



Knowledge, attitude and awareness among the dental students on occupational hazards in prosthetic dentistry - A questionnaire study

Subhiksha K¹, Soumiya T¹, Sruthi A S¹, Sherin A¹, Raghunathan J²

¹ CRRI, Department of Prosthodontics, Karpaga Vinayaga Institute of Dental Sciences, Madhurantakam, Chengalpattu District, Tamilnadu, India

² Reader, Department of Prosthodontics, Karpaga Vinayaga Institute of Dental Sciences, Madhurantakam, Chengalpattu District, Tamilnadu, India

Abstract

To assess the knowledge and awareness of occupational hazards during clinical practice in the department of prosthodontics amongst the undergraduate and postgraduate students. A questionnaire study was conducted among dental students from October 2023 to December 2023. About 200 participants were recruited for the study using simple random sampling method. Data was analysed using SPSS Software. The results showed that most of the students were aware and experienced some kind of occupational hazards in dentistry. Most of them experience some kind of musculoskeletal disorders. Most of the postgraduates were aware of stretching exercise during clinical practice. But only a few undergraduates were aware of it. There are a number of occupational hazards and risks that continue to be a major concern for prosthodontic practices. Knowing the different types of risks will help the prosthodontic professional to work better and take better care of their personal health.

Keywords: Occupational hazards, knowledge, awareness, dental students

Introduction

Occupational hazards are defined as a risk that one experiences in the workplace [1]. The 18th century saw the emergence of occupational risk and risk consciousness, according to Bernardino Ramazzini, the founder of occupational treatment. He has shown how a person's profession plays a part in a variety of dynamic physical ailments and disorders. Studies have revealed that compared to people in other high-risk health occupations, dentists suffer from more serious and frequent health issues [2]. Prosthodontists are most prone to occupational hazards among other dentists due to lots of laboratory procedure in their clinical practice. The most common occupational hazards encountered are physical hazards, chemical hazards, biological hazards, Ergonomic hazards [3]. Physical hazards include trauma, burns etc, chemical hazards may be due to acrylic resins, latex gloves etc, biological hazards include infection due to needle stick injury, aerosols, suction etc.

The term "Ergonomics" is derived from Greek word meaning "Ergo" meaning work, "nomic" meaning natural laws together they create a word that means science of work and a person's relationship to that work [5]. Ergonomics is defined as the study by which the human body can be used at its maximum comfort, safety, efficiency.

The goal of ergonomics is to prevent health problems and to improve productivity. Dentistry is an occupation that requires skilful preparations with greater Precision, Musculoskeletal disorders (MSDs) among dentists results while treating patients with inappropriate operators and patient Position due to inadequate knowledge on ergonomic practice [6].

The most likely be affected include spine, shoulder, elbows and hands, due to this, there is a high prevalence of non-specific lower back & cervical work-related musculoskeletal disorders (WMSDs) among dentists [7]. Gaining ergonomic

knowledge not only avoids musculoskeletal disorder but also increases satisfaction among patients as well as the workers. Ergonomic working principles must be included in the curriculum, so that both undergraduate postgraduate must be aware of the its importance [5]. The objective of the study is to evaluate and inculcate knowledge about occupational hazards among dental students.

Materials and Methods

Study design

A cross sectional questionnaire-based study is conducted to evaluate knowledge, attitude and awareness among dental students on occupational hazards. Questionnaire is enlisted to clinics at Karpaga Vinayaga Institute of Dental Sciences among undergraduates and postgraduates. Each participant signed a consent before answering the question. All details of the study were discussed with the participants before the delivery of questions and collection of data.

Study samples and criteria

The study was determined on the number of undergraduates and postgraduates, a population size of about 200 participants was verified on the basis of G -Power software. Selected participants include postgraduates, interns, final years and third years undergraduates. First year and second year undergraduates were excluded in this study.

Participants grouping and data collection

Data collection was carried out from October 2023 to December 2023. A total of 200 participants were included. The participants were selected through simple random sampling. Data were collected using the prepared questionnaire.

Data analysis

Data from 200 participants were collected and summarised in an excel sheet. The results of the descriptive statistical

analysis were presented as mean, frequency, percentages and standard deviation using SPSS software.

Results

Table 1: Distribution of study participants

Year of study	n (%)
Third year	51(25.5%)
Final year	49(24.5%)
Intern	58(29%)
postgraduate	42(21%)

A total of 200 questionnaires were completely filled and evaluated with a response rate of 100%, maximum response was from interns with a response rate of 29% followed by

third years 25.5%, final years 24.5% and postgraduates 21%. [TABLE 1]

Table 2: Distribution of knowledge about physical hazards

Question	Answer	Frequency				P Value
		Third year	Final year	CRRI	Postgraduate	
1. Do you know various types of occupational hazards in prosthetic dentistry?	Yes	88.2%	100%	100%	100%	0.000
	No	11.7%	0%	0%	0%	
2. Have you ever experienced any physical injury during your clinical practice?	Yes	88.3%	97.9%	98.2%	100%	0.000
	No	19.6%	2.04%	1.72%	0%	
3. If so, what kind of injury you have experienced?	Physical cuts	33.3%	10.2%	31.03%	7.3%	0.000
	Burns	19.6%	4.08%	22.4%	4.8%	
	Both	33.3%	85.7%	62.06%	87.8%	
	None	13.7%	0%	1.72%	0%	
4. What do you think is the most common cause for eye injury in prosthodontic practice?	High speed rotary instruments	31.3%	2.04%	46.5%	43.9%	0.000
	Monomer fumes	23.5%	16.3%	1.7%	12.1%	
	Blue light	27.4%	2.04%	0%	4.8%	
	Pumice polishing	11.7%	32.6%	10.3%	12.1%	
	All of the above	5.88%	46.9%	41.37%	26.8%	
5. What do you think might be the prevalence rate percutaneous injury annually among prosthodontists?	< 10%	62.7%	14.2%	55.1%	100%	0.000
	< 20%	21.5%	53%	44.8%	0%	
	< 30%	9.8%	28.5%	0%	0%	
	< 40%	5.8%	4%	0%	0%	
6. Have you ever experienced any kind of irritation caused by acrylic monomer?	Yes	98.2%	62.7%	93.8%	100%	0.000
	No	1.7%	37.2%	6.1%	0%	
7. What do you think is / are the other possible sources of infectious contamination?	Handpiece	23.5%	4%	36.2%	14.6%	0.000
	Saliva ejector	15.6%	4%	8.6%	2.4%	
	Airotor	29.4%	2%	0%	9.7%	
	Suction	17.6%	6.1%	3.4%	4.8%	
	All of the above	13.7%	83.6%	51.7%	68.2	
8. Which is the most common mode of transmission of Hepatitis B infection?	Saliva	23.5%	2%	13.7%	0%	0.000
	Needle stick injury	29.4%	65.3%	67.2%	68.2%	
	Aerosol	29.4%	4%	0%	0%	
	All of the above	17.6%	28.5%	18.9%	31.7%	
9. Are you allergic to latex gloves?	Yes	45%	53%	79.3%	36.5%	0.000
	No	54.9%	46.9%	20.6%	63.4%	
10. If so what kind of reaction do you develop?	Urticaria	17.6%	2%	13.7%	26.8%	0.000
	Conjunctivitis	7.8%	16.3%	13.7%	0%	
	Mucosal rhinitis	15.6%	8.1%	6.8%	0%	
	All of the above	17.6%	38.7%	53.4%	12.1%	
	None	41.1%	34.6%	12%	60.9%	

Table 2 represents the results showed that 88.2% of third year, 100% of final year, intern and postgraduate were aware of occupational hazards in prosthetic dentistry which was significant. 88.3% of third years, 97.9% of final years, 98.2% of interns, 100% postgraduate have experienced physical injury during their clinical practice which was statistically significant. Most of the students experienced

both physical cuts and burns during their clinical practice. Most of the students experienced irritation caused by acrylic monomer which was statistically significant. Most of the students think that needle stick injury is the most common mode of transmission of hepatitis b infection.

Table 3: Distribution of knowledge about ergonomic hazards

11. Have you ever heard of the term "Ergonomics posture"?	Yes	54.9%	97.9%	100%	100%	0.000
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	No	45%	2%	0%	0%	
12. If yes, do you try to follow the correct operating positions while working?	Yes	23.5%	89.7%	84.4%	80.4%	0.000
	No	58.9%	8.1%	1.7%	0%	
	Sometimes	17.6%	2%	13.7%	19.5%	
13. How many clinical hours do you spend in a week on patients?	20 hours	80.3%	26.5%	84.4%	12.1%	0.000
	20 to 40 hours	15.6%	44.8%	15.5%	0%	
	40 hours	3.9%	28.5%	0%	73.4%	
14. Do you experience pain during/after using vibrating instruments?	Yes	70.5%	89.7%	98.2%	90.2%	0.000
	No	29.4%	10.2%	1.7%	9.7%	
15. Do you take breaks in between clinical procedures?	Sometimes	68.6%	63.2%	89.6%	92.6%	0.000
	Rarely	15.6%	32.6%	10.3%	7.3%	
	Never	15.6%	4%	0%	0%	
16. Do you experience pain in back, neck, shoulder or hands post procedure?	Always	64.7%	71.4%	75.8%	58.5%	0.025
	Sometimes	25.4%	28.5%	24.1%	39%	
	Never	9.8%	0%	0%	2.4%	
17. Where you experience pain the most?	Shoulder	41.1%	28.5%	10.3%	9.7%	0.000
	Neck	7.8%	8.1%	31%	7.3%	
	Back	23.5%	8.1%	39.6%	12.1%	
	Hands	9.8%	0%	3.4%	4.8%	
18. Are you aware of safe limits of tilting neck while performing the Procedure?	All of the above	17.6%	55.1%	15.5%	65.8%	0.000
	Yes	50.9%	77.5%	79.3%	73.1%	
	No	43.1%	16.3%	3.4%	0%	
	somewhat	5.8%	6.1%	17.2%	26.8%	
19. Do you think the work instruments should be in optimal conditions so that you don't need to strain?	Agree	60.7%	91.8%	84.4%	75.6%	0.000
	Disagree	29.4%	8.1%	0%	4.8%	
	Somewhat	9.8%	0%	15.5%	19.5%	
20. Are you aware of the stretching exercises that can be done in clinical hours?	Yes	3.9%	30.3%	36.2%	82.9%	0.000
	No	64.8%	55.6%	3.4%	0%	
	Somewhat	35.2%	14.1%	60.3%	17%	

Table 3 represents that most of the final years, interns and postgraduates were aware of ergonomics posture but half of the third years were unaware of it, which was statistically significant. Most of them experienced pain during in back, neck, shoulder or hand post any procedures which was statistically significant. Pain was experienced the most in all the sites. Most of the final years, intern and postgraduates try to follow correct operating position. Most of the third years were unaware of stretching exercise and about half of the interns and most of the postgraduates were aware of it.

Discussion

It is a well-known fact that a healthy mind and body alone can work efficiently. So, it is important for dentist to be healthy for a successful dental practice. Even though there are technical advancements in all the fields dentists are still facing numerous occupational health issues [8]. Many potentially toxic materials used in dentistry can pose a health occupational hazard if proper precautions are not taken from patients and the environment, dentists are always at risk of exposure to various infectious agents, which can be transmitted through oral and oropharyngeal secretions, blood, air, and water. The only solution would be to avoid the dangers [2].

This study lists the knowledge among the dental students on physico-chemical and biological hazards in prosthetic dentistry. When questioned about ‘‘Knowledge on various types of occupational hazards in prosthetic dentistry’’, 97% of participants chose ‘‘yes’’. For the question ‘‘What kind of injury you have experienced?’’, From all the participants, 65.8% chose the option both physical cuts and burns whereas each one of those were listed separately as other options. There was a significant difference between all parameters $p < 0.001$. When questioned ‘‘what do you think

is / are the other possible sources of infectious contamination?’’, 53.3% chose handpiece, saliva ejector, airtor, suction whereas each one of those were listed as separately as options. 57.3% of participants chose needle stick injury when asked about the most common mode of transmission of hepatitis B infection. This is in accordance with the study conducted by Ramaswami E *et al* [8].

Most of participants were aware of the term ergonomics posture and tried to follow the correct operating positions while working. 68.3% of participants chose ‘‘Always’’ when questioned if they experience pain post procedure. When participants were questioned on ‘‘where they experience pain the most?’’, 36.2% chose the option shoulder, neck, back and whereas each one of these were listed as separate options.

The literature from different countries focuses mainly on infection control and the correct handling of potentially infected materials, as the transmission of infection is very high in dentistry. Usage of personal protective barriers, such as gloves, masks, and goggles, as well as the availability of high-powered suction and good ventilation reduces the risks of aerosols and vapor hazards. Parallel findings have been recorded in several studies. From patients and the environment, dentists are always at risk of exposure to various infectious agents, which can be transmitted through oral and oropharyngeal secretions, blood, air, and water [2].

While a large number of participants (58%) were suffering from some kind of pain or discomfort in their body while working, comparable results were documented by Reddy *et al.* where 60% of the dentists working in private practice in India experienced some musculoskeletal disorders (MSD), and similar results were identified in a different study where 60% participants responded to be suffering from MSD. In accordance with my study, Leggat and Smith in their study among the dentists in Australia documented that 58% of dentists suffered

from neck pain, 53% with shoulder pain, 54% with lower back pain issues, and 9.1% reported taking leave in last year because of an MSD. The incidence and severity of these disorders can be decreased by regularly exercising. Physical therapy like posture correction, ergonomic advice, and stretching exercises are very important to prevent the occurrence of musculoskeletal pains^[8].

Gaining adequate knowledge and information regarding occupational risks and their prevention will contribute to the delivery of better-quality care to patients^[9]. The prevention and reduction of MSD among dentists should include their education in dental ergonomics and awareness of the importance of work-related risk factors^[10]. Various continuing dental education programs (seminars, workshops, and videos) should be organized for students and general practitioners so that dental professionals can acquire knowledge on different methods of prevention^[2, 9, 11]

Conclusion

Most of the study participants were aware of occupational hazards in prosthetic dentistry. Most of the experienced physical injuries during clinical and pre-clinical procedures. A greater portion of participants reported that they suffer from pain and discomfort. Although a dental practice is never free of occupational hazards (physico-chemical, biological, ergonomic hazards), necessary measures must be taken in order to bring more awareness among undergraduate students.

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