

Frequency of Work-Related Musculoskeletal Disorders of Upper Limb among Dentists of Division Gujranwala

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ABSTRACT

Background: Faulty and poor posture has been a cause of musculoskeletal disorders (MSDs) among dentists. Due to the nature of their work, they are more prone to develop upper limb MSDs in the upper limbs.

Objective: To find out the frequency of work-related musculoskeletal disorders of upper limbs among dentists of division Gujranwala.

Methods: It was a cross-sectional study conducted in Gujranwala Division, Pakistan, from April 2022 to July 2022. Convenience sampling technique was used to collect the data. The study included 250 male and female dentists, aged 25-40 years, having working hours > 5 hours and with work experience of at least 1-2 years, both from public and private sectors of the Gujranwala Division. The work-related musculoskeletal disorders were determined using Nordic Musculoskeletal Questionnaire. The data was analyzed by SPSS version 23.

Results: Among the study participants, there were 127(50.8%) females and 123 (49.2%) males. The mean age of the participants was 32.77±6.23 years. Musculoskeletal disorders of the upper limbs were found in 231(92.2%) participants. The most common region involved were; the shoulder in 141 (56.4%), wrist in 82 (32.2%) followed by elbow in 8 (3.2%). Among the participants, 141(56.4%) worked in different work slots of 8-10 hours. One hundred and seventy one participants were habitual of working in sitting posture.

Conclusion: Upper Limb Musculoskeletal disorders are highly prevalent among dentists of the Gujranwala Division with the major regions involved being the shoulder and wrist.

KEY WORDS: Musculoskeletal disorders, Frequency, Upper limb, Dentists

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INTRODUCTION

Musculoskeletal injuries allude to injuries of muscles, tendons, ligaments, nerves, joints, and blood vessels. These are all accommodating structures playing a significant role in the movement.

Musculoskeletal disorders can arise from one or more repetitive injuries and ended up in disruption in sensory stimulation, discomfort, and pain.¹

The severity of injury varies; it may become acute or chronic. Chronic injuries and disorders are more observed and reported, indicating 40% of all chronic disorders.² The reported prevalence was 70% in Iraq,³ 89% of the dentists from Chennai were having musculoskeletal disorders,⁴ in Greek 54.1%⁵ and Karachi

Pakistan shoulder 36.27%, Lower back 34.41% and neck 22.32% while in Lahore 79.1% in Lahore were having musculoskeletal discomforts.⁶ Work-related musculoskeletal disorders (WMSDs) are the most challenging thing in dental clinics.

Dentists are extremely vulnerable to originating musculoskeletal disorders (MSDs) because of their nature of work and long static posture. Dentists during work tend to assume asymmetrical and static postures due to the long-term working nature of dental work i.e., the head is rotated laterally with arms extended out of the body. Long-standing working hours lead to exhaustion and fatigue of joints especially shoulder joints, neck, and muscles which tend to cause pain, discomfort, and swelling.⁷

According to the World Health Organization (WHO), the etiology of WMSDs is multifactorial. One of the key elements that might develop and aggravate WMSDs is the work environment; however, most of its aspects can be changed.

The main fields to look into for the major risk factors for musculoskeletal pain and the development of WMSDs are demographic characteristics, workflow organizations, interpersonal relationships at work, and dentist health characteristics.⁸

This method verily improves dental procedures and work. Moreover, it lessens the fatigue and stress felt by a single-handed dentist. This idea does not support the concept of seated posture to reduce symptoms and effects of MSDs among dentists. It also prevents awkward static posture and undue stress and fatigue on muscles. Interestingly, there are few studies on preventive measures for MSDs.

The work demands of dentists and maintenance of prolonged static posture while treatment, make them more prone to develop MSD. There was a lack of study in the targeted population because, this profession is at high risk of MSDs.

This study aimed to find out the prevalence of work-related MSDs of upper limbs among dentists. This study will help dental practitioners to work on the posture-related ergonomics that can lead to upper limb musculoskeletal disorders and further prevention strategies can be implemented.

METHODS

It was a cross-sectional study conducted in Gujranwala Division, Pakistan, from April 2022 to July 2022. The study was approved by the institutional review committee (DPT/PRI/IRB-459). The sample size was calculated by using the following formula; $n = z^2pq/e^2$, where n = sample size, z = confidence interval (95%), p = probability of success (0.5), q = (1- p), e = level of precision $n=1.96 (8), (0.5) (0.5) / (0.06)^2$.

A convenience sampling technique was used to collect the data. The study included 250 male and female dentists, aged 25-40 years, and with work experience of at least 1-2 years, both from the public and private sectors of the Gujranwala Division.

The dentists who had neurological impairments, and any traumatic injury/accidents leading to musculoskeletal discomfort were excluded from the study.

Written informed consent was taken from all the participants. Body Mass Index was calculated using standard categories of underweight (<18 BMI), normal (18.2-29.9) overweight (25-29.9) and obese (30-39.9).⁹ The Nordic Musculoskeletal Questionnaire (NMQ) was used to assess the MSDs of the study participants. We used only 3 regions from this questionnaire i.e., shoulder, elbow, and wrist.¹⁰

Statistical Analysis

The data was analyzed by using SPSS version 23. The data was presented in the form of frequencies and percentages.

RESULTS

Among the study participants, there were 127(50.8%) females and 123 (49.2%) males. The mean age of the participants was 32.77 ± 6.23 years. In present study, 231(92.4%) were having work related MSD of upper limb. The most common region involved were; the shoulder in 141 (56.4%), wrist in 82 (32.2%) followed by elbow in 8 (3.2%).

Among the study participants, 2(0.8%) were underweight, 52(20.8%) had normal BMI, while 182(72.8%) were overweight. One hundred and twenty-two participants had a work experience of 6-10 years and 141(56.4%) participants worked in different work slots of 8-10 hours (Table.1)

Shoulder (56.4%) is the most vulnerable region for musculoskeletal symptoms, 3.2% participants were suffering from symptoms related to elbow, 96.8% were found to be healthy regarding elbow 32.8% were suffering from wrist discomfort in last 12 months. (Table 2)

Table 1: Baseline characteristics of study participants

Variables	n(%)
Gender	
Male	123 (49.2%)
Female	127 (50.8%)
Marital status	
Married	197 (78.8%)
Unmarried	53 (21.2%)
Body Mass Index	
Underweight < 18	2 (0.8%)
Normal 18.2-29.9	52 (20.8%)
Overweight 25-29.9	182 (72.8%)
Obese >30	14 (5.6%)
Work experience (years)	
1-5	75 (30%)
6-10	122 (48.8%)
11-15	43 (17.2%)
16-20	3 (1.2%)
21-25	7 (2.8%)
Working hours	
< 4	7 (2.8%)
5-7	90 (36%)
8-10	141 (56.4%)
>10	12 (4.8%)
Working posture	
Sitting	171 (68.4%)
Standing	79 (31.6%)
Total	250 (100%)

Table 2: Distribution of musculoskeletal symptoms among different body parts

Region	Response	Occurrence of symptoms during last 12 months	In the last 12 months, prevented from normal activities	In the last 12 months have you seen a physician for this condition	Occurrence of symptoms during last 7 days
		n(%)	n(%)	n(%)	n(%)
Shoulder	Yes	141(56.4%)	26 (10.4%)	52(20%)	5(2.0%)
	No	109(43.6%)	224 (89.6%)	198(79.2%)	245(98.0%)
Elbow	Yes	8(3.2%)	0(0%)	2(0.8%)	3(1.2%)
	No	242(96.8%)	250(100.0%)	248(99.2%)	247(98.8%)
Wrist	Yes	82(32.8%)	14(5.6%)	21(8.4%)	7(2.8%)
	No	168(67.2%)	236(94.4%)	229(91.6%)	243(97.2%)

DISCUSSION

Poor ergonomics and sustained poor posture have been one of the causes of musculoskeletal disorders among dental practitioners. This cross-sectional study was conducted in the Gujranwala division and aimed to determine the Frequency of work-related musculoskeletal disorders of the upper limbs. The shoulder was affected in 141 (56.4%), the wrist 82 (32.8%), and the least affected region was the elbow 8 (3.2 %). Our study depicts mild discomfort at the elbow (3.2%), which lies parallel with the results of the research. In contrast with our study, there is some evidence available that show the high prevalence of MSDs at the elbow.^{1,11} but this our study responses had shown only 8(3.2%) having elbow discomfort. The risk of MSDs was high among the dentist and similar results are also supported by the evidence. According to our study shoulder (56.4%) is at the highest risk to develop musculoskeletal discomfort, followed by the wrist (32.2%) while the lower arm (3.2%) has been found to have the least risk. These findings were in line with the results of a study conducted in Lahore.¹² WMSDs were the commonly reported problems in the dentistry profession and supported by literature, another study stated that shoulder pain (51%) is more prevalent among dentists.¹³ which lies almost parallel to our findings that shoulder MSDs (56.4%).¹⁴ On contrary to our results, Shekhawat in their study suggested that WMSDs at the elbow are very common among dentists, although many research papers rooted that the incidence of WMSDs at the elbow was less.¹⁵ But Blume also reported a higher risk of WMSDs at the elbow but the lowest risk at the shoulder region. Though Blume found the wrist vulnerable too, this is in accordance with our results.¹⁶ but there are still many factors that can be considered including working hours, working posture, and type of equipment used in dentistry. It is noticed that dentists suffer more in terms of less relaxation at work due to dental procedures.¹⁰ The static posture and the muscles

of the body especially the upper extremity, neck, and shoulders remain in static contraction for a longer duration. This prolonged static contraction of muscles results in MSDs, pain, and discomfort in respective regions of the body.¹⁷ According to recent findings, the working posture of dentists are the main leading cause of the developing MSDs. Alyahya in Riyadh focused on ergonomics and musculoskeletal problems and stated that workload and other risk factors had a significant impact on developing musculoskeletal disorders in all dental practitioners. Furthermore recommended that dental ergonomics should be taught and should be enforced in clinics to ensure that all dental professionals have a comfortable working environment.¹⁸

The injury prevention and rehabilitation guidelines suggested an upright posture for dentists for trunk stabilization on muscles of the upper extremity and supporting structures. Accessibility to dental equipment at hand and use of magnification aids to help reduce fatigue and improper postural changes.¹⁰ Dentists, in general, can't prevent static posture due to the nature of dentistry work. They have to sit on a chair most time of the day which leads to static posture and the muscles of the body, especially the upper extremities, neck and shoulders tend to remain in static contraction for a longer duration. This prolonged static contraction of muscles results in MSDs, pain, and discomfort in respective regions of the body.¹⁹

This study was limited to the estimation of WRDMS, lacks the ergonomic assessment of posture, small sample size, and the study duration was too short. Further studies should be done on postural assessment among dentists. It is also suggested that the prevention strategies of WMSDs should be included in the study curriculum of their undergraduate degree.

CONCLUSION

Musculoskeletal disorders are highly prevalent among dentists of the Gujranwala division with the major regions involved are the shoulder and wrist.

Conflict of Interest:

There is no conflict of interest and no funding was granted.

Contributors:

AR: Substantial contributions to the conception or design of the work, Analysis and interpretation of data

GJ: Data collection, data entry, editing

AR: Literature research, data analysis

QY: Critical review, analysis and approval the final version to be published

AS: Manuscript design, drafting the work.

All authors approved the final version and signed the agreement to be accountable for all aspects of the work.

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Data Sharing Statement:

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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