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ORIGINAL RESEARCH

Work-related Musculoskeletal Pain among Different Dental Specialists in United Arab Emirates

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ABSTRACT

Introduction: Dentists are at a very high risk of developing work-related musculoskeletal pain. The present study aimed at studying the prevalence of musculoskeletal pain among different dental specialists in the United Arab Emirates (UAE), and correlating the region of pain with the type of clinical work done by the specialists.

Materials and methods: A sample of more than 100 dentists was chosen randomly from different emirates in UAE. An interview questionnaire was administered regarding the number of years of experience and the presence, region, duration, and type of musculoskeletal pain they experienced.

Results: Musculoskeletal pain is experienced by 83.3% of periodontists, 80% of conservative dentists, 77.8% of endodontists, 72.7% of orthodontists, 70% of oral surgeons, 63.6% of prosthodontists, 63% of general dental practitioners, and 50% of pedodontists. The results have also indicated that the region of experienced musculoskeletal pain does vary according to the specialty. From those dentists who experience work-related musculoskeletal pain, 80% of conservative dentists experience pain in neck and shoulders, 66.7% of periodontists, and 54.5% of orthodontists experience pain in the lower back region. More than 50% of endodontists experience pain in the neck and shoulders regions, and 39% of general dental practitioners who experience pain in the neck region.

Conclusion: Preventive measures need to be taken to decrease the risk of dentists and dental specialists developing work-related musculoskeletal pain.

Clinical significance: The prevalence and distribution of musculoskeletal disorders (MSDs) among registered general dental practitioners and dental specialists in UAE was not clearly documented. The study results indicated that the region that experienced musculoskeletal pain does vary according to the specialty.

Keywords: Cross-sectional study, Dental specialists, Ergonomics, General dental practitioners, Lower back pain, Musculoskeletal pain, Neck pain.

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INTRODUCTION

Despite the outstanding advances in the medical field, it is well known that occupational health hazards are commonly found in almost every profession. For this reason, occupational health and productivity of the employed population must be continuously studied, and preventive measures should be taken. Dentists in particular are at a very high risk of developing work-related musculoskeletal pain. Musculoskeletal disorders (MSDs) are conditions that are concerned with nerve, muscle, tendons, and supporting structures, with symptoms ranging from mild, short-lasting pain, or discomfort to a more severe chronic one. These disorders commonly occur in the neck, shoulders, back, wrist, and hand regions.

Generally, many research articles have shown the correlation between the musculoskeletal pain and dentists in relation to specific body areas. One of these studies is on Danish dentists, where 50% of them suffered from lower back pain and 65% from neck/shoulders pain.[1] Another study was carried out in New South Wales in Australia, which found a very high prevalence of MSDs among involved dentists: 82% reported at least one musculoskeletal symptom in the past month, and 64% reported backache during the previous month.[2] Also, a

study conducted in India suggested that the prevalence rate of work-related musculoskeletal symptoms among dentists was 100% and the recorded symptoms were pain (99.06%), stiffness (3.35%), fatigue (8.39%), discomfort (12.87%), clicks/sounds (4.1%), and other neurogenic symptoms (20.14%).

In addition, regions of symptoms were identified, with the neck having the highest percentage (75.74%).[3] A study done in Southern Thailand found that musculoskeletal pain was the most common problem among dentists, the common sites being the neck, shoulders, and lower back.[4] Also, a 1-year study conducted in Thailand showed that 97% of dentists and dental assistants reported pain in at least one site, and only 3% have reported no pain.[5] Researchers also stated the existing relation of musculoskeletal pain to different dental specialties with a very high incidence of wrist pain was recorded in professions dedicated to oral surgery with respect to other professions, such as prosthodontics, periodontists, pedodontics, endodontics, and general dental practitioners.[6] In that study on 74 dental professionals, 79.8% of participants reported musculoskeletal pain during the past 6 months. The neck region was the most affected, followed by pain in the lumbar area, back pain, wrist pain, and pain in the shoulders.[6] Furthermore, a study has shown that the experience of pain was greatest among general dental practitioners, who were found to have the least awareness of ergonomics, followed by prosthodontists, oral surgeons, endodontists, and periodontists.[7] Moreover, Zarra and Lambrianidis[8] carried out a study among Greek endodontists which reported that 61% of the participants had musculoskeletal pain, and 69% of them experienced it in more than one body part, the majority being in the lower back and neck (30%). The adoption of correct ergonomic positions, regular exercises, and reduced number of patients per day resulted in less prevalence of musculoskeletal pain. Another study, comparing general dental practitioners to orthodontists, found that hand/wrist complaints were more prevalent in orthodontists than in general dental practitioners. On the contrary, shoulder complaints were often reported more by general dental practitioners.[9] In contrast, a study conducted in India showed that the prevalence of musculoskeletal pain in Indian orthodontists is low compared to general dental practitioners.[10]

In Middle East region, a study was conducted in the UAE to measure the prevalence of occupational health hazards among 844 general practitioner dentists. They found that 68% of them have indicated that they suffer from musculoskeletal pain.[11] This shows that the prevalence of pain among dentists in the UAE is quite high, and awareness needs to spread in order to reduce this large number. Another study conducted in Saudi Arabia showed that 85% out of 146 reported some sort of musculoskeletal pain after joining the dental profession. Most of the respondents reported pain in the lower back region,[12] another study done in Egypt has shown that occupational neck (75.1%) and lower back pain (58.5%) were the most prevalent musculoskeletal complaints among dentists in the past 12 months.[13] Al-Wazzan et al[14] in their study done in Saudia Arabia, suggested that these work-related musculoskeletal symptoms were mainly due to faulty postural positions inherent in the dentist's work. The prevalence of MSD among dental specialists is not well documented in UAE. Hence this study was undertaken to determine the prevalence and distribution of MSD among registered general dental practitioners and dental specialists in UAE with more than 5 years of clinical experience.

MATERIALS AND METHODS

This is a cross-sectional, questionnaire-based study categorized according to social demographic information, specialty, years of experience, working hours, presence of pain, region, type and duration of pain, and presence of MSDs, using Standardized Nordic Questionnaire for analysis of musculoskeletal symptoms.[15]

To provide unbiased sample, dentists were chosen by using simple random sampling method from the registered list of dentists and specialists at Ministry of Health in UAE. A random-digit dialing procedure was used, and telephone numbers were selected at random and called to identify dentists who are willing to participate in this survey. Consented dentists were approached in their clinics during their working hours. A consent form was filled by the participants. The research was carried out across private and public dental clinics in the UAE. Dentists with less than 5 years of experience in their field of work, and those with medical conditions that would interfere with the research findings were excluded from the study.

Statistical analysis was done, using inferential statistics to find out the relation between the specialty and region of pain, type, duration of pain, and years of experience. Statistical Package for Social Sciences (SPSS) version 21 was used to determine frequency distributions, means, and proportions. Comparison of proportions was done using Fischer's exact test. Value of less than 0.05 was considered to be statistically significant.

RESULTS

Out of 101 registered dentists, 60 of them were specialists and 41 were general practitioners, filled out the prepared questionnaire. The majority of the participants had 5 to 20 years of experience, and 63% were males and 37% were females. The average age of the participants ranged between 31 and 40 years. Nonsignificant

gender differences were recorded in the studied sample. Therefore, the percentages of both genders were added together. The average working hours of the studied sample was ranged between 30 and 40 hours/week.

With regard to the musculoskeletal pain, the results of the present investigation have shown that 67% of the participants had pain in the past year. The musculoskeletal regions most frequently affected were the neck (42.6%) and lower back (36.6%), followed by shoulders (29.7%), upper back (20.8%), head (10.9%), knees (8.9%), and wrist/hands (7.9%). The least affected regions among dentists in the tested sample were ankles/feet (5.9%), hips/thighs (5%), and elbows (3%). Approximately, half of the interviewed dentists (49.5%) were suffering from pain in multiple regions. Regarding regions of pain, 72% were neck-associated problems and 44% were combined neck pain and back pain. When comparing the regions of pain with the specialty subgroups, shoulder and lower back pain have shown a significant p-value: $p < 0.05$ (Table 1).

The results of this study showed that 63% of general dental practitioners appeared to have experienced work-related musculoskeletal pain, while 37% experienced no pain. Neck pain was experienced in 39% of general dental practitioners, while shoulder pain was experienced in 26.8%, and only 24.4% experienced pain in the lower back region (Table 2). Among different specialists, the prevalence of work-related musculoskeletal pain has shown to be 83.3% among periodontists, 80% among conservative dentists, 77.8% among endodontists, 72.7% among orthodontists, 70% among oral surgeons, 63.6% among prosthodontists, and 50% among pedodontists.

Table 1: Pain distribution among studied sample

Region	*N (%)*	*f-value*	*p-value*
Head	11 (10.9%)	2.008	0.062
Neck	43 (42.6%)	0.746	0.634
Shoulders	30 (29.7%)	2.295	0.033*
Elbows	3 (3%)	0.943	0.478
Wrists & Hands	8 (7.9%)	1.516	0.171
Hops & Thighs	5 (5%)	1.948	0.071
Ankles & feet	6 (5.9%)	0.912	0.501
Upper back	21(20.8%)	1.285	0.266
Lower back	37(36.6)	2.162	0.045*
Knees	9 (8.9%)	1.136	0.348

Endodontists mostly experienced pain in the neck region (55.6%), shoulders (44.4%), and lower back (44.4%). Oral surgeons mostly experienced pain in the lower back region (70%), followed by the neck region (50%), shoulders (10%), and knees (10%). Prosthodontists were found to experience the most pain in the shoulders (45.5%), followed by the lower back region (36.4%), and neck (27.3%).

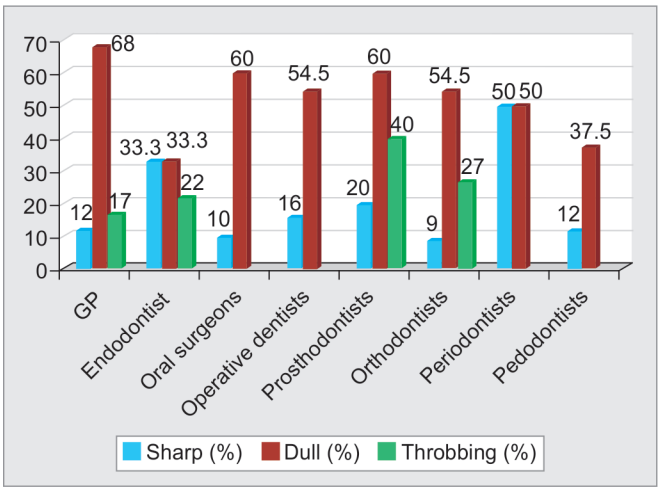
Remarkably, conservative dentists were found to experience pain in the neck and shoulders regions (80%), followed by the wrists and hands and the lower back regions (40%). Orthodontists have shown to mostly experience pain in the lower back region (54.5%), followed by the neck region (36.4%), and the upper back region (18.2%). Periodontists experienced the most pain in the lower back region (66.7%), followed by the neck, head, and shoulders, (50%). Lastly, pedodontists have shown to experience most pain in the upper back region (50%), followed by the neck region (37.5%) and the shoulders and lower back regions (12.5%) (Table 3). In addition, most of

Table 2: Pain distribution among general dental practitioners

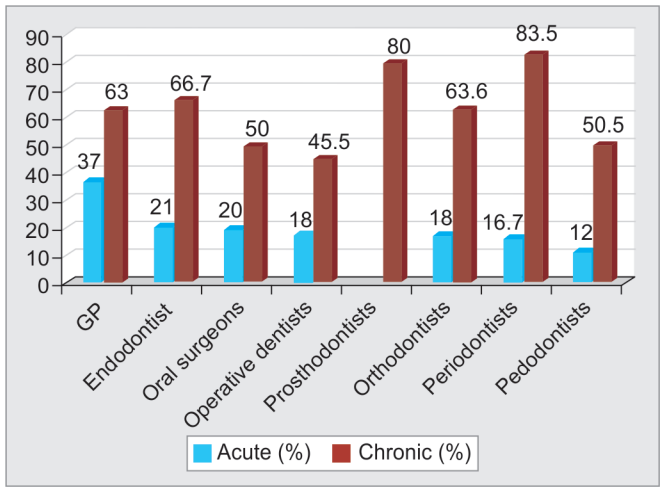
Region	*Head*	*Neck*	*Shoulder*	*Elbows*	*Wrist/Hand*	*Hip/Thigh*	*Ankle/feet*	*Upper Back*	*Lower back*	*Knees*
Percentage	7.3	39	26.5	2.4	7.3	4.9	4.9	17.1	24.4	9.8
Type of Pain	Sharp				Dull			Throbbing		
Percentage	9.8				46.3			12.2		
Duration of Pain	Acute					Chronic				
Percentage	26.8					46.3				

Table 3: Pain distribution among dental specialists

Specialty	*Endodontists*	*Oral Surgeon*	*Prosthodontists*	*Conserv. Dentists*	*Orthodontists*	*Periodontists*	*Pedodontists*
Head	11.1%	0%	9.1%	20%	18.2%	50%	0%
Neck	55.6%	50%	27.3%	80%	36.4%	50%	37.5%
Shoulders	44.4%	10%	45.5%	80%	9.1%	50%	12.5%
Elbows	0%	0%	0%	0%	9.1%	16.7%	0%
Wrists/Hands	11.1%	0%	0%	40%	9.1%	16.7%	0%
Ankle/feet	0%	0%	18.2%	0%	9.1%	16.7	0%
Upper back	22.2%	0%	18.2%	20%	18.2%	33.3%	50%
Lower back	44.4%	70%	36.4%	40%	54.5%	66.7%	2.5
Knees	0%	10%	9.1%	20%3	0%	33.3%	0%
Hip/Thighs	0%	0%	9.1%	0%	0%	33.3%	0%



Graph 1: Type of pain in general dental practitioners and dental specialists



Graph 2: Duration of pain in general dental practitioners and dental specialists

the dentists in all the specialties interviewed were found to experience dull and chronic pain more than any other type or duration of pain (Graphs 1 and 2).

DISCUSSION

Musculoskeletal disorders are conditions that are concerned with damage to nerve, muscle, tendons, and supporting structures in the body. Musculoskeletal disorders occur with symptoms that range from mild, short-lasting pain, or discomfort to a more severe chronic one. These disorders commonly occur in the neck, shoulders, back, wrist, and hand regions. Since all of the dentists' work revolves around the usage of their hands, with long hours in the seated position most of the time, the presence of MSDs/pain will definitely have a negative impact on the productivity of the dentist and the efficiency of his/her work. As a result, a probable decrease in the income of the dentist will occur, with increasing costs as well to treat the condition.

The UAE is a fast-growing country, with increasing dental schools, dentists, and dental specialists. There are currently eight undergraduate and postgraduate dental schools in the UAE, graduating many young dentists every year. The present study was conducted on randomly selected sample of consented registered dentist working in different emirates of UAE. The results have shown that 67% of dentists had experienced work-related musculoskeletal pain during the past year. This was in line with a study conducted in the UAE, which concluded that 68% of dentists suffer from musculoskeletal pain.[11]

In the present investigation, the neck is marked to have the highest prevalence of pain among the rest of the body regions (42.6%). This finding is in accordance with previous studies done in Egypt,[13] Barcelona, Spain,[16] and Iran.[17] On the contrary, another study conducted in Saudi Arabia showed that the majority of the respondents reported pain in the lower back region (60%).[12] However, findings of our study showed that the neck is the most prevalent region of pain where the second highest region of pain has shown to be the lower back (36.6%). This is in accordance with a study conducted in Egypt[13] and in southern Iran.[17] The third highest region is the shoulders with a percentage of 29.7%. The most prevalent regions of pain mentioned above were in agreement with a research conducted among the Danish dentists who showed 65% of studied samples suffered from neck and shoulder pain and 50% of the sample suffered from lower back pain.[1]

The present findings show that out of 67% of dentists who experienced musculoskeletal pain, only 17.5% suffered from pain in one region while the majority of them (49.5%) suffered from multiple regions of pain; 23.76% of them noted pain in two regions; and 25.7% noted more than two regions of pain. This finding is in agreement with a study conducted by Harutunian et al.[16] Furthermore, 72% of the dentists with pain in multiple regions have neck-associated problems, and 44% have neck pain and lower back pain combined. This is in accordance with studies conducted in Australia, Greece, and Saudi Arabia.[2,8,12]

Regarding different dental specialists, the highest percentage of pain was experienced among periodontists with a percentage of 83.30%, followed by conservative dentists (80%). According to the regions of pain, the majority of endodontists have shown to experience neck pain (54.5%), followed by lower back and shoulder pain (44.4%). These findings were in accordance with a study done in Greece by Zarra and Lambrianidis,[8] explaining that most of the endodontists (83%) used sitting position for long hours that could be associated with awkward positions and lack of stretching exercises. Hence, this justified that highest regions affected were the neck and the lower back. Oral surgeons have shown to experience

the highest percentage of back pain (70%), which was in agreement with a study done by Shaik et al.[18] Their findings were further explained by the number of patients the oral surgeon attends a day and some socioeconomic factors involved. This was found to be of contribution to the high percentage of back pain suffered by oral surgeons. An interesting finding in this study showed that conservative dentists have the highest percentage of wrist pain compared to the other specialists. This could be due to the nature of work that they perform. However, a study conducted in Barcelona showed that wrist pain is highest among oral surgeons.[16] With regard to orthodontists, the present findings showed that they suffer from lower back pain, followed by neck pain. These findings were in line with a study done in India by Sangaraju et al.[10] The study mentioned that pain in those specific regions may be contributed to the general dental practice by most of the Indian orthodontists.

With respect to the type and duration of pain, the majority of specialists have shown to experience dull and chronic type of pain. This chronic type of pain may be attributed to posture, repetitious movements, physical loads, psychological stress, and other ergonomic factors. Many researchers support the idea that ergonomic hazards can be managed or alleviated effectively using a multifaceted approach. It involves preventive education, postural and positioning strategies, proper selection and use of ergonomic equipment, and frequent breaks with stretching and postural strengthening techniques.[19] This represents a paradigm shift for daily dental practice. Al-Wazzan et al[14] recommended aerobic and relaxation exercises to be included in the weekly activities of dental personnel. A 30-minute aerobic program three times a week is ideal for overall fitness. Gupta et al,[20] on the contrary, recommended a complementary and alternative medicine (CAM) which can be helpful in managing and preventing this MSD. Research shows that maintaining the low back curve – the lumber lordosis – when sitting can reduce or prevent lower back pain.[21] Proper selection, adjustment, and use of magnification systems have been associated with decreased neck and lower back pain as they allow the operator to maintain healthier postures.[22] Operators also need to know how to adjust the features of their chair to obtain maximal ergonomic benefits.[19] Alternating between standing and sitting position also can be an effective tool in preventing injuries.[21] Operators should also take the time to position their patients properly for mandibular and maxillary procedures. Moreover, dentists should position instruments within easy reach.[23] To prevent injury from occurring to muscles and other tissues, the operator should allow for rest periods to replenish and nourish the stressed structures. Operators may use various stress-reduction techniques to decrease stress-related muscular tension.[21] Due to the cross-sectional design of the study, the causal variables could not be identified, which can be considered as a limitation of the present study.

CONCLUSION

The results of this study have shown that most dentists experience a high rate of musculoskeletal pain in UAE, whether general practitioners or specialists. Periodontists and conservative dentists (83.30 and 80% respectively) are the highest of musculoskeletal pain among dental specialists in UAE. Hence, preventive measures need to be taken to decrease their risk of developing such pain. Maintaining proper ergonomic positions, using ergonomic equipment, taking breaks, as well as exercising regularly can prevent this devastating occupational health problem.

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