

ORIGINAL RESEARCH ARTICLE

DENTAL HEALTHCARE WORKER'S KNOWLEDGE AND ATTITUDE ON HEPATITIS B INFECTION AND THEIR UPTAKE OF HEPATITIS B VACCINATION AT A TERTIARY CARE CENTER IN NEPAL

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ABSTRACT

Background: Hepatitis B is a serious public health problem and dental healthcare workers (HCW) are at a greater risk of acquiring the infection. The main aim of this study was to assess the knowledge, attitude, and hepatitis B vaccination status of dental HCW at a tertiary dental hospital.

Methods: A cross-sectional study was carried out among all dental HCW and their knowledge level, attitude, and vaccine uptake were measured. Factors associated with the receipt of full hepatitis B vaccination was assessed using Pearson's chi-square test. The data was analyzed using Statistical Package for the Social Sciences version 23.

Results: Out of the total 254 dental HCW, 207 responded to the survey signifying a response rate of 81.5%. The mean age of the participants was 25.6±5.4 years. A majority of the participants were female (156; 75.4%), unmarried (169; 81.6%), and dental students (117; 56.5%). Most participants had a fair knowledge (117; 56.5%) and a positive attitude regarding Hepatitis B virus (189; 91.3%). However, the uptake of full dose of hepatitis B vaccine was only 41.5%. Dental HCW's age, marital status, educational attainment, and type of dental HCW were associated with receipt of full vaccination (all p-value <0.05).

Conclusions: Despite fair knowledge and positive attitude, the uptake of full vaccination was low among the dental HCW. Further strategies are needed to improve the hepatitis B vaccine uptake. Specifically, increasing the access of vaccines in the dental hospital should be prioritized, especially for young dental HCW.

INTRODUCTION

Globally, hepatitis B is a serious public health problem.¹ The WHO estimated 887,000 deaths among 257 million people with chronic hepatitis B infection in 2015.² Hepatitis B virus (HBV) can be transmitted through various ways, namely perinatal transmission, unprotected sexual intercourse, or contact with infected blood and body fluids.^{1,3} Dental healthcare workers (HCW) are particularly at a greater risk of acquiring HBV infection compared to the general population.^{1,4}

Due to their potential for exposure to infected patients and/or to infectious materials, dental HCW's knowledge, attitude, and vaccination are important to ensure their protection against the infection. Few studies have explored these issues among dental HCW in Nepal, but they have been limited to dental students and interns.^{3,5,6}

The main objective of this study was therefore, to assess the knowledge, attitude, and hepatitis B vaccination status of all dental HCWs, including dentists, specialists, and auxiliary staff in a tertiary dental hospital.

METHODS

This was a cross-sectional study, carried out among all dental HCWs of Kathmandu Medical College and Teaching Hospital (KMCTH) from 5th July to 6th September, 2020. Ethical approval was obtained from the Institutional Review Committee of KMCTH before conducting this study (Reference no: 2306202003).

The inclusion criteria in this study included dental service providers such as dentists, specialists, dental hygienists, interns, and clinical year dental students (in 3rd, 4th, and final years of the BDS course) who are involved in dental treatment procedures on patients as well as auxiliary staff like dental assistants and helpers who handle sharp instruments in the dental hospital setting. However, dental staffs without direct involvement in patient care or handling dental equipment, such as receptionists and administrative officers, were excluded from the study.

Data was collected using a self-administered survey questionnaire which was initially meant to be paper-based. However, due to a nationwide shutdown of educational institutions in response to the emergence of coronavirus

disease 2019 (COVID-19), paper-based questionnaires were not feasible for everyone, in particular, to dental clinical students. They were therefore invited for online participation via Google form using same questionnaires. The study participants gave their written informed consent to participate in the survey as well as to publish their data without disclosing their personal information. For participants who responded online, clicking the 'I Agree' button on the informed consent page of the online survey implied their consent.

The minimum sample size was calculated using the 87% prevalence of knowledge of Hepatitis B reported by a study conducted at a similar medical college in Nepal,⁵ as a proxy for the sample size for proportion:

$$\begin{aligned} \text{Sample size (n)} &= Z^2 \times (p \times q) / e^2 \\ &= 1.96^2 \times [87 \times (100-87)] / 5^2 \\ &= 3.8416 \times 87 \times 13 / 25 \\ &= 4344.85/25 \\ &= 174 \end{aligned}$$

Where,

Z = 1.96 at 95% confidence interval

p = 87%

q = 100-p

e (margin of error) = 5%

Expecting a 10% loss for non-response, refusal, and absences, the sample size was inflated to 174/0.9 i.e. 193 HCW (193-0.10*193=174). Since the total number of dental HCW at KMCTH was only 254 (during our study period), total sampling technique was used in which all dental HCW who met the inclusion criteria were invited to participate in the study.

The survey questionnaire was based on questions extracted from similar previous study.⁷ Questions were divided into two sections - the first section consisted of socio-demographic details of the participants and the second section was focused on knowledge, attitude regarding hepatitis B infection, and HCW's vaccination status. There were eight questions related to knowledge of Hepatitis B incorporating the infection's cause, transmission, clinical features, treatment, and prevention modalities. For every correct answer/answers to a single question, score 1 was given and a score 0 for the wrong answer. Likewise, five statements were related to attitude, in which agreement to a statement was assigned a score 1 and disagreement a score 0. The last two questions were related to the vaccination status and the reason behind non-vaccination status or incomplete vaccination, if any.

The data from the paper surveys and Google forms were first extracted to a Microsoft Excel Sheet and then further analyzed using Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., Armonk, NY). Negatively worded items were reversed during data analysis. Participants' knowledge on Hepatitis B were grouped into three categories using a modification of Bloom's original cut off points,⁸ such that seven

or more correct answers represented "good knowledge", five to six correct answers meant "fair knowledge" and four or less correct answers were considered as "needed improvement". Similarly, for the construct of attitude toward Hepatitis B, a score of four or more signified a positive attitude and a score of three or less was deemed as a negative attitude. Descriptive statistical analysis was performed to calculate the frequency of different variables in terms of number and percentage. Pearson's chi square test was used to test the association of independent variables with the outcome variable of receipt of full vaccination. Statistical significance was set at p<0.05.

RESULTS

Out of the total 254 dental HCW, 207 responded to the survey (response rate – 81.5%). The mean age of the participants was 25.6±5.4 years. A majority of the study participants were female (156; 75.4%), single/unmarried (169; 81.6%), hindu (189; 92.6%), and had attained or studying Bachelor's degree (173; 83.6%). More than half of the participants (56.5%) were dental students (from 3rd year, 4th year and final year), while the remaining were dentists, specialists, interns, and dental staff (Table 1).

Table 1: Characteristics of study participants (n=207)

Characteristic	Number (%)
Age groups	
20-25 years	139 (67.2)
26-30 years	39 (18.8)
>30 years	29 (14.0)
Mean (SD): 25.6 (5.4) years, Range: 20-43	
Sex	
Male	50 (24.1)
Female	156 (75.4)
Other	1 (0.5)
Marital Status	
Single	169 (81.6)
Married	38 (18.4)
Religion (n=204)*	
Hinduism	189 (92.6)
Buddhism	11 (5.4)
Others (Christian 1, Muslim 1, Kirant 2)	4 (2.0)
Highest education attained	
Up to higher secondary school level	10 (4.8)
Bachelor's level	173 (83.6)
Master's level	24 (11.6)
Dental HCW type	
Dental student	117 (56.5)
Intern	31 (15.0)
Dentist	15 (7.3)
Specialist	23 (11.1)
Dental staff	21 (10.1)

Abbreviations: SD, Standard deviation; n, number; HCW, healthcare worker

*3 participants had missing data

The responses of the participants to the individual items of knowledge and attitude towards hepatitis B are presented in Table 2. It was found that most of the participants had a fair

knowledge (117; 56.5%) and a positive attitude regarding hepatitis B infection and vaccination (189; 91.3%) (Table 3).

Table 2: Participants' responses to each item of knowledge and attitude on Hepatitis B (n=207)

Items	Correct/positive response	Number (%)
Knowledge		
1. Have you ever heard of a disease named Hepatitis B?	Yes	204 (98.6)
2. Is there any vaccination available for Hepatitis B?	Yes	202 (97.6)
3. What kind of infection is Hepatitis B?	Viral	195 (94.2)
4. Is Jaundice one of the common symptoms of Hepatitis B infection?	Yes	186 (89.9)
5. What do you think is the recommended full dose of the hepatitis B vaccine?	Three or more doses	176 (85.0)
6. Can Hepatitis B cause Liver Cancer?	Yes	160 (77.3)
7. How can hepatitis B infection be transmitted?	All three of the below: From mother to child at birth; from unsterilized syringes, needles and surgical instruments; and through contaminated blood and blood products	97 (46.9)
8. Can Hepatitis B be cured?	No	55 (26.6)
Attitude		
1. It is necessary to advise patients to investigate for HBV before undergoing surgeries	Agree	200 (96.6)
2. It is necessary for all dental HCWs to receive hepatitis B vaccination	Agree	200 (96.6)
3. I am at a greater risk of getting HBV infection compared to general public	Agree	186 (89.9)
4. HBV infection is a contagious disease	Agree	169 (81.6)
5. I do not need to isolate from the society if I get diagnosed with HBV infection	Agree	125 (60.4)

Table 3: Knowledge and attitude of dental HCW regarding Hepatitis B (n=207)

Characteristic	Number (%)
Knowledge on Hepatitis B	
Good (score 7-8)	81 (39.1)
Fair (score 5-6)	117 (56.5)
Need improvement (score 0-4)	9 (4.4)
Attitude towards Hepatitis B	
Positive (score 4-5)	189 (91.3)
Negative (score 0-3)	18 (8.7)
Received full vaccination against Hepatitis B	
Yes	86 (41.5)
No/can't remember	121 (58.5)
Reasons for not receiving vaccination (n=95)*	
Not aware of Hepatitis B vaccination/ don't know where to get it	27 (28.4)
Dose yet to be completed/ booster dose remaining	27 (28.4)
Don't have time	20 (21.0)
Forgot to complete dose/ felt lazy	13 (13.7)
Dose incomplete due to COVID-19	5 (5.3)
Not at risk of Hepatitis B	5 (5.3)
Afraid of injection	1 (1.1)

*95 participants who hadn't received full dose of Hepatitis B provided multiple answers

Only 86 participants (41.5%) reported receiving a full dose of hepatitis B vaccination. The most common reason for non-receipt of full vaccination were either a lack of awareness about the local availability of hepatitis B vaccination or an incomplete vaccination (waiting for booster dose) (Table 3). Few participants also cited a lack of time (21.0%) or feeling lazy or forgetting to meet the vaccination appointment (13.7%). For five participants, the restrictions placed due to COVID-19 situation affected their receipt of full vaccine dose.

Chi-square analysis revealed that HCW factors such as age, marital status, educational attainment, and type of dental HCW were associated with receipt of full vaccination against hepatitis B (Table 4). Compared to younger HCW, those older than 30 years were more likely to receive the full vaccine dose (65.5% vs 36.7%; $p = 0.016$). Dental specialists and auxiliary staff were more likely to receive the full vaccine dose than other type of dental HCWs. Knowledge and attitude towards hepatitis B were not significantly associated with receipt of vaccination (Table 5).

Table 4: Relationship between participant characteristics and receipt of full hepatitis B vaccination

Participant characteristics	Received full dose of Hepatitis B vaccine		Chi-square	p-value
	Yes	No		
	n (%)	n (%)		
Age groups				
20-25 years	51 (36.7)	88 (63.3)	8.215	0.016*
26-30 years	16 (41.0)	23 (59.0)		
>30 years	19 (65.5)	10 (34.5)		
Marital Status				
Single	61 (36.1)	108 (63.9)	11.265	0.001*
Married	25 (65.8)	13 (34.2)		
Highest education attained				
Up to higher secondary school level	7 (70.0)	3 (30.0)	11.445	0.003*
Bachelor's level	63 (36.4)	110 (63.6)		
Master's level	16 (66.7)	8 (33.3)		
Dental HCW type				
Dental student	47 (40.2)	70 (59.8)	23.872	<0.001*
Intern	4 (12.9)	27 (87.1)		
Dentist	5 (33.3)	10 (66.7)		
Specialist	16 (69.6)	7 (30.4)		
Dental auxiliary staff	14 (66.7)	7 (33.3)		

*Statistically significant at p -value < 0.05

Table 5: Relationship between participants' knowledge, attitude and receipt of full hepatitis B vaccination

Participant characteristics	Received full dose of Hepatitis B vaccine		Chi-square	p-value
	Yes	No		
	n (%)	n (%)		
Knowledge on Hepatitis B				
Good	40 (49.4)	41 (50.6)	4.180	0.124
Fair	44 (37.6)	73 (62.4)		
Need improvement	2 (22.2)	7 (77.8)		
Attitude towards Hepatitis B				
Positive	81 (42.9)	108 (57.1)	1.539	0.215
Negative	5 (27.8)	13 (72.2)		

DISCUSSION

In this cross-sectional survey, dental HCWs in a tertiary dental hospital of Kathmandu were found to have a fair knowledge and a positive attitude towards hepatitis B

infection. However, the HCW's knowledge and attitude were not associated with their uptake of full dose of hepatitis B vaccination, which was limited to 41.5%. Younger HCW such as dental students, interns, and dentists were more likely to not have received the full vaccination compared to older

dental specialists and auxiliary staff. These findings highlight some important implications for control and prevention of hepatitis B in teaching dental hospital settings.

Dental HCWs include all paid or non-paid individuals working in a dental setting who are directly or indirectly involved in patient care and are at risk of being exposed to possible infectious agents such as blood and body fluids.⁹ In addition to dentists and dental students, dental auxiliaries like assistants and helpers are also exposed to patients' blood and saliva directly or indirectly during their chair side assistance and/or handling and cleaning of sharp instruments. This makes the dental auxiliaries equally vulnerable in contracting and/or transmitting the HBV infection. Besides, they are also responsible for sterilization of dental instruments and disinfection of the dental setting. Therefore, we included all dental HCWs and assessed their knowledge, attitude, and vaccination status in this study.

The levels of knowledge and attitude of the participants towards hepatitis B infection in our study are comparable to the findings of previous studies conducted at different medical/dental colleges of Nepal. Generally, previous studies show that the Nepalese dental students have a high knowledge which may not be different from their medical counterparts.^{5,6,10} As dental students and interns formed more than 70% of our study sample, it was not surprising that our findings were in alignment with these past studies conducted among students. However, in contrast to a previous study in which 100% of the study sample reported to understand all the modes of virus transmission,⁶ less than half of the participants in our study answered correctly about the possible routes of the virus transmission. This knowledge gap identified among the study participants should be addressed, particularly in continuing infection control education programs for the HCWs. Additionally, it is also important to recognize that HBV can remain infectious on the surface for at least seven days, even in the absence of blood.⁵ In a previous study among dental students and interns in Kathmandu, only 39% of the participants correctly realized that HBV remains viable outside of the body for seven days.⁶ This further underlines the need for emphasis on proper sterilization of dental instruments as well as periodic disinfection of dental setting.

Besides, dental HCWs are also prone to needlestick injuries. In a study among students at a medical college in eastern Nepal, around 10% of all needlestick and sharps-related injuries were found to occur among dental interns, mostly during dental extractions.³ While all dental HCWs should follow universal precautions of infection control, vaccination remains the most effective way of preventing HBV infection which may be contracted through these hazardous injuries or exposure to potentially infectious blood/blood products.^{11,12} Vaccination against HBV usually entails a 3-dose vaccine series administered intramuscularly at 0, 1, and 6 months to stimulate the production of antibodies anti-HBs.¹² In our study, the proportion of participants receiving the full three doses of the vaccine was less than 50%, which is significantly lower than those reported in previous studies in Nepal where

the vaccination rates were well above 70%.^{3,5} However, our findings are reflective of recent studies among medical/dental colleges in Nepal and elsewhere in which hepatitis B vaccination rates have remained similarly under par.^{6,10,13}

Interestingly, knowledge and attitude were not associated with the vaccination of dental HCWs in our study. While traditional public health insights recommend more education and behavioral changes for HCW to improve their vaccination rates,^{14,15} the real issue plaguing HCWs in a country like Nepal may be their access to hepatitis B vaccine.¹⁰ This can be more accentuated among young dental students, interns, and freshly graduated dentists, as seen in our study, for whom lack of vaccine availability and challenges in adhering to the vaccination course due to their study/work commitments may be major barriers on receiving the full dose of hepatitis B vaccine. Instituting a vaccination program at the teaching hospital, in which vaccines can be provided at minimal or no cost to the students and interns as a part of their training and to all other HCWs with timely reminders, may be beneficial in increasing the uptake of hepatitis B vaccines. In addition, US Centre for Disease Control and Prevention recommends checking antibody titers after 1-2 months of full dose of vaccination and booster doses to the HCWs whose anti-HBs is <10mIU/ml or those working in high-risk exposure situations.^{12,16} Therefore, screening of the antibodies against hepatitis B is needed to identify and encourage the HCW for vaccine booster dose.

There are few limitations in our study. As this is a single hospital-based study, it may not be representative of all dental HCWs in Nepal. Furthermore, there was an overrepresentation of dental students in our sample due to our sampling technique, which may have affected our overall results. Lastly, we did not check the vaccination status of the participants using their antibody titers but relied on their response to our questions which may be subject to recall bias.

CONCLUSION

Despite fair knowledge and positive attitude regarding HBV infection and vaccination, the uptake of full dose of hepatitis B vaccine among the dental HCWs was less than optimal. Further strategies are needed to improve the hepatitis B vaccine uptake. Specifically, increasing the access of vaccines in the dental hospital should be prioritized, especially for young dental HCWs.

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