

# Frequency of Neck and Upper Extremity Musculoskeletal Disorders in Dentists

Sidra Sarwar<sup>1</sup>, Sarah Khalid<sup>2</sup>, Tahir Mahmood<sup>3</sup>, Hadeeq Jabeen<sup>4</sup>, Shahid Imran<sup>5</sup>

<sup>1</sup> Demonstrator, Department of Physiotherapy, Bahawalpur Medical and Dental College, Pakistan

<sup>2</sup> Physiotherapist, Children Hospital & Institute of Child Health Lahore, Pakistan

<sup>3</sup> Lecturer, Department of Physiotherapy, Agile Institute of Rehabilitation Sciences Bahawalpur, Pakistan

<sup>4</sup> Physiotherapist, Rising Sun Institute for Special Children Lahore, Pakistan

<sup>5</sup> Senior Physiotherapist, Children Hospital & Institute of Child Health Lahore, Pakistan

## ABSTRACT

**Background:** Musculoskeletal disorders are not only becoming prevalent among health care professionals in our country but are affecting their health and performance adversely. They are caused by poor ergonomics and awkward posture during work activities. The purpose of this study was to determine the frequency of neck and upper limb musculoskeletal disorders in dentists of Lahore, Pakistan.

**Material and Methods:** This cross-sectional study was conducted from October 2017 to March 2018. The data was collected using convenient sampling technique from 162 Dentists including 52 males and 110 females of Children hospital Lahore, Punjab Dental hospital and Fatima Memorial Hospital, Lahore. Data was collected by using Mangalore Questionnaire for identification of musculoskeletal disorders. Descriptive analysis of the data was done using SPSS version 22.0.

**Results:** Of 162 dentists, 115 (71%) suffered from musculoskeletal disorders. Shoulder was the most commonly affected region (30.9%) followed by neck (25.9%), arm (6.2%), wrist (4.3%), elbow (3.1%) and forearm (0.6%). Pain (45.7%) was found to be the most common complaint followed by muscle weakness (20.4%), paraesthesia (3.7%) and swelling (1.2%).

**Conclusions:** It was concluded that majority of the dentists were suffering from musculoskeletal disorders with shoulder as the most affected region and pain as the most frequent complaint.

**Key words:** Dentists, Musculoskeletal disorders, Neck pain, Upper extremity

### Authors' Contribution:

<sup>1</sup>Conception; Literature research; manuscript design and drafting; <sup>2,3</sup> Critical analysis and manuscript review; <sup>4,5</sup>Data analysis; Manuscript Editing.

### Correspondence:

Tahir Mahmood  
Email: tahirmahmoodphysio@gmail.com

### Article info:

Received: September 2, 2019  
Accepted: September 26, 2020

**Cite this article.** Sarwar S, Khalid S, Mahmood T, Jabeen H, Imran S. Frequency of Neck and Upper Extremity Musculoskeletal Disorders in Dentists. *J Islamabad Med Dental Coll.* 2020; 9(3): 207-211. Doi: 10.35787/jimdc.v9i3.404

**Funding Source:** Nil  
**Conflict of Interest:** Nil

## Introduction

Musculoskeletal disorders (MSDs) are conditions or injuries of the muscles, nerves, tendons, joints, cartilage and supporting structures. These are

caused and exacerbated by sudden exertion or prolonged exposure to physical factors such as repetitive use, force, exertion, vibration and

awkward postures.<sup>1</sup> Work related MSDs include all musculoskeletal disorders that are caused or aggravated by activities at workplace. Dental work includes various repetitive tasks, awkward postures, high force activities and static positions of joints and body for prolonged time. Static position is essential for high degree of concentration and precision during dental procedures. Deterioration of these abilities affects the practitioner's performance.<sup>2</sup>

Therefore, working posture of Dentists is the major cause of MSDs. The usual posture of a dentist during patient examination and procedural activities is a slightly forward bend of the body with the neck and head tilted in an effort to get a better view, while the arms are elevated and unsupported. The most common symptoms of musculoskeletal disorders in dental practitioners are pain, fatigue, numbness, joint stiffness, shoulder pain, hand and wrist problems including carpal tunnel syndrome. The upper fibres of the trapezius muscles are responsible for elevating the shoulders and rotating the neck.<sup>3</sup> In rounded shoulder posture, these fibres along with neck muscles largely support the arm's weight, increasing muscular strain on the neck and shoulders. In this way "trapezius myalgia" is caused by static, prolonged elevation of the shoulders, continuous mental stress, infrequent breaks and poor head posture in dentists.<sup>4</sup> Other musculoskeletal complaints like numbness and tingling sensation (upper extremity paraesthesia) are caused by nerve compression in the neck or at the wrist.<sup>5</sup>

Simone De and colleagues studied ergonomic risk and preventive measures of musculoskeletal disorders in dentistry environment and found out that static posture is the biggest cause of MSDs in dentists. He identified excessive forward flexion of head and neck, trunk rotation to one side and raising one or both shoulders as most reported uncomfortable postures in dentists.<sup>6</sup> Batham and Yasobant from India reported that the main risk

factors for MSDs identified by dentists themselves were of finger pinch grip, repeated bending of elbow and shoulder joints and fixed posture adopted during work.<sup>7</sup> Patricia and her colleagues used RULA (Rapid upper limb assessment) method to measure the risk of developing upper limb MSDs in dental students. They concluded that dental students were at high risk of developing upper limb MSDs in future.<sup>8</sup>

This study was designed to determine the common work-related upper limb MSDs among dentists. We expect that our study will be helpful in creating awareness about the magnitude of the problem and will draw attention towards management of these issues in healthcare settings.

## Material and Methods

This cross-sectional study was conducted from October 2017 to March 2018 at the Dentistry Department of Children Hospital & Institute of Child Health, Lahore, Punjab Dental hospital, Fatima Memorial Hospital and Lahore Medical and Dental College, Lahore, Pakistan. The study participants were dentists 40-60 years of age, both males and females, with 15-35 years of experience and recruited through convenient sampling. Dental practitioners who suffered musculoskeletal injury during last 6 months or had systemic illness which can cause musculoskeletal pain or discomfort were excluded from the study. Sample size was calculated as 162 with the help of the formula  $n = z^2 p / d$ ; where 'n' is sample size, 'z' is confidence interval (95%), 'd' is precision (5%) and 'p' is prevalence (88%).<sup>9</sup> A self-generated questionnaire, adapted and modified from Mangalore questionnaire, was used for data collection.<sup>10</sup> The questionnaire was designed to explore the symptoms of MSD and the part of upper limb affected by MSD. Participants were instructed to fill this self-reporting and content validated questionnaire regarding their musculoskeletal problems.

Ethical approval was obtained from the Institutional Review Committee of The School of Allied Health Sciences, Children Hospital & Institute of Child Health, Lahore (Ref 1116/SAHS). Participant personal information was kept confidential. Statistical Package for Social Sciences (SPSS) version 22.0 was used to calculate frequencies and percentages of the collected data.

## Results

The percentage of female participants was greater than the male participants in the study (67% vs 32%) and majority was suffering from upper limb MSDs (71%). Most of the participants admitted to maintaining a static posture during work (72%) (Table I).

Variables		Frequency (%)
Gender	Male	52 (32.1)
	Female	110
Affected by upper limb MSDs	Yes	115
	No	47
Maintenance of static Posture during work	Yes	117
	No	45

The most frequently occurring symptom of MSD in our study participants was pain (45.7%) followed by upper limb weakness (20.4%) (Table II).

Musculoskeletal symptoms	Frequency (%)
Pain	74 (45.7)
Weakness	33(20.4)
Burning sensation	6(3.7)
Swelling	2(1.2)
None	47(29.0)

It was also observed that most affected parts of the body by MSD were shoulders (30.9%) followed by

neck (25.9 %) and the least affected part was forearm (Table III).

Region	Frequency (%)
Neck	42 (25.9)
Shoulder	50(30.9)
Arm	10(6.2)
Elbow	5(3.1)
Forearm	1(6)
Wrist	7(4.3)
None	47(29.0)

## Discussion

This study conducted on dentists reports that 71% of the participants with work-related musculoskeletal disorders experienced pain as the most frequent symptom (45.7%) followed by muscle weakness (20.4%). The most commonly affected upper limb areas were shoulder (30.9%) followed by neck (25.9%), respectively.

Our findings are in line with the observations of Hassan and colleagues. They reported a prevalence of 75.8% MSDs among the dental surgeons of Karachi, which is very close to our findings (71%).<sup>11</sup> In another survey by Rabia et al. the main symptom of MSDs in dentists was observed to be pain, most commonly felt in the neck region (96%), followed by shoulder (90%) and upper limb (82%).<sup>12</sup> Our findings are comparable to Rabia and colleagues in terms of pain being the most reported symptom, although there is a slight difference regarding the most affected part, which is shoulder (30.9%) in our study followed by neck (25.9%).

Our findings are also similar to those reported by Al-Ali and colleagues related to occupational health problems of dentists in United Arab Emirates.<sup>13</sup> The most common health problem they found was musculoskeletal pain (68%). Similarly, Haye et al. in their study concluded that the prevalence of musculoskeletal pain ranges between 64% to 93%

among dentists.<sup>14</sup> They observed that the most commonly affected body parts, in order of frequency, were back and neck.

The results of the study conducted by Chamani et al. are also comparable to our findings. They did a comparison of MSDs among dentists and office workers in Kerman, Iran by using Nordic questionnaire and concluded that the frequency of MSDs affecting neck region was much higher in dentists as compared to office workers (46.4% vs 24.5%).<sup>15</sup>

Muralidharan and colleagues used Nordic questionnaire to explore the incidence of MSDs among dentists of South India. They observed that 78% of the participants were having work-related MSDs and most commonly effected areas of the body in order of magnitude were neck, low back and shoulders.<sup>2</sup> Their results are comparable to our findings in terms of prevalence of MSDs which is 71% in our study, however our participants had shoulder as the most commonly affected area of the body.

Morse et al studied risk factors and self-reported pain of MSDs in dental hygienists and found out a step-wise progressive pattern in students, assistant and practitioner hygienists, both in terms of risk factors and MSD pain. They observed that neck pain was the most common symptom of MSD followed by shoulder pain; this is in contrast to our finding where we had shoulder as the most affected area followed by neck. They also found out that excessive flexion of the neck and static posture were two common practices of dental hygienists, which might have led to these findings.<sup>16</sup> In our study too, most of the dentists have stated that they maintain a static posture (72%). Prolonged fixed or awkward postures lead to sustained muscle contraction that results in ischemia and muscle necrosis thus causing musculoskeletal disorders.

The results of previous studies support the findings of the current study, that working postures of

dentists in Lahore are affecting their health and leading to development of different musculoskeletal disorders among these professionals. However, due to small sample size and collection of data from only 3 settings of a single city, these findings cannot be generalized to all the dentist community.

## Conclusion

It was concluded that majority of the dentists were suffering from musculoskeletal disorders with pain as the most frequent complaint. Most affected part of the body was found to be shoulder. It was related to the maintenance of static posture for long periods of time.

## Recommendation

Future studies should aim at assessing awareness/education about good working posture, workplace ergonomics and other factors responsible for MSDs in dental professionals.

## References

1. Tinubu BM, Mbada CE, Oyeyemi AL, Fabunmi AA. Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskelet Disord*. 2010;11(1):12. Doi: 10.1186/1471-2474-11-12
2. Muralidharan D, Fareed N, Shanthi M. Musculoskeletal disorders among dental practitioners: does it affect practice? *Epidemiol Res Int*. 2013; 2013. Doi: 10.1155/2013/716897
3. Valachi B, Valachi K. Mechanisms leading to musculoskeletal disorders in dentistry. *J Am Dent Assoc*. 2003; 134(10): 1344-50. Doi: 10.14219/jada.archive.2003.0048
4. Fernández-de-las-Peñas C, Ge H-Y, Arendt-Nielsen L, Cuadrado ML, Pareja JA. The local and referred pain from myofascial trigger points in the temporalis muscle contributes to pain profile in chronic tension-type headache. *Clin J Pain*. 2007; 23(9): 786-92. Doi: 10.1097/AJP.0b013e318153496a
5. Rehn B, Nilsson T, Järvholm B. Neuromusculoskeletal disorders in the neck and upper extremities among

- drivers of all-terrain vehicles—a case series. *BMC Musculoskelet Disord.* 2004; 5(1): 1. Doi: 10.1186/1471-2474-5-1
6. De Sio S, Traversini V, Rinaldo F, Colasanti V, Buomprisco G, Perri R, et al. Ergonomic risk and preventive measures of musculoskeletal disorders in the dentistry environment: an umbrella review. *PeerJ.* 2018; 6e4154. Doi: 10.7717/peerj.4154
  7. Batham C, Yasobant S. A risk assessment study on work-related musculoskeletal disorders among dentists in Bhopal, India. *Indian J Dent Res.* 2016; 27(3): 236. Doi: 10.4103/0970-9290.186243
  8. Garcia PPNS, Pinelli C, dos Reis Derceli J, Campos JÁDB. Musculoskeletal disorders in upper limbs in dental students: exposure level to risk factors. *Brazilian J Oral Sci.* 2012; 11(2): 148-53. Doi: 10.20396/bjos.v11i2.8641448
  9. George B. Sample Size Estimation and Power Calculation-A Guide to Biomedical Researchers. *Pulmon.* 2013; 15(3): 25-34.
  10. Lahoti S, Narayan A, Ottayil ZC, Bhaskaran U. Prevalence of musculoskeletal disorders among doctors in Mangalore: A cross-sectional survey. *Int J Health Allied Sci.* 2014; 3(3): 204-07. Doi: 10.4103/2278-344X.138609
  11. Hameed MH, Ghafoor R, Khan FR, Bada SB. Prevalence of musculoskeletal disorders among dentists in teaching hospitals in Karachi. *JPMA.* 2016; 66(10): S-36. PMID: 27895349
  12. Khan RS, Ahmad F, Merchant MS. Prevalence of work related musculoskeletal disorders (MSD) among dentists. *Int J Contemporary Med Res.* 2017; 4(5): 1208-11.
  13. Al-Ali K, Hashim R. Occupational health problems of dentists in the United Arab Emirates. *Int Dent J.* 2012; 62(1): 52-6. Doi: 10.1111/j.1875-595X.2011.00091.x
  14. Hayes M, Cockrell D, Smith D. A systematic review of musculoskeletal disorders among Dentists. *Int J Dent Hyg.* 2009; 7(3): 159-65. Doi: 10.1111/j.1601-5037.2009.00395.x
  15. Chamani G, Zarei MR, Momenzadeh A, Safizadeh H, Rad M, Alahyari A. Prevalence of musculoskeletal disorders among dentists in Kerman, Iran. *J Musculoskelet Pain.* 2012; 20(3): 202-7. Doi: 10.3109/10582452.2012.704138
  16. Morse T, Bruneau H, Michalak-Turcotte C, Sanders M, Warren N, Dussetschleger J, et al. Musculoskeletal disorders of the neck and shoulder in dental hygienists and dental hygiene students. *J Am Dent Hyg.* 2007; 81(1): 10-14. PMID: 17362608