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Original article

Assessment of knowledge, attitude, practice and immune status towards Hepatitis B among Dental Students of Navi Mumbai

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Abstract.

Background: Dentists are constantly exposed to the risk of acquiring Hepatitis B due to contact with blood and body secretions of patients. The risk of contracting Hepatitis B by Dental professionals is four times greater than that of the general adult population who do not work or practice in healthcare institutions. The incidence of HBV infection can be reduced by providing proper education and awareness regarding its transmission and vaccination. The present study intended to assess the knowledge, attitude, practice, and immune status of Dental students toward Hepatitis B.

Methodology: A predesigned, validated questionnaire was used to assess knowledge, attitude, and practice (KAP) towards Hepatitis B. 5 mL of blood sample was collected from participants following all aseptic precautions for quantification of Hepatitis B surface (HBs) antibody and Hepatitis B core (HBc) antibody. Quantifications of anti-HBs and anti-HBc were performed by the Chemiluminescent immunoassay (CLIA).

Results: A total of 250 students registered for Bachelor of Dental Surgery (BDS) course participated in the study by filling the questionnaire. The knowledge of BDS increased regarding risk of Hepatitis B infection in Dentists in the knowledge of students as per increase in the academic year. Only 21 (8.4%) were completely vaccinated against Hepatitis B. The mean anti- HBs levels in BDS students was 291.96±81.5 mIU/mL. When serum anti-HBs levels (mIU/mL) in participants were used to assess the immune status of participants against Hepatitis B, 66 (44.6%) were unprotected. A total of 14 (9.5%) participants were reactive for anti-HBc. However, none of these participants showed Hepatitis B surface antigen test positive.

Conclusion: The overall of analysis KAP though showed good results, many participants were partially or not vaccinated. There were many misconceptions related to vaccination. Therefore this study highly recommends the need for awareness programs through special courses. The study also underscores the need for periodic regular serological workups of dental professionals and vaccinations of individuals with less/no immunity to HBV.

Key words: Hepatitis B, vaccination, anti-HBs, anti-HBc

Introduction.

In recent years, the concern towards occupational safety has markedly increased among healthcare workers of both developed and developing nations. HCWs are constantly exposed to environments that affect both health and safety. Hazards may be biological, chemical, physical and psychological. [1] Unsafe working environmental conditions are associated with occupational illnesses and injuries, in addition to hazardous infections like hepatitis B, HIV/AIDS and tuberculosis.[2]

Dentists are prone to various health hazards during routine practice including exposure to variety of infectious agents through percutaneous inoculation and inhalation of bioaerosols, hazardous radiation, noxious chemicals, dental material, noise and mental stress and fatigue.[3] Being the part of day to day practice exposure to these hazards can't be excluded and hence it's extremely essential for dentists to follow occupational health and adapt to safety protocols.[3]

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Occupational transmission of blood borne pathogens (BBP) is of great concern among dental professional of various specialties'. [4] Of various BBP, Hepatitis B Virus (HBV) is of primary concern especially to unimmunized individuals.[5] In dental practice, HBV transmission can occur via exposure to blood or saliva of infected patients/carriers during dental procedures including blood collection, giving injections, suturing and needle stick injury (NSI).[6] HBV transmission also occurs from exposure to saliva and gingival crevicular fluid. [6]

In the era of early clinical exposure (ECE), it is expected that undergraduate student of healthcare courses are well acquainted with both occupational hazards and occupational safety. During undergraduate training, dental students are trained under able guidance and close supervision of qualified dental professional and hence there is a wider scope to educate/train undergraduates regarding occupational hazards and their prevention, and inculcate occupational safety habits in these future dental practitioners. The present study intended to assess knowledge, attitude, practice and immune status of Dental professionals towards Hepatitis B.

Material and methods.

The present cross-sectional study was conducted in the Department of General Pathology and Microbiology of a Dental College and Hospital, in Navi Mumbai, Maharashtra. The study was conducted after obtaining permission from the Institutional Ethics Committee. The entire study was divided into two parts. In the first part of the study a predesigned, validated questionnaire was used to assess knowledge, attitude, and practice (KAP) towards Hepatitis B. The responses towards various aspects of Hepatitis B infection were obtained from undergraduate (First to Final phase) students who were willing to participate in the study. An informed consent was obtained from each participant. The questionnaire was distributed to each participant by the researcher who remained present during the entire session to answer any query related to the questionnaire. The responses were evaluated by a 5-point Likert rating scale that ranged from strongly disagree (score 1) to strongly agree (score 5).

In the second part of the study, 5 mL of blood sample was collected from participants following all aseptic precautions for quantification of Hepatitis B surface (anti- HBs) antibody and Hepatitis B core (anti-HBc) antibody. Quantifications of anti-HBs and anti-HBc were performed by the Chemiluminescent immunoassay (CLIA).

For anti-HBs, participants with antibody titers <10mIU/mL were considered as non-protected whereas antibody titers ≥10 mIU/mL, were considered as protected against Hepatitis B. Individuals with antibody titers >10 to < 100mIU/mL were considered as partially protected Hepatitis B.

In the case of anti-HBc, individuals having anti-HBc levels ≥ an index value of 1.10 were considered non-reactive and presumed to be negative for anti-HBc. Participants having anti-HBc levels < index value of 0.900 were considered reactive and presumed to be positive for anti-HBc. Individuals having anti-HBc levels ranging between an index value of 0.900 and 1.10 were graded initially as equivocal. Individuals with equivocal results were retested twice before reporting results. Participants with repeatedly ≥1.00 (i.e. at least 2 out of 3 results) were considered to be non-reactive and presumed negative for Anti-HBc whereas those repeatedly < 1.00 (i.e. at least 2 out of 3 results) were considered to be reactive and presumed positive for Anti-HBc.

Results.

A total of 250 students registered for the Bachelor of Dental Surgery (BDS) course participated in the study by filling out the questionnaire. A total of 185 (74%) students were females whereas 65 (26%) were males. The mean age of female participants was 22.8±1.4 years whereas the mean age of male participants was 23.6 ±2.1 years. The academic year-wise distribution of participants is shown in Figure 1. Maximum participation was received from IInd year students.

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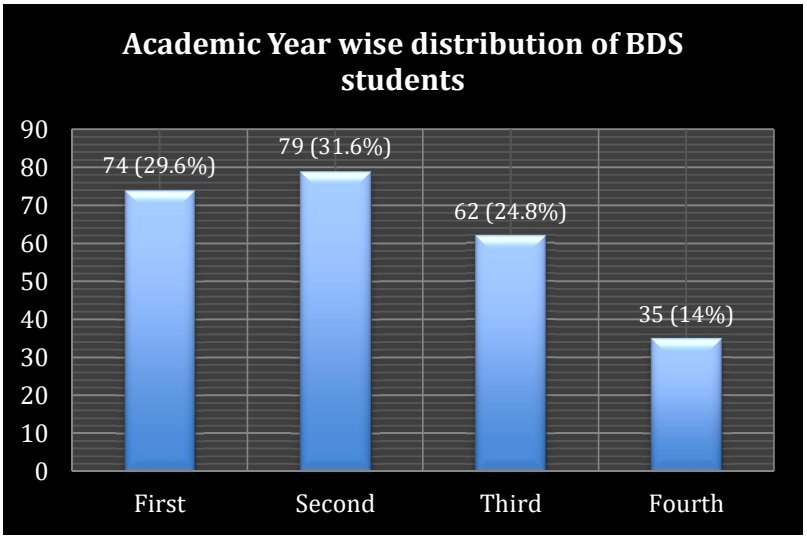

Figure 1. Academic year wise distribution of BDS students

The overview of knowledge of participants to various aspects of Hepatitis B is shown in table 1.]

Table 1. The overview of knowledge of participants to various aspects of Hepatitis B.

Statement	Strongly agree (%)	Agree (%)	Uncertain (%)	Disagree (%)	Strongly disagree (%)
1. Among the healthcare professionals, dentists are placed in a high-risk group and are at the greatest occupational risk of Hepatitis B infection	110 (44)	125 (50)	15 (6)	-	-
2. All Hepatitis B infections do not have symptoms. In the majority of cases, the infection may lead to Acute hepatitis, which manifests as jaundice	62 (24.8)	154 (61.6)	34 (13.6)	-	-
3. Few cases of Hepatitis B infection progress to chronic hepatitis, leading to liver cirrhosis and liver cancer	78 (31.2)	143 (57.2)	29 (11.6)	-	-
4. Hepatitis B infection is commonly transmitted through unscreened blood transfusion, unprotected sexual contact, from mother to child, and also from close household contact, tattoo, and acupuncture practice.	118 (47.2)	115 (46)	14 (5.6)	2 (0.8)	1 (0.4)
5. In dental setup, Hepatitis B	102 (40.8)	133 (53.2)	11 (4.4)	3 (1.2)	1 (0.4)

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	infection is transmitted through direct contact with blood, saliva or nasopharyngeal droplets from infected patients/asymptomatic carriers during the dental procedure and also through Needle stick injuries					
6.	Hepatitis B Infection can be prevented by Vaccination and by Infection control guidelines at work	131 (52.4)	109 (43.6)	09 (3.6)	1 (0.2)	-
7.	Persons exposed to the risk of infection, should report and get post-exposure prophylaxis with HBIG.	91 (36.4)	126 (50.4)	32 (12.8)	1 (0.4)	-
8.	Hepatitis B virus can survive outside the body for at least 7 days. During that time, the virus is still capable of causing infection	44 (17.6)	130 (52)	73 (29.2)	3 (1.2)	-

It was observed that, the knowledge of BDS increased regarding risk of Hepatitis B infection in Dentists in the knowledge of students as per increase in the academic year, as BDS students of fourth year had significantly high knowledge as compared to First and Second year students (Chi square test, *P*= 0.05*). Though IIIrd year students had more knowledge regarding symptoms of Hepatitis B compared to students of other academic years. However this difference was not statistically significant (Chi square test, P=1.66).

IInd year BDS students had significantly high knowledge regarding pathogenesis of hepatitis B as compared to students of first, third and final year (Chi square test, *P*=0.01*). The knowledge of mode of transmission of Hepatitis B was significant high in IIIrd year BDS students (Chi square test, *P*=0.03)**.** All participants from IIIrd and final year were aware about role of vaccination and infection prevention and control (IPC) in prevention of occupation transmission of Hepatitis B infection. As compared to other academic years, students of IIIrd year (72.6%) had less knowledge regarding post exposure prophylaxis (PEP) for Hepatitis B. The IInd and IIIrd year BDS students had better knowledge of basic virology of Hepatitis B.

Out of 250 BDS students, only 19 (7.6%) were completely vaccinated against Hepatitis B, 47 (18.8%) were partially vaccinated and a total of 183 (73.2%) students were not vaccinated. There was increasing trend observed for compliance with vaccination in students of third and fourth academic year. No student of IInd year BDS was completely vaccinated (Figure 2).

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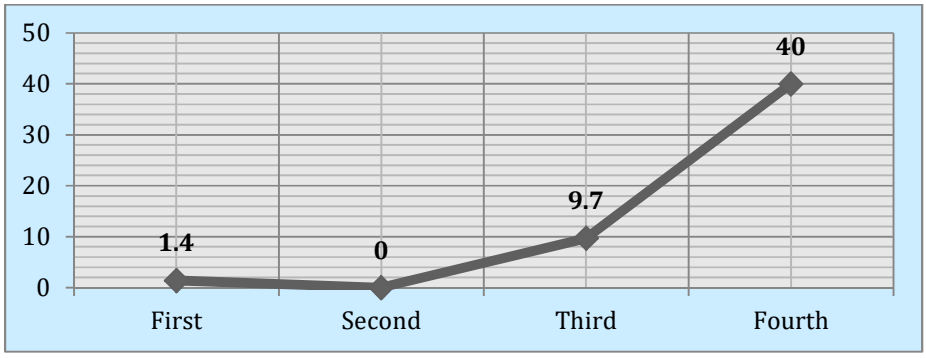

Figure 2. Trend of vaccination among BDS students.

Needle stick injury (NSI) was reported by 13 (5.2%) undergraduate (BDS) students. These included 8 (out of 35) students from IV BDS, 3 (out of 62) students from III BDS and 2 (out of 79) students from II BDS. When statistical analysis was done, the incidence of NSI was significantly high in IV (Final year) BDS students (Chi square test, *P* value <0.00001**).

Out of 250 students who participated in the study, a total of 148 (59.2%) agreed for blood collection for quantification of anti-HBs and anti-HBc levels. The mean anti- HBs levels in BDS students was 291.96±81.5 mIU/mL. Mean (±SD) anti- HBs levels as per academic year of BDS student is shown in figure 3. The mean anti- HBs level was significant high in fourth (final) year BDS students as compared to students of other academic years (One way ANOVA test, P value<0.00001**).

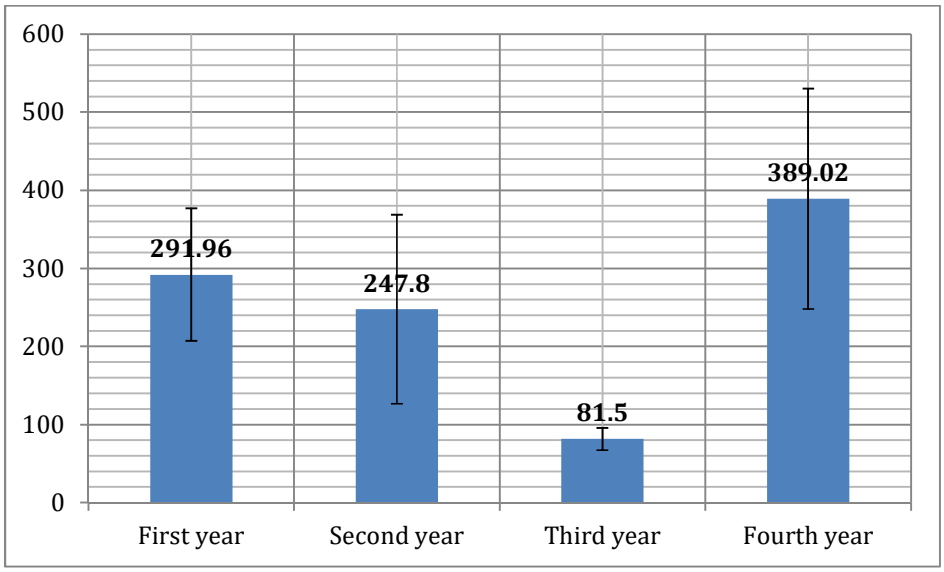

Figure 3. Mean (±SD) anti-HBs levels as per academic year of BDS student.

When serum anti-HBs levels (mIU/mL) in participants were used to assess the immune status of participants against Hepatitis B, a total of 73 (49.3%) participants were found to be fully protected against Hepatitis B. A total of 9 (6.1%) participants were partially protected and 66 (44.6%) were unprotected. A total of 14 (9.5%) participants were reactive for anti-HBc. However, none of these participants showed Hepatitis B surface antigen (HBsAg) test positive.

Discussion.

Hepatitis B infection is the world's most common liver infection caused by Hepatitis B virus (HBV).[7] It is a major health concern and the most common blood-borne viral infection that places HCW at higher occupational risk. In HCW including dentists, the possible forms by which HBV infection can be transmitted via contact with blood or saliva of infected patients while drawing blood, giving injections, or suturing, and NSI sustained while performing procedures.[8] In addition to this, dentist who do not wear gloves while doing procedures are at a higher risk of acquiring HBV infection.

Dentists are constantly exposed to the risk of acquiring Hepatitis B due to contact with blood and body secretions of patients. The risk of contracting HBV by Dental professionals is four times greater than that of the general adult population who do not work or practice in healthcare institutions. The incidence of HBV infection can be reduced by giving proper education and awareness regarding its transmission and vaccination.

Generally, it is assumed that Dentists and other healthcare professionals should have adequate knowledge about diseases and other health conditions, by virtue of their educating and training to health facilities. In this study, the overall level of knowledge about HBV infection among dental students of various years of graduation was good in some aspects like occupational risk of HBV in Dentists, symptoms of Hepatitis B, modes of transmission of HBV, role of vaccine and post-exposure prophylaxis in prevention of Hepatitis B, and low in other aspects like basic virology of Hepatitis B.

Various studies have reported differences in the knowledge, attitude, and practice related to Hepatitis B. International studies conducted in Taiwanese dental students and dental students in Brazil and Turkey have higher KAP rates as compared to students from Saudi Arabia, Yemen, and Karachi. Indian studies from states like Mumbai, Nashik, Mysore, and Chennai have reported low KAP scores in Dental students as compared to the studies conducted in Jammu and Kashmir and Bhopal. This difference in the level of knowledge may be due differences in existing policies, awareness & presence of immunization programmes in places where the studies are conducted and also depends on the curriculum. [9-12]

When academic year wise, knowledge of BDS students was assessed, the level of knowledge regarding occupational risk of HBV in Dentists, symptoms of Hepatitis B, modes of transmission of HBV, role of vaccine and post exposure prophylaxis in prevention of Hepatitis B was high in students belonging to IIIrd and IVth academic year of their graduation whereas knowledge of basic virology of Hepatitis B was high in IInd year students. The high basic knowledge of Virology in IInd BDS students may be due to teaching of General Pathology and Microbiology in IInd year curriculum of BDS course. The Ist year students had comparatively less knowledge (though statistically not significant) in nearly all aspects of Hepatitis B. This may be due to lack of school-based health education for students in our Indian education system. The IIIrd and IVth year students showed good response, which could be attributed to the awareness created among the students, once they enter the professional dental course. Similar observation was noted by Nagpal *et al*.[6]

Since the dentist considers being at high risk to be infected by HBV, vaccination against HBV is an important line in the prevention of cross-infection, despite that only 7.6% of the participants were completely vaccinated. This finding indicates that more obligatory courses regarding HBV infection, transmission and vaccination should be incorporated in the curriculum of the dental colleges. The students should be vaccinated against Hepatitis B before

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clinical work and the boosting doses in the right intervals. In this study, 66 (44.6%) students were found to be unprotected against Hepatitis B. Since dentists have a high risk of exposure to HBV, a mandatory vaccination drive against HBV should be implied. A total of 14 (9.5%) participants were reactive for anti-HBc. However, none of these participants showed Hepatitis B surface antigen (HBsAg) test positive. This finding explains the possibility of resolved Hepatitis B infection which may be acquired due to occupational exposure.

Conclusion.

It is very important for dental practitioners of various cadres to have sound knowledge of Hepatitis B infection, risks related to it, its mode of transmission, preventive measures, and treatments. This study highlights that a vast number of the participants are at risk of Hepatitis B with a history of exposure to needle stick injury. The overall of analysis of knowledge, attitude and practice (KAP) though showed good results, many participants were partially or not vaccinated. There were many misconceptions related to vaccination. Therefore this study highly recommends the need for awareness programs through special courses or continuing dental education programs (CDE), workshops, seminars on transmission, and preventive control measures of HBV infection followed in healthcare institutions for students. The study also underscores the need for periodic regular serological workups of dental professionals and vaccinations of individuals with less/no immunity to HBV.

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