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WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTISTS IN SHARKIA GOVERNMENTAL HOSPITALS, EGYPT

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Abstract

Introduction: Work-related musculoskeletal disorders (WMSDs) among dentists are prevalent complaints. The symptoms might impair work capacity and the future possibility to stay in the profession. Aim of work: to assess the prevalence and distribution of work related musculoskeletal disorders (WMSDs) among dentists working in Sharkia governmental hospitals and to determine the risk factors among them. **Materials and methods:** A cross-sectional study was conducted among (123) dentists. A self-administered questionnaire that involved information about: socio-demographic and work-related data, a version of Standard Nordic MSD questionnaire, and a version of Demand/Control model questionnaire from Karasek. **Results:** The overall prevalence of MSD was (66.7%). Low-back pain was the most prevalent musculoskeletal complaint that reported by (56.9%) of the subjects, followed by wrist, neck and shoulders complaints (50.4%, 47.2% and 42.3% respectively). Age more than forty years, duration of work more than ten years, use of vibrating tools and low job control were the most significant predictors of work-related musculoskeletal disorders among the studied dentists with (OR= 2.70, 2.72, 5.32 and 4.85 respectively). **Conclusion:** WMSDs are significant problems among dental practitioners. Repetitive tasks, using of vibrating tools, bad working habits, and uncomfortable posture contribute to musculoskeletal disorders, loss of production and stress. Educational dental ergonomics program should be introduced as a separate course during undergraduate practice.

Key words: Musculoskeletal disorders, work related, Dentists and Risk factors.

Introduction

Musculoskeletal disorders (MSDs) were described as a range of inflammatory and degenerative disorders that affecting musculoskeletal system; muscles, tendons, joints, ligaments, peripheral nerves, as well as supporting structures such as cartilage and vertebral discs. WMSDs were caused, precipitated, or aggravated by repeated or sustained work activities with insufficient recovery (McMillan, 2014). Musculoskeletal disorders are costly and significant workplace problems affecting occupational health, the careers of the working population and productivity (Babar-Craig et al., 2003) .About 2 million workers suffer from musculoskeletal disorders each year (Laderas et al., 2002).

Dentists are susceptible to occupational health hazards at work and development of cumulative trauma disorders. They assume prolonged static positions which are uncomfortable and asymmetric. They sit or stand for prolonged periods and they maintain head, neck and shoulders in fixed positions for long intervals (Johnston et al., 2008; Kierklo et al., 2011). In dentistry, inconvenient posture, repetitive tasks as well as improper working habits, such as: cavities preparation and filling, root canal instrumentation, scaling or root planning contribute greatly to musculoskeletal disorders (MSDs), psychological stress, and finally cause fatigue (Newell and Kumar, 2004 , Leggat et al., 2007). These conditions can result in decrease of quality of work. Moreover, the monotony of work, artificial light, and work in noise are risk factors for dental personnel (Pandis et al., 2007).

The high prevalence of musculoskeletal disorder reflects the significant work load in dentistry, with high demands on precision, fine, manipulative hand movements and work with unsupported, elevated arms (Akesson et al., 2000). Dentists require good visual acuity, depth perception, hearing, manual dexterity, psychomotor skills, and ability to maintain postures over long periods (Ayers et al., 2009). Diminution of any of these abilities can affect the practitioner's performance (Leggat et al., 2007).

Aim of work

to assess the prevalence and distribution of work related musculoskeletal disorders (WMSDs) among dentists working in Sharkia governmental hospitals and to determine the risk factors among them.

Materials and methods

- **Study design:** It is a cross-sectional study
- **Place and duration of study:** The study was conducted among dentists in Sharkia governmental hospitals over the period from august 2015 to February 2016. In Sharkia governorate, there are 16 governmental hospitals. A simple random technique was used to select five hospitals out of the sixteen governmental hospitals.
- **Study sample:** The total number of dentists in these five hospitals was 137, and 123 of them complete the questionnaire with response rate of (89.7%).

Inclusion criteria: dentists either males or females who were working at least for one year (all of them were working for more than one year).

Exclusion criteria: dentists have MSD before starting work.

- Study methods:

A self-administered questionnaire that involved information about:

The first part: socio-demographic and work-related data that included age, gender, marital status, height, weight, smoking, secondary job, and duration of work.

The second part: include a version of Standard Nordic MSD questionnaire (Kuorinka et al., 1987) which is a valid and reliable screening and surveillance questionnaire that includes various parameters related to MSD to find out the body regions affected by musculoskeletal symptoms. Also questions asking about symptoms increased during workdays and by the end of the work shift and decreased on holidays to consider if it is work-related.

The third part: include a version of Demand/Control model questionnaire from Karasek, which investigates the psychosocial aspects at work distinguished two principal areas: demands, and control (Karasek et al., 1998).

Consent

Verbal consent from all participants was obtained before the start of work with assurance of confidentiality of the data.

Ethical approval:

Approval from the administrative authority of the five studied hospitals was obtained.

Data management

For the data entry and statistical analysis, Statistical Package for the Social Sciences (SPSS) version 21 for Windows was used for frequency distribution tables, mean and standard deviation for descriptive purposes, chi-square and fisher exact for testing the significance of difference of qualitative variables. Logistic regression analysis was carried out to identify the significant risk factors. The level of significance was considered at < 0.05

Results

Table (1): Prevalence of musculoskeletal disorders according to affected area in relation to gender among dentists.

Affected area	Total No =123	Males No=101	Females No= 22	X^2	OR (CI 95%)	p
overall MSD	82 (66.7%)	65 (64.4%)	17 (77.3%)	1.35	1.8 (0.64-5.52	>0.05
Neck	58 (47.2%)	47 (46.5%)	11 (50%)	0.08	1.14 (0.45-2.89)	>0.05
Shoulders	52 (42.3%)	38 (37.6%)	14 (63.6%)	5.09	2.9 (1.11-7.55	<0.05*
Elbow	36 (29.3%)	3 (29.7%)	6 (29.3%)	0.02	0.8 (0.31-2.4)	>0.05
Wrist	62 (50.4%)	48 (47.5%)	14 (63.6%	1.87	1.93 (0.74-5.00)	>0.05
Upper back	38 (30.9%)	30 (29.7%)	8 (36.4%)	0.37	1.35 (0.51-3.56	>0.05
Lower back	70 (56.9%)	53 (52.5%)	17 (77.3%)	4.5	3.07 (1.05-8.98)	<0.05*
Hip	19 (15.4%)	9 (8.9%)	10 (45.5%)	18.4	8.5 (2.8-25.15)	<0.001*
Knee	23 (18.7%)	16 (15.8%)	7 (31.8%)	3.03	2.4 (0.87-7.04	>0.05

*: Significant

Table (1) showed that the prevalence of musculoskeletal disorders among dentists was (66.7%). Low-back pain was the most prevalent musculoskeletal complaint that reported by (56.9%) of the subjects, followed by wrist, neck and shoulders complaints (50.4%, 47.2% and 42.3% respectively). Disorders of hips and knees were the least complaints (15.4% and 18.7%). Shoulders lower back and hips disorders were more prevalent among females with statistically significant differences.

Table (2): Frequency distribution of musculoskeletal disorders among dentists during the previous 12 months in relation to socio-demographic and work characteristics.

Variables	Prevalence of MSD during the previous 12 months		X^2	p
	No	%		
Sex				
Males (No=101)	65	64.4	1.35	>0.05
Females (No= 22)	17	77.3		
Age				
<30 (No=20)	9	45	14.7	<0.05*
30-40 (No=38)	20	52.6		
40-50 (No=35)	27	77.1		
>50 (No= 30)	26	86.7		
Duration				
<10 (No=47)	21	44.7	19.47	<0.001*
10-20 (Mo= 33)	23	69.7		
>20 (No=43)	38	88.4		
Second job				
No (No=26)	20	76.9	1.56	>0.05
Yes (No= 97)	62	63.9		
Smoking				
Non-smoker (No=33)	23	69.7	0.18	>0.05
Smoker (No= 90)	59	65.6		
Chronic diseases				
No (No= 93)	57	61.3	4.96	<0.05*
Yes (No= 30)	25	83.3		
BMI				
Normal (No= 63)	38	60.3	2.34	>0.05
Overweight/ obese (No=60)	44	73.3		
Qualification				
General practitioners (No= 74)	50	67.6	0.06	>0.05
Specialists (No= 49)	32	65.3		

*: Significant BMI: Body Mass Index

Table (2) showed that MSD was more prevalent among females than males but without statistically significant differences. Older age and longer duration of work associated with higher prevalence of MSD with statistically significant differences. Dentists with chronic diseases reported higher prevalence of MSD. There is no association between MSD and smoking, BMI, second job and qualification.

Table (3): Associations between musculoskeletal disorders in past 12 months and self-reported risk factors.

Variable	Musculoskeletal disorders		X^2	OR (CI 95%)	p
	No	Yes			
A-Physical load:					
Use of vibrating tools					
No	23	14	19.79	6.2 (2.67-14.42)	<0.001*
Yes	18	68			
Awkward posture					
No	13	13	4.12	2.46 (1.01-5.97)	<0.05*
Yes	28	69			
Repetitive shoulder and hand movements					
No	9	12	1.03	1.64 (0.62-4.28	>0.05
Yes	32	70			
B-Psychosocial load:					
Job control					
Good job control	22	16	14.92	4.7 (2.1-10.86)	<0.001*
Low job control	19	66			
Work demands					
Low job demand	10	12	1.7	1.887 (0.73-4.81)	>0.05
High job demand	31	70			

*: Significant

Table (3) showed that using of vibrating tools, awkward posture and low job control increase the risk of musculoskeletal disorders among dentists (OR= 6.2, 2.46 and 4.7 respectively). But there is no association between MSD and repetitive shoulder/hand movements and work demand.

Table (4): Multivariate logistic regression analysis for the most predictor variables of work-related musculoskeletal disorders among dentists.

Risk factors	B	S.E.	Wald	p	OR (CI%95)
Age> 40 years	0.996	0.49	4.04	>0.05*	2.70 (1.02-7.14)
Duration of work >10 years	0.997	0.49	4.1	>0.05*	2.72 (1.03-7.23
Chronic diseases	0.53	0.65	0.66	<0.05	1.70 (0.47-6.10)
Use of vibrating tools	1.6	0.491	11.6	>0.001*	5.32 (2.34-13.92)
Awkward posture	0.39	0.55	0.5	<0.05	1.48 (0.50-4.37)
Low job control	1.58	0.48	10.52	>0.001*	4.85 (1.86-12.61)

*: Significant

Table (4) showed that age more than forty years, duration of work more than ten years, use of vibrating tools and low job control were the most significant predictors of work-related musculoskeletal disorders among the studied group dentists with (OR= 2.70, 2.72, 5.32 and 4.85 respectively).

Discussion

Dental practitioners are included within the group of professionals who are at risk of suffering from work-related musculoskeletal disorders due to prolonged forced or awkward postures at work and failure to adopt ergonomic preventive measures (Szymanska, 2002). In the present study, the overall prevalence of musculoskeletal disorders among dentists was (66.7%) (Table 1).

This result was in accordance with the findings presented in a study done by Abduljabbar, 2000 among dental practitioners in Saudi Arabia and he detected that 59.2% were suffering from MSD. But it is lower than that was reported in Australia (87.2%) (Leggat and Smith, 2006), Lithuania (86.5%) (Puriene et al., 2007), and Turkey (94%) (Polat et al., 2007). Compared to other health care professionals, the

prevalence of MSD among dentists was higher than reports among medical physicians (41.7%) in Iran (Mehrdad et al., 2012) and in general population (25.9%) (Bihari et al., 2011).

The present study reported that, low-back pain was the most prevalent musculoskeletal complaint among 56.9% of studied group, followed by wrist, neck and shoulders complaints (50.4%, 47.2% and 42.3% respectively) (Table 1). Similar pattern of distribution was reported by Szymańska (2002) and Pureine et al, (2008) in their studies who reported MSD of lower back was the most prevalent musculoskeletal complaint. This result indicates that most of the dental practitioners adopt positions that frequently result in MSD of the neck and low back regions. Upper back complaint reported by (30.9%) of examined subjects which was different from Alghadir et al. (2015) who detected that the prevalence of upper back region was (23%).

In our study, the overall prevalence of musculoskeletal disorders among dentists during the previous 12 months was more prevalent among females than males but without statistically significant differences (Table 2). Shoulders lower back and hips disorders were more prevalent among females with statistically significant differences (Table 2). Similar studies assessing the prevalence of MSD among dental practitioners in Lithuania (Purieneet al 2008a) and New Zealand (Ayers et al., 2009) revealed higher prevalence of MSD among female practitioners. This justified by the fact that females were more concerned about their health compared to males and they tended to report their health problems more often (Bihari et al., 2011).

In the present study, older age and longer duration of work associated with higher prevalence of MSD with statistically significant differences (Table 2). Similar results were reported in other studies among dental practitioners in Lithuania and Poland (Puriene et al., 2007; Puriene et al., 2008 b) had shown MSD to increase with age.

In contrast to our findings, other studies among dentists of Saudi Arabia and New South Wales showed the prevalence of MSD decreases with age and duration of practice (Marshall

et al 1997 and Abduljabbar, 2000). Their findings were justified that older practitioners dealing with less number of patients and regarding the years of practice, practitioners having developed coping measures (adjusting position and better ergonomically orientation) for MSD.

Our study revealed that, significant relations were found between some self-reported physical risk factors and the occurrence of musculoskeletal disorders in various body sites. Awkward posture of dentists plays a significant important role as a risk factor for the development of work-related musculoskeletal disorders with (OR= 2.46; 95% CI 1.01-5.97) (Table 3). Similar results was detected by (Pandis et al., 2007) who reported that maintaining poor posture for long periods can result in chronic muscular fatigue, pain or discomfort , and with time probably lead to pathological effects with permanent disability. So, Finsen et al. (1998) presume that an increased variation in work postures may decrease the risk of work-related musculoskeletal disorder

Musculoskeletal disorders were associated with using of vibrating tools with (OR= 6.2; 95% CI 2.67-14.42) (Table 3). Alexopoulos et al, (2004) found that most significant and consistent correlation coefficients were between repetitive movements of shoulder/hand, use of vibrating tools and excessive tightening of low back. But in the present study, there was no association between MSD and repetitive shoulder/hand movements.

Low job control was associated with increase the risk of musculoskeletal disorders among dentists (OR= 4.7; 95% CI 2.1-10.86) (Table 3). This is in accordance with the results reported by Alexopoulos et al, (2004) who found that lower job control was a significant factor of comorbidity; also he found high job demands increase the need for recovery that is related to more worst perceived health.

Conclusion and recommendations:

Work-related musculoskeletal disorders are significant problems among dental practitioners. Repetitive tasks, using of vibrating tools, bad working habits, and uncomfortable posture contribute to musculoskeletal

disorders, loss of production and stress. Ergonomic interventions may have a great impact in preventing MSD. Educational dental ergonomics program should be introduced as a separate course during undergraduate practice.

Conflict of interest

The authors declare that there is no conflict of interests.

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