

Review Article

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Hazards in Modern Dentistry – A Review

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ABSTRACT

Despite numerous advances in recent years in the field of dentistry, many occupational health problems still persists. They include stress and professional burnout, allergies from various materials, musculoskeletal disorders and diseases of peripheral nervous system, Percutaneous Exposure Incidents (PEI), biological hazards, hazards due to nitrous oxide and legal hazards. Dental professionals are constantly exposed to a number of specific occupational hazards. In many cases, this exposure results in diseases which are regarded as occupational illnesses. Based on the relevant literature, this review focuses on the occupational hazards in dentistry. Being unaware of the potential hazards in the work environment makes dental personnel vulnerable to occupational injury and illnesses. Awareness of these occupational hazards and implementation of preventive strategies can provide a safe dental environment of all concerned.

Key-words: Occupational hazards, Stress, Allergy, Musculoskeletal diseases, Ergonomics, Dentists.

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Introduction

Although modern dentistry has been described as probably among the least hazardous of all occupations, many risks remain in dental practice which continue to challenge this status. These include percutaneous exposure incidents (PEI), exposure to infectious agents including bio aerosols, musculoskeletal disorders (MSDs), eye injuries, vibration induced neuropathy, exposure to radiation, noise and dental materials and psychological conditions. When such risks cannot be engineered out of the dental clinic, appropriate occupational health and safety measures need to be adopted by dental staff and dental students. The current paper reviews studies relating to occupational hazards and occupational health problems in dental practice, updating a previous literature review.

DEFINITION OF OCCUPATIONAL HAZARD

Occupational hazard can be defined as – “***A risk to a person usually arising out of employment***”.¹

It can also refer to a work, material, substance, process or situation that predisposes, or itself causes accidents or disease, at a work place.

The field of dentistry is not an exception for an exposure to occupational hazards.

Methods

An extensive literature review was conducted which included articles published in peer reviewed journals and pub med indexed journals relating to occupational hazards in dentistry. Only articles of English language were included. The review itself began with the search of the relevant Medical Subject Headings such “occupational hazards”, “musculoskeletal disorders”, “dentists” in Pub Med, the official literature search engine of the National Library of Medicine in United States. The focus of the present review would be the occupational hazards in dentistry and the occupational health problems of dentists.

Occupational Hazards in Dentistry

Professionals in dentistry are exposed to many occupational hazards; their effects appear as ailments that affect the dental practitioner and tend to intensify with age.² Although identification of the risks to orthodontists and other dental professionals has been explored in several studies but the level of awareness of potential health risks for operators is very low in developing countries like in India.³

Hazards Encountered in Dentistry

1. Stress and Professional Burnout
2. Allergies from various materials
 - Latex Hypersensitivity
 - Acrylate and Its Compounds
 - Allergic Asthma
3. Hazards from physical agents
 - Radiation
 - Noise
4. Musculoskeletal Disorders and Diseases of Peripheral Nervous System

Stress and Professional Burnout

Dentists perceive dentistry as being stressful than other occupations. They encounter numerous sources of professional stress, beginning in dental clinic.⁴

In a study conducted by Bushra et al in the year 2012, when asked about any current psychologically traumatic condition, 42% dentists answered yes. For psychological stress, 18.6% stated it had negative influence on the working environment.⁵

In a questionnaire survey conducted by Puriene et al in the year 2007 to examine self perceived psychological wellbeing of Lithuanian dentists and to relate complains of well being to occupational hazards of dental profession. Results showed that substantial numbers of Lithuanian dentists reported work related stress, fatigue, nervousness and anxiety. Tension before work and awakenings at night were frequent complains. Of all, 94.2% of respondents indicated that long working hours affect their general health and 41.7% were bothered by this condition on a frequent or very frequent basis. Although less than 10% of dentists indicated overwork, they indicated that long working hours influence their psychological wellbeing.⁶

A study of burnout and its causes among dentists in Finland identified psychological fatigue, loss of enjoyment for work, and becoming insensitive toward patients. With respect to the specific anxiety sources, a survey of Canadian orthodontists reported that the highest scoring stressors in terms of severity were patient dissatisfaction with treatment, working with uncooperative patients, and falling behind schedule; these agreed with the results of similar studies of general dental practitioners.²

Kay and Lowe reported that the most common factors contributing to stress at work were patient demands (75%), practice management/staff issues (56%), fear of complaints/litigation (54%) and non-clinical paperwork (54%).⁷

2. Allergies from various materials

An occupational allergic reaction particularly of the hands is a common problem among dental personnel.

In a study conducted by Bushra et al in the year 2012 to find out prevalence of professional hazards including psychological, musculoskeletal, biological and allergic problems among dental professionals. Results showed that concerning allergic reactions, 17% suffered from latex allergy and 8% had allergy from acrylic resin.⁸ A study from Thailand reported one-fifths of dentists suffering from contact dermatitis. Approximately one-third of dentists and dental hygienists reported hand dermatoses in few other studies.⁹

3. Hazards from physical agents

Radiation

Dental personnel are exposed to both ionizing and non-ionizing type of radiations. A study conducted among Canadian dentists reported that occupational doses of ionizing radiation among dentists and dental workers have decreased markedly since the 1950s.⁹

A study conducted by Al Wazzan K.A et al, to determine the prevalence of hearing problems among dental personnel from Riyadh city, Saudi Arabia. Results showed that 34 candidates (16.67%) had tinnitus, 30 (14.71%) had difficulty in speech discrimination and 63 (30.88%) had difficulty in speech discrimination in a background noise. Dental technicians were most affected and the incidence of these symptoms was more in personnel exposed to dental field noise for more than four hours per day.¹⁰

Noise

Virtually all noise levels at dental clinics were below 85dB.

Bahannan et al investigated the noise level of various dental hand pieces. Their findings showed that the noise level of high speed turbine hand-piece was 72.91dB and for low speed angled hand-piece was 69.71dB.¹⁰

4. Musculoskeletal Disorders and Diseases of Peripheral Nervous System

Musculoskeletal disorders are common health problems reported among dentists. Its prevalence reported to be between 38-82%. It has been reported that young and less experienced dentists experience more musculoskeletal disorders compared to older and experienced one.¹¹

A Cross sectional descriptive study was conducted by Meenakshi S et al in the year 2014 to assess the work related musculoskeletal disorders among general dental practitioners of Mysore District, Karnataka. Results showed that seventy-eight percent had a prevalence of at least one work related musculoskeletal disorder symptom (WMSD). Most common areas affected by MSD in order of magnitude were neck (50%), low back (14.2%), shoulders (21.7%) and stiffness in fingers (21.7%). A significant association was observed between hours of practice, age, body posture and occurrence of WMSD.¹²

A Cross sectional descriptive study was conducted by Muralidharan D et al in the year 2013 to determine the prevalence and distribution of MSD among dental practitioners in a city in the southern state of Andhra Pradesh, India. Results showed that seventy-three dental practitioners participated in the study of which seventy-eight percent had a prevalence of at least one MSD symptom over the past twelve months. Most common areas affected by MSD in order of magnitude were neck (52%), low back (41%), shoulders (29%) and wrist (26%). One third of the practitioners (40%) required sick leave from their practice during the preceding twelve months.¹³

A questionnaire survey was conducted by Mehrdad et al in the year 2012 to determine the prevalence of musculoskeletal disorders (MSDs) and ergonomic hazards and their relationship among Iranian physicians

who work in teaching hospitals. Results showed that knee pain (19.8%) was the most common complaint among physicians, followed by low back (15.1%) and neck pain (9.8%). A total of 169 physicians (41.7%) reported symptoms in at least one part of their bodies. Prolonged sitting, standing and neck flexion were the most commonly reported ergonomic hazards among the participants. There was statistically significant association for the outcomes of knee pain and symptoms in any part of the body with the work related factors, years of employment and work hours per shift.¹⁴

A questionnaire survey was conducted by Sharma P et al in the year 2011 to assess the awareness among Indian dentists regarding the role of physical activity in prevention of work related musculoskeletal disorders. Results showed that the total sample consists of 80 males and 22 females. Out of the 102 dentists, over 97 of dentists had sought medical advice for these disorders during the previous 06 months and 74 of them also consulted the physiotherapist for exercises and ergonomic advice.¹⁵

A Cross sectional study was conducted by Harutunian K et al in the year 2011 to evaluate the intensity and location of musculoskeletal pain suffered by the students and professors from different postgraduate programs of the School of Dentistry of the University of Barcelona (Spain) and also to identify the variables related to the occurrence of musculoskeletal symptoms and signs and to establish possible preventive measures for such disorders. Results showed that most of the dentists (79.8%) had experienced some kind of musculoskeletal pain in the last 6 months. On comparing the different locations of pain (lumbar, cervical, dorsal, wrist, shoulder and others), the neck was found to be the most commonly affected location (58% of all subjects), and only 34% of the respondents took some preventive measures against musculoskeletal disorders. Women showed a higher frequency of intense pain involving the cervical, lumbar, dorsal and wrist areas ($p < 0.05$). A higher incidence of wrist pain was recorded in professionals exclusively dedicated to oral surgery ($p < 0.05$). No statistically significant correlation was found between the workload (hours) and pain in the different anatomical locations ($p > 0.05$).¹⁶

A Cross-sectional descriptive survey was conducted by Akinpelu A et al in the year 2009 to determine the prevalence and pattern of musculoskeletal pain and healthcare seeking behaviour of dwellers of Igbo-Ora, a rural South-western Nigerian community. Results showed that one thousand and nine participants (677 males and 332 females) reported experience of MSP during 12 months prior to study, giving a 12-month prevalence of 80.0%. The three most frequently reported sites of MSP were low back (47.0%), shoulder pain (19.9%) and knee (15.1%). Prevalence of MSP was high among occupational drivers (92.4%), farmers (89.4%) and artisans (84.6%). Gender ($\chi^2 = 11.676$; $p < 0.001$), age ($\chi^2 = 14.111$; $P < 0.02$) and occupation ($\chi^2 = 94.714$; $p < 0.001$) were significantly associated with prevalence of MSP. Majority of participants (63.9%) believed MSP is work-related. Only 7.2% of participants sought hospital treatment while the majority (81.9%) used self-prescribed drugs for pain alleviation.¹⁷

A Cross sectional survey was conducted by Leggat PA et al in the year 2006 to investigate the prevalence and impact of MSD among Australian dentists. Results showed that Most dentists (87.2 per cent) reported having experienced at least one MSD symptom in the past 12 months. The most prevalent MSD during the previous 12 months were reported at the neck (57.5 per cent), lower back (53.7 per cent) and shoulder (53.3 per cent). MSD which interfered with daily activities during the previous 12 months were reported at the neck (24.6 per cent), the lower back (22.1 per cent) and the shoulders (21.8 per cent). Over one-third (37.5 per cent) of dentists had sought medical advice or treatment for an MSD during the previous 12-month period. Almost 1 in 10 dentists (9.1 per cent) reported taking leave in the previous 12 months because of an MSD. Among those who took sick leave for an MSD, the mean time taken was 11.5 days (SD=16.0 days).¹⁸

Conclusion

Based on the evidence, information and rules local to either the country or region, high standards of Dental Infection Control & Occupational Safety must be followed by the dental team for the safety of the patients and Dental Healthcare Workers.¹⁹

Further, the research is now needed to more carefully elucidate the impact of hazards on dentists and also to identify specific risk factors and effective measures for reducing dental occupational hazards.²⁰

The identification of needle-stick injuries as a common cause of PEI again stresses the importance of preventive strategies with respect to potential blood-borne infections. Further research is now needed to more carefully identify effective measures for reducing PEI among dental personnel.²¹

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