

# Assessment of occupational hazards among dentists practicing in Mumbai

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## ABSTRACT

**Aim:** To assess the awareness of various occupational hazards experienced and the preventive measures undertaken by the dentists in and around Mumbai. **Methods:** The present study was conducted using self-administered questionnaire, which was circulated to 200 dentists practicing in and around Mumbai. The questionnaire also included questions on personal information like age, gender, position (student or faculty), years of experience, and number of working hours per day. Those who completed the questionnaire form completely and willing to participate were only included in the study. The results were analyzed using SPSS version 22.0. **Results:** 23.5% of the participants had the dental working experience more than 10 years and 28.5% dentists worked for  $\geq 8$  h. 69% were general practitioners and 40% of the participants treat nearly 10 to 20 patients per day. 45% of them experienced needle stick injury in clinical practice. 1.5% of dentists in our study admitted receiving some litigation from their patients. **Conclusion:** The present study indicated that occupational hazards, awareness about biological hazards, and preventive measures observed by dentists in Mumbai are generally consistent with published guidelines for infection control and also in accordance with the previous research. The majority of the dental practitioners were suffering from pain in the muscles of neck or back. Regular training and workshops can help lower such problems.

**Keywords:** Clinical practice, dentists, Ergonomics, occupational hazard

## Introduction

Occupational hazard represents a risk or danger as a consequence of working conditions and working environment of a particular job.<sup>[1]</sup> The history about the awareness of various hazards in dentistry can be traced back to Bernadino Ramazzini who is referred to as “Father of Occupational Medicine,” documented the role of occupation in the dynamics of health and diseases.<sup>[2-4]</sup> Contemporary dentistry has been designated as probably the

least hazardous occupation though there are certain risks that still continue to challenge this status.<sup>[5]</sup> The various hazards seen in modern-day dental practice can be classified under 4 broad categories as physical, biological, chemical, and physiological. Dentistry being a demanding career associated with variety of tasks in a challenging work atmosphere proved to affect the health of the individuals physically or even aggravate their preexisting systemic conditions.<sup>[6,7]</sup>

The most prevalent injuries reported and experienced by the dental personnel are musculoskeletal in nature.<sup>[8]</sup> This profession requires to work in the same position and posture using an unremitting tedious technical procedure that can

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predispose the clinical dental worker to neck stiffness or neck ache, wrist ache, and lower backache.<sup>[3]</sup> Moreover, this scenario of health care practice makes the dental staff and auxiliary staff prone to get many infections as they come in direct or indirect contact with surgical tissues, blood, and saliva on a daily basis.<sup>[8,9]</sup> Needlestick injuries or wounds from sharp items and instruments (percutaneous injuries) have been stated to occur about 1%–15% of surgical procedures mostly associated with suturing.<sup>[10]</sup>

Eye injuries might ensue from jutting microscopic bits of calculus or splatter from body fluids that arise during scaling or polishing procedures and while using high-speed hand pieces.

Additional probable source of eye injury is the penetrating dental curing light.<sup>[11,12]</sup> Transitory exposure to irritants associated with volatiles from resin-based materials, X-ray chemicals, and cleansers could cause some reactions in eyes and upper respiratory tract according to the previous research. Others include procaine, eugenol, iodine, formalin, phenol, and other strong disinfectants that could irritate or harm the eyes and upper airway.<sup>[13]</sup>

Dental practitioners also need to update their knowledge on the legal fundamentals, as there are greater possibilities of the dentist coming across such probable cases, particularly in the context with patient authorization and increased desire for enhanced personal appearance. With increasing awareness of the patients with their rights and by-laws, there are high chances of dentists being under psychological stress every other day. To ensure a safe working environment at dental clinics, all the clinicians should procure through knowledge regarding probable hazards and their management as well as prevention of legal risks.<sup>[14]</sup>

Assessment of the occupational hazards experienced by dentist population in Mumbai would help us in motivating and planning preventive approaches to increase the proficiency of these health care practitioners. Hence, the present study was aimed to assess the level of awareness of the various occupation-related hazards and various measures taken for their management among the dentists working in Government Colleges and Hospitals as well as Private clinics in and around Mumbai.

## Materials and Methods

A cross-sectional survey was conducted among the dentists between December 2017 and March 2018. A self-structured questionnaire was distributed to all the dentists working in different private clinics and government dental college and hospital, in and around. The questionnaire comprised of 20 multiple-choice questions (both open end and close ended) on knowledge, attitude, and awareness toward occupational hazards. The first section of the questionnaire contained the demographic data, years of experience of the dentists, number of clinical hours working on patients, and other details followed by the queries regarding the awareness of the various occupation-related hazards and various measures taken for their

management. The survey questionnaire was distributed as hard copy randomly to about 200 dentists and the participants were instructed to choose only one correct and appropriate answer which they feel is correct for each particular question; the filled forms were collected after 15 min. Completely filled forms were only included in the study.

## Statistical analysis

Analysis of survey results was performed using the Statistical Package for the Social Sciences SPSS Version 20 (SPSS Inc; Chicago, IL, USA).

## Results

23.5% of the participants had the dental working experience more than 10 years and 28.5% dentists worked for  $\geq 8$  h. 66% of our participants worked from 4 to 8 h per day [Table 1]. And 69% were general practitioners [Table 2] and 40% of the participants treat nearly 10 to 20 patients per day. Nearly 93% of the dentists considered saliva to be a source of transmission of diseases. All the participants (100%) admitted to be using facemask, gloves, and protective eyewear while working on patients regularly [Table 3]. Almost 88% of dentists believed that aerosol acts as a media for transfer of microorganisms. Majority of the participants (96%) habitually sterilize their instruments. Just about 42% of our dentists used amalgam in their routine dental practice, and 73% of the participants believed that contacting mercury can cause some ill effects. 78.5% of the dentists in the study survey use chemical disinfectants in their practice. About 45% of them experienced needle stick injury in their clinical practice. Around 58% dentists agreed to suffer from pain or discomfort while working on patients. 83% of the dentists work in a clinical setup where there is X-ray machine. 9% of the dentists were not sure if they were exposed to any other radiation other than X-ray source. 69% of the participants believed that there could be ergonomic hazards associated with workstation design in a long duration. 1.5% of dentists in our study admitted receiving some litigation from their patients. 17% of the participants do not feel satisfied with their profession as dental surgeon in our study. Regarding knowledge on technostress, 61% of the participants never heard of the term technostress [Table 3].

## Discussion

Of late, there were few studies done on dentists in different parts of the world to assess the knowledge and awareness regarding occupational hazards. We wanted to know the response from the dentists working in Mumbai. It is a well-known fact that a healthy mind and body alone can work efficiently. Thus, it is very important the dentists should be healthy for a successful dental practice. Regardless of the fact that there is recent technical advancement in different fields, still dentists are constantly encountering numerous occupational health issues.<sup>[15-17]</sup>

**Table 1: Distribution of participants according to years of clinical practice and number of clinical hours in a day**

	Years of Clinical Practice			Daily clinical Working hours		
	<5	5-10	>10	<4 h	4-8 h	>8 h
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
<i>n</i>	112 (56%)	41 (20.5%)	47 (23.5%)	12 (6%)	131 (65.5%)	57 (28.5%)

**Table 2: Distribution of participants according to average number of patients per day and the type of practice**

	Average no of patients			Type of practice	
	<10	10-20	>20	General	Specialty
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)
<i>n</i>	89 (44.5%)	79 (39.5%)	32 (16%)	138 (69%)	62 (31%)

It should be noted that 17% participants in this study were not satisfied with their profession as dental surgeon. 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<sup>[16]</sup> In dental profession, stress at work has become an integral part. 26% of our subjects experienced technostress. Subjects experienced some kind of stress, either it is patient-related or dentist-related or economic. Another interesting fact documented in the previous research is that professional discontent was more commonly related with low back pain.<sup>[17-19]</sup> 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.<sup>[20]</sup> In a study conducted at Jazan University, Saudi Arabia, 54% of participants suffered from MSD and majority of them had to go for specialist treatment.<sup>[21]</sup> Varying results found in another study done among private practitioners in Saudi Arabia where 73% were frequently suffering from MSD.<sup>[22,23]</sup>

It was interesting to know that only 26% of the study population is aware of the word “technostress” though majority of them underwent some form of stress. Technology changes the way people work, and rapid technological advancements make ongoing change inevitable, and these changes can create stress.

Dentists were professionally dissatisfied with factors linked to the level of stress and limited amount of personal time, long working hours, huge competition, and fewer economic returns.

Lack of physical activity among dentists put them at risk to suffer MSD. The study of Hakami in Saudi Arabia stated that 30% of students suffered from problems related to psychological distress.<sup>[24]</sup> 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.<sup>[25,26]</sup> Exercise depletes the excess adrenaline released from stress, rejuvenates the body, and enables to return to a steady-state. This greatly influences the efficiency and energy levels. It is advised to choose an exercise which one can enjoy, that will motivate to continue doing it regularly.<sup>[27-29]</sup> It is proven fact that exercising releases endorphins, considered as “feel-good factor” which makes us better to manage our patients and staff. In our present study, 38% dentists were not involved in any recreational activities due to various reasons. Inexperienced scheduling of treatment may be source of dissatisfaction and discomfort related with failure both to a doctor and a patient. Among the majority of dentists, the presence of stress situations connected to elicit painful thoughts, emotions, or fears. It may also contribute to the development of such rapid reactions as increased tension, high blood pressure, fatigue, sleeplessness, and depression.<sup>[19,30-32]</sup>

In a study carried out in Riyadh, Saudi Arabia to record the prevalence of hearing problems in the last five years, 16.6% of subjects reported to be suffering from tinnitus and 30% of the subjects had difficulty in speech discrimination.<sup>[19]</sup> In our study, specific hearing problems were not evaluated but 68.5% of the participants believed to develop ergonomic hazards in their body associated with workstation design on a long run.

In the present study, we noticed that only 1.5% of the participants faced litigation from patients. This percentage is very less when compared to the other developed countries; the reason could be due to a lack of patient awareness or the dentists might be following the code of ethical principles correctly.<sup>[33-35]</sup>

Wearing of face masks, gloves, and using protective eyewear were the preventive measures routinely employed by the study population and the results were in harmony with the previous studies.<sup>[25,26,35]</sup> And 88% of our participants agreed that aerosols act as a media for transfer of microorganisms. The previous studies stated that some dental materials are aerosolized during high-speed cutting and finishing and may thereby be inhaled by dental staff. Other dental materials are volatile and may give rise to dermatological and respiratory effects.<sup>[31]</sup> Although we did not evaluate the allergic status of our participants toward latex or other dental materials, 73% of our dentists believed that contacting mercury has ill effects, and 79% of the participants use disinfectants regularly in their clinic which are strong and harmful to the eyes and respiratory tract.

Dental personnel are unprotected to both ionizing and nonionizing type of radiations. Ionizing radiation is a

**Table 3: Knowledge of the participants regarding occupational hazards**

Question	Options	Total (n=200)	Percentage (%)
Do you feel saliva can be a source of cross transmission of diseases?	Yes	185	92.5%
	No	8	4.0%
	Not sure	7	3.5%
Do you use facemask, gloves, and protective eyewear while working on patients?	Yes	200	100.0%
	No	0	0.0%
	Not sure	0	0.0%
Does aerosol act as a media for transfer of microorganisms?	Yes	176	88.0%
	No	4	2.0%
	Not sure	20	10.0%
Do you sterilize your instruments?	Yes	199	99.5%
	No	1	0.5%
	Not sure	0	0.0%
Do you use amalgam in your practice?	Yes	83	41.5%
	No	117	58.5%
	Not sure	0	0.0%
Does mercury have any ill effects contacting it?	Yes	145	72.5%
	No	19	9.5%
	Not sure	36	18.0%
Do you use chemical disinfectants in your practice?	Yes	157	78.5%
	No	35	17.5%
	Not sure	8	4.0%
Have you received any needle stick injury in your clinical practice?	Yes	90	45.0%
	No	102	51.0%
	Not sure	8	4.0%
Have you been experiencing pain or discomfort while working?	Yes	116	58.0%
	No	73	36.5%
	Not sure	11	5.5%
Does your clinic have an X-ray machine?	Yes	165	82.5%
	No	34	17.0%
	Not sure	1	0.5%
Is there any source of radiation other than X-rays?	Yes	23	11.5%
	No	160	80.0%
	Not sure	17	8.5%
Do you feel ergonomic hazards associated with workstation design can affect you in the long run?	Yes	137	68.5%
	No	19	9.5%
	Not sure	44	22.0%
Have you received any litigation from any of your patients?	Yes	3	1.5%
	No	193	96.5%
	Not sure	4	2.0%
Do you involve yourself in recreational activities?	Yes	123	61.5%
	No	76	38.0%
	Not sure	1	0.5%
Do you feel satisfied with your profession as a dental surgeon?	Yes	166	83.0%
	No	34	17.0%
	Not sure	0	0.0%
Have you heard of technostress?	Yes	51	25.5%
	No	122	61.0%
	Not sure	27	13.5%

well-established risk factor for malignancy on long-term basis. However, regardless of the fact that, most dental offices and clinics have X-ray machines that are in frequent use. Among our study population, 83% have dental X-ray machine in their clinics and 12% of our study group uses other additional radiation

sources in their clinic. With the improvement in radiologic equipment techniques and radioprotection measures, direct radiation injury has been virtually eliminated. Nonionizing radiation has now proved to be an important concern with the use of blue light and ultra-violet light to cure various dental materials. Exposure to these radiations can cause damage to the various structures of the eye including the retina and the cornea. Use of safety glasses and suitable shields can minimize or eradicate the radiations in this regard.<sup>[33,35,36]</sup>

83% of our study population believed saliva as a source of cross transmission of diseases. This exposure is related to the fact that dentists work in a limited-access and restricted-visibility field and frequently use sharp devices. Percutaneous exposure incidents facilitate transmission of bloodborne pathogens such as human immunodeficiency virus (HIV), hepatitis C virus (HCV), and hepatitis B virus (HBV).<sup>[32,33]</sup> Needles and drilling instruments such as burs represented the most common devices as the cause of exposure and injury. 45% of our study group admitted having experienced needle stick injury in the dental clinic. In contrast, 72% of the dental students of Australia had experienced sharp instrument injury during their clinical training. The contradicting results were due to the reason that we included the clinicians and experienced faculty in our study. With the emergence of blood-borne pathogens, dentists are obliged to adopt a number of precautions and sterilization protocols that have become universally accepted to prevent from spread of infection.<sup>[37,38]</sup>

Although occupational hazards can include musculoskeletal conditions, psychosocial stress, radiation exposure, and the risk of communicable diseases, sharps injuries remain the most common among surgeons in practice and the most frequent route of transmission of blood-borne pathogens. The management of these musculoskeletal conditions and psychological stress requires increased efforts in the primary healthcare settings through a combination of clinical interventions and encouraging awareness regarding behavioral change including exercise, weight management, and mental health.

The inference of this study is vital for health care interventions that lead to a better quality of life for future doctors. However, this study has certain limitations which should not be neglected. Based on the cross-sectional study design, it was not possible to detect the connection and identification of potential risk factors and the use of a self-reported questionnaire could lead to logical bias.

## Conclusion

The majority of the study population were aware of the biological hazards associated with the practice of dentistry. Nearly, half the participants experienced stress and sharp instrument injury. In addition, musculoskeletal disorders or pain were reported by larger group of participants. The majority of the partakers were involved in some recreational activity.



In order to be productive professionally, one must be healthy. High production demands in combination with stressful working conditions will affect overall health. One thing should be kept in mind that every technology, no matter how beneficial, can exert a negative impact on some members of the population. Dentists should control their working hours, pace of work, be aware of occupational hazards, and observe their mental health. Strategies for improving mental health and reducing the effects of occupational hazards should be developed and implemented in order to secure the well-being of dentists. Numerous continuing dental education programs should be organized so that dental professionals can gain knowledge about various newer improvements and strategies to have a cheerful working environment.

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### Conflicts of interest

There are no conflicts of interest.

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