Original Article

Ergonomics among dentists in the states of Telangana and Andhra Pradesh

ABSTRACT

Aim: This study is designed to evaluate the work-related musculoskeletal disorders among dentists in the states of Telangana and Andhra Pradesh.

Materials and Methods: This study was conducted to disclose the incidence, location, and intensity of musculoskeletal pain among dentists in the states of Telangana and Andhra Pradesh. A questionnaire study was designed. Six hundred and twenty-four dentists participated in the survey working in different centers of Telangana and Andhra Pradesh. Demographic information, type of professional practice, duration of working hours, posture of working, and the distance of travel from home to workplace were collected. This was related to whether a dentist is suffering from any musculoskeletal disorder. The location of pain, intensity of pain, and the preventive measure they employ in their daily life are noted.

Results: It was observed that oral and maxillofacial surgeons followed by general dentists were more prone to musculoskeletal disorders. Due to the lack of a well qualified/trained assistant in addition to lack of sophisticated equipment is resulting in professional induced musculoskeletal disorders among oral and maxillofacial Surgeons. General dentists who try to perform all the dental procedures by themselves without the support of specialists were more prone to musculoskeletal disorders. The majority of the participants have lower back pain with a visual analog scale score of 5. It was believed by most of the participants that a good physical exercise in the morning helps from preventing such professional-induced musculoskeletal disorders.

Conclusion: Oral and maxillofacial surgeons, due to their unique work, are more prone to muscle imbalances, and hence ergonomic interventions are essential to maintain optimal health during the course of their professional career.

Keywords: Dentistry, ergonomics, oral and maxillofacial surgeon

INTRODUCTION

The field of dentistry is a branch of medicine that deals with the diagnosis, prevention, and treatment of diseases, disorders, and conditions of the oral cavity and surrounding maxillofacial area. The clinical work of a dentist does not only limit to teeth but also includes other aspects of the craniofacial complex such as the temporomandibular joint and other supporting, muscular, lymphatic, nervous, vascular, and anatomical structures.

Musculoskeletal disorders comprise a wide range of inflammatory and degenerative disorders that affect the muscles, tendons, and nerves of the body. Once the musculoskeletal system is affected by this disorder, it invariably results in pain and functional impairment,

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particularly in the neck, lower back, shoulders, elbows, wrists, and hands.[1] Professional-induced musculoskeletal disorders have become more prevalent in the current scenario. They are predominantly encountered in professionals requiring repetitive, forceful, or prolonged exertions of the extremities or carrying of heavy objects and prolonged awkward postures. The level of risk greatly depends on the intensity, frequency, and duration of the exposure to the abovementioned conditions.[2]

Dental surgeons because of the complex and skilled nature of professional work that they carry out in addition to the prolonged awkward postures that they attain to deliver the professional work make them one of the most susceptible professionals to occupation-induced musculoskeletal disorders. Literature shows that majority of the occupation-related musculoskeletal disorders are from motions that are repetitive or from maintaining a static position.[3] Hence, this study is designed to evaluate the work-related musculoskeletal disorders noticed among dentists in the states of Telangana and Andhra Pradesh.

MATERIALS AND METHODS

A cross-sectional survey was undertaken to evaluate the work-related musculoskeletal disorders among dentists in the states of Telangana and Andhra Pradesh. The study included 624 well-qualified and experienced dentists working in different units in the states of Telangana and Andhra Pradesh. Dentists who are suffering from prior spine or any other joint disorders, inflammatory diseases, and a history of trauma or fall in the past 6 months were excluded from the study. Dentists who had gynecological problems and had undergone spinal anesthesia and any other medical or surgical conditions contributing to pain were also excluded from the study.

Before commencing the study, an institutional ethical committee clearance was obtained. The dentists were explained in detail about the project. Informed consent was taken from each dentist, and they were requested to assist in the process of carrying out the project. A questionnaire containing twenty questions divided under four categories was sent through Google Forms to the e-mails of those doctors who were well-qualified and experienced practitioners in the fraternity of dentistry as shown in Table 1. The questionnaire was sent to approximately 810 consultants, but unfortunately, only 624 dentists responded even after repeated reminders. The participants were instructed to answer the questionnaire very precisely without any descriptions. After collecting the filled questionnaires, the survey forms were evaluated and critically analyzed.

Table 1: The questionnaire used in the study

Parameter	Factors
Sociodemographic data	Age
	Sex
	Professional experience (in years)
	Specialty
	Type of professional practice
	Sitting dentistry
	Standing dentistry
	Leisure activities
Ergonomic features	Dominant limbs: right/left
	Characteristics of the working chair
	Manual chair
	Hydraulic chair
	Professional work with or without an assistant
	Type of assistant
	Trained assistant
	Doctor
	Untrained assistant
	Average distance traveled for professional work
Musculoskeletal disorders	Locations of pain
	Neck
	Lower back
	Shoulder
	Wrist
	Lower limbs
	VAS:1-10
A set of closed or semi-closed questions	Sick leaves per month
	Need for analgesics: Yes/no
	Preventive or mitigating measures
	Physiotherapy
	Swimming
	Exercises
	Intensity of work
	Normal
	Moderate
	Heavy
	Workload (number of hours per week)
	Under medication for any systemic conditions
	Cardiac
	Orthopedic
	Metabolic disorders
	Others
	Armamentarium using
	Conventional
	Advanced

VAS: Visual analog scale

RESULTS

A cross-sectional survey was undertaken to evaluate the work-related musculoskeletal disorders among dentists in the states of Telangana and Andhra Pradesh. Six hundred and twenty-four well-qualified and experienced dentists working in different units in the states of Telangana and Andhra Pradesh participated in the survey. The results are tabulated as follows.

The age of the participants ranged from 28 to 63 years, with a mean age of 40 years. Of the 624 participants, 479 (76.76%) participants were males. The clinical experience of the participants ranged from a minimum of 3 years to a maximum of 32 years, with a mean experience of 14 years. On an average, each dentist who participated in this study carries out clinical work for 58 h a week.

Of the 624 participants, 156 were oral and maxillofacial surgeons, 113 were endodontists, 98 were prosthodontists, 74 were periodontists, 51 were pedodontists, and 132 were general dentists. With regard to the type of professional practice, 61.4% of the participants perform exclusively their specialty work, whereas 38.6% of the participants perform general dentistry as shown in Figure 1. Nearly 54.5% of the participants felt that the intensity of clinical work they carry out on a daily basis was moderate, whereas 23.7% of the participants felt that the intensity of clinical work was severe as shown in Figure 2.

With regard to the posture during clinical work, 14.9% of the participants practice sitting and standing posture, whereas 83.8% of the participants only practice sitting posture as shown in Figure 3. For 97.4% of the participants, the right hand is their dominant hand. It is noteworthy that 36.7% of the participants use mechanical dental chairs to carry out their clinical work, whereas only 63.3% of the participants use hydraulic chairs. Nearly 63.1% of the participants use conventional armamentarium, whereas 36.9% of the participants use advanced armamentarium to carry out their clinical work.

With regard to the type of assistant, 54.2% of the participants work with a trained assistant, whereas 36.2% of participants work with an untrained assistant, and 09.6% have a junior doctor assisting them as shown in Figure 4. Of 624 participants, 431 (69.07%) participants complain of musculoskeletal pain. The results of the study reveal that musculoskeletal disorders were noted more in participants belonging to the specialty of oral and maxillofacial surgery comprising 84.6%, followed by general dentists. Pertaining to the location of pain, the most common anatomical area involved was the lower back pain as shown in Figure 5. The majority of the participants had a visual analog scale (VAS) score of 5 as shown in Figure 6. Nearly 76.5% of the clinicians who are suffering from musculoskeletal disorders did not require an analgesic. In the remaining group of clinicians, nonsteroidal anti-inflammatory drug (NSAID) was sufficient to relieve the pain. Around 74.2% of the participants felt that a good physical exercise was sufficient to prevent such occupation-induced musculoskeletal disorder.

DISCUSSION

It is a well-known fact that ergonomics is the science of corresponding working environments and human capabilities.[4] The actual concept of ergonomics is to facilitate the operator to perform their professional work and other activities carefully and competently. Hence, it emphasizes on the necessity to recognize circumstances that lead to

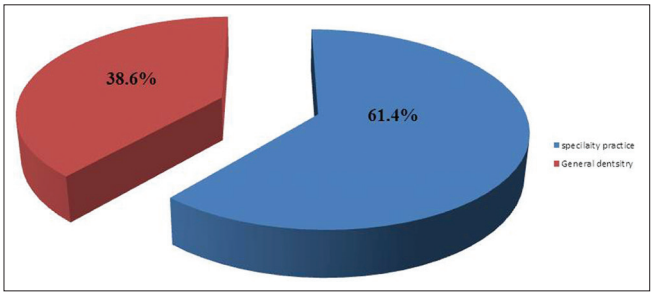

Figure 1: Graph showing type of professional practice

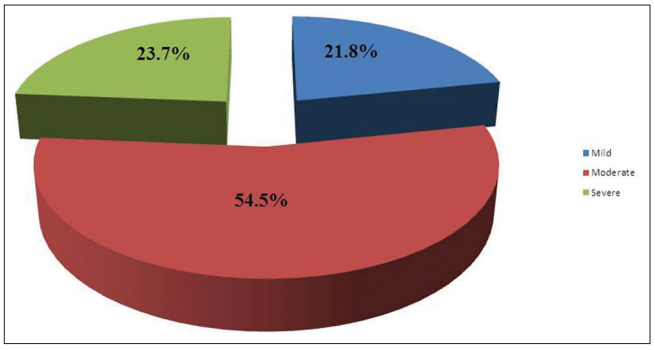

Figure 2: Graph showing the intensity of professional work

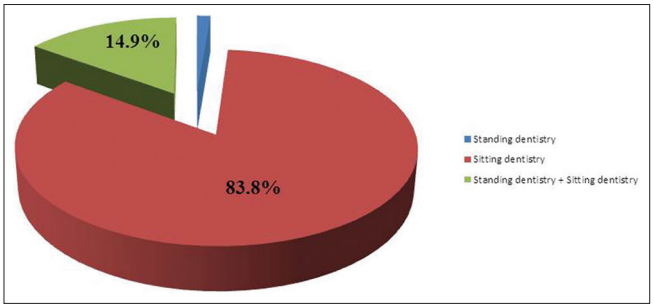

Figure 3: Graph showing the type of posture attained by the participants

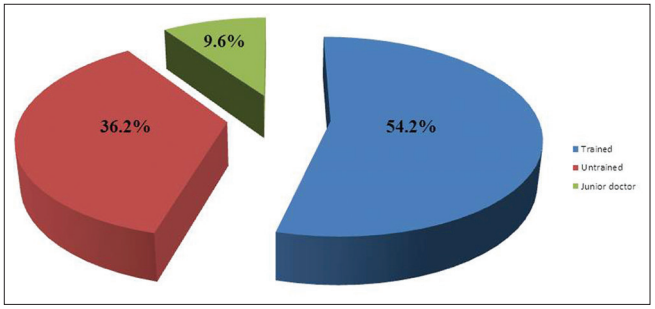

Figure 4: Graph showing the type of assistant helping the clinician

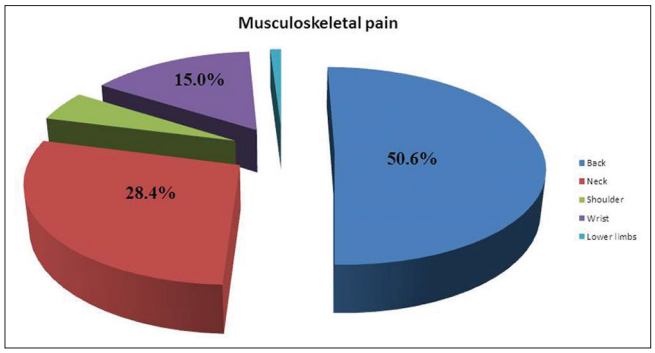

Figure 5: Graph showing the anatomical location of pain

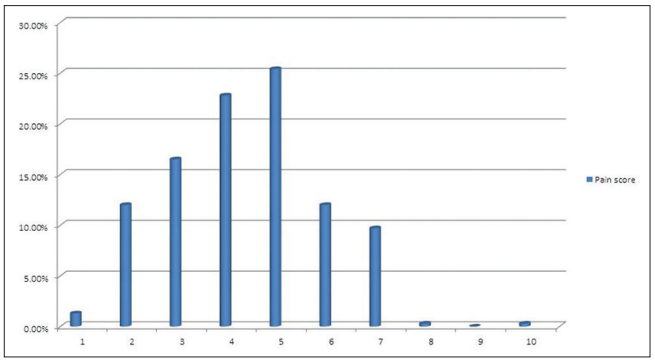

Figure 6: Graph showing visual analog scale scores

discomfort and implement changes to curtail or eradicate those circumstances.

With regard to dentistry, literature has shown that performing repetitive task in uncomfortable physical posture has contributed immensly to musculoskeletal disorder and has lead to loss of productivity.[5] Hence, it is ergonomically recommended that four-handed dentistry is the most encouraging way to deliver dental services since it reduces unwanted physical movements of the operator and enhances the progress of the procedures.[6]

Posture is considered a key element in occupation-related musculoskeletal disorders. During dental procedures, an operator attains a posture evolved from the orthostatic posture to a seated posture, especially to adopt the concept of four-handed dentistry.[7] Orthostatic posture is often adopted despite its many disadvantages, especially while performing the exodontia.[8] The results of this study show that only 83.8% of the clinicians attain a sitting posture to carry out their clinical work, whereas 14.9% of them use both sitting and standing postures to carry out their clinical work. Literature shows that dental graduates, particularly in their early days of career, attain a standing posture to carry out the dental extractions.[7] A recent study had reported a high incidence of knee disorders in students performing alveolar surgeries in an unfavorable standing posture.[9]

A recent study revealed that neck and shoulder pain is the most common complaint of the dentists under the study, followed by pain in the wrist and elbow and knee/foot pain. The risk of developing work-related musculoskeletal symptoms in dentists is additionally increased due to the long hours of work and maintaining a static posture while performing movements of very fine eye–hand coordination.[10] It is also noted that medical professionals who do not perform any kinds of exercise in their daily life are more prone to musculoskeletal disorders among the dental surgeons.[3] This is in accordance with the results of this study.

The results of this study reveal that musculoskeletal disorders were noted in 69.07% of participants. Around 53.6% of these clinicians experience lower back pain more predominantly than at any other anatomical regions. This is followed by the pain in the neck. The mean VAS score among these clinicians was 4. The majority of them did not require an analgesic for pain relief, but in those who required an analgesic, a simple NSAID was sufficient. The majority of them believed that a simple physical exercise in the morning was good enough to prevent such occupation-related musculoskeletal disorders.

Literature reveals that maintaining the low back curve – the lumbar lordosis – when sitting can reduce or prevent low back pain.[11] Interchanging between standing and sitting also can be an effective tool in preventing injuries.[11] Operators should take the time to position their patients properly for mandibular and maxillary procedures. To prevent harm to the musculoskeletal system, the operator should allow for rest periods to replenish and nourish the stressed structures.

The majority of the participants were using conventional armamentarium and are assisted by an unqualified/a trained assistant, unlike in the Western countries where their counterparts use advanced equipment and have a qualified assistant. The results of this study show that majority of the participants work for 58 h a week, and they consider their intensity of work as moderate. Hence, it can be concluded that lack of a proper physical exercise or a leisure activity before or after the complex and skilled nature of professional work that they carry out in addition to the prolonged awkward postures that they attain to deliver the professional work make them susceptible professionals to occupation-induced musculoskeletal disorders.

CONCLUSION

Musculoskeletal disorders in medical professionals will invariably result in loss of work efficiency. Dentists are prone to unique muscle imbalances and require ergonomic

interventions to maintain optimal health during the course of their career. The present survey has shown high prevalence rates of musculoskeletal pain in surgeons. The results showed that physical risk factors involving constrained posture, repetitive movements, etc., were significant predictors of work-related musculoskeletal symptoms in surgeons. The results also indicated that the surgeons had a high sense of commitment and self-imposed pressure.

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Conflicts of interest

There are no conflicts of interest.

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