

Prevalence of Work Related Musculoskeletal Disorders (MSD) among Dentists

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ABSTRACT

Introduction: In dentistry occupational hazards can consequence in damages such as inhalation of chemicals, percutaneous abuses and musculoskeletal disorders (MSD). The MSD are not very common among the dental professionals however, among Pakistani dentists, the prevalence of MSD is uncertain. The objective of this study was to find out prevalence and distribution of MSD symptoms amongst dentists in the suburbs of Karachi, Pakistan.

Material and methods: A cross-sectional study was made by incorporating a Nordic Musculoskeletal Questionnaire (NMQ) in English language and completed by 50 dentists (26 female, 24 male). In addition to the demographic aspects, the prevalence of musculoskeletal disorders in various anatomical sites such as neck, shoulder, upper extremities, lower extremities, thighs/hips, knees, ankle and feet was assessed through the distribution of questionnaire. In order to compare MSD prevalence among various subgroups, the chi-square test was applied.

Results: Their main clinical symptom remains the pain that was frequently felt in the region of the neck (96%), shoulder (90%) and upper extremities (82%). Almost equal pain has been felt in the region of lower extremities (46%) and thigh/hips area (44%). Pain in knees (34%) and ankle/feet (20%) was also recorded. The current study reported a high prevalence of MSD associated with multiple factors.

Conclusion: Self-acknowledgment is essential for the prevention of occupational damages of musculoskeletal nature. This study recommends that there is need to incorporate ergonomic work practice to create alertness of the risk of MSD and to endorse health and safety measures.

Keywords: Musculoskeletal Disorders; Occupational Hazards; Ergonomics; Prevalence

INTRODUCTION

In the past decades, musculoskeletal disorders (MSD) have become very familiar worldwide.¹ Among various populations, occupational hazards are very common; musculoskeletal disorder is one of the important occupational hazards that affect different members of various healthcare professions.² By definition, the musculoskeletal disorder is described as the disorder of the nerve, tendons, muscles, joints, ligaments, spinal disc and cartilage.³ Dentistry is among the occupation that is more frequently affected by musculoskeletal disorder, their work comprises of the risk factors that may result in various pathologies such as tenosynovitis, bursitis, tendinitis and synovitis.⁴ The symptoms of musculoskeletal disorder may include any of the subsequent complains such as stiffness, swelling, weakness, redness, pain or paraesthesia. Particular risk factors along with work related activities are responsible for the cause of MSDs such as clumsy and static postures, exposure to mechanical stress, forceful movements and vibration exposure. Presence of these factors

increases the risk of developing MSDs.⁵ If discomfort, irritation and pain incidences are avoided on regular basis, it may lead to an injury or career-ending disability.⁶ One of the important occupational health issues in dentistry is basic operating posture, nevertheless, it is substantial that operator's physical posture must be such that all the muscles are well-balanced, comfortable and in neutral position. The most likely reason to cause MSDs is posture outside the neutral position. It is important to understand the mechanism resulting in these problems to build an approach to lessen the risk of injury related to work.⁷ It has been reported that the MSD is one of the frequent problem in Pakistan that contribute about 40% of all cost towards the work related injuries treatment.⁸ Various studies suggested that the distribution of body and musculoskeletal pain severity in dental staff described an incidence between 46-71%.⁹ In comparison of upper body symptoms with people with different occupation such as pharmacists, people working in offices and farmers, the symptoms occurred more commonly in dentists.¹⁰ Hence, the aim of this study was to define the prevalence of work-related musculoskeletal disorders among dentists practising in suburbs of Karachi, Pakistan.

MATERIAL AND METHODS

The study was conducted on qualified dentists registered with the national regulatory body (Pakistan Medical and Dental Council) and practicing in Karachi; Pakistan (n=50). The study protocol was reviewed and approved by the Ethical Committee of Baqai Medical University, Karachi, Pakistan. Professional categories academicians, postgraduate trainee, registrars and general dentists carrying our private practice were included in this study. Any participant holding an invalid registration, doing observer-ship or working under supervision were excluded. A questionnaire focusing on the musculoskeletal disorder and based on the Nordic Musculoskeletal Questionnaire (NMQ) in English language was developed. All participants were explained about the purpose of data collection and an informed consent was obtained for their participation in this study. The NMQ is a valid research tool with a self-explanatory human body view from back and front in a diagrammatic presentation to highlight anatomical areas for assessment and identification

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How to cite this article: Rabia Sannam Khan, Fatima Ahmad, Muhammad Sabih Merchant. Prevalence of work related musculoskeletal disorders (MSD) among dentists. International Journal of Contemporary Medical Research 2017;4(5):1208-1211.

of musculoskeletal complaints. The questionnaire comprised of following sections¹⁰;

1. The section one covered demographic questions about gender, age, weight and height.
2. The section two included work related questions including working experience, working hours per week and position of work, either sitting or standing.
3. The section three dealt with trouble with the locomotive organs based in the history of discomfort during the last 12 months.
4. The section four was concerned with six key questions that were rated on the point scale (seldom or never, now and then, often and always) as shown in the Table 1.

The human body was distributed into anatomical areas including dorsal and ventral surface that were also included in the questionnaire. The participants were encouraged to recognize and pinpoint the areas of the body.⁵ The incidence of musculoskeletal complaints affecting each anatomical region was determined in terms of frequency and percentage.

STATISTICAL ANALYSIS

Descriptive data were reported as percentages using the Microsoft Excel software (Microsoft; v2007). In order to compare MSD prevalence among various subgroups, the chi-square test was applied. All data were analysed for statistics using the SPSS (v20, statistical package for social sciences, IBM, USA). The p-values were calculated using the Chi-square test while comparing the responses of musculoskeletal pain among various groups. A p-value of less than 0.05 was

considered as significant.

RESULTS

The data of present study are based on the perception and experiences of licensed dentists practicing in suburbs of Karachi, Pakistan. The overall response rate was 100% as all participants fully completed the given questionnaires. Cross tabulation was done for the data detailing number of participants including gender, age, height and weight (Table 2).

There were 26 (52%) female and 24 (48%) male participants. Although there was no statistically major variance based on gender, there was a significant difference based on age group among male and female participants. The age of majority of participants 47(94%) ranged between 20-40 years. Further demographic data is illustrated in Table 2 which describes the correlation between weight and height of dentists. Dentists having weight of 60-80 kg (88%) were significantly greater ($p<0.05$) than 40-60 kg (12%) and equally distributed among height groups. In contrast, the majority of 60-80 kg group dentists were taller with a height of 5.5'-6.5' (66%) whereas 34% had height of 4.5'-5.5' (Table 2).

In addition, the actual data collected revealed that a significantly higher proportion of dentists (86%) were suffering from some kind of MSD ($p<0.05$). There were no significant differences among male (83.7%) and female (88.5%) dentists. While only 14% of working dentists reported free from any kind of musculoskeletal pain.

Among the participants reporting MSD, data were further interpreted for the anatomical location of MSD and related

Questions	Answer choices			
	Seldom or never	Now and then	Often	Always
Have you ever hurt your locomotive organs in an accident?				
Has musculoskeletal complaint continued at least for few hours during the past 12 months?				
Has musculoskeletal complaint continued at least for few hours during the past 12 months?				
Has musculoskeletal complaint continued daily during the past 12 months with minimal presence of at least 1 month?				
Has musculoskeletal complaint led to a period of sickness absence in the past 12 months?				
Have you ever taken medical care because of musculoskeletal trouble during the last 12 months?				

Table-1: List of key questions and possible answer used to evaluate the MSD status of participants

		Age (years)		Frequency n (%)
		20-40	40-60	
Gender	Male	21	3	24(48)
	Female	26	0	26(52)
Total		47 (94)	3(6)	50(100)
		Height		Frequency n (%)
		4.5'-5.5'	5.5'-6.5'	
Weight	40-60 kg	3	3	6(12)
	60-80 kg	14	30	44(88)
Total		17(34)	33(66)	50(100)
		MSD		Frequency n (%)
		Yes (%)	No (%)	
MSD	Male	20 (83.7)	4 (16.3)	24(100)
	Female	23 (88.5)	3 (11.5)	26(100)
Total		43 (86%)	7 (14)	50(100)

Table-2. Demographic characteristics of that data (including gender, age, height and weight of participants) and over all response for the prevalence of musculoskeletal complaints

factors. The most commonly affected area was neck region 48 (96%) followed by shoulder and upper extremities 45 (90%) and 41 (82%) respectively (Figure 1). The least prevalent symptoms were reported in knees, ankles and feet 17 (34%) and 10 (20%) respectively.

In terms of possible aetiology or related medical history, this study analysed the behaviours, complains, severity, and need to seek a medical care by interpreting the data in the form of questions i.e. hurting of locomotive organs before in any accident which showed the range from 4 (8%) to 13 (26%) by getting the answers in the form of seldom/never, now and then, often and always (Figure 2). Change of job due to sickness lead from 2(4%) to 18(36%), while, dentists complaining of few hours of discomfort since 12 months came out to be in the range of 2 (4%) to 3 (6%). Additionally pain on daily basis since one month were 2(4%) to 5(10%), and the dentists who had no complain ranged from 2 (4%) to 4 (8%). And those who required medical care because of the pain since 12 months were 5 (10%) to 7 (14%).

DISCUSSION

Globally, the musculoskeletal disorders among dentists are one of the principal work-related problems.¹² This study included male and female participant of various age, height and weight. The most communal age group was in the range of 20-40 years which demonstrates that the large number of percentage of dentists with musculoskeletal disorders, were in this age range, which correlate with the study conducted in the Saudi Arabia.¹³ Besides age, we also focused on weight and height. Furthermore, results of this study shown that the location and frequency of MSD may be inclined posture. Among the practitioners, majority (76%) reported to practice in sitting position while 24% practices in standing position that shows majority of the dental practitioners work without assistants and respondents in sitting position. These findings are suggestive that the incorrect strategy of not practicing four-handed dentistry. Besides demographic information and postures, we also focused on its localization. The main areas of manifestation of pain among the dentists was associated with the neck (96%) and shoulder (90%), while relatively lower upper extremities (82%).

Careful analyses of this study showed that the higher percentage of dentists sampled have experience neck, shoulder and pain in upper extremities, which also included the hands, arms and axilla respectively. These findings are in agreement with a previous study conducted on in Australian population and showed that dental practitioners suffered more frequently of neck, shoulder and back pain with a prevalence of 64%.¹⁴ A similar study conducted in the United States of America, discovered that approximately 44% of dentists suffered from pain in upper extremities.¹⁵ However the distribution of neck and shoulder pain type is the key both for dentists working in various countries.

The prevalence of neck ache among dentist has been reported as high as 96%, however in Denmark, the incidence was much lower (65%)¹⁶, Saudi Arabia (65%).¹³ and Queensland (57.5%)¹⁷ The second most common MSD reported was shoulder ache (90%). Opposing to the outcomes of this study, Mileard and Ekewan¹⁸ described a prevalence of 51% for shoulder ache where as Bernard¹⁹ reported 37% of dentists experienced from

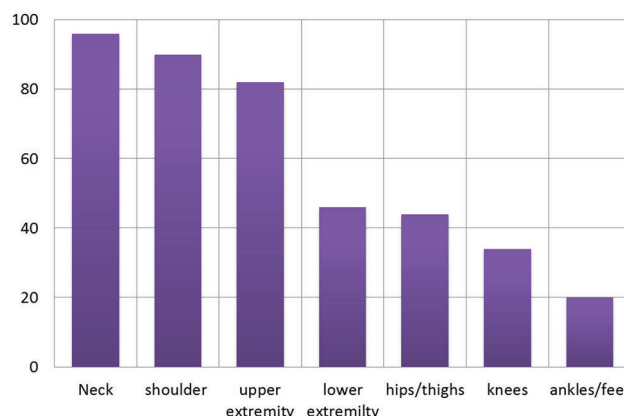


Figure-1: Prevalence of musculoskeletal complaints among various anatomical sites; (data presented as percentages).

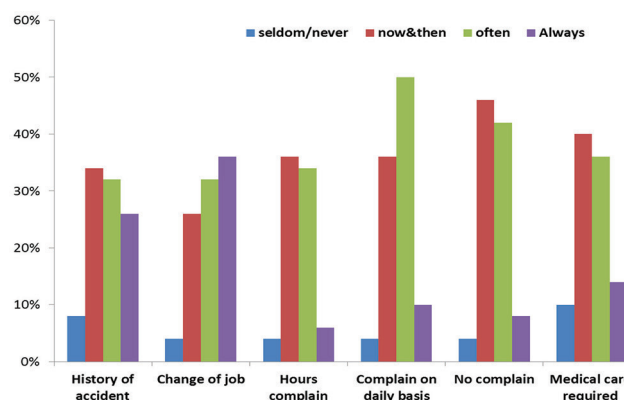


Figure-2: Behavior attributes and participant's response to key questions regarding musculoskeletal pain.

shoulder ache. The third most commonly testified MSD was pain in upper extremities (82%), however for Saudi Arabia the study outcomes report 73.5%.

The prevalence of lower extremities pain 46% was close to the figure reported in many countries including the Australia¹⁷, Israel²⁰ and United States of America.²⁰ Other less commonly reported MSD in this study were thighs/hips, knees and ankle/feet ache. It was also assessed that the previous history of dentist being practicing to analyse the behaviours, complains, severity, and need to seek a medical care by interpreting the data in the form of questions i.e. hurting of locomotive organs before in any accident that showed the range from 8% to 26%. Change of job due to sickness lead from 4% to 36%, while, dentists complaining of few hours of discomfort since 12 months came out to be in the range of 4% to 6%. Additionally pain on daily basis since one month were 4% to 10%, and the dentists who had no complain ranged from 4% to 8%. And those who required medical care because of the pain since 12 months were 10% to 14%. In this study, direct or indirect vision correlation was not found for unapproachable areas and the prevalence of MSD. Though, Abdul-Jabber et al¹³ stated that there is less pain and less discomfort when dental practitioners habitually use the dental mirror in such positions where the view directly is difficult. While operating such areas in the oral cavity, using indirect vision through the dental mirror facilitates more comfortable and relaxed position for the operator. Hence, lowering the muscular stresses and reducing the chances of

developing MSD.

Furthermore, Rice et al²¹ reported that musculoskeletal disorder signs are an outcome of many risk factors such as repetitive movements, prolonged static postures and poor position. Extended static postures in repetition are assumed to start a sequence of events that could be a reason for injuries, pain, career-ending issues and discomfort as possibly seen in the case of musculoskeletal disorders.²² Lalumandir et al.^{23,24} recounted that high occurrence of MSD is seen in dental specialties but with disparity in frequency and locations.²¹

There are a number of limitations for this study. The sample size included in this study was small and representative practitioners working in metro city. The finding can be biased based on multiple factors such as work load, number of patients treated in a single sitting, work environment, type of working (private/government sector, clinics, hospital or academician) and work stress may influence the results. Further long terms studies involving larger sample size from diverse populations are required to validate these findings.

CONCLUSION

Within the restriction of this study, the succeeding conclusion can be drawn that the prevalence of musculoskeletal disorders and symptoms is very high among registered dentists in Karachi. The neck and shoulders are the most frequently affected anatomical sites for muscular disorders. Dentist must follow the basic health and safety principles and be aware of correct working postures. In addition, regular rest intermissions between the patients and regular medical examination can be very helpful.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 05-05-2017; **Accepted:** 08-06-2017; **Published:** 16-06-2017