

Assessment of Various Dental Occupational Hazards and Safety Measures among Dentists of Odisha, India

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ABSTRACT

Aim and objective: Dental professionals are more prone to get exposed to various occupational health problems. The aim is to assess various dental occupational hazards and safety measures among dentists of Odisha, India.

Materials and methods: The present study was conducted among 572 dental professionals of both genders. A self-administered questionnaire which comprises name, age, gender, number of years of experience, type of occupational hazard, awareness of occupational hazards, safety measures practiced, and working hours per week was given to dental professionals and the responses were recorded.

Results: 545 (95.2%) dentists were responded out of 572 participants. Age group 20–40 years had 55 males and 24 females, 40–60 years had 154 males and 84 females, and >60 years had 116 males and 60 females. 220 dentists had 10–15 years of experience, 190 had 5–10 years, 60 had <5 years, 40 had 15–20 years, and 35 had >20 years. The difference was significant ($p < 0.05$). The most common occupational hazard was musculoskeletal disorders seen in 480 (88%), stress in 273 (50%); maximum occupational hazard (52%) was noticed in dentists with <5 years of working experience; proper safety protocols adopted by dentists were the use of sterilized instruments 99%, gloves 98%, face mask 82%, vaccination against hepatitis 54%, head cap 51%, eyewear 12.6%, and proper waste disposal 7%. The difference was significant ($p < 0.05$).

Conclusion: The chances of occupational hazards are more common in dentists. The prevalence was higher among dentists with less than 5 years of experience.

Clinical significance: Knowledge and awareness about occupational hazards can help prevent complications due to occupational hazards in dental practice.

Keywords: Dental professional, Musculoskeletal disorders, Occupational hazards.

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INTRODUCTION

Occupational hazard refers to a risk or danger as a consequence of the nature or working conditions of a particular job.¹ It is not uncommon among dental professionals. However, owing to better sterilization procedures and knowledge about occupational hazard, it is relatively less as compared to a medical professional. Although dental occupational hazards are the least hazardous of the all the occupations, many risks still persist which are challenging for the dental professionals.²

Dentists and dental workers are dealing with patients and dental instruments and a wide range of risks, and sometimes, even legal hazards may occur. Due to restricted accessibility in patient's mouth, dentists have to work in appropriate posture which leads to musculoskeletal problems. There can be physical, chemical, biological, and mechanical aspects. Physical injuries occur due to poor illumination at working area, eye pain, and radiological exposure. Chemical aspect includes hazards due to mercury, beryllium, silica, and powdered natural rubber latex and processing solutions in dark room. Biological hazards such as viruses and bacteria infection are common. Transmissible diseases currently of greatest concern to the dental professionals are human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and tuberculosis.³

Dental professionals are at risk of getting exposed to infections such as bacterial and viral, radiation (while shooting radiographs), dental materials such as mercury exposure during silver amalgam filling, percutaneous exposure incidents during needle stick injury, musculoskeletal disorders, psychological problems and dermatitis, eye insults and respiratory disorders. Thus, following protective

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measures becomes essential which includes proper sterilization and disinfection.⁴

A thorough knowledge of all dental occupational hazards can prevent the chances of occurrence. The possible outcomes of

occupational hazards can be stress, musculoskeletal injuries (neck, waist, shoulder pain), and chances of acquiring hepatitis B and C during accidental needle exposure, etc. Therefore, the knowledge about these are thereby essential in creating awareness among dentists. There should be a continuous education program for dental healthcare personals and recent updated measures and newer strategies to tackle with these hazards should be imparted.⁵ Considering this, the present study aimed at assessing various dental occupational hazards and safety measures among dentists of Bihar, India.

MATERIALS AND METHODS

The present study was conducted in the Department of Oral Medicine and Radiology, Kalinga Institute of Dental Sciences, KIIT University, Bhubaneswar, Odisha, from April 2019 to October 2019. It comprises 572 dental professionals of both genders. Of this, 545 (95.2%) dentists agreed to participate, thus making the final study population. All the recruited participants were contacted either directly at their private clinics, working in institutions, and some practitioners were contacted by e-mail. The study protocol was approved from the institutional ethics committee of Kalinga Institute of Dental Sciences, KIIT University, Bhubaneswar. All the dental professionals were well-informed and a written consent was obtained. Inclusion criteria were dental professionals of any genders, those with experience not less than 1 year and those giving consent. Exclusion criteria were experience less than 1 year and those not giving consent. Eighteen closed-ended questionnaires (yes or no questions) were used to assess the knowledge and awareness. Questions were framed on the basis of tested previous studies with some modifications.

Data such as name, age, gender, etc., were recorded. A self-administered questionnaire (18 questions) (see Appendix) which comprises number of years of experience, type of occupational hazard, awareness of occupational hazards, safety measures practiced, and working hours per week was given to dental professionals by personal visit to 165 (30%) and by e-mail contact to 380 (70%) in various parts of Odisha, India, and the responses were recorded.

Results thus obtained were tabulated and subjected to statistical analysis using Chi-square test. *p* value less than 0.05 was considered significant.

RESULTS

545 (95.2%) dentists responded out of 572 participants. The response rate was very good. Of 572 participants, 316 (98%) from 322 were responded by direct personal questionnaire and 229 (91.6%) responded from 250 by e-mail. Age group 20–40 years had 55 males and 24 females, 40–60 years had 180 males and 110 females, and >60 years had 116 males and 60 females (Table 1). 220 dentists had 10–15 years experience, 190 had 5–10 years, 60 had <5 years, 40 had 15–20 years, and 35 had >20 years (Table 2). The difference was significant (*p* < 0.05).

Table 1: Demographic data of subjects

Age group (years)	Male	Female
20–40	55	24
40–60	154	84
>60	116	60
Total	325 (59.6%)	220 (40.4%)

Table 2: Distribution of samples according to working experience

Working experience (years)	Number	<i>p</i> value
<5	60	0.05
5–10	190	
10–15	220	
15–20	40	
>20	35	

Chi-square test, significant, *p* < 0.05

Table 3: Prevalence of different occupational hazards

Occupational hazards	Number	<i>p</i> value
Infection	82 (15%)	0.01
Stress	273 (50%)	
Latex hypersensitivity	28 (5.1%)	
Nervousness and anxiety	218 (40%)	
Musculoskeletal disorders	480 (88%)	
Hazards due to nitrous oxide gas	6 (1.1%)	

Chi square test, significant, *p* < 0.05

Table 4: Work experience and occupational hazards

Working experience (years)	Percentage of occupational hazards	<i>p</i> value
<5	52	0.05
5–10	23	
10–15	17	
15–20	5	
>20	3	

Chi-square test, significant, *p* < 0.05

Table 3 shows that the most common occupational hazard was musculoskeletal disorders seen in 480 (88%), stress in 273 (50%), nervousness and anxiety in 218 (40%), infection in 82 (15%), latex hypersensitivity in 28 (5.1%), and hazards due to nitrous oxide gas in 6 (1.1%). The difference was significant (*p* < 0.05).

Table 4 shows that maximum occupational hazard (52%) was noticed in dentists with <5 years of working experience followed by 23% in 5–10 years of experience, 17% in 10–15 years of experience, 5% in 15–20 years of experience, and 3% in >20 years of experience.

Figure 1 shows that maximum dentists had working hours in week experience of 48 hours (35%), which is followed by 56 hours (30%), 44 hours (20%), 40 hours (10%), and 36 hours (5%). The difference was significant (*p* < 0.05).

Figure 2 shows that proper safety protocol adopted by dentists was use of sterilized instruments by 99%, gloves 98%, face mask 82%, vaccination against hepatitis 54%, head cap 51%, eyewear 12.6%, and proper waste disposal 7%. The difference was significant (*p* < 0.05). We found that the maximum experienced occupational hazard was musculoskeletal disorder, with less than 5 years of experience.

DISCUSSION

Dental profession is a high-risk profession for developing work-related hazards. Though there are many improvements in equipment and treatment modalities, dentists are still exposed to

various occupational hazards.⁶ Occupational health is demanding highest degree of physical, mental, and social well-being of healthcare workers. Ill health or deviation from health resulting from unfavorable working conditions leads to increased risk of hazards. Healthy practitioners are important for a successful dental practice and well-being of the patient. Even work-related problems may have a harmful impact on personal and professional lives.⁷ The present study assessed various dental occupational hazards and safety measures among dentists of Bihar, India.

In the present study, we have included 545 dental professionals in which 325 (59.6%) were males and 220 (39.4%) were females. Age group 20–40 years had 55 males and 24 females, 40–60 years had 154 males and 84 females, and >60 years had 116 males and 60 females. We have found that working experience of 10–15 years was seen in 220 dentists, followed by 5–10 years in 190 dentists, <5 years in 60 dentists, 15–20 years in 40 dentists, and >20 years in 40 dentists.

Reddy et al.⁸ in their study on 66 dentists conducted in Government Dental College and Research Institute, Ballari, Karnataka, India, found that 92.4% dentists faced with physical hazards, 13.6% with chemical hazards, 63.6% with biological hazards, and 78.7% with psychological hazards. It was found that dental surgeons who had

<5 years of experience had greater prevalence of physical hazard seen in 93.3%, which is similar to our findings.

Rafie et al. assessed posture factors to musculoskeletal disorders in dentists and concluded that improper work posture of dentists had a substantial impact on musculoskeletal disorders.⁹

We have found that the most common occupational hazard was musculoskeletal disorder seen in 480 (88%), stress in 273 (50%), nervousness and anxiety in 218 (40%), infection in 82 (15%), latex hypersensitivity in 28 (5.1%), and hazards due to nitrous oxide gas in 6 (1.1%).

Al-Aslami evaluated the awareness level and occupational exposure in 200 dental students and professionals in Jazan Dental College, Saudi Arabia, and found significantly higher difference between male and female participants pertaining to hand wrist pain, neck shoulder pain, anxiety, and backache and concluded that definite psychological distress related to the conditions.¹⁰

We have observed that maximum occupational hazard was noticed in dentists with <5 years of working experience seen in 52% dentists. 35% of dentists had 48 hours working in a week. Solanki et al.¹¹ conducted a study in Rajasthan Dental college, Jaipur, India, among 525 private dental practitioners of western Rajasthan, India; in this study, males were 300 and females were 225. 61.7% had the habit of working in sitting posture and only 18.8% practiced standing dentistry. 40.7% dentists had backache while 4.1% of dentists had shoulder pain. A highly significant correlation was observed between posture of dentists and musculoskeletal problems.

Ayatollahi et al. evaluated various occupational hazard exposures among dental staff, found that strained posture causes musculoskeletal problems, and concluded that dentists should be continuously updated about newer strategies to reduce hazards.¹² Chopra and Pandey evaluated the awareness level among dentists of Indian Navy about the occupational hazards and found that participants were aware about hazards. Backache was the common hazard and they concluded that awareness should be made about preventive measures.¹³ Puriene et al. evaluated the psychological comfort of Lithuanian dentists. Half of the participants experience general health problems frequently; some of the participants reported work-relevant stress, fatigue, anxiety and nervousness. Long working hours was the main cause of health problems among

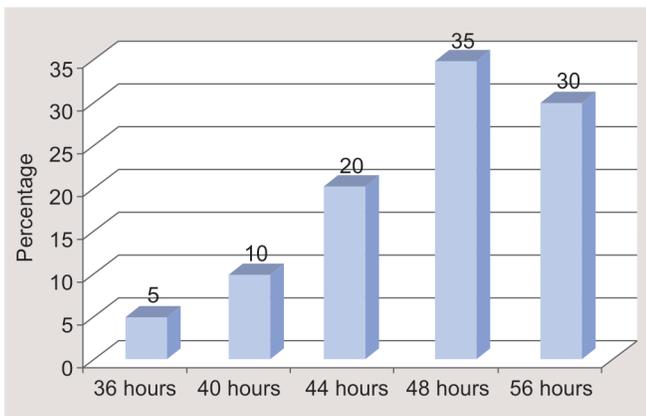


Fig. 1: Working hours over percentage of hazards

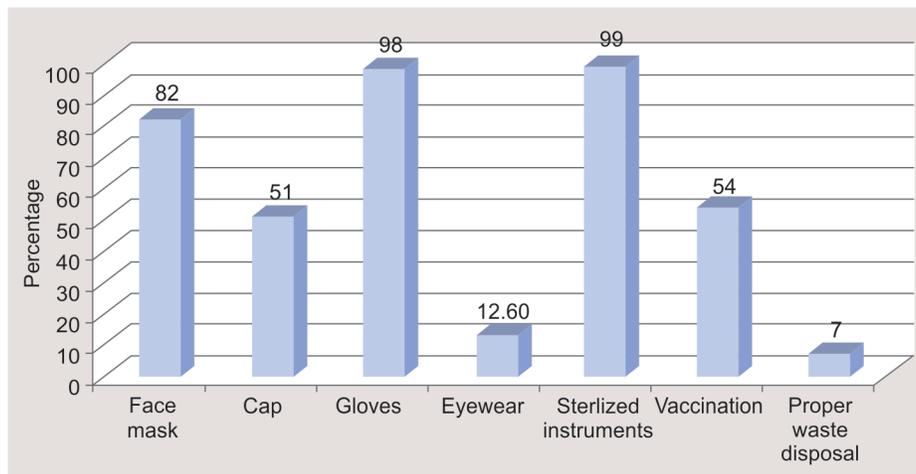


Fig. 2: Prevalence of different occupations hazards with percentage

most of the dentists.¹⁴ They observed more nervous and anxiety problems in contrast to our findings.

We have observed that proper safety protocol adopted by dentists was use of sterilized instruments seen in 99%, use of gloves in 98%, use of face mask in 82%, vaccination against hepatitis in 54%, head cap in 51%, protective eyewear in 12.6%, and proper waste disposal in 7%.

Dentistry is at constant risk of exposure to various environmental and human infectious agents, which can be transmitted through oral and oropharyngeal secretions, blood, air, and water. Contamination can affect staff, patients, and even members of their family.¹⁵ These health hazards affect the dentists such as these can lead to eye problems, stress, depression, anxiety, musculoskeletal disorders, etc. This in turn affects on their working efficiency and prevents from longer duration of working which in turn creates financial, social, and family problems.

A good knowledge about occupational hazard among dentists can prevent occupational hazards. Even if occupational hazards occur, dentists should be in a position to tackle it. Most of the occupations hazards can be prevented with improved knowledge and awareness. The precautions and the measures such as short working hours, adopting correct posture during working on patients, short rest between patients, careful handling of instruments, and the use of mercury-free restorative materials. Proper handling and disposal of waste should be considered. Dental education among students regarding occupational hazards is very important, and this may be helpful during clinical practice. There is more need to create awareness among the dentists with less experience as they are more prone to occupational hazard; as in our study, dentists with experience less than 5 years had more occupational hazards.

The shortcoming of the study is small sample size. The effect of posture on occupational hazard was not assessed.

CONCLUSION

The chances of occupational hazards are more in dentists. The prevalence was higher among dentists with less than 5 years of experience. This study helps in assessing risk and status of safety measures adopted by dental professionals, and hence, occupational hazards can be minimized in practice of primary care procedure. In addition, long-term studies are needed on larger sample size, taking into account the evaluation of other factors.

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APPENDIX

Question Frame: Questionnaire Used in the Study

- Q 1. Name
- Q 2. Age
- Q 3. Gender–Male/Female
- Q 4. How much is your working experience?
- a. 1–5 years
 - b. 5–10 years
 - c. 10–15 years
 - d. >20 years
- Q 5. What is your working hours per week?
- a. 1–3 hours
 - b. 4–6 hours
 - c. 7–9 hours
 - d. more than 9 hours
- Q 6. Have you encountered infection of occupational hazard?
- a. Yes
 - b. No
- Q 7. Have you encountered stress in your dental practice?
- a. Yes
 - b. No
- Q 8. Have you encountered Latex hypersensitivity?
- a. Yes
 - b. No
- Q 9. Have you encountered nervousness and anxiety?
- a. Yes
 - b. No
- Q 10. Have you encountered musculoskeletal disorders?
- a. Yes
 - b. No
- Q 11. Have you encountered hazards due to nitrous oxide gas?
- a. Yes
 - b. No
- Q 12. Do you use face mask?
- a. Yes
 - b. No
- Q 13. Do you use head caps?
- a. Yes
 - b. No
- Q 14. Do you use gloves during dental procedures?
- a. Yes
 - b. No
- Q 15. Do you use eye wears?
- a. Yes
 - b. No
- Q 16. Do you use sterilized instruments as proper safety protocol?
- a. Yes
 - b. No
- Q 17. Have you had vaccination against hepatitis?
- a. Yes
 - b. No
- Q 18. Do you follow proper waste disposal as proper safety protocol?
- a. Yes
 - b. No