

Prevalence of musculoskeletal disorder and experience among dental practitioners in Chennai - A cross-sectional survey

R. Pradeep Kumar^{1*}, Suganthi Saraswathi², Lakshmi Thangavelu³

ABSTRACT

Background: The aim of this study was to investigate the prevalence and distribution of musculoskeletal symptoms among dentists in Chennai and also its impact in their daily activities. **Materials and Methods:** The survey instrument was a self-administrated questionnaire, which was responded by 130 dentists in Saveetha Dental Hospital, Chennai, India. The following aspects were investigated age, gender, working hours per day, years of practice, pain symptoms during the past 12 months, and its interference in the daily work during the past 12 months. Questions also included the data on operating posture of the dentists, clock position, and practice of regular exercise daily. **Results:** The results showed 89% of the dentist reported at least one musculoskeletal complaint in the past 12 months. The mean age of the study population was 30.4 years. The most prevalent sites with symptoms reported during the past 12 months were the neck (67%), shoulders (58%), and lower back (51%).

KEY WORDS: Dentist, Musculoskeletal disorder, Occupational risk, Posture

INTRODUCTION

The musculoskeletal system is a complex entity, composed of bones, joints, muscles, tendons, ligaments, bursa, nerves, and blood vessels. Musculoskeletal disorders (MSDs) are identified as injuries to this system. They can occur from a single or cumulative trauma and cause pain in the neck, shoulder, arm, wrist, hands, upper and lower back, hips, knees, and feet.^[1]

MSDs have become increasingly common worldwide during the past decades. Nearly 2 million workers suffer from MSDs each year.^[2] Various work-related factors have been established as predisposing the disorders. The profession of dentist exposes them during their work to many burdensome and harmful factors. The irrational posture adopted by dentists during their work causes discomfort and disorders

of the musculoskeletal system and the peripheral nervous system.^[3] A slightly hand neuropathy has also been reported caused by exposure to high-frequency vibration tools.^[4] Dental personnel has an increased risk of developing such disorders.^[5]

Musculoskeletal pain, particularly back pain, has been found to be a major health problem for dental practitioners.^[6-12] Several studies have reported a similar prevalence of MSDs among dentists. In a survey of Danish dentists, for example, 50% and 65% reported a 1 year prevalence of low back pain and neck/shoulder pain, respectively.^[13] The Queensland study also examined MSD at seven other body sites, revealing that the 12-month period - the prevalence of shoulder pain (53%) was as prevalent among dentists as lower back or neck pain.^[14] This finding is similar to an investigation of dental workers in the United States (US) military (53%),^[7] as well as another study of Danish dentists (65%).^[10]

Some investigations suggest that the prevalence and location of pain and other symptoms may be

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¹Reader, Department of Public Health Dentistry, Saveetha Dental College, Saveetha University, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India, ²Department of Pedodontics, Tamil Nadu Government Dental College, Chennai, Tamil Nadu, India, ³Department of Pharmacology, Saveetha Dental College, Saveetha University, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India

*Corresponding author: Dr. R. Pradeep Kumar, Department of Public Health Dentistry, Saveetha Dental College, Saveetha University, Saveetha Institute of Medical and Technical Sciences, 162, Poonamallee High Road, Chennai - 600 077, India. E-mail: drpradeepkumar@gmail.com

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influenced by posture and work habits, as well as other demographic factors.^[6]

An ergonomically deficient workplace may not cause immediate pain because the human body has a great capacity for adapting to a poorly designed workplace or structured job. However, in time, it will surpass the body's coping mechanisms, causing inevitable physical symptoms, emotional stress, low productivity, and poor quality of work.^[15,16]

Hence, the purpose of this research is to study the prevalence and distribution of the symptoms of MSDs among dentists in Chennai, India.

MATERIALS AND METHODS

The study population comprised 130 dental practitioners randomly selected from a private hospital in Chennai. The ethical clearance was obtained from the Institutional Ethical Committee from Saveetha University, Chennai. Each of the participants completed a self-administered, anonymous data-gathering sheet. It included items on sociodemographic variables (age and gender) and the work-related questions (years of practice and working hours per day). Participants were requested to report whether they had experienced pain or discomfort in any of nine different body areas (neck, shoulder, elbow, wrist/hand, upper back, lower back, hip, thighs, knee, and ankles/foot) during the past 12 months, and being prevented from doing normal activities due to these symptoms during the past 12 months, and also whether medical treatment is sought in the previous 12 months. Data were anonymously coded and entered into a spreadsheet program and subject to analysis.

The study also included the operating position of the dentist while working and the clock-related working position, with the mouth of the patient as the center of a circle, the dentist's working positions were determined. Consequently, 12 o'clock corresponds to the dentist sitting behind the head of the patient.

Additional information was requested whether daily exercise is followed by them.

RESULTS

Response

A total of 130 questionnaires were returned completed. The sample included general dentists and specialists mainly orthodontists, oral and maxillofacial surgeons, endodontists, periodontists, and specialist in pediatric dentistry. A significant proportion of general dentists had postgraduate studies.

Baseline Characteristics

Of the 130 participants, 64 were male and 66 were female. Table 1 illustrates the distribution of age groups by gender and Table 2 depicts the predominant operating position of the dentist at work, stratified by gender. It was evident that only <50% of the dentists adopted appropriate operating positions.

Prevalence of MSD

Most dentists (89%) reported to have at least one musculoskeletal complaint during the past 12 months [Figure 1]. The most prevalent musculoskeletal complaints among dentists during the previous 12 months were reported at the neck (67%), lower back (51%), and in the right shoulder (28%).

Neck pain was significantly more likely to be reported by general dentists, younger dentists, and dentists with less experience, predominantly males (72%). Similarly, upper back pain was significantly more likely to be reported by younger dentists and predominantly males (77%) and lower back pain is more significant in the females (53%). Shoulder pain is predominant in the males and mainly in the right shoulder (30%). Elbow, wrist, and hand pain are significantly more likely to be reported by female dentists.

Impact on MSD in Dental Practice

Figure 2 reveals that the musculoskeletal symptoms most frequently interfering the dentist's regular

Table 1: Personal characteristics and working experience among dentists (n=130)

Personal characteristics	Mean (n=130)	Male (n=64)	Female (n=66)
Age (years)	30.4	30.0	30.9
Years of practicing (years)	6.5	5.9	7.1
Working hours (h)	7.9	8.2	7.5

Table 2: Operating posture frequently adopted by the study participants

Operating posture	Total n (%)	Male n (%)	Female n (%)
A. Whole back bent the seat straight	53 (40)	28 (44)	26 (39)
B. Lower and upper back straight, the neck bent with the seat straight	46 (35)	22 (34)	23 (35)
C. Whole back bent, the seat forward tilted	12 (9)	6 (9)	7 (17)
D. Lower and upper back straight, the neck bent, the seat forward tilted	23 (18)	10 (16)	12 (18)

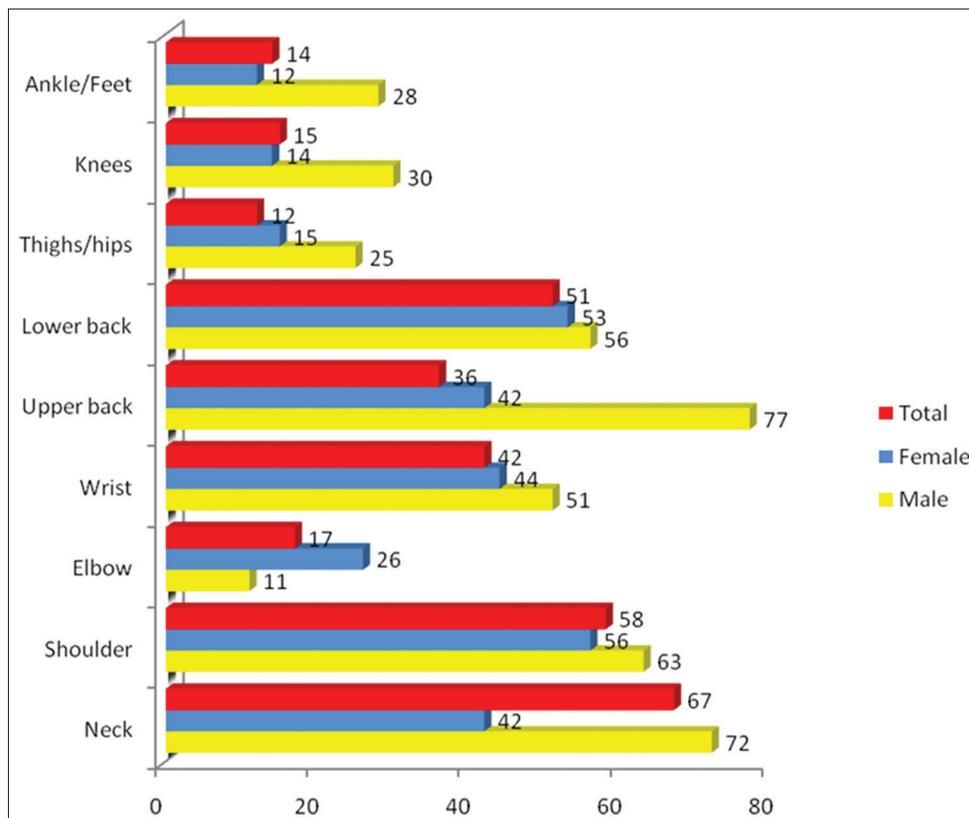


Figure 1: Prevalence of musculoskeletal symptoms experienced by dentists in the past 12 months

activities are at the neck (41%), the lower back (36%), and shoulders (33%). Neck pain that interfered with daily activities was significantly more likely to be reported by males (42%) and younger dentists. Shoulder pain and lower back pain were predominant in the males 36% and 39%, respectively. Elbow and wrist/hands pain was significantly more common in the females which is 12% and 30%, respectively. Over 13% of dentist had sought medical advice or treatment for MSD during the previous 12 months.

When the operating position of the dentist in relation to the patient was assessed, 54.6% of the dentists reported using a position between 10 and 12 o'clock. Dentists who used 9 o'clock position reported more symptoms (15.5%), while dentists who used 10 o'clock position reported the lowest symptoms.

Only <50% of the dentists reports using proper sitting posture, whereas the remaining does not adopt to the standard criteria. The most predominant sitting posture of the studied dentists were the whole back bent and seat straight. Dentists', who exercise regularly (40%), reflected reduced symptoms of pain in the neck, upper back, and knee region.

DISCUSSION

The physical load among dentists seems to put them at high risk for the occurrence of MSDs. In our study,

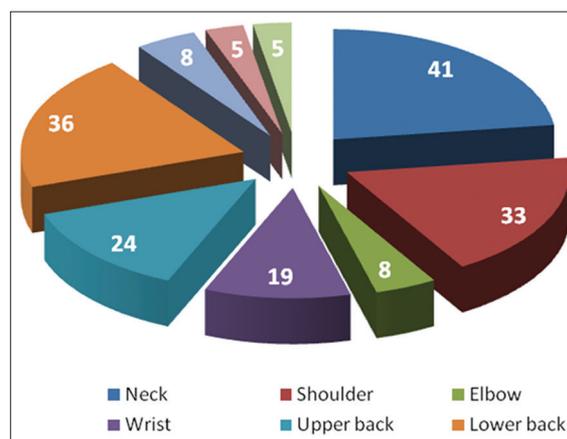


Figure 2: Interference at work due to symptoms of musculoskeletal disorders during the past 12 months

the dentists were asked to record the occurrence of pain and discomfort over the past 12 months and the impact in their daily activities. The questionnaire gave answers only with respect to the occurrence of symptoms and not to the frequency and intensity of pain and discomfort. The investigation showed that the frequency of pain and discomfort in the neck, shoulders, and lower back was relatively high. This corresponds with earlier investigations from different parts of the world. Only 15 dentists, of the 130 who answered the questionnaire, were completed without pain and discomfort in the locomotor system. 89% of dentists

reported at least one musculoskeletal complaint. 13% sought medical care.

A survey of dentists in Israel similarly reported that 55% and 38% of them had experienced musculoskeletal symptoms in the lower back and neck in contrast to this study, 51% had lower back, and 67% had neck pain.^[17] In this regard, similar health problems have also been reported during studies of dentists in the US^[7] and among Norwegian dental hygienists.^[18] A Saudi study, however, reported a slightly lesser rate of MSD among their subjects 74%^[19] Milerad and Ekewan found slightly lesser prevalence than in our study, with 44% for neck and 51% for shoulder complaints,^[8] whereas in our study, the amount of neck pain was 67% and shoulder pain was 58%. Abduljabbar *et al.* found a higher prevalence of the pain factor in the females, whereas in our study, it is the males who are highly affected.^[20] The 12-month period prevalence of neck-related pain among Queensland dentists (57.5%)^[14] was similar to that reported by dentists in many countries such as Denmark (65%)^[13] and Saudi Arabia, but in this study, the neck pain is relatively high (67%). A study done in Queensland dentists reported hand pain in one-third of them^[14] which is lower than the 76% of dental workers reporting one or more symptoms of carpal tunnel syndrome in the US military study,^[10] whereas in this study, 42% of them reported to have symptoms in hand wrist.

In this study, significant MSDs were more common in younger and less experienced dentists (30.4) which are similar to an investigation of Thai dentists, which also revealed that less experienced dentists were more likely to suffer musculoskeletal pain than their more experienced counterparts.^[21] Possible explanations could be experienced dentists are probably better at adjusting their working position and techniques to avoid musculoskeletal problems compared to their less experienced counterparts, or they simply developed coping strategies to deal with the pain.

The proportion of dentists seeking medical attention for MSD during our investigation (13%) was lesser to that reported during a study of dental personnel in Saudi Arabia (37%).^[20] Dentists who can recognize and identify their own postures, and the equipment usage patterns that are associated with increased risks of experiencing musculoskeletal pain and discomfort.

Recommendations

As repetitive strain injuries are on the rise in dentistry ergonomics and educational intervention plays a major role in the prevention of various occupational-related MSDs.

Dentists Area and Chair Position

The dentists room should have a suitable area to allow free movement of the dentist during work to

minimize flexion. Patient chair should be placed at midsternal level, should be electronic, easy to adjust, and comfortable to patients. Dentists should maintain an erect position by positioning chair close to the patient, minimizing forward bending or excessive leaning over the patient. Foot has to be placed flat on the floor to promote a neutral or anterior tilt to pelvis, which keeps back aligned and promotes the natural curvatures of back. The relationship between the knees to the patient chair should be at 90°. Thighs should be parallel to the floor. Hip angle must be 90°.

Gloves

Each dental health care worker must have gloves of proper size and fit. The influence of gloves has potentially contributed to carpal tunnel syndrome.

Lighting Needs

Position the adjustable light to avoid strain on the neck.

Working Time

The time period should suitably distribute between work and rest, dentists should have a resting period during between each patient.

Medications

MSDs are mostly mechanical in origin, medication is not capable of removing the cause of pain. It should be taken only when pain is chronic and severe.

By this available information, a dentist should be able to recognize and identify their postures, practicing positions, and the equipment usage that is associated with increased risks of musculoskeletal pain and discomfort. Such recognition is the first critical step to avoiding or neutralizing ergonomic habits and work environment layouts that might otherwise unnecessarily shorten professional clinical careers.

CONCLUSION

The following conclusion can be drawn down by the study, the results suggest that the prevalence of neck, shoulder, and back pain is relatively high. In some cases, MSD was shown to interfere with daily activities, while a very few sought medical attention. MSDs remain a major occupational health problem. Ergonomic interventions may have a greater impact in prevention. Further, research is now needed to more carefully elucidate the impact of MSD on dentists, especially with respect to the cessation or reduction of clinical practice and also to identify specific risk factors and effective measures for reducing MSD among them.

REFERENCES

1. Hayes M, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among the dental professionals. *Int J Dent Hyg* 2009;7:159-65.
2. Andersson GB. Epidemiologic features of chronic low back pain. *Lancet* 1999;354:581-5.
3. Szymanska J. Disorders of musculoskeletal system among dentists from the aspect of ergonomics and prophylaxis. *Ann Agric Environ Med* 2002;9:169-71.
4. Akesson I, Lundborg G, Horstmann V, Skerfving S. Neuropathy in female dental personnel exposed to high frequency vibrations. *Occup Environ Med* 1995;52:116-23.
5. Rundcran L, Johnsson B, Moritz U. Pain and discomfort in the musculoskeletal system among the dentists. A prospective study. *Swed Dent J* 1991;15:219-28.
6. Marshall ED, Duncombe LM, Robinson RQ, Kilbreath SL. Musculoskeletal symptoms in new south wales dentists. *Aust Dent J* 1997;42:240-6.
7. Jacobsen N, Hensten-Pettersen A. Occupational health problems among dental hygienists. *Community Dent Oral Epidemiol* 1995;23:177-81.
8. Scully C, Cawson RA, Griffiths M. Physical and chemical dangers in dentistry. In: *Occupational Hazards to Dental Staff*. Ch. 3. London: British Medical Journal; 1990. p. 55-98.
9. Milerad E, Ekenvall L. Symptoms of the neck and upper extremities in dentists. *Scand J Work Environ Health* 1990;16:129-34.
10. Shugars D, Miller D, Williams D, Fishburne C, Stricklans D. Musculoskeletal pain among general dentists. *Gen Dent* 1987;4:272-6.
11. Bassett S. Back problems among dentists. *J Can Dent Assoc* 1983;49:251-6.
12. Biller FE. The occupational hazards in dental practice. *Oral Hyg* 1946;36:1194-201.
13. Finsen L, Christensen H, Bakke M. Musculoskeletal disorders among dentists and variation in dental work. *Appl Ergon* 1998;29:119-25.
14. Leggat PA, Smith DR. Musculoskeletal disorders self-reported by dentists in Queensland, Australia. *Aust Dent J* 2006;51:324-7.
15. Murphy DC. Ergonomics and dentistry. *N Y State Dent J* 1997;63:30-4.
16. Palm N. "Ergonomics: – OSHA's next regulatory frontier? *J Mich Dent Assoc* 1994;76:28-30.
17. Ratzon NZ, Yaros T, Mizlik A, Kanner T. Musculoskeletal symptoms among dentists in relation to work posture. *Work* 2000;15:153-8.
18. Rice VJ, Nindl B, Pentikis JS. Dental workers, musculoskeletal cumulative trauma, and carpal tunnel syndrome, who is at risk? A pilot study. *Int J Occup Saf Ergon* 1996;2:218-33.
19. Al Wazzan KA, Almas K, Al Shethri SE, Al-Qahtani MQ. Back and neck problems among dentists and dental auxiliaries. *J Contemp Dent Pract* 2001;2:17-30.
20. Jabbar TA. Musculoskeletal disorders among dentists in Saudi Arabia. *Pak Oral Dent J* 2008;28:135-44.
21. Chohanadisai S, Kukiattrakoon B, Yapong B, Kedjarune U, Leggat PA. Occupational health problems of dentists in Southern Thailand. *Int Dent J* 2000;50:36-40.

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