

## Awareness Regarding Occupational Hazards Among the Dental Students of a Medical College of Nepal

Adhikari S,<sup>1</sup> Bhattarai R<sup>2</sup>

<sup>1</sup>Lecturer, <sup>2</sup>Assistant Professor, Department of Community Dentistry, College of Medical Sciences, Bharatpur, Nepal.

### Abstract

**Introduction:** Dental students, during their clinical and preclinical practices, are constantly exposed to a number of occupational hazards. Such exposures lead to various ailments and diseases. The study was done to assess the awareness regarding occupational hazards among dental students in College of Medical Sciences, Nepal.

**Methods:** A questionnaire-based, descriptive cross-sectional study was conducted among the dental students from College of Medical Sciences, Nepal. Demographic details and awareness on different variables like bioaerosols, X-rays, blue light radiation, vibration, noise, posture, ergonomics, mercury vapour inhalation and percutaneous incidents, were assessed with the close-ended questions. Questionnaire was delivered to the participants in paper-printed forms. Data analysis was done using SPSS version 17. Chi-square tests were done to find the association between the variables to education and gender and the level of significance was set at  $p < 0.05$ .

**Results:** The mean knowledge score for the male students was higher than that for the female students and the difference was statistically significant ( $p < 0.001$ ). Fourth year students had the highest mean knowledge score ( $6.25 \pm 1.70$ ) and second year students ( $2.71 \pm 2.43$ ) had the lowest, and the scores were statistically significant ( $p < 0.001$ ). More than two-third of the students (72.8%) did not know that vibration causes peripheral neuropathy; more than three-fifth of them (61.7%) didn't know that noise induced hearing loss is possible at dental settings and; about three-fifth of them (59.3%) did not know that X-ray hazards can be mitigated by barrier methods and position distance rule.

**Conclusion:** The awareness regarding the radiation hazards, vibration hazards and noise induced hazards seem to be limited among the dental students. The study suggests introducing specific intervention programs like occupational safety seminars, trainings or workshops, for the dental students, before the commencement of their practical classes.

**Key words:** Awareness; Dental students; Educational level; Occupational Hazards; Perception.

### Introduction

Occupational hazard is defined as a risk or danger as a consequence of the nature or working conditions of a particular job.<sup>1</sup> Dental professionals and students are exposed to various forms of direct and indirect, physical<sup>2,3</sup> and chemical,<sup>4,5</sup> radiological and other hazards.<sup>4,6</sup>

*Conflict of Interest: None*

#### \*Corresponding Author

Dr. Santosh Adhikari  
Lecturer, College of Medical Sciences, Bharatpur,  
Nepal  
E-mail: santoshddc@gmail.com  
Phone No.: 9845480144

In many cases, they result in musculoskeletal disorders particularly in the neck, lower back, and shoulders;<sup>7</sup> allergies;<sup>8</sup> and other forms of occupational illnesses.<sup>9,10</sup>

More than one-fourth of the dental professionals become disabled before they retire<sup>11</sup> and half of the dental professionals report a recent needle-stick and sharps injuries.<sup>12,13</sup> The exposure of dental students to occupational hazards commence from their early practical classes, in the first year. Hence, awareness regarding the same among them is important. Moreover, in the context of our country, very few studies have been done regarding occupational hazards

among the dental students. This study was done to assess the awareness regarding occupational hazards among dental students of College of Medical Sciences, Nepal.

## Methods

The study was a cross sectional descriptive study. Ethical approval for the study was obtained from Institutional Review Committee of College of Medical Sciences, Bharatpur. Written informed consent was taken from the participants. The study was carried out from 16<sup>th</sup> November 2021 to 15<sup>th</sup> December 2021. All the students enrolled for BDS at College of Medical Sciences were invited to participate in the study. Each participant was asked to respond to the self-administrated questionnaire with closed ended questions, and the responded data-sheet was collected on the same day. The questionnaire contained two sections. First section included questions on demographic information viz. gender and academic level of the student. The second section included nine questions measuring the knowledge about occupational hazards. Questionnaires were paper-printed, and a forehand explanation was given about the importance of their participation,

The statistical analysis was performed using Statistical Package for Social Sciences version 17. Descriptive analysis was carried out to depict the distribution of the participants based on educational level and gender, and to assess their knowledge regarding their awareness to different domains of occupational hazards. Mean knowledge scores and standard deviations were calculated for different gender groups and educational level groups. While

calculating knowledge score, each knowledge-related question was given a score of one if the participant admitted having knowledge of the same and, a score of zero if he/she admitted not having knowledge regarding the same. All the scores were added to get the total score for the participant. Chi-square tests and ANOVA tests were applied to find the association between the parameters and the level of significance. The significance level was set at  $P < 0.05$ .

## Results

Eighty-one participants responded to the study, thus the response rate was 77.14%. The distribution of participants based on their education and gender, has been depicted in Table 1, and the status of knowledge of the participants on different domains of occupational hazards in dentistry, has been depicted in Table 2.

Table 2 shows that more than two-third of the students (72.8%) did not know that vibration causes peripheral neuropathy; more than three-fifth of them (61.7%) didn't know that noise induced hearing loss is possible at dental settings and; about three-fifth of them (59.3%) did not know that X-ray hazards can be mitigated by barrier methods and position distance rule.

The mean knowledge score of the students was  $4.83 \pm 2.41$ . The mean knowledge score was lower for the males compared to females. Similarly, fourth year students showed highest mean knowledge score followed by final year, intern, third year and first year students respectively. The second-year students had the lowest mean knowledge score. All the results were statistically significant. (Table 3)

**Table 1:** Distribution of participants based on education and gender

Variables		Frequency	Percentage
Gender	Male	24	29.6
	Female	57	70.4
Education	1 <sup>st</sup> year	11	13.6
	2 <sup>nd</sup> year	7	8.6
	3 <sup>rd</sup> year	21	25.9
	4 <sup>th</sup> year	4	4.9
	Final year	8	9.9
	Interns	30	37.0

**Table 2:** Frequency and percentage of participants with knowledge on different domains

Variables	Status of knowledge	Frequency	Percentage
Bio-aerosols are a source of occupational hazards	Doesn't know	32	39.5
	Knows	49	60.5
X-ray hazards can be mitigated by barrier methods & position distance rule	Doesn't know	48	59.3
	Knows	33	40.7
Blue light radiation causes non-ionizing injury	Doesn't know	35	43.2
	Knows	46	56.8
Vibration induced peripheral neuropathy can occur in dental practice	Doesn't know	59	72.8
	Knows	22	27.2
Noise-induced hearing loss can occur in dental settings	Doesn't know	50	61.7
	Knows	31	38.3
Long working hour in same posture can precipitate musculoskeletal disorders	Doesn't know	31	38.3
	Knows	50	61.7
Ergonomic design can be crucial in mitigating occupational injuries	Doesn't know	18	22.2
	Knows	63	77.8
Mercury vapor inhalation during mercury handling can harm the nervous system, lungs and kidneys	Doesn't know	33	40.7
	Knows	48	59.3
Percutaneous incidents are related to Hepatitis B, Hepatitis C and HIV transmission	Doesn't know	32	39.5
	Knows	49	60.5

**Table 3:** Mean knowledge score for gender and education levels

Variables		Frequency	Mean knowledge score	p value
Gender	Male	24	3.67±2.39	0.006*
	Female	57	5.32±2.27	
Study level	1 <sup>st</sup> year	11	2.91±1.81	0.000**
	2 <sup>nd</sup> year	7	2.71±2.43	
	3 <sup>rd</sup> year	21	4.48±2.56	
	4 <sup>th</sup> year	4	6.25±1.70	
	Final year	8	6.00±2.13	
	Interns	30	5.77±1.92	
All students		81	4.83±2.41	

\*Statistically significant, Independent t-test applied

\*\*Statistically significant, ANOVA test applied

## Discussion

In our study, a large number most of participants (59.3%) reported that they did not know that X-ray injuries can be mitigated by barrier methods and position distance rule. This proportion is higher as compared to a similar study conducted in the same district, which depicted that only 15% had poor knowledge regarding radiation hazards.<sup>14</sup> The differences could be temporal or due to the difference in the criteria of determining the knowledge of the participants. Our study employed self-reporting technique, while the compared study checked whether the participants could give a correct answer to the questions. Similarly, another study among the students in a medical college of Nepal also revealed that only 47.5% of the participants lacked knowledge of radiation protection.<sup>15</sup> The significance of radiation hazards in dental profession is high. But as a large number of dental students report of being unaware of radiation hazards, it seems important that specific intervention programs like seminars or orientation programs regarding radiation safety measures for the dental students, preferably in their first year period, could be helpful as well as meaningful.

Our study showed that 40.7% of the dental students did not know that mercury handling can be harmful. The finding is in contrast to a study performed in a dental institution in Kathmandu which showed that 16.6% of the participants were unaware that mercury handling can be unsafe.<sup>16</sup> The fact that two-fifth of the dental students were unaware of mercury toxicity, is alarming.

Sixty one percent of the participants were aware of musculoskeletal disorders in our study which is similar to the findings of a study in Tamil Nadu, India.<sup>17</sup> About forty percent participants in our study reported to be unaware of bio-aerosol as a source of occupational hazards, while only 10% of the participants reported to be unaware of the same in a study done among the dental students

in Chennai.<sup>18</sup> The reasons for the difference could not be established. However, it was surprising to find that such a large number of the students in our study were unaware of bio-aerosols, despite their experience of and sensitization to the recent COVID-19 pandemic. The findings also indicate the need and importance of trainings and education programs related to occupational health practices.<sup>19</sup>

The awareness status regarding vibration-related hazards and noise-induced hazards depicted in our study, could not be compared to other studies due to the lack of similar studies in the similar population. However, the findings that only 27.2% and 39.3% of the students respectively, are aware of those hazards, imparts a message that there is a high chance that the dental students could become the victims of the same.

In our study, the mean knowledge score was lower for the males compared to females and the results were statistically significant. This is in contrast to a study performed among Saudi Arabian dental students, which showed that there was no statistically significant difference in awareness level across the gender groups. Similarly, our study showed that fourth year students had highest mean knowledge score followed by final year, intern, third year, first year and second year students respectively. Thus, our study declined the general assumption that knowledge level tends to increase with increasing academic level, as portrayed in the Saudi Arabian study.<sup>20</sup> The major limitation of the study is that it relied on self-reported data and did not cross-check the awareness status with multiple choice questions containing correct as well as incorrect answers.

## Conclusion

The awareness regarding the radiation hazards, vibration hazards and noise induced hazards seem to be limited among the dental students. The study suggests introducing specific intervention programs like occupational safety

seminars, trainings or workshops, for the dental students, before the commencement of their practical classes.

### Acknowledgement

I would like to thank all the BDS students of College of Medical Sciences, who have agreed to participate in this research.

### References

1. Chopra SS, Pandey SS. Occupational hazards among dental surgeons. *Med J Armed Forces India*. 2007;63(1):23-5.
2. Gambhir RS, Singh G, Sharma S, Brar R, Kakar H. Occupational health hazards in the current dental profession- A review. *The Open Occu Health & Safety J*. 2011;3:57-64.
3. Pelka M, Distler W, Petschelt A. Elution parameters and HPLC-detection of single components from resin composite. *Clin Oral Investig*. 1999;3(4):194-200.
4. Ayatollahi J, Ayatollahi F, Ardekani AM, Bahrololoomi R, Ayatollahi J, Ayatollahi A, et al. Occupational hazards to dental staff. *Dent Res J*. 2012;9(1):2.
5. Rubel DM, Watchorn RB. Allergic contact dermatitis in dentistry. *Australas J Dermatol*. 2000;41(2):63-9.
6. Szymanska J. Occupational hazards of dentistry. *Ann Agric Environ Med*. 1999; 6(1):13-9.
7. Ayers K, Thomson W, Newton J, et al. Self-reported occupational health of general dental practitioners. *Occup Med*. 2009;59(3):142-148.
8. Bârlean L, Dănilă I, Săveanu I, Balcoş C. Occupational health problems among dentists in Moldavian Region of Romania. *Rev Med Chir Soc Med Nat Lasi* 2013;117(3):784-788.
9. Raja K, Tilak AH. Occupational hazards in dentistry and its control measures; *World J Phar. Res* 2014;3(6):83010. Khatib AA, Ishtayeh M, Barghouty H, Akkawi B. Dentists' perceptions of occupational hazards and preventive measures in East Jerusalem. *East Mediterr Health J*. 2006;12(1):153-160.
11. U.S. Social Security administration. Fact Sheet. SSA publication. February 7, 2013.
12. Leggat PA, Smith DR. Prevalence of percutaneous exposure incidents amongst dentists in Queensland. *Aust Dent J*. 2006;51(2):158-161.
13. Oyewusi CO, Okanlawon FA, Ndikom CM. Knowledge and Utilization of Hepatitis B Infection Preventive Measures and Influencing Factors among Health Care Workers in Ibadan, Nigeria. *Int J Caring Sci*. 2015;8(1):164-176.
14. Garg D, Kapoor D. Awareness Level of Radiation Protection among Dental Students. *J Nepal Med Assoc*. 2018;56(212):800-803.
15. Chhetri K, Singh S, Dangal A, Sah S, Shrestha S, Maharjan S. Knowledge of radiation protection among dental students in a medical college, Nepal. *J Med Imaging Radiat Sci*. 2022;53(4):35-36.
16. Dixit PB, Dixit S, Dahal S, Poudel P, Ghimire S, Koirala T. Knowledge, attitude and practice of dental students, interns and practitioners to the use of amalgam in a dental institution of Kathmandu, Nepal. *J Kathmandu Med Coll*. 2020;9(1):31-36.
17. Karthikeyan GR, Balasubramaniam B, Aiyathurai M, Velu D, Indrapriyadharshini K, Devar MN. Insights into Knowledge, Attitude and Perception about Dental Ergonomics and Work-Related Musculo Skeletal Disorders (MSD) among Dental Professionals at Chengalpet District, Tamil Nadu, India: A cross-sectional study. *Int J Occup Saf Health*. 2022;12(1):1-7.
18. Geetha KR, Suresh KG. Awareness and Knowledge About Dental Aerosols among Dental Students. *Int J Innov Sci Res Technol*. 2020;5(10):637-643.
19. Banaee S, Claiborne DM, Akpinar-Elci M. Occupational health practices among dental care professionals before and during the COVID-19 pandemic. *Work J*. 2021;68(4):993-1000. doi: 10.3233/WOR-205319.
20. Al-Aslami RA, Elshamy FMM, Maamar EM, Shannaq AY, Dallak AE, Alroduni AA. Knowledge and Awareness towards Occupational Hazards and Preventive Measures among Students and Dentists in Jazan Dental College, Saudi Arabia. *Open Access Maced J Med Sci*. 2018;6(9):1722-1726.