

Neck and back pain as reported by dental practitioners in Riyadh city

Abstract

Purpose: Dentistry is a physically demanding profession, due to the number of dental procedures involved. Hence, musculoskeletal pain, a common symptom among dental professionals, can be affected by several factors, such as ergonomically inappropriate positions and extended work hours. Hence we investigated the severity and extent of back and neck pain and assessed the related factors among dental practitioners in Riyadh, Saudi Arabia.

Materials and Methods: A survey using a digitized structured 21-item questionnaire was conducted in dental professionals working in Riyadh, including general practitioners, specialists, consultants, and clinical-year students, both male and female, working in both government and private sectors. The surveys were distributed through e-mail and research social media official accounts, and voluntary participation was possible through the Survey Monkey website.

Results: Seven hundred fifteen participants responded, and 77.2% of them were right-handed. A significant difference between sex in the regularity of workout was observed ($p=0.007$). Moreover, survey results further showed a relationship between some personal characteristics and pain-related variables. No significant difference was found between the neck and/or back pain and dental practice, but there was a strong correlation between shoulder pain and the age of the practitioner found ($p=0.006$). Furthermore, shoulder pain was associated with the level of education, working sector, and number of patients per day ($p=0.020$, 0.013 , and 0.030 , respectively). A significant difference was found between the type of pain and the number of patients treated per day ($p=0.006$). A strong association between work-related pain and sitting posture was found ($p\leq 0.001$).

Conclusion: Musculoskeletal pain is related with dental practice, with lower back pain being the most commonly reported. There is a substantial relationship between work-related back pain and sitting posture. No association was found between sex and existence of pain.

Keywords: back and neck pain, dentistry

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Introduction

Dentistry has become an essential component of today's self-hygiene. Along with its numerous benefits, dentistry is considered to be a physically demanding profession.¹ Dental activities such as oral surgery, endodontic, and fixed prosthodontics are responsible for the physical demand.¹ This physical demand can lead to several complications. Musculoskeletal pain is a prevalent symptom among dental professionals.² Several factors can contribute to musculoskeletal symptoms experienced by dental professionals. For example, working in ergonomically inappropriate positions can be the leading cause.² Another factor leading to musculoskeletal symptoms is the duration of work. More extended working hours can be associated with a higher incidence of musculoskeletal symptoms.²⁻⁴ Additionally, the number of patients treated by a dental professional has the potential to increase or decrease the incidence of musculoskeletal symptoms.³⁻⁶

There are several types of pain experienced by dental practitioners, with different body areas involved such as the back, neck, knees, wrists, elbows, and feet.^{2,7} Among these, the literature indicates that the majority of pain experienced by dental practitioners is in the back and neck. Furthermore, the same literature suggests that more dental practitioners report back pain than neck pain.^{2,3,8-10} Therefore, conducting a study focused on back and neck pain experienced by dental professionals in Riyadh, Saudi Arabia, can provide valuable insight into the causes of those pains. Furthermore, efficiently identifying the pain can aid the process of finding solutions toward

mitigating, or more preferably, eliminating the problem. The aims of the study are to assess the severity and extent of the back and neck pain among dental practitioners in Riyadh and assess the related factors. The study reviewed for this proposal is an article by Külcü et al. The study evaluated the incidence of lower back and neck pain among dental professionals and students in Turkey. The study showed that 61% and 34% of respondents reported lower back and neck pain, respectively. The leading cause of pain is inappropriate work posture, which is consistent with the findings of other studies. An important conclusion of this study indicates that working while sitting is favorable to reduce the occurrence of the symptoms.¹⁰

Materials and methods

After obtaining Institutional Review Board (IRB) approval from Riyadh Elm University, a survey was done using a questionnaire. The questionnaire included items investigating the number of hours worked by the individuals from the surveyed sample, number of patients they treat daily, and demographic information. Survey questions were focused on investigating back and neck pain and the expected related factors among dental practitioners. The target number for the studied group was 500 samples. Dental professionals working in Riyadh including general practitioners, specialists, consultants, and clinical students, both male and female, and working in both the government and private sectors were included. Non-dental professionals and dental professionals not working in Riyadh were excluded.

Results

A total of 715 dental professionals participated in this study (female=437, 61.1%; age, between 20 and 25 years). Clinical-year dental students (n=205, 28.7%) were the most common type of health professionals that participated in the study, as shown in Table 1.

Table 1 Characteristics of the study participants

		n	%
Sex	Male	278	38.9
	Female	437	61.1
	Total	715	100
Age	20-25 years	267	37.3
	26-31 years	170	23.8
	32-46 years	212	29.7
	47 years and older	66	9.2
	Total	715	100
Level of education	Clinical year dental student	205	28.7
	General practitioner (less than 5 years)	144	20.1
	General practitioner (more than 5 years)	125	17.5
	Specialist	139	19.4
	Consultant	102	14.3
Medication	Total	715	100
	Yes	27	3.8
	No	688	96.2
Total	715	100	

Most (n=316, 44.2%) of the dental professionals worked out sometimes, with 225 (31.5%) exercising 1-2 times per week; 180 (25.1%), 3-4 times/week; and 67 (9.4%), 5 times or more, as shown in Figure 1. Work-related characteristics suggested that most (n=227, 31.7%) of the dental professionals were working in the private sector and the majority (n=304, 42.5%) were seeing 1-5 patients per day. Nearly half (n=328, 45.9%) of the dental professionals worked for 6-8 hours per day. More than three-fourths (n=552, 77.2%) of the dental professionals practiced right-handed dentistry, and most (n=415, 58.0%) were working 4-5 days in a week. The majority (n=280, 39.2%) of the dental professionals mainly worked in seated or sometimes standing positions, as shown in Table 2.

A chi-square test was performed, and a significant relationship was found between sex and regularity of workout, χ^2 (3, n=715)=12.18, p=0.007* and frequency of exercise per week, χ^2 (3, n=715)=10.22, p = 0.017, as shown in Table 3. Study participants reported that lower back was the most common (53.7%) site of pain followed by neck (51.9%), upper back (44.8%), shoulders (42.5%), middle back (36.4%), arms (24.1%), and palms hinge (14.4%), as displayed in Figure 2. Shoulder pain showed a significant relationship with age (p = 0.006*), level of education (p=0.020*), working sector (p=0.013), and the number of patients seen per day (p=0.030), as shown in Table 4. The occurrence of pain on different sides was found to be significantly associated with the working sector (p=0.003*). Similarly, work-related pain showed significant association with age (p=0.004*), level of education (p=0.003*), and working sector (p=0.004*). Type of pain was significantly associated with the number of patients seen per day (p=0.006). Most of the dental professionals

complained about the different severity of pain, which is found to be significantly associated with sex (p=0.019*), level of education (p=0.038*), working sector (p=0.009*), and the number of patients seen daily (p=0.004*). Similarly, various contributing factors have shown significant association with age (p = 0.006), level of education (p=0.002*), working sector (p≤0.001*), and number of patients seen (p≤0.001*), as shown in Table 5. A total of 246 (34.4%) of the dental professionals agreed that neck pain was relieved by movement, whereas 178 (24.9%) used analgesics to ease the pain. In addition, 270 (37.8%) of the dental professionals complained that the pain affected their daily routine activities, as shown in Table 6.

Table 2 Work-related characteristics among study participants

Variables	n	%	
Working sector	Government sector only	227	31.7
	Private sector only	315	44.1
	Both	173	24.2
No. of patients per day	1 patient to 5 patients	304	42.5
	6 to 10 patients	172	24.1
	10 to 15 patients	191	26.7
Hours of work per day	16 patients and more	48	6.7
	Less than 4 hours	48	6.7
	4 to 6 hours	212	29.7
Hands used	6 to 8 hours	328	45.9
	More than 8 hours	127	17.8
	Left hand	163	22.8
Days in a week you practice	Right hand	552	77.2
	1 to 3 days	131	18.3
	4 to 5 days	415	58
Position at work	6 to 7 days	169	23.6
	Standing all the time	38	5.3
	Mostly seated, sometimes standing	280	39.2
Position at work	Mostly standing, sometimes seated	225	31.5
	Seated all the time	172	24.1

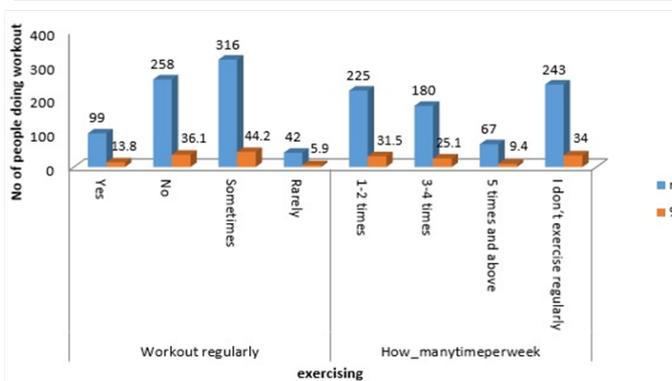


Figure 1 Exercise among participants.

Table 3 Association between sex and exercise

Variables		Male		Female		χ^2	p
		n	%	n	%		
Workout regularly	Yes	43	15.5	56	12.8	12.183	0.007*
	No	80	28.8	178	40.7		
	Sometimes	133	47.8	183	41.9		
	Rarely	22	7.9	20	4.6		
How many times per week?	1-2 times	97	34.9	128	29.3	10.222	0.017*
	3-4 times	79	28.4	101	23.1		
	5 times or more	27	9.7	40	9.2		
	I do not exercise regularly	75	27	168	38.4		

Table 4 Prevalence of back and neck pain and its association with personal characteristics

Prevalence of pain		n	%	p Value				
				Sex	Age	Level of education	Working sector	No. of patients per day
Neck	No	344	48.1	0.179	0.302	0.616	0.21	0.923
	Yes	371	51.9					
Upper back	No	395	55.2	0.581	0.076	0.144	0.119	0.805
	Yes	320	44.8					
Middle back	No	455	63.6	0.988	0.416	0.401	0.534	0.782
	Yes	260	36.4					
Lower back	No	331	46.3	0.963	0.949	0.627	0.802	0.054
	Yes	384	53.7					
Shoulder	No	411	57.5	0.975	0.006*	0.020*	0.013*	0.030*
	Yes	304	42.5					
Arms	No	543	75.9	0.157	0.552	0.288	0.058	0.072
	Yes	172	24.1					
Palms hinge	No	612	85.6	0.27	0.417	0.338	0.583	0.491
	Yes	103	14.4					
I do not feel the pain	No	657	91.9	0.491	0.958	0.975	0.413	0.444
	Yes	58	8.1					

Table 5 Association between personal characteristics and pain-related variables

Pain-related variables		n	%	p Value				
				Sex	Age	Level of education	Working sector	No. of patients per day
Pain side	Right	160	22.4	0.268	0.075	0.146	.003*	0.651
	Left	79	11					
	Both Sides	415	58					
	I do not have any pain	61	8.5					
Experience work-related pain	All the time	59	8.3	0.202	.004*	.003*	.004*	0.071
	Most of the time	123	17.2					
	Sometimes	372	52					
	Rarely	114	15.9					
	I never experienced pain	47	6.6					

Table Continued

Pain-related variables	n	%	p Value				No. of patients per day	
			Sex	Age	Level of education	Working sector		
Type of pain	Sharp	106	14.8	0.37	0.184	0.184	0.429	.006*
	Dull	308	43.1					
	Achy	87	12.2					
	Burning	89	12.4					
	Throbbing	67	9.4					
	I never experienced pain	58	8.1					
Severity	Mild	263	36.8	0.019*	0.533	0.038*	0.009*	0.004*
	Moderate	329	46					
	Severe	67	9.4					
Main contributing factor	I do not have pain	56	7.8	0.202	0.006*	0.002*	0.001*	0.001*
	No. of patients seen per day	108	15.1					
	Working hours	161	22.5					
	Sitting posture	398	55.7					
	I have no pain related to my practice	48	6.7					

Table 6 Pain relievers and pain effects

Pain relievers		n	%
Neck pain relieved by movement	Yes	246	34.4
	No	213	29.8
	Not sure	256	35.8
Analgesic use	Yes, and it works	178	24.9
	Yes, but it did not work	124	17.3
	No, I did not take any analgesic	413	57.8
Pain affected daily normal activities	Yes	270	37.8
	No	249	34.8
	I do not know	196	27.4

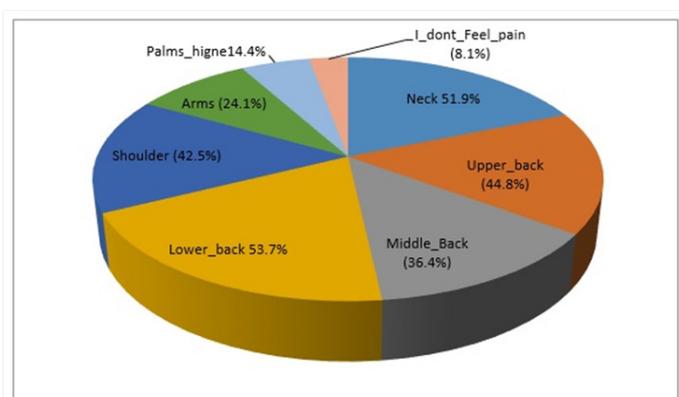


Figure 2 Prevalence of neck, shoulder, and back pain among study subjects.

Discussion

In the present study, we investigated the frequency and severity of back and neck pain among dental professionals in Riyadh. We have observed that lower back pain was the most frequently reported type of pain (53.7%). This observation is consistent with earlier findings by Gaowgzeh et al.³ and Vijay³ & Ide.⁹ In contrast, in the study of Decharat et al.,² shoulder pain was the most common type of pain. Generally, lower back and neck pain are the two most commonly reported type of pain in previous studies, but the type of pain (lower back or neck) differs from one study to another. This difference appears to be mainly dependent on the surveyed group. The second most common pain according to the survey is neck pain (51.9%), which is to be expected.

Shoulder pain, which was the most common in dentists,² was found to be highly common in this study (42.5%). It is also associated with age, educational level, sector, and number of patients per day

($p=0.019$, 0.038 , 0.009 , and 0.004 , respectively). Contrary to the findings of Rising et al.¹¹ 2005 and Decharat et al.,² who reported that shoulder pain was significantly higher among male practitioners, this study did not find a relationship between sex and shoulder pain. In addition, a study conducted in China found that symptoms of shoulder pain were statistically higher among female practitioners,^{12,13} which conflicts with the findings of Decharat et al.² Although shoulder pain is commonly reported, an association between shoulder pain and sex differs among studies, and it seems to depend mainly on the surveyed group in each study. In this current study, the results show that shoulder pain is significantly higher in the clinical-year students (aged 20–25 years) than in the other age groups. This can be attributed to the level of experience in using proper techniques that can potentially decrease the chance of shoulder pain. The level of pain seems to decrease as the educational level increases. This finding is supported by the study done in Sweden, where younger dentists had worse pain symptoms compared with more experienced dentists.¹⁴ When it comes to the number of patients seen per day, shoulder pain is significantly higher among professionals who treated 16 and more patients, which is expected, as a higher number of patients can lead to higher incidence of pain.

The results of this research showed that the occurrence of pain is significantly related to the working posture ($p\leq 0.001$). This result has been reported by all sources referenced in this study. It might be reasonable to expect pain in various areas after consistently adopting inappropriate postures for prolonged periods. A study conducted by Decharat et al.² provides statistical data on the musculoskeletal symptoms caused by dental work in southern Thailand.² The study compared a subject group consisting of dental work professionals with a reference group that comprised of workers from different professions. The study overwhelmingly showed that musculoskeletal symptoms were more common among dental work professionals. In addition, among dental health workers, the study showed that a more prolonged working period is associated with a higher percentage of musculoskeletal symptoms, especially in the shoulders, neck, and lower back. Furthermore, the rate of musculoskeletal symptoms increases among medical workers that practice in ergonomically inadequate positions.

Another study by Gaowgzeh et al.³ reviewed musculoskeletal disorders among dentists with a specific focus on lower back pain. The study found that 70% of the surveyed dental professionals reported back pain, with lower back pain being the most dominant in the 46.7% of the cases. Inappropriate postures are considered to be the primary factor leading to these musculoskeletal problems. An interesting observation in this study was the fact that no correlation was found between lower back pain and the number of patients treated per day. The same lack of association was also present between lower back pain and the number of years of experience. A concerning conclusion of this study was that even though the majority of professionals surveyed knew the advantages of using assistive tools and exercise, less than 50% of them used either.

The study by Chandra et al.,⁸ which focused on the same issue mentioned above, provided another review of the relationship between dentistry and lower back pain in India. Similar to the findings of Gaowgzeh et al.,³ 73% of the surveyed group reported back pain, with 40% explicitly reporting lower back and neck pain. Again, the main factor causing neck and back pain is adopting wrong postures during the job. The severity of pain experienced by professionals was

considered low, as only 36% of the group surveyed sought medical attention. Aerobic exercise and yoga were recommended as a means of mitigating musculoskeletal problems.⁹ Vijay & Ide⁹ conducted a similar study by surveying dental students in the United Kingdom. Of the 390 individuals interviewed, 79% reported pain. Lower back pain was also the most commonly reported pain, as indicated by 54% of the surveyed group. Consistent with the studies stated above, only a minority of the surveyed groups sought medical attention, which reflects a low pain severity. This study differs from the above-mentioned studies in that approximately 56% of the respondents used stretching to alleviate the symptoms.

About 44.2% of participants responded that they sometimes exercised, whereas 36.1% reported that they do not exercise at all. This is a somewhat significant percentage, but it is more reasonable compared with the reviewed literature where the rate of professionals not working out is far more significant. For example, Gaowgzeh et al.³ found that 83% of dental professionals in their study did not exercise. Decharat et al.² found that 90% of participants in their study did not exercise. This is in disagreement with the findings of Vijay & Ide,⁹ where only 17% did not exercise at all. These results only show that exercising results are inconsistent, and they mainly depend on each surveyed group. In this study, the fact that a considerable number of dental professionals do not exercise despite their knowledge of the resulting benefits can be attributed to hectic schedules as well as with the severity of pain. About 36.8% of participants indicate that the level of pain they experience is mild, and 46% state that the pain is moderate, which when combined is 82.8%, indicating that the level of pain is moderate or lower. When this fact is considered, it would be reasonable to assume that the benefits resulting from exercising do not represent a priority to dental professionals. Hence, they do not make extra effort to set a time for exercising. The chi-squared test performed between exercise and sex reveals that the percentage of exercise among men is statistically higher than that in women.

The frequency of work-related pain was found to be associated with the age group, educational level, and working sector ($p=0.004$, 0.003 , and 0.004 , respectively). These relationships are very similar to those existing for shoulder pain. Therefore, the explanations are somewhat similar. For example, the pain is less frequent among professionals with higher level of education. This is probably attributed to their higher level of experience, allowing them to adopt better practice techniques that can potentially alleviate the level and frequency of pain.

Conclusion

This study investigated musculoskeletal pain among dental professionals in Riyadh, Saudi Arabia. It was motivated by the frequency of pain among dentists and the benefits that can be gained from identifying the underlying causes. From the results of the study, the following conclusions can be made:

- (1) The study proves an existing relationship between musculoskeletal pain and dentistry, with only 8.1% of participants not reporting pain.
- (2) Lower back pain was the most common type of pain among dental practitioners surveyed in this study.
- (3) Exercise, a simple and useful method of alleviating pain, is ignored by practitioners.

- (4) The study revealed what could be considered a degree of lack of technical knowledge experience by younger practitioners, which leads to a higher frequency of pain among this particular group. More emphasis on using better techniques can serve as a simple yet efficient solution.
- (5) The lack of any relationship between sex and site of pain shows that musculoskeletal pain is independent of sex. Pain is probably a result of a combination of factors related to the practice of dentistry.

Data availability

The data used in this study were supplied by Dr. Nancy Ajwa. Requests for access to these data should be made to Dr. Nancy Ajwa (nancy.ajwa@gmail.com) which is stored in the department library of Riyadh Elm University, Riyadh.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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