

Are we straining to succeed? Prevalence of work-related musculoskeletal disorders among dentists in teaching hospitals

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Abstract

Objective: To determine the prevalence of work-related musculoskeletal disorders among dentists.

Method: The cross-sectional study was conducted in Islamabad, Pakistan, from January to March 2023 after approval from the ethics review committee of the Islamic International Dental Hospital, Islamabad, and comprised dentists associated with 4 major dental teaching hospitals in the city. Data was collected using a self-administered questionnaire adapted from literature. Prevalence of work-related musculoskeletal disorders was explored along with its association with variables, like age, gender, experience, designation and history of injury. Data was analysed using SPSS 26.

Results: Of the 250 forms distributed, 188 (75.2%) were returned duly filled, while the remaining participants either did not respond or partially filled out the forms. Among the respondents, 64 (34%) were males and 124 (66%) were females, and the overall prevalence of work-related musculoskeletal disorders was 172 (91.5%). There was no significant difference among the variables based on anatomic site-specific data, except the designation variable, with individuals having a history of injury to neck ($p=0.027$) or shoulder ($p=0.001$) and those designated as professor ($p=0.040$) were significantly at risk of developing pain due to work-related musculoskeletal disorders.

Conclusions: A significantly high number of dentists were found to have some form of work-related musculoskeletal disorder.

Keywords: Work-related musculoskeletal disorder, Prevalence, Dentists, Neuropathy, Islamabad. (JPMA 74: 1265; 2024)

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Introduction

Musculoskeletal disorders (MSDs) refer to a group of conditions that affect the muscles, bones, tendons, ligaments and other structures that support and move the body. These disorders can cause pain, discomfort, and limitations in mobility and function. MSDs can affect various parts of the body, including but not limited to the back, spine and neck. In healthcare professionals, work-related MSDs (WRMSDs) are particularly prevalent due to the physically demanding nature of their work. Tasks like lifting patients, prolonged standing, and repetitive movements can increase the risk of developing MSDs. Nurses, physicians, physical therapists and other healthcare workers (HCWs) often experience a higher incidence of MSDs compared to the general population.

The dental profession is associated with a large number of individuals at risk of developing WRMSDs,¹⁻³ whose incidence is affected by a multitude of factors.² It is interesting to note that disorders of the upper limb constitute the majority of the affected areas.⁴ WRMSD was

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recognised as a significant issue for dentists in literature reviews concerning general health and occupational health problems among the dentists^{3,5} which can result from an isolated incident or repeated stress.⁶

There is considerable evidence linking the physical demands of a clinical job to MSDs in oral health professionals,^{7,8} contributing significantly to sick leave, decreased productivity and abandoning the field.^{4,7} Emerging literature shows that the prevalence of WRMSD may also be associated with psychological factors, such as anxiety disorder and major depressive disorder.⁹ Limited space of work makes working in the mouth an uncomfortable environment, requiring that the treatment provider manoeuvre awkward positions of muscular imbalance and asymmetrical positions of rotation and inclination.¹⁰ In addition to the dentist's posture, regular use of high-frequency vibration equipment, such as high-speed handpieces and scalers, contributes to the development of neuropathic disease in the dentist's hands.¹¹ Additionally, the coronavirus disease-2019 (COVID-19) pandemic increased the risk to the dentist, necessitating the use of more additional gear, like personal protection kits, which further restricted freedom of motion, elevated mental stress, and created unbalanced postures, all of which contribute to WRMSD.^{12,13}

To the best of our knowledge, there is no study quantifying the consequences faced by dentists afflicted with WRMSDs in Islamabad, the capital city of Pakistan. The current study

was planned to fill the gap by estimating the prevalence of WRMSDs among dentists in the local setting.

Subjects and Methods

The cross-sectional study was conducted in Islamabad, Pakistan, from January to March 2023 after approval from the ethics review committee of the Islamic International Dental Hospital (IIDH), Islamabad, and comprised dentists associated with 4 major dental teaching hospitals in the city. An English-language questionnaire, adapted from the validated Nordic questionnaire¹⁴ designed to assess WRMSDs, was used to target regions of interest relevant mostly to dental professionals, namely the neck, shoulders and lower back.¹⁵ It was distributed online to clinical dental practitioners from the Islamic International Dental College, the School of Dentistry of the Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), the Margalla Dental College, and the Islamabad Medical and Dental College. The sample size estimated using OpenEpi version 3.01¹⁶ calculator with confidence level 95% and expected prevalence 76% based on a similar study.¹⁷ Informed consent was obtained, and convenience sampling method was used to raise the sample from among dentists of either gender aged 20-60 years designated exclusively as faculty members, demonstrators, postgraduate residents, or house officers. The participants had been actively performing clinical duties at their respective institutions on a routine basis for at least the preceding 6 months. Individuals performing duties of an academic nature with little or no exposure to clinical practice, as well as those suffering from anxiety or any form of major depressive disorder were excluded.

Data was analysed using SPSS 26. Descriptive analysis was performed by calculating the frequencies and percentages of categorical data. Chi-square test was used to evaluate relationships between WRMSDs and study variables. $P \leq 0.05$ was considered statistically significant.

Results

Of the 250 forms distributed, 188(75.2%) were properly filled out and received by the author. While remaining forms were rejected due to incomplete submission or lack of response from the participants. Among the respondents, 64(34%) were males and 124(66%) were females, and the overall prevalence of WRMSDs was 172(91.5%).

The most common site of pain was the neck 142(75.5%), followed closely by the lower back 136(72.3%), and the least reported site of pain was the shoulders 108(57.4%) (Table 1). The highest prevalence of WRMSDs was noted among those having 5-10-years of working experience, followed by those with <5 years of practice, and those with >10 years of practice (Table 1). Data on anatomic site-specific percentage of WRMSDs based on years of practice

revealed no significant difference ($p > 0.05$).

Furthermore, 60 (93.8%) of the males and 112 (90.3%) of the females reported experiencing pain ($p > 0.05$) (Table 2).

Table-1: Anatomic site-specific distribution of WRMSDs among dentists relative to years of practice.

Symptomatic area with WRMSD n(%)	Years of practice	Positive MSD within year of practice n(%)	p-value
Neck 142(75.5) $p=0.017$	<5	90(71.4)	0.056
	5-10	36(90)	
	>10	16(72.7)	
Shoulder 108(57.4) $p=0.003$	<5	74(58.7)	0.081
	5-10	26(65)	
	>10	8(36.4)	
Lower back 136(72.3) $p=0.202$	<5	86(68.3)	0.201
	5-10	32(80)	
	>10	18(81.8)	

WMSRD: Work-related musculoskeletal disorder, MSD: Musculoskeletal disorder.

Table-2: Distribution of symptomatic area based on gender.

Symptomatic area	Positive MSD within gender n(%)	p-value
Neck		
Male	48(75)	0.903
Female	94(75.8)	
Shoulder		
Male	40(62.5)	0.314
Female	68(54.8)	
Lower back		
Male	44(68.8)	0.429
Female	92(72.3)	

MSD: Musculoskeletal disorder.

Table-3: Distribution of WRMSDs based on age group.

Symptomatic area	WRMSD within age-group n(%)	p-value
Neck		
<30 years	114(73.1)	0.084
>30 years	28(87.5)	
Shoulder		
<30 years	94(60.3)	0.085
>30 years	14(43.8)	
Lower back		
<30 years	112(71.8)	0.701
>30 years	24(75)	

WMSRD: Work-related musculoskeletal disorder.

Table-4: WRMSDs based on the history of previous injury to the site.

Symptomatic area	MSD with history of injury to site n(%)	p-value
Neck		
Positive history of injury	14(100)	0.027
Negative history of injury	128(73.6)	
Shoulder		
Positive history of injury	14(100)	0.001
Negative history of injury	94(54)	
Lower back		
Positive history of injury	16(61.5)	0.185
Negative history of injury	120(74.1)	

MSD: Musculoskeletal disorder.

Table-5: Duration of pain and its consequences.

Symptomatic area	Experienced pain in the last 7 days n(%)	Experienced pain in the last 12 months n(%)	Reduced clinical work due to pain in last 12 months n(%)	Changed Duties or jobs due to pain n(%)	Required professional assistance n(%)
Neck	54(38)	114(80.3)	54(38)	18(12.7)	28(19.7)
Shoulder	46(42.6)	88(81.5)	34(31.5)	16(14.8)	16(14.8)
Lower back	64(47.1)	108(79.4)	52(38.2)	30(22.1)	20(14.7)

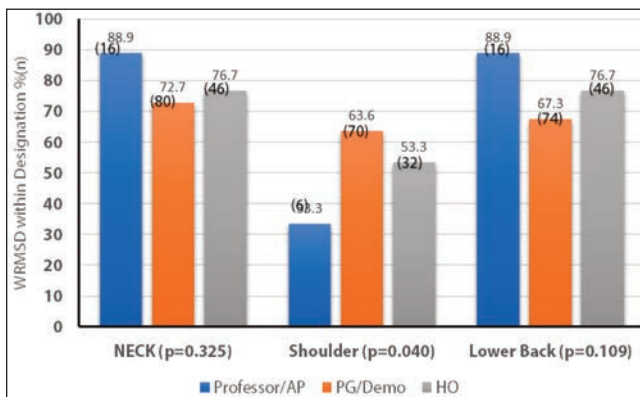


Figure: Distribution of work-related musculoskeletal disorders (WRMSDs) based on designation.

In terms of age, 144(92.4%) subjects of those aged <30 years and 28(87.5%) of those aged >30 years reported WRMSD ($p>0.05$) (Table 3).

Among the respondents that reported a positive history of previous injury, 37(91.7%) also developed WRMSD, whereas 135(91.4%) of those without such a history developed WRMSD ($p>0.05$). Anatomic site-specific values for neck ($p=0.027$) and shoulder ($p=0.001$) pain in individuals with positive history of injury were significant (Table 4).

Among the participants designated as professors, associate professors and assistant professors, 13(72.2%) reported positive for WRMSD, 74(67.2%) designated as demonstrators or postgraduate residents, and 41(68.3%) working as house officers also reported the same. The difference was significant only for shoulder pain (Figure).

Among the participants who had a history of WRMSD pain, 60(42.7%) reported having experienced pain in the preceding 7 days alone, while 107(76.7%) reported experiencing pain due to WRMSD in the preceding 12 months, with 49(34.9%) reporting they had to change jobs or duties due to pain. Only 23(16.4%) participants with a history of WRMSD pain required professional help to alleviate the symptoms (Table 5).

Discussion

In the present study, the response rate was 188(75.2%), which was comparable to previous studies.^{18,19} The current findings suggested a trend similar to that reported by

studies performed in different cities in Pakistan.^{17,20,21}

The current study found a prevalence of 172(91.5%), suggesting that WRMSDs among dentists in Islamabad were a very common occurrence. A comparison of anatomic site-specific WRMSDs revealed that neck pain was the most prevalent, while shoulder pain was the least prevalent site. Other loco-regional studies²¹ on the subject reported similar findings. The fact that dentists need to maintain neck posture for long periods coupled with frequent changes in the head position to visualise minute details of the oral cavity is bound to put greater stress on the neck. This may explain the prevalent nature of this MSD among dentists.²²

The highest prevalence of WRMSDs was reported by dentists who had been practicing for 5-10 years. This was in line with literature,²³ However, comparisons based on gender vary across literature. The current data did not reveal significant differences in outcome even when the results were compared according to anatomic site-specific pain in the lower back, shoulders and neck. However, anatomic site-specific differences among the group associated with shoulder pain was noted as the least reported symptomatic area among both genders while also exhibiting the greatest difference between values for males and females albeit at a non-significant level. This was in contrast to previous studies that found female dentists to be more likely to face WRMSDs^{17,18-21,24} whereas a study in Nigeria suggested the opposite was true.²⁵ However, a study in Germany²⁶ supported the current outcome about gender.

WRMSDs among participants aged above or below 30 years did not show significant differences. This was in agreement with other studies.^{26,27} However, literature on the subject also suggested that age was an important factor dictating the prevalence of WRMSDs among dentists.^{17,18-21} Therefore, it must be noted that anatomic site-specific differences in the age group associated with neck and shoulder were noted to have a considerable difference ($p=0.08$).

Designation can also be used as a measure of age, and the results showed no significant difference in overall pain due to WRMSDs faced by dentists holding different designations. It is worth mentioning, however, that an exception to this was the data related to shoulder pain, which showed that professors and associate professors had a significantly lower chance of developing WRMSDs due to shoulder pain compared to the other respondents.

The comparison between individuals with a positive and negative history of injury to the site showed no significant

difference, concluding that dentists with no prior history of injury were just as likely to develop WRMSDs as those who had experienced an injury. However, there was a significant difference based on injury history at the site of neck and shoulder; concluding that dentists with a prior history of injury to neck or shoulder were more than likely to suffer from relevant anatomic site-specific pain. A study performed on medical students also supported such a relation between past injury and MSD pain.²⁸

Due to the need to conduct certain incredibly precise operations in a small workspace, dentists commonly adopt uncomfortable and undesirable postures in their line of work. A key predictor of MSDs in dentists is adopting an awkward and uncomfortable posture.²² Career-ending problems, injuries and disabilities can occur as a result of long-standing static posture.¹⁹ Permanent disabilities may also occur as a result of pathological effects due to the long-term use of static postures, which cause chronic muscular fatigue and imbalances. Muscle ischaemia, necrosis, pain, hypomobility, and disc issues follow, resulting in the adaptation of soft tissues over time, ensuring a pathological sequel.^{29,30}

The current results revealed real-life consequences faced by dentists as a result of pain due to WRMSDs, ranging from chronic pain and reduced clinical work to changes in duties and necessary professional assistance to alleviate pain. However, the results also showed that only about 23(16.4%) of the participants who faced pain due to WRMSDs sought professional help, which ranges from pharmacological pain treatment³¹ to physical therapy.^{32,33} The current study highlighted the need to educate dentists on the knowledge of ergonomics and the importance of regular consultation with professionals working with WRMSDs to increase their awareness of the subject.

In an ergonomic posture, dentists must align their head, neck and back in a straight line, avoiding excessive bending, twisting or reaching. The back should be relaxed, but in a stable position, with the feet flat on the floor and knees at a comfortable angle. The recommended hip angles range from 90° to 105° with a tilting seat pan to 125° on a saddle-style stool. The thighs should be sloping downward, with the feet flat on the floor or footrest. The shoulders should be relaxed and the upper arms close to the body, while the forearms and wrists need to be kept parallel to the floor.³⁴⁻³⁶

On the basis of the findings, dentists should be encouraged to pay close attention to posture, and take regular breaks in between long sessions. Multiple digital devices have emerged along with posture brace equipment that may help with maintaining good ergonomics. Strengthening and stabilising specific muscles, like the shoulder and back,

along with regular chairside stretching is recommended. Individuals must cater to their trigger points and consult physical and neuromuscular specialists for the early detection and treatment of potential future problems. A systemic approach to the problem is also recommended, which requires the induction of knowledge and posture training at the undergraduate level along with a change in policies at the government level by introducing awareness campaigns and access to professional help to promote the health and longevity of the dental professional. There should be an in-house professional at every dental hospital for the purpose and there should be yearly awareness campaigns accompanied by mandatory examinations of dentists to control the high rate of prevalence among dentists worldwide.

The current study had its limitations. Subjective feedback of pain and site of pain is the primary limitation as no objective assessment was performed. Each person has a unique threshold of pain which may result in reporting bias. Furthermore, the ability to recall previous history related to pain may introduce a recall bias. The participants were recruited through convenience sampling rather than proportionate sampling per site, resulting in sampling bias that could have affected the generalisability of the findings. Also, multiple comparisons were not considered for statistical purposes even if it was unlikely to change the findings.

Conclusion

WRMSDs were highly prevalent among the dentists of Islamabad, particularly among individuals with a positive history of injury. This high prevalence indicated that dental professionals were at a high risk of developing such postural problems, with shoulder and neck regions being the most susceptible. Therefore, knowledge on ergonomic posture during the treatment of patients was essential.

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Author Contribution:

MAR: Design and concept, data collection, questionnaire design, article writing.

SSA: Design and concept, questionnaire design and article review.

NA & NS: Data collection, analysis and interpretation.