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Prevalence of musculoskeletal disorders among dentists in Qassim region, Saudi Arabia

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Abstract
Background: Musculoskeletal disorders (MSD) are one of the main work related health hazards affecting dental practitioners.
Objective: to determine the prevalence of musculoskeletal disorder in dentists in Qassim region of Saudi Arabia.
Design: Cross sectional descriptive study.
Settings: Qassim Region.
Methods and Material: cross sectional study was conducted in Qassim region on 106 dentists. Data collection was done by self-administrated standardized Nordic questionnaire. Data was processed and analyzed at the 5% level of significance.
Mean Outcome Measures: the prevalence of MSD in terms of musculoskeletal symptoms like pain or discomfort in the preceding 12 months.
Results: there was a high prevalence of musculoskeletal disorders among dentists in Qassim region, most affected areas were lower back (61%), neck and shoulders (49.1%).
Conclusions: Dentists in Qassim region are at high risk for MSD with high prevalence of MSD among them.

Keywords: MSD, ergonomics, nordic, musculoskeletal disorders

Introduction

Background and Objectives

Musculoskeletal disorders (MSD) is a common cause of long-term pain and disability affecting millions of people [1]. It is characterized by multiple signs and symptoms like discomfort, persistent pain of the muscles, joints and other parts of the body. It could be caused or exacerbated by repeated movements and prolonged body postures [2].

MSD may be occupational meaning work-related musculoskeletal disorders or non-occupational. Multiple researchers within the field of work related MSD mention that work conditions might result in or aggravate illness, however, alternative factors like characteristics of the employee (gender, age) alongside psychosocial problems (supervisor and co-worker social support) should be thought about as well [3].

Dentistry is a challenging profession, it involves a high degree of concentration and precision. Dentists need clear visual sense, depth perception, good hearing, manual dexterity, and capacity to hold working postures over long periods of time [4].

Literature reviews around the globe have proven a high prevalence of MSD among dental professionals. Dentists mountain static postures during work which require more than fifty percent of the body's muscle to contract while resisting gravity. When the body is repetitively exposed to prolonged static postures, it leads to pain, injury, or career ending MSD [1].

A recent updated review on the prevalence of neck symptoms has mentioned a rate of varying between 17–73% for dentists, 38–62% for dental assistants and 54–83% for dental hygienists [4].

In the last 20 years a great interest has developed in ergonomics and work related MSD associated with dental practice. MSD prevalence among dentists and other dental professionals is manifested primarily as neck, shoulder, hand and wrist pain (also classified as upper extremity MSD) and low back pain [5].

'Ergonomics' word was derived from the Greek, which means 'Ergon : work' and 'nomos: natural laws'. It can be defined as a science of keeping the physical, physiological and psychological conditions of work to the abilities of the employees for the purpose of making the workplace more suitable to develop safety, health and efficiency. The philosophy of ergonomics link with all aspects of living and can be implemented in work environment, at home or in entertaining activities [5].

Many studies on Musculoskeletal disorders among dentists were investigated by different researchers with different methodologies have been conducted and concluded increased risk of developing MSD in multiple regions of Saudi Arabia none of which were in Qassim region [6-8].

The aim of this study is to determine the prevalence of MSD`1 among dental practitioners in Qassim region of Saudi Arabia.

Materials and Methods

The study proposal and questionnaire were approved by research and ethical committees of Qassim university.

A cross-sectional study through a questionnaire-based survey was conducted among among dentists in Qassim region. The data collection was done over the period of 3 months from August to October 2016.

Study Settings

Dental clinics in Qassim were divided into 2 groups:

governmental clinics (i.e. Ministry of health Hospitals, primary health care centers and military hospitals) and private clinics (i.e. Private hospitals, clinics and dental centers). Seven cities were randomly selected to be included in the study.

Inclusion criteria

General practitioners and specialists between the ages of 25-70 years were included. Dental interns and dentists with systemic conditions affecting bones, joints and muscles were excluded from the study.

Study Participants

Total 106 dentists were involved in the survey (36% females and 64% males). The sample was collected form 7 different cities in Qassim province including: 22 subjects from Alrass city, Onaizah: 18, Buraydah: 38, Albadyaa: 4, Ryad Alkhabra: 4, Albokirea: 12 and Almithnab: 8. Sample included 31 dentists from governmental Hospitals and 75 dentists working in private clinics (Table 1).

These values are represented using the pie-charts which are presented in

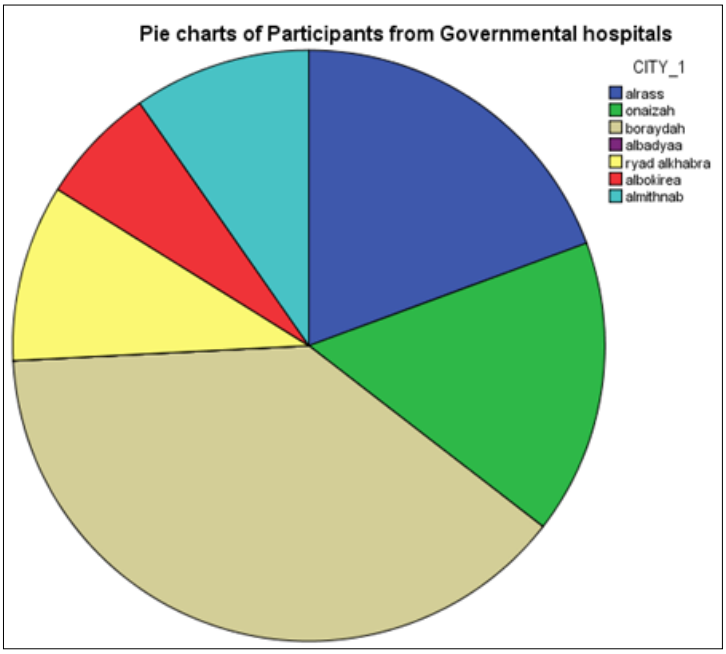

Fig 1: Pie chart of the Participants from Governmental hospitals.

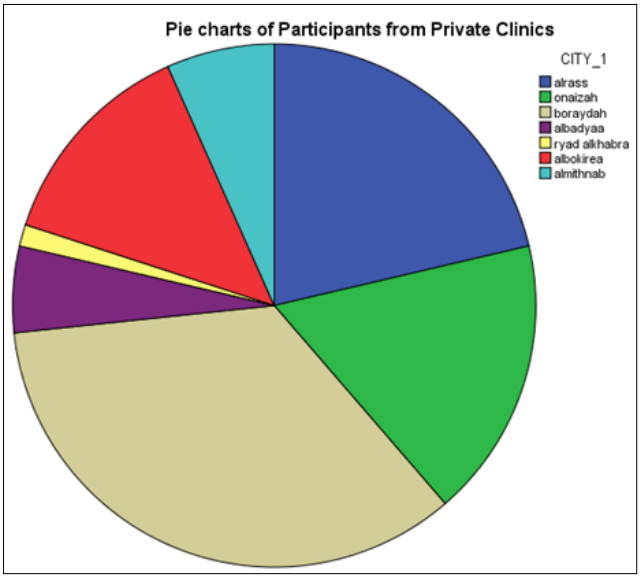

Fig 2: Pie chart of the Participants from Private Clinics.

The age of the participants ranged from 25-60 yrs. *with mean age of 37.6.* The sample was divided into 5 groups according to the no. of years of practicing dentistry (**Table 2**).

These values are represented in the following pie chart in

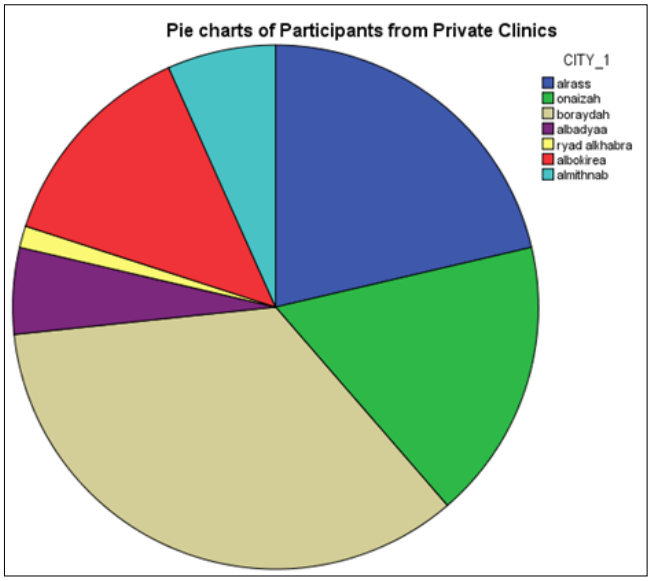

Fig 3: Pie Chart of the Participants' Years of Experience.

Table 1: Number of participants in each city from governmental and private clinics

Participants from Governmental hospitals		
City	**Number of dentists**	**Percentage (%)**
Alrass	6	19.35
Onaizah	5	16.13
Buraydah	12	38.71
Albadyaa	0	0.00
Ryad Alkhabra	3	9.68
Albokirea	2	6.45
Almithnab	3	9.68
	31	100.00
Participants from Private Clinics		
City	Number of dentists	Percentage (%)
Alrass	16	21.33
Onaizah	13	17.33
Buraydah	26	34.67
Albadyaa	4	5.33
Ryad Alkhabra	1	1.33
Albokirea	10	13.33
Almithnab	5	6.67
Total	75	100.00

Table 2: Experience

Years of Experience	**Frequency**	**Percentage (%)**
Less than 5 Years	16	15.1
5-10 Years	34	32.1
10-15 Years	25	23.6
15-20 Years	18	17.0
More than 20 Years	13	12.3
Total	106	100.0

Table 3: No. of participants according to the specialty

Discipline							
Operative	**Endodontics**	**Periodontics**	**Prosthodontics**	**Surgery**	**Orthodontics**	**Pedodontics**	**GP**
13	7	2	4	9	9	1	61

Questionnaire

Questionnaire used in this study is the Standardized Nordic Questionnaire (SNQ). This questionnaire records musculoskeletal symptoms (pain, ache, discomfort) in the preceding twelve months. SNQ consists of structured, binary, forced, or multiple choice variants. It consists of two components, a general questionnaire and a specific questionnaire focusing on the neck, shoulders, and low back regions. The general questionnaire records whether musculoskeletal symptoms are present or not and if so within which area are they localized and whether they are ongoing (presence of MSD symptoms during the last seven days). SNQ also includes a diagram of the human body viewed from the back, divided into 9 anatomical areas. This helps the participants to identify the areas of the body to which the questions are directed. The questionnaire also included demographic variables like age, gender, qualification, duration of practice, average patients treated per day, nature of practice, and if the participants were right or left handed (Figure 4).

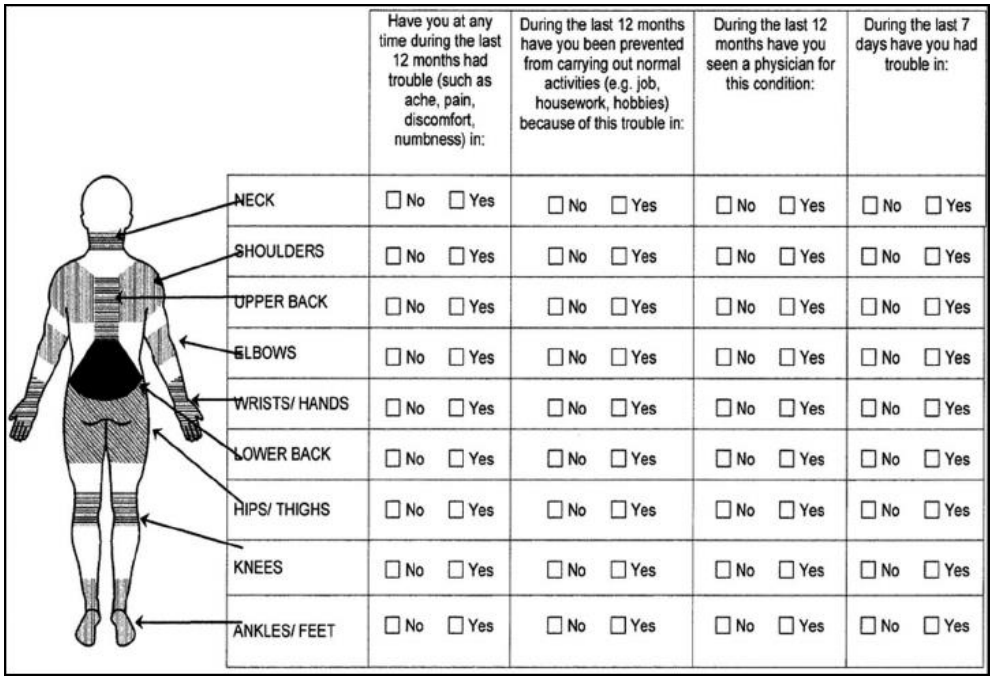

Fig 4: Standardized Nordic Questionnaire SNQ

Data Collection

Approvals for data collection were obtained from administrative departments of the selected hospitals/clinics. Dentists were approached in their free or break hours. The purpose of the study was explained. Dentists were not under obligation to participate in the study. The questionnaires were distributed and collected back again after being completed by the dentists during the same day.

Statistical Analysis

Data was processed and analyzed through SPSS program (version 22). Descriptive statistics were completed using frequency count and percentages. Chi square tests were also performed to define the difference between the studied groups at the 5% level of significance.

Results

The result shows that the most affected areas were: Lower back 62%, Neck and shoulders 49.1%, upper back 36.8%, wrists and hands 29.2%, knees 22.6%, feet 17.9% lastly elbows and hips 16% (Table 4).

There was no significant difference in the prevalence MSD and years of experience (Table 5).

Table 4 shows the prevalence of MSD in most affected areas of the body, which includes the neck and it was observed that 43.8% of those with 5 or more years of experience says yes, about 55.9% of those with about 5-10 years of experience says yes, 64% of those with 10-15 years of experience says yes while 30.8% of those with more than 20 years of experience says yes to MSD in the Neck area of the body.

Considering the Elbow area, it was observed that 25% of those with 5 or more years of experience says yes, about 17.6% of those with about 5-10 years of experience says yes, 16% of those with 10-15 years of experience says yes while 15.4% of those with more than 20 years of experience says yes to MSD in the Elbow area of the body and so on.

In Table 5, we observe that there was no significant difference or relationship in the prevalence of MSD and years of experience (p-values obtained from the chi-square analysis between prevalence of MSD and years of experience are all greater than 0.05)

There was also no significant difference in the MSD and gender (Table 6)

Table 5: Relation between age of experience and MSD

	Experience										p (x^2)
	≥ 5 Y		5-10 Years		10-15 Y		15-20 Y		More than 20 Y		
	No	%	No	%	No	%	No	%	No	%	
Neck	7	43.8%	19	55.9%	16	64.0%	6	33.3%	4	30.8%	0.161
Shoulder	6	37.5%	19	55.9%	15	60.0%	7	38.9%	5	38.5%	0.404
Upper Back	6	37.5%	14	41.2%	13	52.0%	4	22.2%	2	15.4%	0.137
Elbow	4	25.0%	6	17.6%	4	16.0%	1	5.6%	2	15.4%	0.646
Wrists hands	4	25.0%	9	26.5%	9	36.0%	7	38.9%	2	15.4%	0.586
Lower Back	8	50.0%	21	61.8%	18	72.0%	11	61.1%	8	61.5%	0.727
hips	1	6.2%	7	20.6%	5	20.0%	4	22.2%	0	0.0%	0.293
knees	2	12.5%	10	29.4%	8	32.0%	3	16.7%	1	7.7%	0.277
feet	3	18.8%	7	20.6%	6	24.0%	2	11.1%	1	7.7%	0.682

Table 6: Relation between gender and MSD.

	Gender				
	Male		Female		P (X^2)
	No	%	No	%	
Neck	31	45.6%	21	55.3%	0.419
Shoulder	29	55.8%	23	44.2%	0.105
Lower Back	45	66.2%	21	55.3%	0.300

Discussion

The physical load surrounding dentists seems to put them at risk for developing MSD, neuromuscular inhibition and muscular imbalance. Pain and dysfunction can often be noticed among dental professionals. Long working hours, static postures, repetitive movements, use of force, insufficient equipment, workplace designs and unsuitable work patterns are most probably the factors that increase the risk for the occurrence of MSD. However, MSDs are not a preventable part of the oral health care providers' professional life [9-10].

Since 1992, Occupational Safety and Health Administration (OSHA) has been preparing Federal legislation related with ergonomic hazards at workplaces. If stress is kept within sensible boundaries, work performance will be adequate and the worker's physical condition and well-being will be maintained. on the other hand, if stress is excessive, adverse outcomes may cause accidents and injuries. Several musculoskeletal injuries and disorders can be caused by physical strain in the work place [11].

The aim of this study was to determine the prevalence of MSD among dentist in Qassim area, Saudi Arabia.

Results revealed high prevalence of MSD pain in the last 12 months among dentists in Qassim region. This was also reported in other countries like: India (78%) [12], Australia (87%) [13], Iran (73%) [14], and New Zealand [15]. Studies done in KSA also reported a high prevalence of MSD: Dammam and Riyadh (82.9%) [16], Riyadh (90.2%) [17], Hail (77.9%) [7].

Lower back problems (pain) was the most experienced symptom of MSD at 62% in dentists in Qassim region. This prevalence was comparable to that reported in other regions in KSA such as Riyadh (68.1%) [17] and Hail (73.5%) [7] but higher than the percentages reported in other countries: Taiwan (66%) [18], Denmark (59%) [19], Brazil (58.4%) [20], Australia (53.7%) [13], New Zealand (59%) [15], and Iran (33.8%) [14].

The prevalence of neck pain in Qassim was at 49.1%. It was similar to that reported by Iran (43.4%) [14] but much lower than prevalence reported by Hail KSA (66%) [7], Riyadh KSA (64%) [17], Denmark (65%) [19], Taiwan (72%) [18], Australia (57.5%) [13], and New Zealand (59%) [15].

The prevalence of shoulder pain in Qassim was at 49.1%. This was comparable to reported results by: Hail KSA (43%) [7], Brazil (40%) [20], New Zealand (45%) [15]. But It was higher than results reported in Riyadh KSA (22.1%) [17], Iran (25%) [14], Australia (33%) [13] but lower than the prevalence reported by Taiwan (75%) [18].

Age or years of experience were not significantly related to MSD in this study. However, in Dammam and Riyadh it was reported that Younger dentists had more symptoms than the older dentists [7]. and study in Riyadh reported that shoulder pain and lower back pain were significantly related to years of experience [16, 17].

Gender was not related to prevalence of MSD in Qassim region which was also proved in Hail. However, In Asser it was reported that Males had a higher frequency of complaints than females. and the female dentists had a significantly higher frequency of pain, headache and weakness than their male in Riyadh and Dammam [7, 16, 21]. Physical examination was not performed in this study which limited the result.

Conclusion

To conclude, the prevalence of MSD among dentists in Qassim region is high.

Lower back pain proved to have the highest prevalence followed by Neck and shoulders.

There was no significant relation between years of practicing dentistry (years of experience) and MSD.

Gender of the subject proved to have no significant correlation to risk of developing MSD.

Recommendations

1. More extensive longitudinal studies using a larger sample size which includes a physical examination.
2. Further studies to identify the major specific risk factors related to MSD and how to prevent them
3. Studies regarding the dentists' knowledge regarding MSD and ergonomics and increasing their awareness for a longer and healthier career.
4. Studies evaluating the working environments.
5. Studies evaluating the knowledge of dental students about ergonomics.

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