

# PREVALENCE OF MUSCULOSKELETAL DISORDERS AND ASSOCIATED RISK FACTORS: A SURVEY CONDUCTED AMONG DENTISTS IN LAHORE

<sup>1</sup>SARA ZAHOR, <sup>2</sup>SAROOSH EHSAN, <sup>3</sup>ADEELA RAFIQUE, <sup>4</sup>MUHAMMAD ARSLAN TAYYAB  
<sup>5</sup>MUHAMMAD FAYYAZ NAFEES, <sup>6</sup>MUHAMMAD ABDUL BASIT, <sup>7</sup>MUHAMMAD ABBAS JAMIL

## ABSTRACT

*Study was conducted to determine the prevalence of musculoskeletal disorders and associated risk factors among dentists in Lahore.*

*Observational cross-sectional survey conducted in Lahore during March to May 2016. A total of 467 dentists were included with experience ranges from 1-30 years. Orebro Musculoskeletal Pain Questionnaire and specially designed questionnaire were used to record dentists' responses of dentists.*

*A total of n=467 dentists participated in the study. Results of the current study showed that 88% (n=411) of the total participants were suffering from MSDs. Out of which 51% (n=209) were males and 49% (n=202) were females with no statistically significant difference (p=1.03). Lower back pain was found to be the major complaint of the subjects accounting for 53% (n=218) of the total cases. An increase in prevalence of MSDs was seen with the increasing number of working years of dentists. This increase in MSDs was found to be statistically significant (p value=0.02). Dentists who performed procedures in sitting position had significantly less symptoms of MSDs (p=0.01). Most of the dentists worked between 4 to 8 hours a day. It was observed that increased number of working hours were directly associated with increased symptoms of MSDs (p value=0.01).*

*It is concluded that MSDs has high prevalence among dentists and associated factors such as practicing years and work place ergonomics have a great impact on the prevalence of MSDs. Musculoskeletal disorders can be reduced through improving knowledge of ergonomics.*

**Key Words:** Dentists, Musculoskeletal disorders, Risk Factors.

## INTRODUCTION

Ergonomics is derived from Greek words, "Ergo" meaning work and "Nomos" meaning natural laws or systems. Ergonomics is an applied science which deals with devising ways and product designs to enhance efficiency and safety at workplace. It takes account of individual's abilities and his limitations to make sure that the overall working environment suits every worker.<sup>1,2</sup>

It has been documented that sitting for longer periods of time, sustained muscular contractions, working in

awkward positions and performing repetitive movements are some of the important ergonomic factors that lead to musculoskeletal disorders (MSDs).<sup>3,4</sup> MSDs have serious negative impact on the individual's personal health and his efficiency and productivity at work. It not only negatively affects the quality of life of the worker but also the quality of work performed by the individual. According to National Institute for Occupational Safety and Health (NIOSH), biomechanical and psychosocial risk factors form the basis for MSDs.<sup>5</sup>

Work related MSDs are common in health care providers and like many other fields, dentistry also demands high levels of commitment and professionalism. To perform different dental procedures a dentist requires good psychomotor skills, visual acuity, manual dexterity and capability to maintain adequate posture for longer periods of time.<sup>6,7</sup> In literature researchers have documented varied prevalence of MSDs among dentists. Musculoskeletal pain is relatively common among dental professionals, affecting multiple regions of the body including lower back, neck, shoulders, hands and arms.<sup>8,9,10,11,12</sup>

<sup>1</sup> Dr Sara Zahoor, FCPS PGR, Operative Dentistry FMH

<sup>2</sup> Dr Saroosh Ehsan, Associate Professor, Operative Dentistry FMH

<sup>3</sup> Dr Adeela Rafique, Assistant Professor

<sup>4</sup> Dr Muhammad Arslan Tayyab, M.Phil Oral Pathology

<sup>5</sup> Dr Muhammad Fayyaz Nafees, FCPS PGR Orthodontics FMH

<sup>6</sup> Dr Muhammad Abdul Basit, BDS

<sup>7</sup> Muhammad Abbas Jamil, Lecturer PSRD

All authors are from Department of Operative Dentistry, FMH College of Medicine and Dentistry, Shadman, Lahore

**Received for Publication:** March 2, 2017

**Revised:** April 8, 2017

**Approved:** April 9, 2017

Although modern techniques and equipment are in use and four handed dentistry is trending yet it has been observed that prevalence of MSDs is on the rise among dental professionals.<sup>13</sup> In a recent study conducted in 2015 Gupta et al reported the prevalence of MSDs to be between 60% to 90% in practicing dentists.<sup>14</sup> Its important to note that there is neutral zone for movements of all joints and muscles and movement within this zone does not cause injury. Injury to joints or muscles resulting into pain and other symptoms occur when the movements are performed beyond the range of neutral zone.<sup>15</sup> It has also been documented that prevalence of MSDs also increases with increased number of practicing years among dentists.<sup>16</sup>

Global prevalence of MSDs is on the rise among practicing dentists,<sup>14</sup> but there is no baseline data of MSDs among dentists in Lahore, Pakistan. So, this study was conducted to determine the prevalence of MSDs and associated factors among dentists in Lahore, Pakistan.

## METHODOLOGY

It was an observational cross-sectional survey based study conducted from March 2016 to May 2016, among dentists from different dental colleges of Lahore including Fatima Memorial Hospital College of Dentistry, University College of Dentistry Lahore, Sharif Dental College, CMH Institute of Dentistry Lahore, Lahore Dental College, Akhter Saeed Dental College, de, Montmorency College of Dentistry and dentists working at private clinics in different regions of Lahore including Faisal Town, Model Town, Johar Town, Shadman, Muslim Town, Garden Town etc. All the participants of the study were informed about the purpose of study and consent was taken. Dentists of both genders with practicing experience ranging from 1 to 30 years were included in the study. Dentists suffering from any co-morbid conditions such as tumours or any bone diseases such as arthritis or muscle dystrophies were excluded from the study. A total of 467 dentists from different dental colleges and private clinics participated in the study. Tools for the survey included Orebro Musculoskeletal Pain Questionnaire<sup>17</sup> and a self-developed questionnaire by the investigator focusing on MSDs and associated risk factors like treating position, working hours, routine exercise, using aids such as dental loops.

All data was entered and analysed using IBM SPSS Statistics 20. The data has been represented as frequencies and chi-square test was used to determine the relationship of musculoskeletal disorder with other variables like, gender, experience of the dentist, working position, and working hours per day. A p-value of  $\leq 0.05$  was considered as statistically significant.

## RESULTS

A total of n=467 dentists participated in the study. Out of these, 47% (n=221) were males and 53% (n=246) were females. Results of the current study showed that 88% (n=411) of the total participants were suffering from MSDs. Out of which 51% (n=209) were males and 49% (n=202) were females. Although males were affected more than female participants but this difference was not found to be statistically significant (p=1.03). Lower back pain was found to be the major complaint of the subjects accounting for 53% (n=218) of the total cases. Distribution of pain among dentists in respect of involved site is depicted in Table 1.

Pain at more than one site was also observed among the dentists with single site involvement being the leading symptom accounting for 69% (n=203) cases.

TABLE 1: DEPICTS DISTRIBUTION OF PAIN AS PER SITE INVOLVEMENT

Pain Site	No. of patients (n)
Lower Back	218 (53%)
Neck	160 (39%)
Shoulders	136 (33%)
Legs	45 (11%)
Arms	29 (7%)

TABLE 2: DEPICTS INCREASE IN MSDS WITH INCREASING PRACTICING YEARS

Practicing years	Surveyed Dentists	Dentists Suffering from MSDs	p value
1-5 years	304	258 (85%)	= 0.02
6-10 years	98	92 (94%)	
11-15 years	42	39 (93%)	
> 15 years	23	22 (96%)	
Total	467	411	

TABLE 3: DISTRIBUTION OF WORKING HOURS AMONG DENTISTS

Working Hours Per Day	Surveyed Dentists	Dentists with Symptoms of MSDs	p value
Less than 4 hours	52	31 (60%)	= 0.01
4 to 8 hours	387	352 (90%)	
More than 8 hours	28	28 (100%)	
Total	467	411	

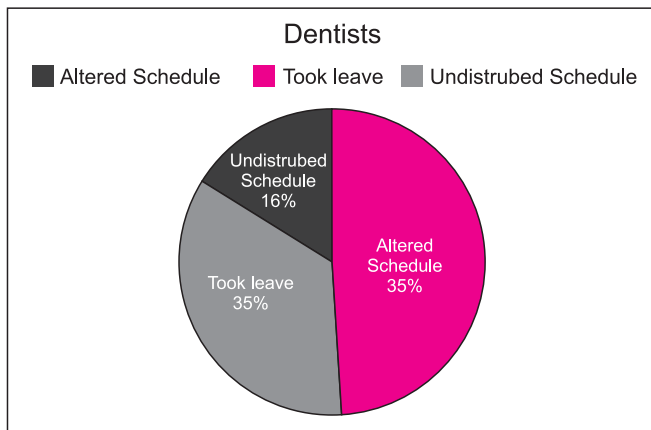


Fig 1: Disturbance of routine schedule of dentists

Involvement of two sites was found in 23% (n=95) cases and three or more than three sites were involved in 8% (n=33) cases.

An increase in prevalence of MSDs was seen with the increasing number of working years of dentists. This increase in MSDs was found to be statistically significant (p value=0.02) as shown in Table 2.

It was also observed that most dentists n=341 (73%) worked with chair side assistant while remaining n=126 (27%) worked alone. Most dentists n=322 (69%) performed the routine dental procedures in sitting position, yet other n=145 (31%) of the dentists preferred standing while performing procedures. Out of n=145 dentists who performed procedures in standing position 96% (n=139) suffered from MSDs. While in sitting group out of n=322, 84% (n=272) had symptoms of MSDs. This difference in position was also found to be statistically significant (p=0.01). Most of the dentists worked between 4 to 8 hours a day as shown in Table 3. It was observed that increased number of working hours were directly associated with increased symptoms of MSDs (p value=0.01). It was also recorded that only 3% (n=14) of the dentists used dental loops and magnification tools while performing dental procedures. Rest of the 93% (n=453) did not use any magnification aid and performed procedures with naked eyes. Only 7% (n=33) participants ever visited a physiotherapist in their whole career. Mostly participants 89% (n=416) took only a single break throughout their work period per day while 9% (n=42) took break after every two patients and only 7% (n=33) took break after every patient.

As far as use of indirect vision is concerned results of this study showed that most dentists n=430 (92%) worked off and on in indirect vision to treat maxillary teeth while n=14 (3%) never used indirect vision and n=23 (5%) always worked in indirect vision. It was also found in this study that routine schedule of around 84% (n=393) dentists was disturbed due to pain as shown in Fig 1.

## OREBRO MUSCULOSKELETAL PAIN QUESTIONNAIRE

Results of the current study showed that 17% (n=81) of participants were in low risk category (<105), 62.5% (n=292) of participants were in moderate risk category (105-130) and 20% (n=94) of participants were in high risk category (>130) of MSDs.

## DISCUSSION

Musculoskeletal discomfort is one of the most common causes of reduced efficiency and decreased job satisfaction among dentists. Main reason for MSDs among dentists can be attributed to inadequate workplace ergonomics. In the current study, it was found that most of the dentists had symptoms of MSDs. Similar studies conducted by different researchers have shown similar results.<sup>11,14</sup> Limaye et al from India conducted a study on Indian dentists of Mumbai region in 2015 and found that 77% participants had MSDs.<sup>11</sup> Global prevalence of MSDs among dentists have been reported to be between 60% and 90% which goes hand in hand with the results of current study.<sup>14</sup>

Male prevalence was found to be higher in current study which is in accordance with the results of the study conducted by Limaye et al. in 2015.<sup>11</sup> This difference in gender distribution may have cultural basis because both studies have been conducted in the Indian subcontinent.

It was found that with increasing number of practicing years, symptoms of MSDs also increase. This has been documented in literature by Rehman et al. and Tareen et al.<sup>18,20</sup> As far as site involvement is concerned, in current study lower back was the most affected site followed by neck and shoulders. Arms and legs were least affected. Similar results were documented in an Indian study in which lower back (50%), neck (43%) and shoulders (35) were affected in similar fashion.<sup>11</sup> Study conducted by Rehman et al also reported that lower back (57.8%) was the most affected site followed by neck (37.5%) and shoulders (29.6%).<sup>18</sup>

In another studied conducted by Moosavi et al neck (69%) was the predominant site of pain followed by shoulders (51%), upper back (51%) and lower back (39%).<sup>10</sup> These results showed that posture modification should be done to avoid these musculoskeletal pains.

Current study reported that a good number of dentists had to alter their schedule due to MSDs and few even had to take leave because of musculoskeletal pain. These results are in accordance with the results of study conducted by Mansoor et al. in which they reported that most dentists had to take leave from work owing to musculoskeletal pain.<sup>19</sup>

Current study showed that most of the dentists worked with dental assistant. This result is in accor-

dance with the result of study conducted by Tareen et al in 2013 in which 65.8% of dentists worked with dental assistants.<sup>20</sup> Most dentists worked 4-8 hours per day which is consistent with the studies conducted by Rehman et al and Tareen et al in which most dentists worked for 5-6 hours per day.<sup>18,20</sup> It was found that very little number of dentists routinely did exercise which may be due to busy schedule and over involvement in work. This result is also consistent with the findings reported in literature by Tareen et al. In their study, only 6% dentists exercised regularly.<sup>20</sup> Similarly a few dentists were reported to wear dental loops while performing dental procedures a finding consistent with the results of study conducted by Tareen et al.<sup>20</sup> Most dentists in the current study performed routine dental procedures while sitting on dental stool. This result is also consistent with studies conducted in Peshawar by Tareen et al and Rehman et al<sup>18,20</sup> working in sitting position resulted in better posture and lesser symptoms of MSDs. Current study also documented most dentists did not take break while treating patients, had never visited physiotherapist in their whole career and use indirect vision off and on to treat upper teeth. All these findings are consistent with the results of the studies conducted by Rehman et al and Tareen et al.<sup>18,20</sup>

Ergonomic factors such as working with assistant, taking breaks during patients, treating patients in sitting position, use of indirect vision for upper teeth, use of dental aid such as dental loops during treatment, regular workout and visiting a physiotherapist all of these factors play important role in aggravating the musculoskeletal pain and should be considered by every dentist to avoid MSDs.

## CONCLUSION

It is concluded that MSDs has high prevalence among dentists and associated factors such as practicing years and work place ergonomics have a great impact on the prevalence of MSDs. Musculoskeletal disorders can be reduced through improving knowledge of ergonomics.

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## CONTRIBUTIONS BY AUTHORS

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|----------------------------------|--|
| <b>1 Sara Zahoor:</b>            | Conception and design of research, literature search, data collection, data analysis, drafting of article and abstract writing |
| <b>2 Saroosh Ehsan:</b>          | Conception and design of research, drafting of article and final review  |
| <b>3 Adeela Rafique:</b>         | Conception and design of research, drafting of article and final review  |
| <b>4 Muhammad Arslan Tayyab:</b> | Literature search, drafting of article   |
| <b>5 Muhammad Fayyaz Nafees:</b> | Data collection and data analysis  |
| <b>6 Muhammad Abdul Basit:</b>   | Data collection and data analysis  |
| <b>7 Muhammad Abbas Jamil:</b>   | Conception and design of research.   |