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## Indian dental students' vaccination status, knowledge, attitudes, practices regarding Hepatitis B

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### Abstract

As Hepatitis B (HBV) is the most important type of viral hepatitis easily transmitted in dental settings, this cross-sectional study conducted among 500 interns from 12 dental colleges of Karnataka, India to assess the vaccination status, knowledge, attitude, practices regarding HBV using a 35 – item structured questionnaire. Of the 500 students only 71.6% had completed the Hepatitis B immunization schedule. Knowledge level regarding carrier rate, the incubation period, clinical features and transmission was low. Although 66.2% agreed that professionals have a moral duty to treat HBV infected patients only 57.4% students showed willingness to treat them. The practices followed were noted to be inadequate to prevent transmission, with only 61% students using gloves, 72.8% using face masks and 1.6% using protective eyewear routinely. A total of 73.5% said there is a need for practical application based teaching of HBV prior to entering the clinical years. Hence, a revision of curriculum with emphasis on vaccination and infection control against HBV is recommended.

**Keywords:** Hepatitis B; dental education; dental students; immunization; KAP

### 1. Introduction

Dentistry is predominantly a field of surgery, involving exposure to blood and other potentially infectious materials and thereby requires a high standard of Infection Control and Safety practices in controlling cross contamination and occupational exposures to bloodborne diseases. Currently, although adequate control of communicable diseases has been achieved in the developed countries through education, public health measures, regulations as well as practice of infection control and safety, it remains to be achieved in developing countries<sup>[1]</sup>.

As the incidence of AIDS, Hepatitis B virus infection (HBV) and other associated blood borne diseases is on the rise in South Asia (with the case load in India about 5.7 million) and is predicted to reach epidemic proportions, it is essential to improve the knowledge, attitude and practice of infection control and safety<sup>[1]</sup>.

During the provision of dental treatment, both patients and dental health care personnel (DHCP) can be exposed to pathogens through contact with blood, oral and respiratory secretions and contaminated equipment. Following recommended infection control procedures can prevent transmission of infectious organisms among patients and dental health care personnel<sup>[1]</sup>.

Hepatitis B is not only the most serious type of viral hepatitis but also one that is easily transmitted in dental settings<sup>[2]</sup>. It is 50 to 100 times more infectious than HIV<sup>[2]</sup>. Hence, is the most important infectious occupational disease for medical, dental students and health care workers<sup>[3]</sup>.

The hepatitis B virus (HBV), discovered in 1966, infects more than 350 million people worldwide and is a leading cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma, accounting for 1 million deaths annually<sup>[3]</sup>.

In India, HBV surface antigen prevalence among general population ranges from 2 to 8% which places India in an intermediate HBV endemicity zone and with 50 million cases is the second largest global pool of chronic HBV infections<sup>[4]</sup>. Also, in India, about 4% of the population is estimated to be HBV carriers giving a total pool of approximately 36 million carriers<sup>[2]</sup>. Among healthcare workers seroprevalence is two to four times higher than that of the general population<sup>[4]</sup>.

However, the awareness among dental students about the hazards of Hepatitis B is still limited. Similarly, the vaccination status of dental students who are constantly at risk of getting this infection is reported to be low<sup>[3]</sup>. Hepatitis B is a preventable disease and the students of dental sciences have an effective role in its prevention. Since dental students are in constant contact with patients during their studying period and afterwards, they are in danger of acquiring viral hepatitis<sup>[5]</sup>. The dental students should be familiar not only with treatment but also with epidemiological aspects of diseases such as transmission, prevention and control so as to control the spread of this disease in hospitals and in society. Therefore, it is vital to study the level of information of this group<sup>[5]</sup>. Hence, this study was undertaken to determine Indian dental students' vaccination status, knowledge, attitudes, practices and willingness to care for Hepatitis B patients.

## 2. Methodology

A cross-sectional comparative questionnaire study was conducted to determine the vaccination status, knowledge, attitudes, practises regarding and willingness to care for hepatitis B infection among 500 dental interns in Karnataka, India. The dental schools in India have a five-year syllabus, in which students in the fifth year are directly involved with patients, rendering treatment under supervision, thus spending more time interacting with patients.

### 2.1 Ethical Clearance

Before conducting the study, ethical clearance was obtained from the ethical committee of Government Dental College and research Institute, Bangalore.

### 2.2 Source of the Data

The study was conducted among 500 dental interns from 12 representative dental colleges in Karnataka, India. A list of the dental colleges was obtained from website of Dental Council of India<sup>[6]</sup>.

### 2.3 Permission

The necessary permission to carry out the study was obtained from the Principals and respected authorities of the dental colleges.

### 2.4 Consent

Written Informed consent was obtained from all the dental interns, which was designed in English.

### 2.5 Pilot Study

Prior to the commencement of the main study, a pilot study was conducted among 50 dental interns to assess the feasibility and validity of the proforma.

### 2.6 Method of Sampling

There are about 239 dental colleges in India with 44 dental colleges in the state of Karnataka alone. Of these 12 dental colleges were selected randomly.

### 2.7 Sample Size

Sample size was calculated by using the formula –  $Z^2 pq/e^2$

$Z$  = standard normal deviate = 1.96

$p$  = prevalence (pilot study: mean number of correct responses was 15;  $15/33 \times 100 = 45\%$ )

$q$  =  $1 - p$

$e$  = error (error was fixed at 10%)

Sample size =  $(1.96)^2(0.45)(0.55)/(0.045)^2 = 470$ ; which was

rounded off to 500.

## 2.8 Criteria

1. All the dental students from various colleges who were present on the day of study and gave consent to participate were included.
2. Students who were not willing to give consent to participate in study were excluded.

## 2.9 Data Collection

A standardized structured proforma was developed to collect the data, which consisted of two parts. The first part consisted of demographic information like the age, sex and the vaccination status which was recorded as immunization schedule completed, incomplete and not vaccinated. The second part consisted of the questionnaire, which had 35 questions related to knowledge, attitude, practices and willingness to care for Hepatitis B among the dental students.

## 2.10 Questionnaire

A 35 – item structured questionnaire used to collect data was based on earlier study conducted by Ali A. Al-Jabri *et al*<sup>[7]</sup>. The questionnaire was also reviewed by experts (Head of Department of Microbiology and Virology) and content validity was ensured.

A pilot study was conducted among 50 students. In the pilot study, the respondents were asked for feedback on clarity of the questions and whether there was any difficulty in answering the question or ambiguity as to what sort of answer was required. The students who participated in the pilot were not included in the final sample and no modification was required in the questionnaire.

Out of 35 questions:

- A. 17 questions were related to knowledge, recorded by providing 4 options – one correct response, 2 incorrect responses and the last response as 'I don't know'
- B. 6 questions were related to attitude, recorded on a 5 – point Likert Scale and
- C. 10 were related to practices, recorded as – yes, no and not always.
- D. The final two questions were regarding the need for revision in Hepatitis B in curriculum. First recorded as 'yes', 'no' and I can't comment; depending on the need felt by the student and the second had four alternatives as to what the revision should be.

All the questions were closed ended.

Before administering the questionnaire, the students were briefed about the objectives of the study. Students were informed that their participation was voluntary and no incentives were provided for participation in the study. Surveys were kept anonymous.

Students were interviewed by the investigator using the proforma. The questionnaire forms were distributed to the students during their break hours. The students were given sufficient time to fill the questionnaire and the forms were retrieved on the same day.

To determine the test-retest reliability of the survey questions, 50 students who completed the survey during the initial administration, completed the survey four weeks later.

## 2.11 Statistical Analysis

Completed questionnaires were entered in a database using MS Excel (Microsoft Corporation, Redmond, WA, USA).

To test the reliability of the survey items, Cronbach's alpha

co-efficient was used. Descriptive statistics were generated for all questions. Frequency distributions and percentages were examined for each answer. Pearson’s correlation test was applied to assess the relation between knowledge, attitudes and practices.

The statistical significance level was set at  $P < 0.05$ . Statistical analysis was conducted using Statistical Package for Social Science (SPSS) version 14.0 (Chicago, IL). The p-value was considered significant when less than 0.05 (with confidence interval of 95%).

**3. Results**

The study was conducted to assess the vaccination status, knowledge, attitude, practices and willingness of 500 dental interns of the 12 representative colleges of Karnataka, India, toward HBV infection. (Table 1)

**Table 1:** Age and sex – wise distribution of the dental interns

Age (years)	Males	Females	Total
23 ± 0.6	193 (38.6%)	307 (61.4%)	500 (100)

**Vaccination status: (Table 2)**

Of the 500 dental interns, only 71.6% (358) were vaccinated for Hepatitis B virus infection. Out of the vaccinated students 63% did not remember the vaccination schedule followed by them and 67.4% did not know the brand name of the vaccine they used.

**Table 2:** Distribution of students according to their immunization status

Immunized for HBV	Yes	No	Total
<b>Total</b>	358 (71.6%)	142 (28.4%)	500 (100)

**Knowledge regarding epidemiology, incubation, clinical features: (Table 3)**

One third of the students (35.4%) were aware that the carrier rate of HBV is 2-8% in India and (32.2%) that it was previously known as serum hepatitis. Only 148 (29.6%) dental students knew that the incubation period of HBV ranges from 1 – 6 months and even less [72 (14.4%)] knew its clinical features.

**Knowledge about transmission and inactivation of HBV: (Table 3)**

More than half the students [294 (58.8%)] were aware that HBV is not transmitted through eating or drinking from the same cup or plate. Although 232 (46.4%) responded that transmission of HBV through sneezing and coughing is possible. A majority of the students [465 (93%) and 409 (81.8)] were aware that Hepatitis B virus may be transmitted from a pregnant woman to her unborn child and through direct contact with open skin lesions such as eczema, cuts and scratches respectively. Only one - third of the students were aware that HBV is a heat stable virus and that 2% glutaraldehyde can be utilized for its inactivation.

**Knowledge about available immunization for HBV: (Table 3)**

Again, only one third students were aware that both active and passive types of immunizations are available for HBV. Less than half (44%) knew the schedule of immunization followed for HBV and only 13% responded correctly that booster doses, after the 3-dose vaccination series is completed, are needed for individuals with low titers of antibody.

**Table 3:** Knowledge of the students regarding hepatitis B infection

Sr no	Question	Correct responses
1.	The previously known term for hepatitis B (HBV)	32.2%
2.	Carrier rate of hepatitis B in India	35.4%
3.	Infectivity of HBV compared to HIV	59%
4.	Incubation period of HBV	29.6%
5.	Clinical features of HBV	14.4%
6.	Transmission of HBV through eating or drinking from same plate or cup	58.8%
7.	Vertical transmission of HBV	87%
8.	Transmission of HBV through sneezing and coughing	42.6%
9.	Transmission of HBV through cuts and scratches	81.8%
10.	Screening for HBV before transfusion	73.6%
11.	Heat stability of hepatitis B virus	35%
12.	Inactivation of HBV	27.8%
13.	Risk of transmission of HBV through needle stick injury	21.2%
14.	Available immunization for HBV	35%
15.	Immunization schedule for HBV	44.2%
16.	Requirement of booster doses	13.6%
17.	Specific treatment available for HBV	34.8%

**Attitude regarding HBV infection (Table 4)**

Most of the students (94%) agreed that Hepatitis B virus (HBV) is the most widespread and important type of viral hepatitis. Only 30% said they would willingly work in same environment as a person infected with hepatitis B. Half the students (49.4%) did not feel mandatory screening is required for all health personnel for hepatitis B, 38% felt it essential and 11% were uncertain. Two thirds (66%) of the fifth year students felt that health professionals have a professional and moral duty to treat hepatitis B infected patients, however, only 57% were willing to treat a HBV infected patient.

**Table 4:** Attitude of the students regarding hepatitis B infection

Sr no	Question	Favourable attitude (Strongly agree and agree)
1.	I feel Hepatitis B virus (HBV) is the most widespread and important type of viral hepatitis	94.2%
2.	I would willingly work in same environment as a person infected with hepatitis B	30.0%
3.	I feel mandatory screening is required for all health personnel for hepatitis B	38.8%
4.	I feel a personal worry about the risk of being infected by Hepatitis B	66.2%
5.	Health professionals have a professional and moral duty to treat hepatitis B infected patients	66.2%
6.	I am willing to treat a HBV infected patient	57.4%

**Practices followed by the students regarding HBV infection (Table 5)**

Of the 500 students 23% students had treated a HBV infected patient in clinical practice. A total of 61% used gloves regularly in clinics; of which 92% said that they change gloves between patients. Although all the students use clinical scrubs or coats, regular use of facemask was reported by only 72.8% students; and only 8 students (1.6%) reported using protective eyewear.

**Table 5:** Practices of the students regarding hepatitis B infection

Sr no	Question	Yes	No	I don't know/remember
1.	Have you treated a HBV infected patient in your clinical practice	23.2%	60.6%	16.2%
2.	Have you had a needle stick or sharp injury or prick?	68%	13%	19%
		Yes	No	Not always
3.	In your daily clinical practice, do you use gloves?	61.6%	-	38.4%
5.	Do you change gloves in between patients?	92.6%	-	7.4%
6.	In your daily clinical practice do you use facemasks?	72.8%	-	27.2%
7.	Do you change facemasks in between patients?	-	66.6%	33.4%
8.	In your clinical practice, do you use eye protective wear?	1.6%	63%	35.4%
9.	In your daily clinical practice do you use clinical scrubs or coats?	100%	-	-
		Do not recap and dispose	Recap & dispose	Needle burner
10.	In your daily clinical practice how do you dispose syringes?	2%	38%	60.0%
		Quaternary ammonium compounds	Autoclave	Combination
11.	The mode of sterilization used routinely in your practice	-	98.4%	1.6%

**Curriculum: (Table 6)**

Majority of the interns felt a need for revision of the current syllabus to include a more practical application of HBV.

**Table 6:** Students opinion regarding curriculum of hepatitis B infection

Sr no	Question	Yes	No	I can't comment
1.	There is a need for revision of the curriculum of HBV	91.6%	-	8.4%
		Dedicated curriculum with practical application	Workshops/ seminars/ Online matter	I can't comment
2.	What can be done to better the current scenario towards HBV	73.5%	19.4%	7.1%

**4. Discussion**

The present investigation was conducted to explore the vaccination status, knowledge, attitude, practices and willingness of dental students toward HBV infection. The study examined a total of 500 dental interns of the 12 representative colleges of Karnataka, India. Female students were in greater proportion compared to males, representing a larger number of females entering the dental profession.

The dental curriculum in India encompasses a five-year course, covering medical subjects in the 1st and 2nd years, dental subjects in the 3rd and 4th year and a compulsory rotatory internship in the fifth year. No major differences in the curriculum are observed in the various universities across India, thus this study group forms the reference population for all dental school candidates.

Hepatitis B is the most important infectious occupational disease for dental students [3]. It is 50 to 100 times more infectious than HIV [2]. However, the awareness among dental students about the hazards of Hepatitis B is still limited. Similarly, the vaccination status of dental students who are constantly at risk of getting this infection is reported to be low [3].

The proportion of immunized dental participants in the present study (71.6%) was lower as compared to the study conducted in Taiwanese dental students (73.7%) [8] and dental students in Karachi where it was 81% [9]. The proportion of dental students immunized for HBV was higher in present study (71.6%) as compared to the dental students in Yemen where it was found to be 38.8% [10]. The difference in immunization status among various groups may be due to differences in existing policies, awareness or presence of immunization programmes in places of conduct of these studies.

This study shows some misconceptions that the knowledge regarding the epidemiology and transmission of HBV infection, along with paucity of knowledge regarding the

clinical features and immunization of HBV. The misconceptions harboured by students in this study were higher as compared to students from Oman<sup>7</sup> and Karachi [9]. The lacunae in the knowledge regarding transmission and overall spread might be due to lack of practical application of the theoretical aspects of HBV virology. Also, the paucity of knowledge regarding the immunization schedule and requirement of booster doses maybe due to a lack of involvement and participation of dental students in vaccination drives for HBV.

Similarly, the attitudes of the students represent an overall hesitancy in treating HBV or working with HBV infected persons, with merely (34%) willing to do so. This is again lower than the proportion of Omani students [7] (58%) who said they would willingly work in the same environment as a HBV infected person. Also, required importance to immunization against HBV is lacking, as seen by half the number of students disagreeing to compulsory screening of health care workers. This attitude can be improved by correcting the misconceptions regarding HBV and placing paramount importance towards spread of HBV infection not only among healthcare workers but society as well.

The practices followed by the students in this study were found to be unsatisfactory. With only 61% students using gloves regularly in clinics; of which 92% said that they change gloves between patients. The regular use of facemask was reported by only 72.8% students; and only 8 students (1.6%) reported using protective eyewear. This highlights a need for implementation of strict regulations for adherence to the universal safety precautions.

Finally majority students (91.6%) reported that the curriculum needs to have a more practical orientation, right from their preclinical years and preferred dedicated HBV vaccination and infection control protocols within their curricula of second academic year (73.5%), over other resources like

workshops/seminars and online materials.

To improve the current scenario, immunization drives can be started in respected institutions to ensure complete the vaccination of students prior to entry into the clinical years of study.

This ensures protection to the students' right from day one of their supervised clinical practice.

## 5. Conclusion

Now the responsibility lies with dental educators to create a module, which includes both enhanced simulated and actual clinical experiences in order to facilitate dental students' learning of effective HBV preventive strategies. Until adequate importance is placed on immunization and practical modules we can expect there to be a continued lacunae and paucity in fight against spread of HBV infection methods in the country.

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