

## Occupational Exposures Occurring among Dental Students of Bhopal City, India

Sudhanshu Saxena\*, Sonia Tiwari\*\*, Shashikiran N.D.\*\*\*

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### Abstract

The purpose of this study was to assess total number, type and rate of reporting of occupational exposures experienced by dental students in Bhopal city, India. A pretested questionnaire was used to record information regarding demographic profile, vaccination status (HBV), occupational exposures (during last 6 months), clinic in which exposure occurred, treatment sought, and reporting about exposure to the concerned staff. Statistical analysis was done using chi-square test. Results showed low occupational exposure rate among Indian dental students. But junior students need proper training. There is a need to educate students about reporting and post exposure protocol.

**Keywords:** Occupational Exposure; Dental Students; Reporting; Hepatitis B vaccination.

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### Introduction

Injuries from occupational accidents among health care workers are associated with agents of biological risk, as they are the gateway to serious and potentially lethal infectious diseases that can be spread by contact between people, such as hepatitis B, hepatitis C, and AIDS. Studies have demonstrated that dental students are among the most vulnerable to blood borne exposure.<sup>1</sup> In Dentistry occupational injuries are likely to occur due to a small operating field, frequent patient movement, and the variety of sharp instruments used in everyday practice.<sup>2,3</sup> Also the frequent creation of aerosols, the presence

of blood and saliva make the dentist's work place a hazardous site, as, many infectious agents may be present in the blood and saliva, as consequences of bacteremia and viremia associated with systemic infections. It has been observed that, not surprisingly unqualified health care workers in general, demonstrate a higher risk of injury than trained workers. Surveys in Dental schools in the USA have shown that, the majority of reported exposures involve students,<sup>4</sup> as their manual skills are under developed, their clinical experience is limited, they frequently work without an assistant and they will be continually practicing a variety of tasks new to them.<sup>5</sup> The majority of these exposures are percutaneous.

The risk of HIV seroconversion following an occupational blood exposure has been estimated to be 0.2 to 0.3% for perenteral exposures and 0.1% or less for mucosal exposures.<sup>2,6,7</sup> The risk associated with a percutaneous exposure to hepatitis B virus (HBV) are estimated to be 2% for HBe ag negative and about 3% for HBe ag positive blood. The same risk has been reported as 1.8% for hepatitis C virus (HCV).<sup>2</sup> It has been shown that the under reporting of these events is common which may under estimate the true scale of exposures.<sup>5</sup> The effective students

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**Author's Affiliation:** \*Senior lecturer, Department of Public Health Dentistry, \*\*Lecturer, Dept of Oral Pathology and Microbiology, \*\*\*Dean, Professor & Head, Department of Pedodontics & Preventive Dentistry, People's College of Dental Sciences and Research centre, Bhanpur, Bhopal, Madhya Pradesh, India.

**Reprints Requests:** Dr. Sudhanshu Saxena, Senior Lecturer, Department of Public Health Dentistry, People's College of Dental Sciences & Research Centre, People's group, Bhanpur, Bhopal-462037, Madhya Pradesh, India.

E-mail: dr.sudhanshusaxena@gmail.com

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training in the prevention of occupational exposures, and the safety of their clinical environment can only be ensured by monitoring the incidence of such exposures. Analysis of the factors that are associated with their occurrence can provide protocols and procedures to reduce their number. Hence, this study was conducted to assess the total number, type and rate of reporting of occupational exposures experienced by Dental students in Bhopal city, Madhya Pradesh, India.

## Materials and Methods

A pretested questionnaire was used to record occupational exposures in under graduate dental students in two dental teaching institutions of Bhopal city, Madhya Pradesh, India. All the students studying in the third, final year and interns of a five year undergraduate dental course were included. Participation in the study was voluntary. The study was conducted from 1<sup>st</sup>-30<sup>th</sup> June 2010. Questionnaire was distributed to the students attending the postings in the all the nine departments, the importance of study were explained, and all students were requested to complete the questionnaires. Questionnaire consisted of questions to record information regarding, demographic profile (age, sex, year of study etc), vaccination status (HBV), occupational exposures (during last 6 months), clinic in which exposure occurred, treatment sought, and the reporting about the occupational exposure to the concerned staff. Informed consent was obtained from all the participants. Ethical clearance was obtained by ethical committee of institution before the start of study. Statistical analysis was done using chi-square test.  $p$  value < 0.05 was considered statistically significant.

## Results

A total of 400 questionnaires were distributed. Rate of return was 96.75% (n=387). Table I shows the demographic

profile of the participants. Table II shows number of occupational exposure in last six months according to year of study and gender. III B.D.S. students have significantly higher number of exposures (Table III). However gender wise difference was statistically not significant.

Maximum numbers of exposures in last six months were reported in the department of oral surgery, followed by conservative & endodontics and periodontics (Table IV).

### *Type of Occupational Exposure*

Fifty seven percent of all the exposures were percutaneous, 27% were cutaneous and 16% were mucous membrane exposures.

### *Vaccination status*

Nearly 76% of III B.D.S., 90% of IV B.D.S., and 95% of Interns were fully vaccinated against Hepatitis B (Table V).

### *Time of the exposure*

Considering all the students more exposure occurred in the afternoon (67%) than in morning clinics.

It was also noted that 53% of the exposure occurred during the treatment of patient and rest 47% during cleaning or sorting of instruments.

### *Reporting to concerned staff*

Only three students in III B.D.S., five students in IV B.D.S., and two interns reported about exposure to staff in the respective clinics.

### *Blood Test and Treatment*

None of the students have undergone blood test or any kind of treatment after the exposure.

## Discussion

This study showed low occupational exposure rate among Indian dental students

**Table I: Demographic profile of study participants**

	Male	Female	Total	Age in years (Mean $\pm$ SD)
III B.D.S.	61 (49.59%)	62 (50.41%)	123 (100%)	20.86 $\pm$ 0.64
IV B.D.S.	77 (49.04%)	80 (50.96%)	157 (100%)	21.98 $\pm$ 0.51
Intern	53 (49.53%)	54 (50.47%)	107 (100%)	22.77 $\pm$ 1.02
<b>Overall</b>	191 (49.35%)	196 (50.65%)	387 (100%)	21.87 $\pm$ 1.98

**Table II: Occupational exposure in last six months**

		None	One	Two	> Two	Total
<b>III B.D.S.</b>	Male	39 (63.93%)	12 (19.67%)	06 (9.84%)	04 (6.56%)	61 (100%)
	Female	42 (67.74%)	13 (20.97%)	05 (8.06%)	02 (3.22%)	62 (100%)
<b>IV B.D.S.</b>	Male	59 (76.62%)	11 (14.28%)	05 (6.49%)	02 (2.60%)	77 (100%)
	Female	62 (77.5%)	12 (15%)	03 (3.75%)	03 (3.75%)	80 (100%)
<b>Intern</b>	Male	41 (77.36%)	07 (13.21%)	05 (9.43%)	00 (0%)	53 (100%)
	Female	43 (79.63%)	07 (12.96%)	04 (7.41%)	00 (0%)	54 (100%)
<b>Total</b>		286 (73.90%)	62 (16.02%)	28 (7.24%)	11 (2.84%)	387 (100%)

**Table III: Comparison of occupational exposure among different study years**

	No	At least One	Total
III B.D.S.	81 (65.85%)	42 (34.15%)	123 (100%)
IV B.D.S.	121 (77.07%)	36 (22.93%)	157 (100%)
Intern	84 (78.50%)	23 (21.50%)	107 (100%)
<b>Total</b>	286 (73.90%)	101 (26.10%)	387 (100%)

$\chi^2 = 6.12$ ,  $df = 2$ ,  $p < 0.05$

**Table IV: Department in which exposure occurred during last six months in students**

Departments	III B.D.S.	IV B.D.S.	Interns	Total
Oral medicine	01	00	00	01
Oral surgery	17	16	10	43
Pedodontics	02	03	01	06
Orthodontics	00	00	00	00
Periodontics	09	07	05	21
Conservative & Endodontics	12	10	05	27
Prosthodontics	00	00	00	00
Public Health	01	00	02	03
Dentistry				
Oral pathology	0	00	00	00
<b>Total</b>	42 (41.58%)	36 (35.64%)	23 (22.77%)	101 (100%)

**Table V: Hepatitis B Vaccination status of the students**

	Fully Vaccinated	Not Vaccinated	Total
III B.D.S.	93 (75.61%)	30 (24.39%)	123 (100%)
IV B.D.S.	141 (89.81%)	16 (10.19%)	157 (100%)
Interns	102 (95.33%)	05 (4.67%)	107 (100%)
<b>Total</b>	336 (86.82%)	51 (13.18%)	387 (100%)

$\chi^2 = 21.50$ ,  $df = 2$ ,  $p < 0.001$

compare to study conducted by Sofola *et al* (58.8%),<sup>8</sup> and Machado-Carvalhais *et al* (58.4%).<sup>9</sup>

Exposure was more common among III B.D.S. students. These students also have low levels of technical skill, thus making them potentially more prone to accidents than others. This was in contrast to the study done on practicing dentists of USA, in which it was shown that age experience and skill were not related to injury rate.<sup>10</sup>

Association between gender and occupational exposure was statistically not significant. Similar results have been previously reported. In contrast, Wood *et al* found that female undergraduate students not only had a higher level of risk, but were also more concerned for themselves and their patients regarding exposure to potentially infectious material. However, it is still unclear whether women experience a greater number of occupational episodes of exposure or whether they are more prone to report them (or both). This is an area for further research.<sup>9</sup>

Exposures were common in department of oral surgery, followed by conservative & endodontics and periodontics. This was similar to the study conducted by Clelland *et al* in US.<sup>11</sup> This is possibly related to improper handling of local anesthetic syringes. Therefore increased instruction and handling practice of may be appropriate in the early stages of clinical training to reduce injuries.<sup>4</sup>

Most of the occupational exposures were percutaneous in nature. A percutaneous injury carries a higher risk of transmission of HBV than with trans-mucosal contact. The estimated risk for Human Immuno deficiency Virus (HIV) via penetrating injuries is 0.3%, and for hepatitis C it averages to 1.8%.<sup>4</sup> Some students could be at risk of acquiring HBV infection as few would be undertaking patient treatment had not completed their immunization program. Present study nearly 87% of participants were fully vaccinated against HBV. This result was better than the study conducted among Nigerian students.<sup>8</sup>

Reporting of occupational exposures was low in the present study and none of the

participants have undergone blood test or post exposure prophylaxis. It may be due to the fact that the students considered the exposure to be minor or of low risk or the protocol adopted by the institution to be inadequate.<sup>1</sup>

Another factor that might increase the risk of occupational exposures may be the absence of chairside assistants. Presence of assistant might reduce the chances of occupational exposures. More exposures were noted to have occurred when students were working alone than when assisted in the UK.<sup>8</sup> Indian dental students frequently work unassisted due to shortage of chairside assistants. Shortage of trained chairside assistants is a problem in India and may be due to an inadequate number of training schools leading to inadequate supply rather than financial reasons. Government of India and Dental council of India need to address these issues.

## Conclusion

Results of present study showed low occupational exposure rate among Indian dental students. But junior students need proper training. Under reporting of incidents is common. Ways to encourage and facilitate reporting should be sought. Also, Students did not take blood testing and post exposure prophylaxis. They need to be educated with this aspect.

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