



Understanding Occupational Hazards in Dental Training: Awareness and Prevalence among Students at Adhiparasakthi Dental College and Hospital.

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ABSTRACT:

Introduction: Occupational hazards are inherent risks associated with various professions. The significance of occupational health was highlighted by Bernardino Ramazzini in the 18th century. Despite advancements in safety measures, dental professionals continue to face notable risks. This study assesses the prevalence and awareness of occupational hazards among dental students and interns at Adhiparasakthi Dental College and Hospital, Melmaruvathur.

Materials and Methods: A cross-sectional study was conducted among third and fourth-year students and interns, with a sample size of 279 participants. Data were collected using a structured questionnaire and analyzed using SPSS version 21.0. Descriptive statistics, frequency distributions, percentages, and ANOVA were used to identify significant differences between groups, with a p-value threshold of 0.00 for statistical significance.

Results : The study had 279 participants, 77.1% of whom were women. Sharp instrument injuries were the most common physical hazard (50.2%), with burs causing 31.7% of injuries. Needlestick injuries were frequent, with 64.5% of participants experiencing them 6-10 times. Infections were the most common biological hazard (82.1%), and 89.6% recognized saliva as a contamination source. Stress factors included academic (30.1%) and practice-related (26.9%) pressures. Personal protective measures were generally adhered to, with 94.6% using gloves during treatments.

Discussion: The findings indicate that dental students are highly aware of occupational hazards but still experience significant risks, particularly from sharp instruments and needlestick injuries. The use of dosimeters was notably low, highlighting a gap in radiation safety practices. The high prevalence of stress-related issues underscores the need for mental health support and stress



management strategies.

Conclusion: This study provides a detailed overview of occupational hazards among dental students, emphasizing the need for improved safety protocols and mental health support. Broader research across multiple institutions is recommended to generalize findings and enhance occupational safety in dental education.

1. Introduction

An occupational hazard is a risk inherent to an individual's profession¹. Awareness of occupational risks dates back to the 18th century when Bernardino Ramazzini, the pioneer of occupational medicine, highlighted the critical role of occupation in health and disease dynamics². While developed countries have extensively studied the risks faced by oral healthcare workers, there is comparatively less information available from developing nations³. Despite advancements in sterilization techniques and increased awareness of occupational hazards, dental professionals still face significant risks, albeit fewer than their medical counterparts.

Annex C of I.S. OHSAS 18002:2008 classifies occupational hazards into four categories, as mandated by the 2005 Act on workplace health and safety: physical, chemical, biological, and psychosocial⁴. Physical risks in dentistry include exposure to dangerous radiations, such as ionizing and non-ionizing radiation, and musculoskeletal stress injuries caused by improper posture. Chemical risks arise from anesthetics, latex, acrylate compounds, amalgam, and common compressed gases. Biological risks stem from healthcare waste, sharps, and allergens found in blood, saliva, and other biological contaminants⁴. Psychosocial risks may result from stress due to excessive workload, job insecurity, and legal or medical issues².

Raising awareness among dentists is crucial. Dental healthcare personnel should engage in continuous education programs that provide updated techniques and procedures to mitigate these hazards. The prevention of workplace dangers is the cornerstone of occupational health practice¹. Consequently, this study aims to assess the prevalence and awareness of occupational hazards in dentistry among third-year students, fourth-year students, and interns at Adhiparasakthi Dental College and Hospital, Melmaruvathur.

2. Materials and methods:

A cross-sectional study was meticulously conducted among dental students at Adhiparasakthi Dental College and Hospital to assess their awareness and prevalence of occupational hazards. The study population comprised third-year students, fourth-year students, and interns, resulting in a total sample size of approximately 279 participants.

The methodology for data collection was comprehensive. Descriptive statistical analysis was performed using SPSS version 21.0 (IBM, USA). The results of this analysis were presented in several formats, including mean values, frequency distributions, percentages, and standard deviations, providing a detailed quantitative overview of the data.

To explore the relationships and differences between various demographic and academic subgroups, comparisons and associations were analyzed. The subgroups considered included different sexes, age groups, academic designations (third-year students, fourth-year students, and interns), and varying levels of awareness about occupational hazards. The statistical tool employed for these analyses was ANOVA (Analysis of Variance), which is adept at identifying significant differences between group means. In this study, a P-value of 0.00 was set as the threshold for statistical significance.

Through this rigorous approach, the study aimed to provide an in-depth understanding of the awareness and prevalence of occupational hazards among dental students, offering valuable insights that could inform educational programs and safety protocols within the institution.

3. Results:

A total of 279 responses were received. Out of which men comprised 22.9% and women comprised 77.1% making women as the majority participant. Most of the participants were in the age group between 21 - 30 years. Third year students formed 22.6%, fourth year students formed 35.8%, interns formed 41.6% out of the total participants.



A comprehensive total of 279 responses were collected for the study. Among these, male respondents constituted 22.9%, while female respondents accounted for the majority at 77.1%. The data revealed that women were the predominant participants in this survey.

In terms of academic standing, the study encompassed a diverse representation of dental students. Third-year students comprised 22.6% of the total participants,

fourth-year students constituted 35.8%, and interns comprised the largest portion at 41.6%.

This breakdown underscores the inclusivity of the study, encompassing participants across various stages of their dental education and training. Such diversity enhances the study's validity and provides a comprehensive perspective on the awareness and perceptions of occupational hazards among dental students.

TABLE 1

S.no	QUESTIONS	ANSWERS	FREQUENCY	PERCENTAGE	P VALUE
1	According to you, which is the most common physical hazard?	Musculoskeletal Pain	122	43.7	0.00
		Sharp instrument injury	140	50.2	
		Burns	13	4.7	
		Others	4	1.4	
2	Select the types of injuries you suffered during your clinical practice?	Needle prick	54	13.6	0.00
		Burs	126	31.7	
		Scalers	67	16.9	
		Root canal files	60	15.1	
		Other	17	4.3	
		Nothing	73	18.4	
3	How many times have you had needle stick injury?	0 - 5 times	67	24.0	0.00
		6 - 10 times	180	64.5	
		> 10 times	32	11.5	
4	Which is the most common location in which you had needle stick injury?	Fingers	161	57.7	0.00
		Palm	15	5.4	
		Arm	8	2.9	
		No injury	95	34.1	
5	Do you use a Dosimeter for assessing the amount of radiation exposure and dose?	Yes	67	24.0	0.00
		No	180	64.5	
		Maybe	32	11.5	



Table 1 The study examined the prevalence of physical hazards among dental students and interns, revealing that sharp instrument injuries were the most common, affecting 50.2% of participants (140 individuals). Among the various types of injuries sustained during clinical practice, 31.7% of participants reported injuries caused by burs, making it the predominant injury type. Furthermore, when queried about the frequency of

needlestick injuries, 64.5% of participants indicated they had experienced such injuries between 6 to 10 times. Of those who had suffered needlestick injuries, 57.7% reported that their fingers were the most commonly affected site. Additionally, when asked about the use of dosimeters for monitoring radiation exposure and dosage, 64.5% of participants responded negatively, indicating they did not use dosimeters.

TABLE 2

1	According to you, which is the most common biological hazard?	Infection	229	82.1	0.00
		Allergies	48	17.2	
		Hearing Problem	2	.7	
2	Do you think saliva will act as a source of contamination for various diseases?	Yes	250	89.6	0.00
		No	7	2.5	
		Maybe	22	7.9	
3	Do you think that aerosols can act as a media for transfer of microorganisms?	Yes	256	91.8	0.00
		No	4	1.4	
		Maybe	19	6.8	
4	Have you ever undergone post exposure prophylaxis due to contact with exposed tissues, saliva, and blood?	Yes	78	28.0	0.00
		No	189	67.7	
		Maybe	12	4.3	
5	Which of the following products are you allergic to?	Latex	46	14.3	0.00
		Dental Polymer	29	9	
		Monomer	48	14.9	
		Nothing	198	61.7	

Table 2 The study examined the prevalence of biological hazards among dental students and interns, finding that infections were the most common, affecting 82.1% of participants (229 individuals). When asked if they believed saliva could be a source of contamination for various diseases, 89.6% of participants responded affirmatively. Additionally, 91.8% agreed that aerosols could facilitate the transfer of microorganisms. When

queried about undergoing post-exposure prophylaxis due to contact with exposed tissues, saliva, and blood, 67.7% of participants indicated they had never done so. Regarding allergies to dental products, 61.7% of participants reported no allergies. However, latex and monomer were the most common allergens, affecting 14.3% and 14.9% of participants, respectively.



TABLE 3

1	Which of the following do you think is the most common factor for stress among dental students?	Patient Related Factors	67	24.0	0.00
		Practise Related Factors	75	26.9	
		Economic Related Factors	53	19.0	
		Academic Related Factors	84	30.1	
2	Do you involve yourself in various activities other than dentistry and any other hobbies?	Yes	219	78.5	0.00
		No	42	15.1	
		Maybe	18	6.5	
3	Are you satisfied with your profession as a dentist?	Yes	201	72.0	0.00
		No	31	11.1	
		Maybe	47	16.8	
4	Do you encounter nervousness or anxiety before, during or after treatment?	Yes	163	58.4	0.00
		No	47	16.8	
		Maybe	69	24.7	

Table 3 The study discusses various factors influencing stress among dental students and interns, categorized under psychosocial factors, which are also potential occupational hazards in dentistry. According to the study, infections were the most prevalent psychosocial hazard, affecting 82.1% of participants (229 individuals). When asked if they engaged in activities

outside of dentistry, 78.5% of participants responded affirmatively. Furthermore, 72% of participants expressed satisfaction with their profession as dentists. Regarding experiences of nervousness or anxiety before, during, or after treatment, 58.4% of participants reported having encountered such feelings.

TABLE 4:

1	Do you use gloves while working on patients?	Yes	264	94.6	0.00
		No	2	.7	
		Maybe	13	4.7	
2	Which of the following do you use during screening of patients?	Facemask	66	23.7	0.00
		Gloves	6	2.2	
		Both facemask and gloves	206	73.8	



		Nothing	1	.4	
3	How frequently do you change your gloves?	Change after each patient	271	97.1	0.00
		Wash gloves between each patients	8	2.9	
4	How frequently do you change your facemask?	Change after each patient	114	40.9	0.00
		At the end of the day	117	41.9	
		When the mask feels dirty	48	17.2	
5	How frequently do you wash your hands?	After treatment	73	26.2	0.00
		Before and after treatment	205	73.5	
		At the end of the day	1	.4	
6	Do you wear protective eye wear while working on patients?	Yes	96	34.4	0.00
		No	134	48.0	
		Maybe	49	17.6	

Table 4 The study discusses the percentage of participants who have adopted necessary personal protective measures against potential occupational hazards. When asked if they use gloves during treatment, 94.6% of participants responded affirmatively. In terms of protective measures during patient screening, 73.8% reported using both a facemask and gloves. Regarding the frequency of changing gloves, 97.1% of participants stated they change their gloves after each patient. As for changing facemasks, 41.9% indicated they do so at the end of the day, while 40.9% reported changing their facemask after each patient. Concerning hand hygiene, 73.5% of participants wash their hands before and after treatment. However, when asked about the usage of protective eyewear while working on patients, 48% answered "No".

4. Discussion:

This cross-sectional study, conducted among third and fourth-year students and interns at Adhiparasakthi Dental College and Hospital in Melmaruvathur,

provides valuable insights into the prevalence and awareness of occupational hazards among dental students. Drawing on data from previous global studies⁵⁻⁷, the study aimed to assess both physical and psychosocial hazards and the personal protective measures employed by the participants.

Physical Hazards

The findings reveal that sharp instrument injuries are the most common physical hazard, affecting 50.2% of participants. This high incidence underscores the inherent risks associated with the frequent use of sharp tools in dental procedures⁸. Musculoskeletal pain disorders were the next most common physical hazard, reported by 43.7% of participants. This highlights the ergonomic challenges in dentistry, which can lead to significant long-term health issues, including early retirement due to musculoskeletal disorders (MSDs)⁷. The study's emphasis on burs as a primary cause of sharp instrument injuries (31.7%) suggests a need for improved protocols and equipment handling to reduce such incidents⁹.



Needlestick injuries are notably frequent, with 64.5% of participants experiencing them between six to ten times, and 11.5% more than ten times. Fingers were the most common site of injury, emphasizing the need for enhanced protective measures and training in safe needle handling. Despite the known risks of radiation exposure in dentistry, the study found that 64.5% of participants did not use dosimeters, indicating a significant gap in radiation safety awareness and practices⁸.

Biological Hazards

Infections were identified as the most common biological hazard, affecting 82.1% of participants. The study also revealed high awareness among participants regarding the potential of saliva (89.6%) and aerosols (91.8%) as contamination sources for various diseases. Despite this awareness, 67.7% had not undergone post-exposure prophylaxis following contact with exposed tissues, saliva, and blood, suggesting either a lack of perceived risk or gaps in post-exposure protocols⁹. The study highlights that 38% of participants reported allergies to dental materials, with latex and monomer being the most common allergens. This underscores the importance of identifying and managing material sensitivities in dental practice to prevent adverse reactions.

Psychosocial Hazards

Stress is a significant occupational hazard in dentistry, with 30% of participants citing academic factors as the primary stressors, followed by practice-related (26.7%) and patient-related factors (24%). The study found that 78.5% of participants engaged in recreational activities outside dentistry, suggesting that such activities might serve as effective stress-relief mechanisms. However, 58.4% of participants reported experiencing nervousness or anxiety related to dental procedures, indicating a need for better mental health support and coping strategies within the profession¹⁰.

Personal Protective measures

The study demonstrates commendable adherence to personal protective measures among participants. A significant majority (94.6%) reported using gloves during treatment, and 73.8% used both facemasks and gloves during patient screening. Furthermore, 97.1% of participants changed gloves after each patient, reflecting

good infection control practices. However, there is room for improvement in the use of protective eyewear, with 48% of participants not wearing them during treatment^{11,12}.

The data also revealed variability in the frequency of facemask changes, with 41.9% changing them after each patient and 40.9% at the end of the day. This highlights the need for clearer guidelines and adherence to best practices in facemask usage. Hand hygiene practices were robust, with 73.5% of participants washing their hands before and after treatment.

5. Conclusion

This study provides a comprehensive overview of the occupational hazards faced by dental students and interns, highlighting significant areas for improvement in safety practices and stress management. While there is a high level of awareness and adherence to personal protective measures, gaps remain in the consistent use of radiation dosimeters and protective eyewear, as well as in the management of psychosocial stressors. Addressing these issues through enhanced training, clearer guidelines, and better support systems will be crucial in mitigating occupational hazards and improving the overall health and well-being of dental professionals.

The study's limitation, being confined to a single institution, suggests the need for broader research across multiple dental colleges to provide a more generalized understanding of occupational hazards in dentistry. Future studies should also consider comparative analyses between different clinical professions within dentistry to identify specific risks and protective practices unique to each specialty.

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