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Original Article

Occupational Hazards in Dentistry – An Assessment of Awareness Among Dental Undergraduate Students

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Abstract

Background: Health profession has been declared among the top 15 professions exposed to a high risk of occupational hazards by US Bureau of Labor Statistics. Threats may range from anxiety and allergy to life-threatening illnesses like hepatitis.
Objective: To evaluate the knowledge of undergraduate dental students about occlusal hazards (OH) in dentistry.
Study type, settings and duration: A cross-sectional study was conducted at Armed Forces Institute of Dentistry (AFID), Rawalpindi and Islamic International Dental College (IIDC), Islamabad over a period of three months from October 2018 to December 2018.
Methodology: A questionnaire based survey was conducted to assess the awareness of 156 undergraduate dental students concerning Occupational Hazards in dentistry. Only students who routinely came in contact with patients were included. Questions were asked about concept of Occupational hazards, protocols for cross-infection prevention, ergonomics, material handling and psychosocial issues. Data was analyzed using SPSS version 24.
Results: All respondents were well-aware about Occupational Hazards in dentistry. Majority (96%) were immunized for hepatitis B. Students (78%) revealed poor knowledge about ergonomics and material handling. Most of them (89%) used mercury in routine but less than 40% knew about the management of spilled mercury. Most of the students (54%) felt stressed owing to peer pressure and competition.
Conclusion: Undergraduate trainees at AFID and IIDC are familiar with Occupational Hazards in their profession. Dedicated efforts are required to improve the training of subjects in the areas of ergonomics and material handling.
Key words: Biohazards, dental professional, dental students, occupational hazards.

Introduction

Occupational hazard denotes a threat of potential harm, detriment or adversarial health effects, specific to a profession or place of occupation, which are encountered on a daily basis during that specific trade or at that place of work.[1] For the first time, in 17th century, the notion of work-related ailments was introduced by an Italian physician B. Ramazzini, also remembered as the "father of occupational medicine".[2] Ramazzini witnessed and documented progress of morbidities owing to the work place environment. He also offered numerous safety measures intended to curtail the exposure to work-related threats to health.[3] Today work-related threats and hazards are globally identified and understood, still professionals all over the world continue to face work-related threats to health in their daily life.

In 2011, US Bureau of Labor Statistics declared healthcare profession as being amongst the top fifteen professions related with a high risk of

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Authors Contribution

AA conceptualized the project along with statistical analysis. AA, AA[2] & BR did the data collection. MN & DAK performed the literature search. Drafting, revision and writing of manuscript was done by AA, AA[2] & MN. DAK & AT also did the critical revision.

occupational hazards (OH).[4] Oral and maxillofacial healthcare extends a huge assortment of occupational threats to the clinicians.[5] These include allergy, lassitude, anxiety, musculoskeletal disorders as well as severe and terminal illnesses such as hepatitis and AIDS.[6] Moreover, ailments inclined to exacerbate over months and years from continued subjection to the "risk factors" at workplace.[7] Quite a few of the occupational ailments can be ascribed to prolonged work periods in a deskbound or 'sedentary' position, however, majority of the practically fatal, serious ailments occur because of injury with "contaminated sharp objects", exposure to injurious chemicals and to microbes existing in the patients' body fluids.[8]

In order to the prevent and diminish the hazard risk associated with dentistry practices, a comprehensive knowledge and in-depth understanding of the potential risks is imperative along with a strict employment of universally followed" protocols for deterrence and infection control.[9] Sadly, cross-infection control in countries with low socioeconomic status is not optimal.[10] Literature suggests defiance of dental personnel towards embracing the safety protocols as the main culprit rather than the lack of necessary resources.[11] Accounts emphasizing a dearth of application of international safety protocols by the healthcare workers have been extensively reported.[12-17] A sizeable transformation in conduct is paramount to reducing the OH in dentistry. At the same time, enlightening all healthcare workers with current knowledge about the possible threats as well as the required precautionary steps required to reduce these threats cannot be overstressed.[18]

The aim of this study is to assess the knowledge of undergraduate dental students about OH in dentistry. The knowledge thus gained will be a step ahead towards optimizing oral healthcare in the developing country, both for the practitioner and the patient.

Methodology

A cross-sectional study was conducted at Armed Forces Institute of Dentistry (AFID), Rawalpindi and Islamic International Dental College (IIDC), Islamabad over a period of three months from October 2018 to December 2018. Using the WHO calculator, keeping the confidence interval (1-α) at 95%, absolute precision (d) at 0.05 and anticipated population proportion (P) at 0.885, a total sample size of 156 was calculated. Undergraduate dental students from 3rd year and final year that routinely attended and treated patients in clinical setting were included. Students in their first or second year of undergraduate training who did not have any interaction with patients were excluded from the study. A structured, closed-ended questionnaire with fifty stems, adopted from Viragi et al[5] was used to evaluate the knowledge of the subjects about "occupational hazards in dentistry". Questions comprised of different categories including general knowledge about work-related problems, means for personal protection, ergonomics, cross-infection control, dental material and psychosocial issues. Data was analyzed using SPSS version 24.

Table 1: Knowledge about occupational hazards in dentistry.

Questions	*Responses*		
	Yes (%)	*No (%)*	*Don't Know (%)*
Are you aware of occupational hazards in dentistry?	100	-	-
Do you think it is possible to practice hazard-free dentistry?	68	29	03
Do you think dentists are more prone to HBV/HCV/HIV infections?	97	03	-
Do you think HBV/HCV/HIV are the greatest hazards in dentistry?	95	02	03
Methods adopted for personal protection			
Do you always wear gloves before examining a patient?	99	01	-
Do you always wear a face mask during dental procedures?	80	20	-
Do you use goggles to protect your eyes?	21	79	-
Have you ever heard about certified particulate respirators?	08	92	-
Have you ever used certified respirators?	-	100	-
Have you ever acquired an infection from a patient?	-	100	-
Did you have an injury from a sharp object in the last six months?	16	84	-
Have you been vaccinated against HBV?	96	03	01
Awareness regarding ergonomics in dentistry			
Are you aware of ergonomics in dentistry?	22	78	-
Do you think sound ergonomics can prevent occupational hazards in dentistry?	22	-	78
Do you wear earplugs that allow normal sounds but block high frequency intensity sounds?	13	87	-
Have you suffered from or are you suffering from eye strain or blurred vision?	30	70	-
Have you suffered from backache ache due to your dental practice?	83	17	-
Have you suffered from wrist ache due to your dental practice?	19	81	-
Have you suffered from neck ache due to your dental practice?	81	19	-

Descriptive statistics were calculated. Effect modifiers like year of education were controlled by stratification. Post-stratification Chi-square test was used. *p*-value less than 0.05 was considered as significant.

Results

Of the 156 distributed questionnaires, 144 were received back with a response rate of 92.3%. Majority (86%) of the respondents were females. This can be attributed to female predominance in dental profession owing to a higher merit achieved by females and relatively easier working hours associated with dentistry.

Study subjects were quite familiar with work-related problems in the field of dentistry. Table-1 highlights the responses to questions about general knowledge, methods adopted for personal protection and awareness about ergonomics. All of the students were aware of hazards associated with dentistry as a profession while only 68% thought that hazard-free dentistry can be practiced. Although it is mandatory for dental students to be vaccinated against Hepatitis B, yet 3% of the study subjects had not been vaccinated and were in regular contact with patients. Majority of the subjects always wore gloves (99%) and masks (80%) to protect themselves, and 96% had been immunized against HBV. Approximately 83% suffered from backache due to their clinical practice. Regarding cross-infection control practices, majority (97%) of the subjects responded that they changed gloves on every patient and that instruments were adequately sterilized (Figure-1). Awareness of subjects about handling of dental materials was not optimal (Figure-2), with many (89%) subjects in regular contact with mercury and 60% unaware of the clinical presentation of exposure to chemicals. Majority (71%) of the subjects agreed that they got irritated with non-compliant patients while 62% revealed that their personal problems affected their clinical practice (Figure-3).

A significant difference (p =.01) was observed between subjects of different education years regarding handling of spilled mercury. A higher number of final year students (52%) were aware of the protocols to handle spilled mercury than 3rd year students (26%). Similarly, a significant difference was observed (p =0.001) in the reported complaint of back ache, where a greater number of final year students suffered from backache due to their clinical practice in comparison to 3rd year students (Table-2).

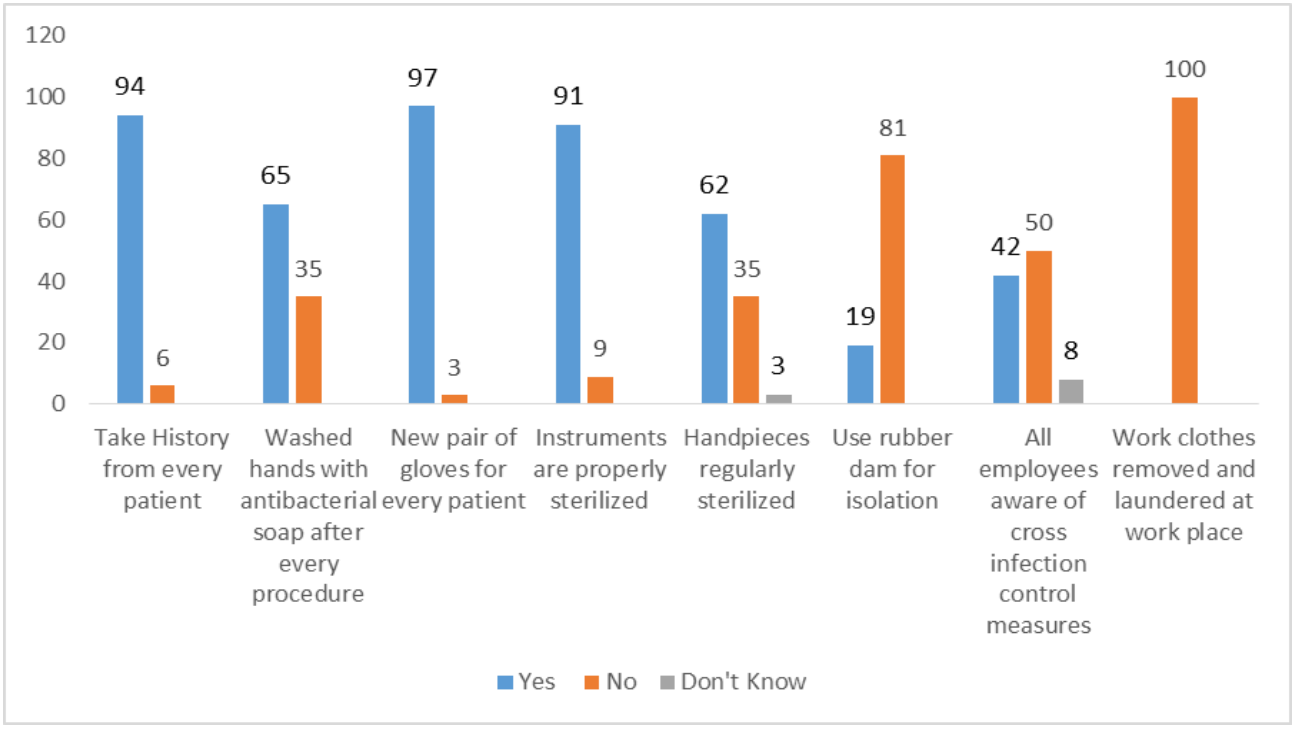

Figure 1: Knowledge regarding cross infection control practices among under graduate students of dentistry.

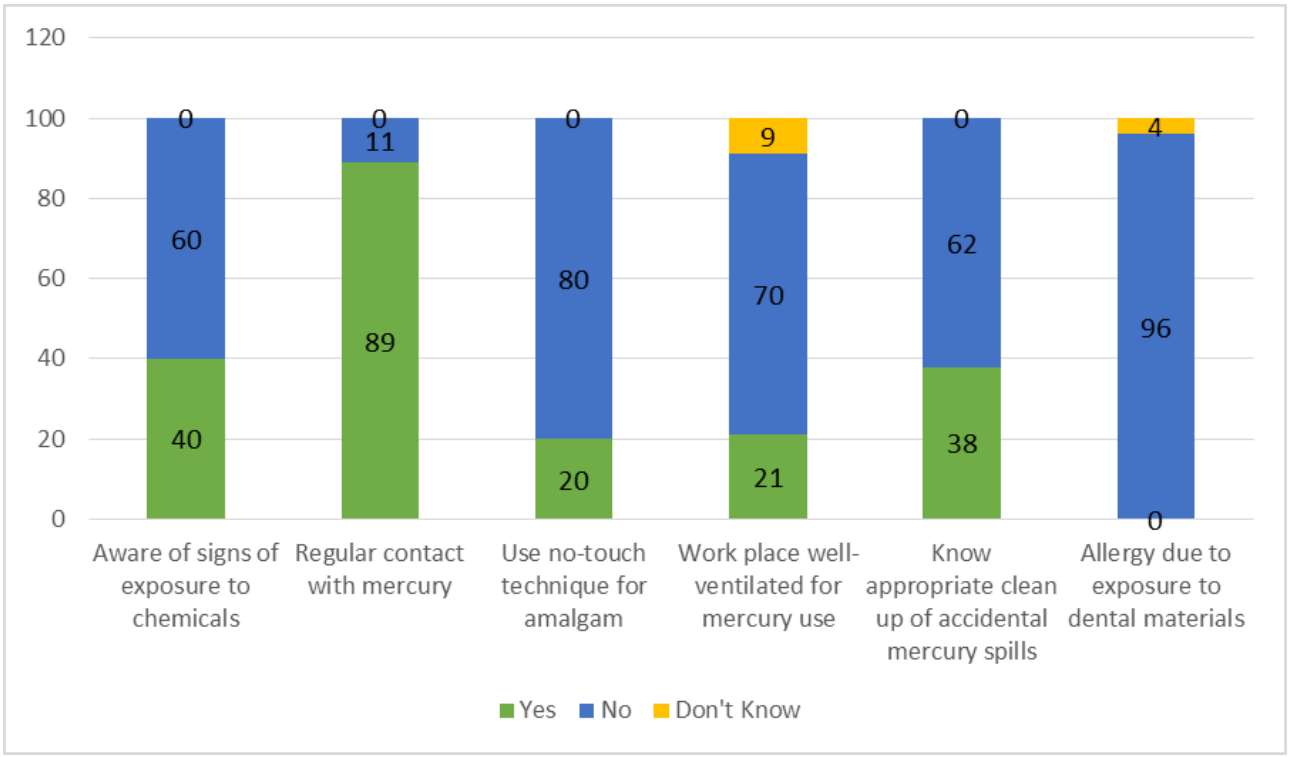

Figure 2: Awareness of dental undergraduate students regarding handling of dental materials.

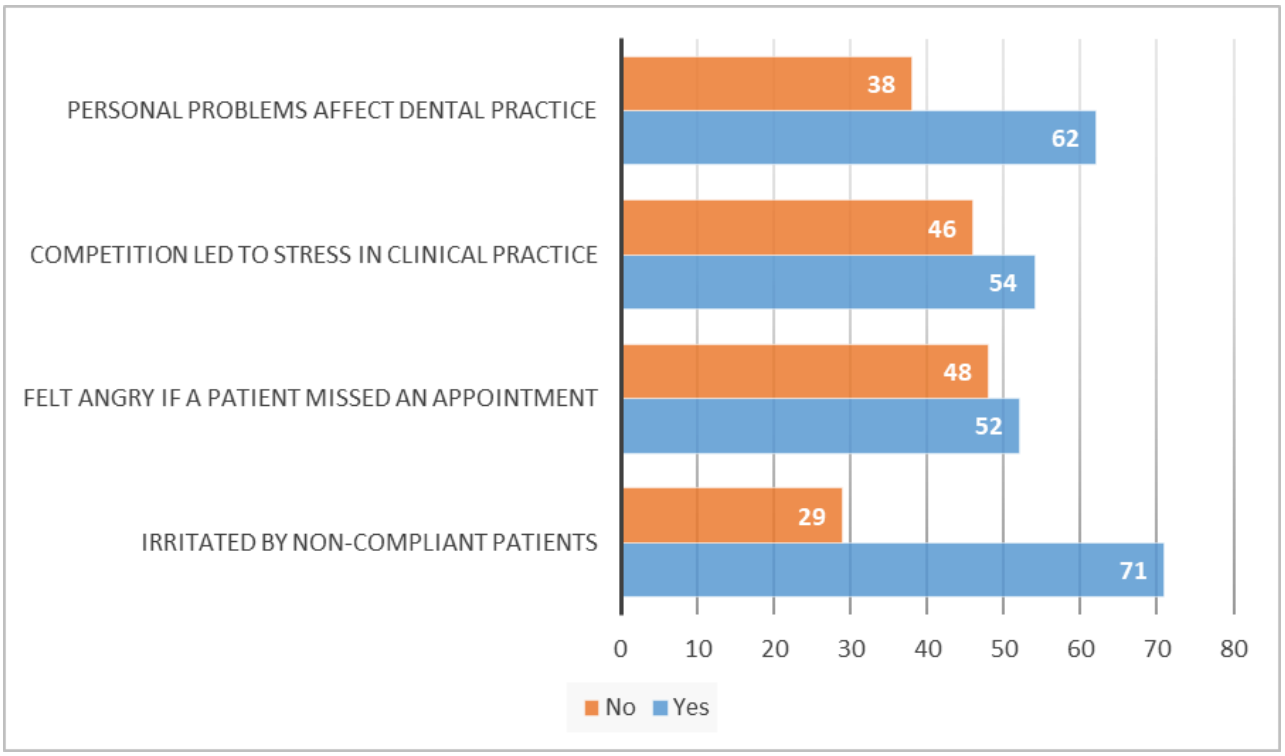

Figure 3: Psychosocial factors affecting the clinical practice of dental undergraduate students.

Table 2: Effect of year of education on frequency of backache and knowledge about mercury handling.

Question	Response	Year of Education		p
		3rd Year	4th Year	(Chi-square)
Know how to manage mercury spillage	Yes	23	38	0.01
	No	52	31	
Back ache due to clinical practice	Yes	26	59	<.001
	No	44	15	

Discussion

Dentistry is deemed as a markedly hazardous vocation, both by the health care workers and the patients.[19] Dental practice exposes the clinician to a higher risk of illness, allergy, musculoskeletal disorders as well as psychological ailments. All respondents in the current study revealed ample knowledge about the threats associated with dental practice. Viragi et al[5] and Fasunloro et al,[8] in their respective studies, documented similar level of awareness about potential threats to health associated with dental practice.

In terms of barriers for personal protection, most of the subjects customarily wore gloves (99%) and face masks (80%) in contrast to goggles preferred by a mere 21%. These findings are endorsed by Chopra and Pandey,[17] Al-Rabeah and Mohammed[20] and Khatib et al.[19] About 96% of the subjects in this study demonstrated adequate vaccination status against Hepatitis B. This is because of strict cross-infection policies at the institutes that do not allow students to work on patients unless they are vaccinated against HBV and provide a proof of their vaccination. This immunization prevalence is higher compared to the findings of Viragi et al[5] where less than 90% of the dental professionals were immunized. Similarly, in their study, Fasunloro et al8 reported less than 70% subjects with immunization against HBV while for Mehboob et al[21], the immunization prevalence was close to 80%.

In the present study, 16% of the subjects declared a contact with a sharp object in the last six months that resulted in an injury. However, none of the subjects reported getting infected from a patient. In a study done on Indian population, a somewhat higher prevalence (33%) of injury from sharp objects has been reported.[5] On the contrary, Tadakamadla et al[22] found a very high prevalence (50%) of injury from sharp objects such as needles, blades, etc.

More than 80% of the subjects reported having suffered from backache and neck-ache owing to their clinical practice. This is a disturbingly high frequency. This may be because although students are taught about maintaining a good posture, its importance may not have been adequately inculcated in their minds. Moreover, students should be closely monitored and supervised to assess their postural habits. Reporting ergonomic hazards to local dentists, Rehman et al[23] found that more than 50% dental personnel suffred from backache and neck-ache. Contrarily, a very low prevalence (9.7%) of musculoskeletal issues has been reported by Mehboob et al.[21] The high prevalence of ergonomic issues in study participants obligates strict practice of accurate posture maintenance during clinical practice. Habits adopted during training life continue for the rest of the career. It is the obligation of the facilitators to make sure that students obey the ergonomic guidelines and develop good postural habits.

The respondents of this study showed optimal practice in terms of cross-infection protocols. Most of the subjects made a record of patient history (94%), used anti – bacterial soap for handwashing (65%) and every patient was attended to after wearing a new pair of gloves (97%). This is because the students are trained to follow universal standards of cross infection control. The institutes where these students are trained are ISO 9001:2008 certified for quality management which justifies the high standards of practice. At the same time, it may be mentioned that no system is free of flaws and that there is always a room for improvement. Similar results have been reported in the Indian population in two different studies.[5,22] Conversely, prevalence of rubber dam usage was quite low (19%) while workplace clothes were not left or laundered at workplace for any of the respondent. This practice has also been reported by Al-Khatib et al[19] in Jerusalem population.

Knowledge of students in the current study regarding clinical presentation of inadvertent subjection to chemicals was poor. Around 89% of the subjects used mercury regularly but only 38% knew the proper management in case of spilled mercury. Similar results have been reported by Fasunloro et al[8] where 71.1% of dental personnel were in regular contact with mercury but all the personnel who handled mercury were unaware of possible mercury poisoning. Chopra and Pandey[17] and Viragi et al[5] on the contrary, reported practice of no-touch-technique for mercury; however, subjects did not undergo measurement of blood mercury levels periodically. In the present study, a significantly greater percentage (52%) of final year students depicted a greater knowledge of such a management. The higher

percentage of contact with mercury may be explained by the fact that dental amalgam is still one of the commonly used filling materials in developing countries including Pakistan. Students are required to fulfill a quota of 200 dental amalgam restorations in their final year as per the statutes of Pakistan Medical and Dental Council (PMDC).[24] Although dental amalgam use has been banned in Western countries,[25] it cannot be totally eliminated in developing countries owing to poor socioeconomic status of the general population.

Majority (96%) of the subjects did not report any known allergy to the routinely used dental materials. Chopra and Pandey[17] documented comparable results in the Indian population. Concerning psychosocial aspects, 54% approved that they got stressed owing to peer pressure and competition in training, 62% revealed their training and work being affected by their private issues and 71% got irritated with non-compliant patients. Similar results have been reported in the Indian and American population.[5,26] With advancements in technology, dentistry too is progressing at a rapid pace. Also, general population today is more aware about treatment options and more concerned about esthetics. This calls for increased hard work and improved performance by the students in daily routine and its associated stress.

An attempt was made to conduct a simple yet comprehensive survey to assess the awareness of students about OH and highlight the need for any improvements thereof. The study, however, has a few limitations. Being a questionnaire based survey, the results are subject to reporting bias of the study participants. While the questions were aimed to assess the awareness of students, actual practice of the students was not analyzed. This means that being aware of the problem or its solution is not enough. While students may be adequately aware, whether they practice standard protocols or not needs independent evaluation. Moreover, students from only two institutes were assessed. Other institutes should be targeted as well and the results should be compared.

OH poses a momentous danger to dental health care workers globally. Greater emphasis is needed to practice “hazard free dentistry” during the undergraduate and postgraduate education of dental students. More exploratory work is required to assess the actual practice of dental and paradental healthcare workers towards OH. Furthermore, continuing dental education courses, workshops and conferences must be organized to coach the healthcare community about potential health risks and how to counter them.

Undergraduate students and house surgeons at AFID and IIDC were well-acquainted with dental practice related health risks. Barriers for self-protection and infection control protocols adopted by the subjects were satisfactory.

However, knowledge of study subjects regarding ergonomic risks and correct usage of dental materials needs improvement. Dedicated efforts are required to improve the training of students in the abovementioned areas.

Undergraduate students must be adequately guided and trained to meet practice standards the world over. Students’ posture during clinical procedures must be closely monitored and supervised by skilled faculty members. Special emphasis must be placed on handling of dental materials during pre-clinical years. Dedicated workshops may be conducted to acquaint undergraduate students, faculty members as well as practicing clinicians with WHO standards of patient safety and protocols of practicing hazard – free dentistry. Safety checklists must be introduced for every procedure in every department to minimize the potential for error. Also, official reporting of patient safety incidents should be encouraged to prevent such incidents in future.

Conflict of interest: None declared.

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