis B, which makes  
39 them vulnerable to hepatitis B during clinical years. This might represent the scenario of not only  
40 Nepal but South Asian countries and creates an alarm to taking the vaccination programs  
41 seriously. Since the majority of the non-vaccinated participants responded unavailability of  
42 vaccination program as the main cause, we strongly recommend the provision of the Hepatitis B  
43 vaccination program to the pre-clinical medical students so that they will be protected when they  
44 enter clinical training.

45 **Keywords** - Attitude; Hepatitis B; Knowledge; Medical students; Nepal; Practice;  
46 Vaccination

## 47 Introduction

48 Hepatitis B virus is the most contagious blood-borne pathogen that can cause both acute and  
49 chronic liver diseases [1,2]. Vaccination is the mainstay of prevention against Hepatitis B infection  
50 with 90%-100% protection conferred following complete vaccination [2,3]. World Health  
51 Organization (WHO) recommends special consideration of healthcare workers & medical students  
52 for Hepatitis B virus screening and vaccination [2].

53 The risk of accidental exposure among medical students is high due to a lack of experience and  
54 direct contact with a patient's potentially infectious body fluids [4, 5, 6]. Hence, medical students  
55 with the start of clinical years are at high risk of Hepatitis B infection. However, no studies in the  
56 past assessed the Hepatitis B vaccination status among preclinical level medical students in Nepal.  
57 To provide a basis for the implementation of Hepatitis B vaccination programs, our study aims to  
58 estimate the Hepatitis B vaccination status along with knowledge, attitude and practice regarding  
59 Hepatitis B infection among preclinical medical students of a medical college in Nepal.

## 60 **Materials and methods**

### 61 **Study design and settings**

62 This is a descriptive cross-sectional study done among the preclinical year (1<sup>st</sup> and 2<sup>nd</sup> year)  
63 students of the Nepalese Army Institute of Health Sciences (NAIHS), Nepal. The data for the study  
64 was collected from 6<sup>th</sup> July 2020 to 14<sup>th</sup> July 2020. The whole sampling technique was used. The  
65 students who were no longer attending classes and were not in contact were excluded from the  
66 study. This made the sample size to be 198 (first year-100, second year-98). The data was collected  
67 from the participants via Google forms circulated through the mail after explaining the objective  
68 of the study in the form itself. The participation was completely voluntary and the anonymity was  
69 insured. Those who submitted the response were considered to have given consent. The  
70 participants didn't receive any incentives.

### 71 **Study sample**

72 The total population of the preclinical year of NAIHS was taken. The data collection time lasted  
73 from 6<sup>th</sup> July 2020 to 14<sup>th</sup> July 2020. All of the participants were reached in 4 phases by making 8  
74 groups of 25 people each; through online sessions regarding study details. The expected non-  
75 response rate was kept at 5% of the total population of the study. During this survey period, all  
76 students were stranded at home due to the COVID-19 (Coronavirus disease 2019) pandemic  
77 imposed lockdown. Also Nepal government and global health governing agencies like WHO were  
78 advocating to limit gathering and movements due to fear of the spread of COVID. So we mailed  
79 questionnaire to participants via Google forms after an online session.






## 80 **Study instrument**

81 A self-administered online questionnaire containing 21 items was used for the study  
82 ([supplementary file](#)). It contained 3 items for demographics, 5 for the Knowledge section, 5 for  
83 the attitude and 5 for practice, 1 for vaccination status and 1 for total dose taken, and 1 for the  
84 reason of not getting vaccinated. The questionnaire was developed after an extensive literature  
85 search in the English language. The questionnaire was pre-tested among 5 % of the study sample,  
86 10 students from the 3rd and 4th year of medical school, and modified accordingly. The  
87 questionnaire was then administered after the necessary modification.






## 88 **Exposure variables**

89 The survey questionnaire included baseline exposure variables like age (below 19 years, 20 years  
90 and above), sex, vaccination status, and academic year (1st year, 2nd year).

## 91 **Outcome variables**

92 A semi-structured pre-piloted knowledge, attitude, and practice questionnaire  to collect data,  
93 and its internal consistency was assessed by using Cronbach's  $\alpha$ . The internal reliability of the  
94 present study  to be 0.698 indicating high internal consistency for our scale for this specific  
95 sample. Five-point Likert scale  to quantify the response on knowledge, attitude, and practice  
96 ranging from 1-5; 1 being  least acceptable  response to the item asked while 5 being the most  
97 acceptable response to that item.

## 98 **Statistical methods**

99 The data collected through the google forms were extracted to Microsoft Excel-13 and  then  
100 imported and analyzed by using SPSS (Statistical Package for Social Sciences) version 22.  
101 Kolmogorov-Smirnov (K-S) test, the Shapiro-Wilk test  used to assess the normality of data   
102 distribution and classified  data as normal if the significant value of the test is greater than 0.05. If  
103 the value is below 0.05, the data are classified as non-normal distribution. Our data were non-  
104 normal so non-parametric tests were used using the median as a measure of distribution. A Chi-  
105 square test was used to check the association between variables. Spearman's rho was used to check  
106 the correlation between knowledge and attitude, knowledge and practice and attitude, and practice 

## 107 **Ethical consideration**

108 The study was approved by the Institutional Review Committee of NAIHS. All the participants  
109 were informed about the study and its objective by incorporating the consent form in the  
110 questionnaire itself. Anyone who filled the form was understood to have given the consent.


## 111 **Results**

## 112 General characteristics




113 **Table 1** shows the general characteristics of the respondents who participated in the study. Out of  
 114 198 preclinical medical students, 181 (91.4% response rate) students participated in the study, 85  
 115 (47%) from the first year, and 96 (53%) from the second year. The mean age of the study  
 116 participants was 19.93 ( $\pm 1.436$ ) years, ranging from 17-28 years. The majority of the respondents  
 117 were male (n=123, 68%) **as** compared to females (n=58, 32%). Regarding Hepatitis B vaccination  
 118 status, 71 (39.2%) study participants weren't vaccinated while 110 (60.8%) students were  
 119 vaccinated. Among the 110 vaccinated students, 67 (60.9%) received at least 3 doses of Hepatitis  
 120 B while 43 (39.1%) received less than 3 doses. Among 71 non-vaccinated students, the major  
 121 reason for not being vaccinated was the lack of a vaccination program being offered (n=53, 74.6%).

122 **Table 1. Baseline characteristics and Hepatitis B vaccination status of the respondents (N =**  
 123 **181).**

Variables		n	%
Age (in Years)	19 and below	67	37.0
	20 and above	114	63.0
	<i>Mean<math>\pm</math>SD</i>	19.93 $\pm$ 1.436	
Gender	Male	123	68.0
	Female	58	32.0
Academic year	1st Year MBBS	85	47.0
	2nd Year MBBS	96	53.0
Vaccinated against hepatitis B	No	71	39.2
	Yes	110	60.8

Doses of Hepatitis B vaccine received	Not vaccinated	71	39.2
	One	14	7.7
	Two	29	16.0
	Three	55	30.4
	More than three	12	6.6
Reason for Not vaccinate  against Hepatitis B	No vaccination program offered	53	29.3
	Low risk of Hepatitis B	6	3.3
	Not sure about vaccination status	4	2.2
	Lack of Knowledge	4	2.2
	High vaccination fees	2	1.1
	Efficacy doubted	2	1.1

## 124 **Assessment of Knowledge related to Hepatitis B**

125 The majority of the study participants agreed that Hepatitis B is caused by a virus (87.3% strongly  
 126 agreed) and Hepatitis B can cause liver cancer (43.6% strongly agreed, 37% agreed). In terms of  
 127 knowledge on the mode of transmission, around three fourth  of the respondents strongly agreed  
 128 on contaminated blood and body fluids (78.5%), unsterilized syringes/needles (75.7%),  
 129 unprotected sex (71.8%) and infected mother to fetal transmission (71.8%). Similarly, most of the  
 130 respondents disagreed on casual contact (49.2% strongly disagreed, 26.5% disagreed) and  
 131 cough/sneeze (40.9%  strongly disagreed, 22.7% disagreed) as a mode of transmission. However,  
 132 regarding contaminated food/water as a mode of transmission for Hepatitis B, only 33.7% strongly  
 133 disagreed while 22.1% were neutral and 11.6% strongly agreed. About two third  d agreed that


134 healthcare workers are at increased risk of getting Hepatitis B (29.8% strongly agreed, 38.1%  
 135 agreed). When asked about prevention, the majority responded with vaccination (80.1% strongly  
 136 agreed), avoiding sharp needles/syringes (39.8% strongly agreed, 42% agreed), and using gloves  
 137 when handling body fluids (47% strongly agreed, 42% agreed). However, regarding antivirals as  
 138 a preventive measure, only 3.3% strongly disagreed while 24.9 % were neutral and 26.5% strongly  
 139 agreed. Additionally, 20.4% strongly disagreed on avoiding contaminated food/water as a  
 140 preventive measure for Hepatitis B while 25.4% were neutral and 11.6% strongly agreed (**Table**  
 141 **2**). The median score for knowledge was 61 (**Table 3**).

142 **Table 2. Knowledge, Attitude and Practice findings of the respondents.**

Questions for response	Strongly Disagree n(%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly agree n(%)
<b>Assessment of Knowledge related to Hepatitis B</b>					
1. Hepatitis B is caused by a virus.	10 (5.5)	4 (2.2)	0 (0)	9 (5.0)	158 (87.3)
2. Hepatitis B can be transmitted by :	2 (1.1)	3 (1.7)	9 (5.0)	37 (20.4)	130 (71.8)
2. a. Infected mother to fetus					
2. b. Contaminated blood and body fluids	2 (1.1)	1 (0.6)	2 (1.1)	34 (18.8)	142 (78.5)
2. c. Unprotected sex	7 (3.9)	5 (2.8)	10 (5.5)	29 (16.0)	130 (71.8)
2. d. Casual contact (shaking hands)	89 (49.2)	48 (26.5)	18 (9.9)	16 (8.8)	10 (5.5)
2. e. Unsterilized syringes/needles	3 (1.7)	2 (1.1)	4 (2.2)	35 (19.3)	137 (75.7)
2. f. Coughing/sneezing	74 (40.9)	41 (22.7)	33 (18.2)	19 (10.5)	14 (7.7)
2. g. Contaminated food/water	61 (33.7)	30 (16.6)	40 (22.1)	29 (16.0)	21 (11.6)
3. Hepatitis B can cause liver cancer.	4 (2.2)	8 (4.4)	23 (12.7)	67 (37.0)	79 (43.6)
4. Healthcare workers are at increased risk of getting hepatitis B than general population:	5 (2.8)	16 (8.8)	37 (20.4)	69 (38.1)	54 (29.8)
5. Hepatitis B can be prevented by:	2 (1.1)	2 (1.1)	3 (1.7)	29 (16.0)	145 (80.1)
5. a. Vaccination					
5. b. Antivirals	6 (3.3)	7 (3.9)	45 (24.9)	75 (41.4)	48 (26.5)

5. c. Avoiding sharp needle/syringe injury	5 (2.8)	10 (5.5)	18 (9.9)	76 (42.0)	72 (39.8)
5. d. Avoiding contaminated food/water	37 (20.4)	34 (18.8)	46 (25.4)	43 (23.8)	21 (11.6)
5. e. Using gloves when handling body fluids	1 (0.6)	5 (2.8)	14 (7.7)	76 (42.0)	85 (47.0)
<b>Assessment of Attitude towards Hepatitis B</b>					
6. I feel uncomfortable sitting with a hepatitis B infected person.	34 (18.8)	45 (24.9)	55 (30.4)	35 (19.3)	12 (6.6)
7. I don't mind shaking hands/hugging with a hepatitis B infected person.	12 (6.6)	26 (14.4)	41 (22.7)	65 (35.9)	37 (20.4)
8. I believe the hepatitis B vaccine is safe and effective.	5 (2.8)	2 (1.1)	17 (9.4)	92 (50.8)	65 (35.9)
9. I believe healthcare workers should receive hepatitis B vaccination.	0 (0)	0 (0)	13 (7.2)	49 (27.1)	119 (65.7)
10. I don't need hepatitis B vaccination because I am not at risk	101 (55.8)	54 (29.8)	19 (10.5)	6 (3.3)	1 (0.6)
<b>Assessment of Practice towards Hepatitis B</b>					
11. I ask/use a new blade for shaving/hair cutting.	4 (2.2)	4 (2.2)	11 (6.1)	33 (18.2)	129 (71.3)
12. I ask for a new syringe before injection.	0 (0)	1 (0.6)	6 (3.3)	22 (12.2)	152 (84.0)
13. I ask for sterilized equipment for ear/nose piercing.	3 (1.7)	2 (1.1)	18 (9.9)	48 (26.5)	110 (60.8)
14. I always report for needle prick / sharp injuries.	0 (0)	18 (9.9)	46 (25.4)	59 (32.6)	58 (32.0)
15. I attend hepatitis B related awareness programs.	15 (8.3)	21 (11.6)	65 (35.9)	50 (27.6)	30 (16.6)

143

144 **Table 3. Summation of knowledge, attitude and practice score distribution** 

	Knowledge sum (n=181)	Attitude sum(n=181)	Practice Sum(n=181)	Total Score (n=181)
Mean	60.86	19.91	20.97	101.73



Median	61.00	20.00	21.00	102.00
IQR	(57.00-66.00)	(18.00- 21.00)	(19.00- 23.00)	(96.00- 108.00)

## 145 **Assessment of Attitude towards Hepatitis B**

146 The majority were neutral (n=55, 30.4%) sitting with a Hepatitis B positive person, however,  
 147 6.6% (n=12) strongly agreed on feeling uncomfortable while sitting with a Hepatitis B positive  
 148 person and 18.8% (n=34) strongly disagreed. Many don't mind shaking hands with a Hepatitis B  
 149 positive person (n=65, 35.9 %), however, 6.6 % (n=12) strongly disagreed on doing so. Around  
 150 half of the respondents, 50.8% (n=92) agreed that hepatitis B vaccination is safe and effective  
 151 whereas 2.8% (n=5) strongly disagreed. Most of the respondents, 65.7% (n= 119) strongly agreed  
 152 that healthcare workers should receive hepatitis B vaccination and 55.8% (n=101) strongly agreed  
 153 that they need Hepatitis B vaccination because they are at risk (**Table 2**). The median attitude score  
 154 was 20 (**Table 3**).

## 155 **Assessment of Practice towards Hepatitis B**

156 Among the respondents, the majority (n=129, 71.3%) ask for a new blade while cutting or shaving  
 157 hair. 84% (n=152) of them ask for a new syringe before injection. 32% (n=58) strongly agreed on  
 158 reporting their needle prick injury whereas 9.9% (n=18) disagreed. A small number of people  
 159 (n=15, 8.3%) strongly disagreed on attending any hepatitis B awareness program whereas 27.6%  
 160 (n=50) agreed (**Table 2**). The median score for practice was 21 (**Table 3**).

## 161 **Categorization of Knowledge Attitude and Practice (KAP) score and** 162 **its association with baseline characteristics**

163 **Table 4** demonstrates the association of KAP score with baseline characteristics like age, gender,  
 164 academic year, vaccination status, doses of vaccination received, and reasons for not being  
 165 vaccinated. There is no significant association observed. The median KAP score was 102 (**Table**  
 166 **3**). **Fig 1** shows that the KAP was good (above the median score) among 92 (50.8%) respondents.

167 **Table 4. Association of KAP score with baseline characteristics.**

Variables		KAP score Category		p-value
		In-adequate (<102)	Good ( $\geq$ 102)	
Gender:	Male	62	61	.628
	Female	27	31	
Age	19 and below	36	31	.347
	20 and above	53	61	
Academic year	1st Year MBBS	44	41	.511
	2nd Year MBBS	45	51	
Vaccinated against hepatitis B	No	37	34	.525
	Yes	52	58	
Doses of Hepatitis B vaccine	No	37	34	.455
	One	8	6	
	Two	10	19	
	Three	29	26	
	More than three	5	7	
Reason for Not vaccinated against Hepatitis B	No vaccination program offered	27	26	.564
	Low risk of Hepatitis B	3	3	
	Not sure about vaccination status	1	3	
	High vaccination fees	2	0	
	Efficacy doubted	1	1	

	Lack of Knowledge	3	1	
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168

169 **Figure 1. KAP score category among the respondents.**

170

## 171 **Correlation of knowledge, attitude, and practice on Hepatitis B**

172 We found a weak positive correlation between knowledge with attitude ( $r=0.343$ ) and attitude with  
 173 practice ( $r=0.170$ ). However, no significant correlation was found between knowledge with  
 174 practice ( $r=0.009$ ,  $p$ -value 0.909) (**Table 5**).

175 **Table 5. Correlation of knowledge, attitude, and practice.**

Variables	Spearman's correlation coefficient	p-value
Knowledge-Attitude	0.343*	$p < 0.01$
Knowledge-Practice	0.009	$P=0.909$
Attitude-Practice	0.170**	$P=0.022$

176 \*Correlation is significant at  $p < 0.01$  level (2-tailed).

177 \*\*Correlation is significant at the 0.05 level (2-tailed).

178

## 179 **Discussion**

180 The risk of exposure to Hepatitis B infection among medical students is the same, if not greater  
 181 other healthcare workers since they are banked on to be involved in patient care at the beginning

182 of clinical training. This highlights the importance of getting vaccinated and acquiring adequate  
183 knowledge about the infection before getting into clinical training. However, Nepal lacks adequate  
184 studies that assess the vaccination status of the students and their knowledge, attitude, and practice  
185 regarding Hepatitis B infection. This study looks into the vaccination status of preclinical students  
186 and describes their KAP towards the infection. These students will soon get exposed to clinical  
187 settings after the COVID-19 pandemic will come under control.

188 The Hepatitis B vaccination status among preclinical medical students in our study was 60.8%  
189 which is quite lower than the only other study done among medical students in the country where  
190 86.5% of the students were vaccinated [7]. But our finding is similar to a study from Pakistan,  
191 where 60% were vaccinated [8]. And it is higher than the findings of a study from Nigeria and  
192 another study from Pakistan where 47.7% and 42.2% were reported to have been vaccinated  
193 respectively [9,10]. Among vaccinated students, 60.9% were fully vaccinated (3 and more doses).  
194 This is similar to the study from Saudi Arabia where 38% were found to have received all three  
195 doses and much higher than 2% completing all three doses according to a finding from Ethiopia  
196 [11,12]. However, the finding from another study done in Nepal showed a higher percentage (83.7%)  
197 of students completing full doses [7]. This warrants a need to look into the vaccination status of  
198 students before going into clinical years to ensure high vaccination rates during their clinical  
199 training.

200 Among the non-vaccinated participants (39.2%) of our study, the main reasons for non-vaccination  
201 were found to be: no vaccination program offered (74.6%) followed by low risk of Hepatitis B  
202 (8.5%) and lack of knowledge (5.6%). The result is similar to other studies from Nepal and Nigeria  
203 that showed a lack of vaccination programs (43.2%) and lack of opportunity (57.4%) respectively  
204 as the major reasons for non-vaccination [7,9]. These findings sufficiently shed light on the urgent

205 necessity to implement vaccination programs for medical students. However, the high cost of  
206 vaccines was stated as the major reason for non-vaccination among health science students from  
207 Uganda [13]. A study from Pakistan showed non-compliance as a major reason for the low -  
208 vaccination rate [8].

209 Out of the students surveyed, 92.3% were aware that Hepatitis B is caused by a virus. A study  
210 from Nepal done among preclinical medical and dental students revealed that 93.6% of the  
211 participants were aware of the cause of Hepatitis B infection [14]. Regarding the knowledge about  
212 the mode of transmission, the majority knew about infected mother to fetus transmission (92.2%),  
213 transmission through contaminated blood and body fluids (97.3%), unprotected sex (87.8%), and  
214 unsterilized syringes/needles (95%). The findings are parallel to the findings of a study from  
215 Northeast Ethiopia and higher than the study from Haramaya University, Ethiopia [12,15].  
216 However, very few participants strongly disagreed with the transmission of infection via casual  
217 contact, coughing/sneezing, and contaminated food/water. This gap in knowledge could increase  
218 the probability of patients with hepatitis B infection from being ostracized from society.

219 80.6% of respondents agreed Hepatitis B virus can cause liver cancer in the present study. This is  
220 comparable with Ethiopian and Saudi Arabian studies among medical students showing 81.3 % and  
221 75.5% agreeing hepatitis B causes liver cancer respectively. [11, 12]. 96.1% of our study  
222 participants agreed that the Hepatitis B infection can be prevented by vaccination. A study by  
223 Alhwaish MA et al and Abdela A et al showed 86.5% and 84.6% respectively responded vaccine  
224 prevents hepatitis B [11,12].

225 Regarding attitude related to Hepatitis B infection and vaccination; 43.7% didn't feel  
226 uncomfortable sitting with a Hepatitis B positive person. 56.3% didn't mind shaking hands or  
227 hugging with a Hepatitis B infected person which is higher than the finding from Saudi Arabia.

228 indicating the more acceptable attitude of students responding to the present study [16]. In our  
229 study, 86.7% of the participants thought that the hepatitis B vaccine was safe and effective which  
230 is similar to a finding from Saudi Arabia and Ethiopia [11,12]. This finding is higher as compared  
231 to another study from Saudi Arabia where only 63% considered the vaccine safe [16]. 92.8% of  
232 our participants believed that healthcare workers should be vaccinated which is notably higher as  
233 collated with a study from Saudi Arabia [16]. The same study from Saudi Arabia also stated that  
234 62% of its participants believed that they were at higher risk of contracting Hepatitis B infection;  
235 which is lower than our study's finding which 85.6% [16]. As of our study, 3.9% thought that they  
236 don't need to be vaccinated and that they are not at risk which is comparable with an Indian study's  
237 finding with 3.7% responding they don't need it [17]. Though this is a small proportion as  
238 compared to other findings it needs to be addressed because medical students, being a part of the  
239 healthcare delivery system, should be well aware that they need to be vaccinated as they are always  
240 at risk of contracting and spreading the Hepatitis B infection.

241 In our study, 89.5%, 96.2%, and 87.3% of the participants asked for a new blade for shaving/hair  
242 cutting, a new syringe for injection, and sterile equipment for ear/nose piercing respectively which  
243 reflects the good safety practices among the participants. A study by Rathi A et al also showed  
244 similar findings in the case of participants asking for a new blade for shaving/hair cutting and  
245 sterile equipment for nose/ear piercing [17]. The finding for asking for new syringes for injection in  
246 our study is more than that in Ethiopia and India [15,17]. 64.6% of our study participants said that  
247 they always report needle prick/sharp injuries which is similar to Alhowaish MA et al showing  
248 68% while a study by Abdela A et al reported only 53.7% will report needle stick injury [11, 12].  
249 44.2% of our study participants agreed that they attend Hepatitis B related awareness programs  
250 which are significantly greater than the finding from Ethiopia i.e. 23.9% [15].

251 This study found that females had better overall KAP scores compared to males which are per the  
252 previous study from Pakistan [18]. However, it contradicts the study from Malaysia which had  
253 found no association between gender and knowledge [19]. Similarly, second-year students had  
254 better KAP scores than first-year students which are in line with the findings of a study from  
255 Pakistan where 1st professional year had the least knowledge [18]. This can be associated with the  
256 fact that second-year students have got more instructions and information and are more aware of  
257 the disease. Those who had been vaccinated were found to have better KAP scores than those who  
258 weren't. A weak positive correlation was found between knowledge with attitude and attitude with  
259 practice somewhat similar to the correlations found in a study from Malaysia [19].

260 The major limitation of this study is that we didn't measure the anti- Hepatitis B surface antibody  
261 (HBsAb) titer of the participants; hence the vaccination status could not be verified. Likewise,  
262 recall bias and information bias might have also affected the result of our study. We had mentioned  
263 the date of the introduction of the Hepatitis B vaccine in the immunization program of Nepal in  
264 the questionnaire and also collected the responses anonymously to mitigate these biases. This study  
265 was done by collecting responses using an online questionnaire in a country where internet  
266 penetration is 57% [20]. This may have affected the response rate of our study. Finally, the results  
267 may not be generalizable to all the medical colleges of Nepal since the data was collected only  
268 from NAIHS but it will surely provide a reference for further research in this field. The health care  
269 system needs to be strengthened in poor resource countries like Nepal where a limited number of  
270 health care providers are available. Due to the limited availability of resources, health protection,  
271 and promotion of providers has to be kept under consideration. Due to the COVID-19 pandemic,  
272 the health care delivery system is highly impacted including clinical learning of medical students.  
273 Before they get exposed to the clinical rotation, we recommend the governing body to make

274 available and implement mandatory Hepatitis B vaccination to safeguard the health of medical  
275 students.

## 276 **Conclusion**

277 We found that there were more than one-fourth of the respondents not vaccinated for Hepatitis B  
278 despite it being a vaccine-preventable disease. The main reason for not getting vaccinated was the  
279 unavailability of vaccination programs. Vaccination programs need to be provided for all  
280 healthcare workers and medical students before they go into their clinical years so that they can  
281 prevent themselves from the hazards of non-vaccination and needle stick injuries. A change must  
282 be instilled from the regulatory bodies of medical schools as well as the government and a free  
283 vaccination program can be administered to all students coming into the hospital before they enter  
284 clinical years.

## 285 **Declarations**

### 286 **Ethical approval and consent to participate:**

287 Ethical approval is obtained from the Institutional Review Committee of NAIHS and is attached  
288 in a supplementary file. All the participants were informed about the study and its objective via  
289 online session before the study also incorporating the consent form in the questionnaire itself.  
290 Anyone who filled the form was understood to have given their consent

291 **Consent for Publication:** not applicable

292 **Availability of data and materials:** The datasets analyzed during the current study are available  
293 from the corresponding author on reasonable request.



294 **Competing interests:** The authors declare that they have no competing interests.

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297 **Authors' contributions** DBS, MK, MK, PS, SP, and BBT contributed to concept  
298 and design, literature search, data collection, interpretation of data, and review. DBS analyzed  
299 data.

300 All authors were involved in drafting and revising the manuscript and approved the final version.

301 “All authors listed have read and approved the manuscript” for further processing and  
302 publication.

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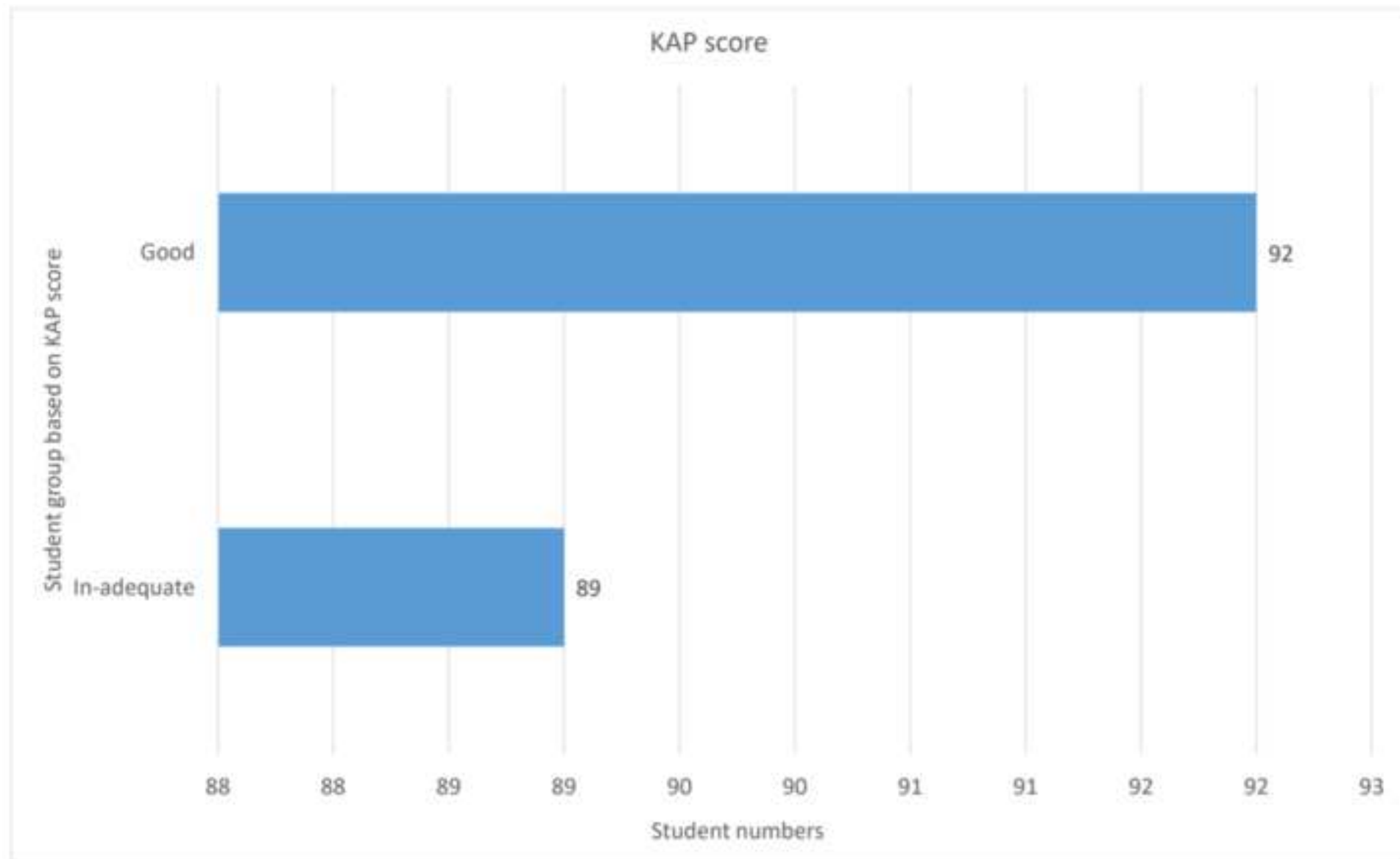
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## 400 **Figure legends**

401 **Figure 1:**KAP score category among the respondents

## 402 **List of supplementary files**

**403 Supplementary file 1: Questionnaire**





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**Supporting Information**

Supplementary file HBV Questionnaire.docx

