Musculo-skeletal Disorders and Quality of Life among Primary Healthcare Dentists in Menoufia Governorate, Egypt

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Abstract

Background: One of the main occupational diseases among dentists is musculoskeletal disorders (MSDs). Their quality of life and productivity at work might become negatively affected by these issues. Aim of the study: to ascertain the frequency of MSDs among primary care dentists and assess their effect on the dentists' quality of life. Setting: This cross-sectional study was conducted on different primary healthcare centers (PHCs) in Menoufia governorate. Sampling: 170 dentists were chosen by convenient sampling while the PHCs were selected by multistage random sampling. Tools: A predesigned questionnaire included sociodemographic and occupational information as well as two scales-the Standardized Nordic questionnaire for MSDs and the WHO shortened form for quality of life. Results: MSDs were present in 148 (87.1%) of the 170 dentists in this study, with the majority occurring in the neck, shoulders, and lower back (67.1%, 58.2%, and 57.6%, respectively). The occurrence of MSDs was associated with age, body mass index, years of experience, weekly working hours, and longstanding (adjusted OR: 1.48, 1.17, 1.25, 2.27, and 2.75, respectively). The mean overall score of quality of life and its four domains was lower for those with MSDs than for those without. A higher BMI and a greater number of MSD sites were poor indicators of quality of life. Conclusion and Recommendations: According to this study's findings, the dentists' quality of life was affected by their approximately high level of MSDs. Therefore, it is crucial to adopt a health education program that includes ergonomic regulations to avert these conditions.

Keywords: Dentists, Musculoskeletal Disorders, Quality of Life; Primary Healthcare

Introduction

The high-quality care in dentistry demands physical and mental effort; the concept of quality of life is crucial in the dental profession. These stressors among dentists contribute to negative effects on health, including musculoskeletal disorders, which lower quality of life and work productivity (Abraham et al., 2018). According to Al-Emara et al. (2024), in Finland, these disorders have reduced dentists' work capacity through sick leave, early retirement, and challenges in daily life stemming from impairment.

The term "musculoskeletal disorders" (MSDs) refers to injuries caused by repetitive damage to the musculoskeletal system, including injuries to the muscles, bones, nerves, tendons, joints, ligaments, cartilage, and spinal disc (Hayes et al., 2009; Bonanni et al., 2022). According to data from the Global Burden of Disease (GBD) 2019 study, more than one billion people worldwide suffer from MSD, which includes rheumatoid arthritis, fractures, various injuries, osteoarthritis, low back pain, and neck discomfort. Additionally, MSDs account for most years lived with disability (YLDs) globally, contributing to 149 million YLDs, or 17% of all YLDs worldwide (Cieza et al., 2021).

MSDs are among the most prevalent occupational risks among dentists due to the repetitive, long-term, and immobile nature of their employment. Additionally, the working environment plays a vital part in the development of these conditions. Stressful, unfavourable, or awkward work conditions might increase these health difficulties (Shekhawat et al., 2020). Also, Shah et al. (2022) reported that gender, number of working hours, and lifestyle, including exercise and diet, were associated factors for MSDs.

According to a previous study conducted in Pakistan, dentists had a greater prevalence of physiotherapists MSDs or nurses, than particularly regarding lower back discomfort (Hashmi et al., 2023). For use in epidemiological investigations, the Nordic Musculoskeletal Questionnaire (NMQ) is a validated approach that measures nine body regions of MSDs (Crawford, 2007).

The quality of life encompasses various dimensions, including social interactions, environmental features, psychological circumstances, independent levels, and spiritual patterns, in addition to physical health (Haraldstad et al., 2019). Quality of life (QOL) in the modern dental profession demands skills and expertise among dentists, exposing them to unfavourable situations and workplace trauma, which encourages the development of MSDs. (Saliba et al., 2016).

There are two questionnaires of the World Health Organization Quality of Life (WHOQOL): the WHOQOL-100 questionnaire and its shortened version (the WHOQOL-BREF). The WHOQOL-BREF has the twentysix most crucial questions out of the 100 in the previous version and can evaluate the state of global health in four domains: physical, psychological, social relationship, and environmental. The environmental domain makes this tool unique in contrast to other wellknown instruments like the 36-Item Short Form survey and WHO Disability Assessment Schedule 2.0; it incorporates an environmental domain that examines the life circumstances in greater detail. Additionally, even with a much smaller question count than its previous version, it may nevertheless exhibit strong validity and good to psychometric qualities (WHO, 2012).

Significance of the study

Dentists who experienced MSDs had lower levels of satisfaction with their quality of life (Saliba et al., 2016). Prior research in Egypt, such as the investigation conducted by Senosy et al. (2022) in Beni Suef city, indicated that the prevalence of MSDs among dentists was notably high, with an overall rate of 90.9%. **El Hosseini et al. (2019)** conducted a study at Ain Shams University's Faculty of Dentistry and found that the prevalence of MSDs among dentists was 66.7%. To our knowledge, no prior research has evaluated the impact of these MSDs on Egyptian dentists' quality of life. Therefore, measuring the prevalence of MSDs among dentists and how these conditions affect their quality of life is essential for the development of ergonomic strategies and preventative initiatives in the healthcare sector that are intended to protect their health.

The aim of the study

Determining the occurrence of MSDs among primary healthcare dentists and assessing the relationship between MSD problems and the dentists' quality of life were the objectives of this study.

Research Questions

What is the prevalence of MSDs among primary healthcare dentists, and does it influence their quality of life?

Hypothesis

Null hypothesis: MSDs among primary healthcare dentists do not influence their quality of life.

Alternative hypothesis: MSDs among primary healthcare dentists influence their quality of life.

Subjects and Methods

Research design: It was a crosssectional survey. This type of design is suitable for determining disease prevalence and examining associations among the collected variables (Capili 2021).

Study settings: This study was conducted at the primary healthcare centers (PHCs) in the Menoufia Governorate. The Menoufia Governorate, one of Egypt's twentyseven governorates, is situated in the Nile Delta in the country's north. The primary healthcare centers were chosen through a multistage random sampling procedure. Four cities in the Menoufia governorate—Elbagour, Shebin Alkom, Ashmoon, and Quesna—were chosen at random for the first phase. The selection of PHCs, considering the representation of both urban and rural areas from each city, was the second stage. By simple random sampling, a single urban PHC and ten rural PHCs were selected from each city (Figure 1).

Subjects: This study involved 170 dentists from a variety of primary Through convenient healthcare facilities. sampling, the subjects were chosen as there were 1546 primary healthcare dentists in the Menoufia governorate overall. There were around five primary healthcare dentists in each urban PHC, compared to approximately four in the rural area. The selected PHCs in this study employed 180 primary healthcare dentists. There were 170 participants included in this study, and 94.4% of them responded.

Eligibility: All primary healthcare dentists, regardless of age or gender, who had worked for more than a year were allowed to participate in this study. Dentists with fewer than a year of experience or those who experienced muscle pain prior to beginning work were not eligible.

Sampling *technique*: The setting of the primary healthcare centers (PHCs) was chosen by a multistage random sample, and the studied dentists were selected by a convenient sampling.

Sample size: The OpenEpi online calculator, version 3, was used to calculate the sample size. It had a 95% confidence interval 80% power. According and to prior investigation in Pakistan (Younis et al. 2022), 87% of dentists who provided primary healthcare had musculoskeletal disorders. A total of 1546 dentists working in primary healthcare facilities Menoufia in governorate, Egypt, made up the computed sample size of 157 dentists. To adjust for nonresponse, an 8% increase in sample size was implemented. The total sample size was 170 dentists.

Tools for gathering data: The questionnaire was designed in English and consisted of the following three parts and two tools:

• The first part had sociodemographic elements like age, gender, residence, and marital status.

• The second part: Anthropometric measurements, weight, and height were included to calculate the body mass index (BMI) by multiplying the weight (kilograms) by the square of height (meters).

• Third part: Occupational information consisted of qualifications, dental specialization, years of experience, worked hours per day, and job nature, such as a history of prolonged standing or sitting.

• Tool I operated with NMQ to measure MSDs frequency. It was a clearly defined form that includes anatomical mapping of the body that describes nine areas. It included inquiries on complaints encountered in the past week and the last year, as well as restrictions on activity levels during those periods. These questions required yes or no answers (Crawford, 2007).

• Tool II included the WHOQOL-BREF, a validated instrument for evaluating quality of life that has good internal consistency (Vahedi, 2010). With twenty-six questions, it required answers based on their behavior over the last two weeks.

Scoring system for WHOQOL-BREF: The twenty-six items of this score ranged from one to five points: one for worst health status and five for the best one, but the inverse for questions number 3, 4, and 26. These inverse questions were transformed to positively framed questions (6-point of this item). There were four health domains: physical (7 questions), psychological (6 questions), social relationship (3 questions), and environment (8 questions). The first two questions were for overall health and quality of life. The final score of each domain is the sum of its questions. To ensure compatibility between the domain score and the WHOQOL-100 score, the sum is multiplied by 4. After that, the total of all the domains is transformed to a 0-100 scale. This score was expressed in mean and standard deviation. The higher the score was present, the greater the quality of life was among the participants. The steps of calculation for each domain were elucidated on page 106 of the WHOQOL-BREF manual (in the supplementary material).

Field work: This work took place from early September to late December 2024. The

researchers visited the chosen PHCs in the mornings of three days per week during the period of the study to gather data from every participant and complete the questionnaire. Participation in this study is voluntary, and participants may leave at any time; other than that, all details are confidential, and the identity is anonymous.

Ethical Consideration:

This research was fully reviewed and approved Menoufia Faculty bv the of Medicine's ethical committee with the Review Institutional Board (IRB) (11/2024COM7). The goal and details of the study were explained to each participant. Participation was totally voluntary. Personal data was kept private.

Data analysis: Version 23 of SPSS (SPSS Inc., Chicago, IL, USA) was utilized. The qualitative variables (illustrated as numbers and percentages) between these two groups (e.g., MSDs or not, prolonged standing or not, prolonged sitting or not) were compared using the chi-square test. Two sets of quantitative data (expressed by mean \pm SD or median and range) were compared using either the student t-test or the Mann-Whitney test, depending on the situation. Binary logistic regression provided an adjusted odds ratio (OR) with a 95% confidence interval to identify the factors that contribute to MSDs, including age, gender, residence, BMI, years of experience, number of hours worked per day, and prolonged standing or sitting. Multiple linear regression was used to identify factors that predict quality of life. The significance is considered as P-value <0.05.

Results:

The present study reported that the overall MSDs among the examined dentists was 87.1% (Figure 1a). The neck, shoulders, lower back, upper back, and wrists/hands accounted for most MSD locations over the past 12 months (67.1%, 58.2%, 57.6%, 49.4%, and 40.6%, respectively) (Figure 1b). These MSDs caused the studied dentists to be unable to work, primarily in the neck (26.5%), lower back (21.8%), shoulders (17.6%), and wrists/hands (17.1%) (figure 1c). The highest percentages of MSDs over the previous seven days were

present mainly in the neck, lower back, shoulders, and upper back (38.2%, 36.5%, 32.9%, and 31.2%, respectively) (figure 1d).

Compared to those without MSDs, the examined dentist with MSDs had a higher age (33.1 ± 6.7) , lived in an urban area (59.5%), had an elevated BMI (27.7±5.9), had worked for a longer period (median= 7, ranging from one to 24 years), worked longer hours per week from 20 to \geq 40 (79%), and spent more time sitting (70.9%) or standing (69.6%) (P <0.05) (Table 1).

The posture of the dentists with MSDs had an impact on where they were located. When comparing the locations of MSDs in people who had and did not spend a lot of time sitting or standing, this was clarified. The dentists who practiced prolonged sitting had MSDs mainly in the neck (76.2%), elbow (36.2%), and lower back (68.6%). While those who worked with prolonged standing had MSDs mostly in the shoulders (72.8%), upper (67%), hips/thighs back (38.8%), and ankles/feet (32%) (P < 0.05) (Table 2).

In the present study, the predictors for the presence of MSDs among the studied dentists were age (adjusted OR: 1.48), BMI (adjusted OR: 1.17), year of experience (adjusted OR: 1.25), number of working hours per week (adjusted OR: 2.27), and prolonged standing (adjusted OR: 2.75) (P < 0.05) (Table 3).

MSDs revealed lower Those with WHOOOL-BREF overall, physical, psychological. social relationship, and environmental scores (57.7±16.3, 49.7±12.8, 59.2±16.5, 48.3±11.6, 48.5±12.9, and respectively) than those without MSDs (74.4±11.2, 61.7±6.6, 63.8±6.3, 73.1±8.9, and 71.3 ± 7.4 , respectively) (P < 0.05) (Table 4). Among the dentists who experienced MSDs, WHOQOL-BREF scores were significantly smaller among those who had two or more sites of MSDs (50.7±15.9, 47.3±12.2, 47.3±12.2, and 46.1±11.8, respectively) than those with one MSD location (66.7±11.9, 52.9±13.1, 53.1±11.8, and 51.2 \pm 10.7, respectively) (P < 0.05) except for the social relationship score (58.1±17.4 versus 60.6±15.3, P >0.05) (Table 4).

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On application of multiple linear regression between WHOQOL-BREF and the other parameters, it was reported that the overall score was inversely associated with the number of MSD sites (β : -5.7, P <0.05) and BMI (β : -0.54, P <0.05). The physical domain was indirectly correlated with the number of MSD sites (β : -4.6, P < 0.05) and BMI (β : -0.34, P <

0.05), while the psychological and social relationship domains had an inverse correlation only with BMI (β : -0.52 and -0.46, respectively) (P < 0.05). The environmental domain was indirectly associated with the number of MSD sites (β : -3.02, P < 0.05), age (β : -0.76, P < 0.05), and BMI (β : -0.58, P < 0.05) (Table 5).

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PHCs: primary health care centers

Figure 1: The prevalence of Musculoskeletal Disorders (MSD) among the studied dentists (n=170) (a) Overall MSD among the studied dentists (n=170)



(b) Prevalence of MSD by body region during the last 12 months (n=170)





Sociodemographic and occupational	Total	MSD	No MSD	P value
characteristics	participants	(n=148)	(n=22)	
	(n=170)			
Age (year)	32.1±6.9	33.1±6.7	25.5±2.8	P < 0.001*
Gender				
Male	73 (42.9%)	61 (41.2%)	12 (54.5%)	P=0.24
Female	97 (57.1%)	87 (58.8%)	10 (45.5%)	
Marital status				
Single	62 (36.5%)	53 (35.8%)	9 (40.9%)	
Married	104 (61.2%)	91 (61.5%)	13 (59.1%)	P=0.86
Widow	3 (1.8%)	3 (2.0%)	0 (0.0%)	
Divorced	1 (0.6%)	1 (0.7%)	0 (0.0%)	
Residence				
Urban	95 (55.9%)	88 (59.5%)	7 (31.8%)	P=0.01*
Rural	75 (44.1%)	60 (40.5%)	15 (68.2%)	
BMI	27.3±5.7	27.7±5.9	24.6±1.7	P=0.02*
Qualification:				
MBBS	135 (79.4%)	117 (79.1%)	18 (81.8%)	
Master	28 (16.5%)	25 (16.9%)	3 (13.6%)	P=0.93
MD	7 (4.1%)	6 (4.1%)	1 (4.5%)	
Specialties				
General practitioner	128 (75.3%)	110 (74.3%)	18 (81.8%)	
Oral surgery	25 (14.7%)	22 (14.9%)	3 (13.6%)	P=0.30
Pedodontist	14 (8.2%)	14 (9.5%)	0 (0.0%)	
Periodontics	2 (1.2%)	1 (0.7%)	1 (4.5%)	
Orthodontics	1 (0.6%)	1 (0.7%)	0 (0.0%)	
Years of experience	5 (1-24)	7 (1-24)	2 (1-10)	P < 0.001*
Number of working hours per week				
<10	18 (10.6%)	9 (6.1%)	9 (40.9%)	
10-<20	29 (17.1%)	22 (14.9%)	7 (31.8%)	P<0.001*
20-<30	43 (25.3%)	41 (27.7%)	2 (9.1%)	
30-<40	43 (25.3%)	41 (27.7%)	2 (9.1%)	
≥40	37 (21.8%)	35 (23.6%)	2 (9.1%)	
Prolonged sitting				
Yes	116 (68.2%)	105 (70.9%)	11 (50.0%)	P=0.04*
No	54 (31.8%)	43 (29.1%)	11 (50.0%)	
Prolonged standing				
Yes	113 (66.5%)	103 (69.6%)	10 (45.5%)	P=0.02*
No	57 (33.5%)	45 (30.4%)	12 (54.5%)	

Table 1: Distribution of MSD regarding sociodemographic and occupational characteristics among the studied dentists (n=170)

*Significant difference

The body regions	Prolonge	d sitting	P value	Prolonged standing		P value
of MSD	Yes (n=105)	No		Yes	No (no.=45)	
		(n=43)		(no.=103)		
Neck	80 (76.2%)	22 (51.2%)	0.003*	77 (74.8%)	37 (82.2%)	0.32
Shoulders	71 (67.6%)	28 (65.1%)	0.77	75 (72.8%)	25 (55.6%)	0.04*
Elbows	38 (36.2%)	7 (16.3%)	0.02*	35 (34.0%)	10 (22.2%)	0.15
Wrists and hands	48 (45.7%)	21 (48.8%)	0.73	52 (50.5%)	17 (37.8%)	0.15
Upper back	60 (57.1%)	23 (53.5%)	0.68	69 (67%)	14 (31.1%)	< 0.001*
Lower back	72 (68.6%)	21 (48.8%)	0.02*	44 (42.7%)	24 (53.3%)	0.23
Hips and Thighs	36 (34.3%)	13 (30.2%)	0.63	40 (38.8%)	9 (20.0%)	0.02*
Knees	36 (34.3%)	13 (30.2%)	0.63	38 (36.9%)	11 (24.4%)	0.14
Ankles and Feet	22 (20.9%)	13 (30.2%)	0.23	33 (32.0%)	7 (15.6%)	0.04*

Table 2: The association of body regions of MSD and posture among the studied dentists who had MSD (n=148)

*Significant difference

Table 3: Binary logistic regression to detect the predictors of MSD among the studied dentists (n=170)

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Predictors	β	Adjusted OR	95% CI	p value
Age (year)	0.39	1.48	1.21 - 1.81	0.004*
Gender				
Male	-0.59	0.55	0.18 - 1.71	0.30
Female (reference)				
Residence				
Urban	1.06	2.89	0.88 - 9.47	0.08
Rural (reference)				
BMI	0.15	1.17	1.01 – 1.36	0.04*
Years of experience	0.22	1.25	1.05 – 1.49	0.01*
Number of working hours per week	0.82	2.27	1.37 – 3.77	0.001*
Prolonged sitting				
Yes	-3.15	2.24	0.98 - 6.05	0.06
No (reference)				
Prolonged standing				
Yes	1.01	2.75	1.11 - 6.82	0.03*
No (reference)				

β: Beta; OR: odds ratio; CI: confidence interval; *Significant difference

Table 4: The association between WHOQOL-BREF scores and other parameters among the studied dentists (n=170)

Parameter		WHOQOL-BREF scores					
		Overall QOL	Physical domain	Psychological domain	Social relationship domain	Environmental domain	
Presence of MSD							
Yes (n=148)		57.7±16.3	49.7±12.8	48.5±12.9	59.2±16.5	48.3±11.6	
No (n:	=22)	74.4±11.2	61.7±6.6	63.8±6.3	73.1±8.9	71.3±7.4	
P value		P<0.001*	P<0.001*	P<0.001*	P<0.001*	P<0.001*	
	Sites of MSD						
Q	one site MSD	66.7±11.9	52.9±13.1	53.1±11.8	60.6±15.3	51.2±10.7	
Ŵ	≥two sites MSD	50.7±15.9	47.3±12.2	44.9±12.6	58.1±17.4	46.1±11.8	
ad	P value	P<0.001*	P=0.008*	P<0.001*	P=0.36	P=0.007*	
in di	Gender						
vhc 148	Male	57.4±16.3	49.9±12.7	48.8±12.7	60.8±15.2	48.9±10.1	
ts v n=]	Female	58.1±16.4	49.7±13.1	48.3±13.1	58.1±17.3	47.8±12.5	
tist (P value	P=0.81	P=0.92	P=0.82	P=0.34	P=0.60	
len	Speciality						
le C	GP	57.5±17.1	49.5±12.9	49.4±12.8	59.7±16.2	48.5±12.2	
Ţ	Others	58.5±13.9	50.4±12.8	45.7±13.1	57.9±17.4	47.6±9.8	
	P value	P=0.73	P=0.73	P=0.13	P=0.56	P=0.69	

WHOQOL-BREF: Short-form of World Health Organisation Quality of Life tool *Significant difference

	Overall QOL	Physical domain	Psychological domain	Social relationship domain	Environmental domain
Parameter	β	β	β	β	β
	(95% CI)	(95% CI)	(95% CI)	(95% CI)	(95% CI)
MSD sites	-5.7*	-4.6*	-1.7	-2.3	-3.02*
	(-8.7 to -2.8)	(-6.9 to -2.4)	(-4.1 to 0.69)	(-5.3 to 0.68)	(-5.3 to -0.70)
Age (year)	-0.44	-0.31	-0.38	-0.17	-0.76*
	(-1.2 to 0.31)	(-0.88 to 0.26)	(-0.99 to 0.22)	(-0.93 to 0.59)	(-1.3 to -0.18)
BMI	-0.54*	-0.34*	-0.52*	-0.46*	-0.58*
	(-0.97 to -	(-0.67 to -0.02)	(-0.87 to -	(-0.89 to -0.03)	(-0.91 to -0.24)
	0.12)		0.18)		
Years of	0.29	0.36	0.13	0.09	0.49
experience	(-0.56 to 1.1)	(-0.28 to 1.01)	(-0.55 to 0.82)	(-0.78 to 0.95)	(-0.18 to 1.15)
Number of	-0.25	-1.00	-0.19	-0.84	-1.17
working	(-2.2 to 1.7)	(-2.5 to 0.48)	(-1.7 to 1.4)	(-2.8 to 1.1)	(-2.7 to 0.35)
hours per					
week					

Table 5: Multiple linear regression for WHOQOL-BREF scores and other parameters among the studied dentists who had MSD

β: Beta; CI: confidence interval; *Significant difference

Discussion:

Dentists reported that MSDs were very common because of their work nature as well as uncomfortable work environments. However, few research studies showed how these conditions affected their quality of life. So, the purpose of this research was to assess the frequency of MSDs and its relationship with the quality of life among primary healthcare dentists.

This study revealed a high frequency of MSDs among the examined dentists, located mainly in the neck, shoulders, and back. This is supported by a prior study conducted by Senosy et al. (2020), who carried out a comparative cross-sectional study among 131 physicians and 66 dentists in Beni Suef city, Egypt and reported that dentists faced MSDs at higher rates than physicians (90.9% versus 74%). El Hosseini et al. (2019) conducted another study in Egypt, involving 403 dentists from Ain Shams University's Faculty of Dentistry, which documented a 66.7% prevalence of MSDs, with neck and shoulder pain being the most common complaints.

In Saudi Arabia, various studies have been carried out, such as in the Hail Region (68 participants), Al-Madinah (70 participants), and Riyadh (184 participants). These studies indicated a high prevalence of MSDs among dentists (Aljanakh et al., 2015; Al-Mohrej et al., 2016; Al-Gunaid et al., 2017).

Also in India, **Rambabu and Suneetha** (2014), **Bhuvaneshwari et al.** (2020), and **Kumar et al.** (2020) reported that the frequency of MSDs among dentists was 61 out of 100, 545 out of 572, and 88 out of 151, respectively.

Ohlendorf et al. (2020) in Germany found that among 450 dentists, MSDs were present in 65.6% during the last week and 92% during the last year, with the most affected regions being the neck, shoulders, and lower back.

Another study in Bangalore carried out by **Hegde et al. (2018)** found that over 97% of the 200 dentists surveyed had experienced pain primarily in the neck and back areas.

According to this study, dentists who were higher age, resided in an urban region, had an elevated BMI, had a longer time of employment, worked more hours per week, and spent more time standing or sitting were more likely to suffer from MSDs. This is in line with **Rambabu and Suneetha (2014)**, who discovered that overweight and obesity were considerable risk factors for musculoskeletal discomfort among one hundred dental surgeons in India. The association between BMI and MSDs is well described by multiple mechanisms, such as elevating forces and mechanical demands across the joints (Viester et al., 2013). Dentists usually are not seeking physical activities due to fatigue stemming from their long hours and heavy workloads (Thakar et al., 2015). This may contribute to elevated BMI among dentists. So, one of the successful preventative measures for MSDs depends on a healthy lifestyle, including exercise and diet, to reduce BMI.

The nature of work among dentists is a significant contributor to the development of MSDs, as they spend more working hours sitting or standing. This is validated by different previous studies, like Hegde et al. (2018) in Bangalore and Senosy et al. (2020) in Egypt, which found that prolonged working hours or standing or sitting during work posed serious risks for MSDs. Silva R and Silva J (2017) conducted a Brazilian study on 167 primary care dentists and revealed that there was a significant relationship between MSDs and weekly time spent working among dentists. Additionally, a study by Afshar et al. (2022) on 187 dentists in Iran confirmed that there were significant associations between occupational hazards and either weekly time spent at work or work years.

The frequency of MSDs among female dentists was more prevalent than that of male dentists in this study; however, this difference was not statistically significant. According to a previous investigation, female dentists in Germany reported significantly experiencing pain more frequently than males (**Ohlendorf et al. 2020**).

In this study, the position of the dentists was linked to various MSD sites. Continuous standing is connected to MSDs in the shoulders, upper back, hips/thighs, and ankles/feet, whereas long sitting is related to MSDs in the neck, elbows, and lower back. The findings of **Hegde et al. (2018)** are consistent with this.

In this study, the risk factors of having MSDs among the studied dentists were longer age, elevated BMI, longer experience years, extended working hours per week, and prolonged standing. This aligns with previous research by **Aljanakh et al. (2015)** in Hail, Saudi Arabia; **Al-Gunaid et al. (2017)** in Madinah, Saudi Arabia; and **Bhatia et al. (2024)** in India.

Some of these factors that contribute to MSDs in dentists are modifiable. Future research could focus on evaluating the effectiveness of preventive measures targeting these factors among dentists.

The WHOQOL score of the dentists under study was influenced by their MSDs. This is elucidated by lesser mean values for its total score, physical, social relationship, psychological, and environmental components. Similar findings were in a prior investigation by **Alrayes et al. (2020)** involving 313 dentists from various cities in Saudi Arabia.

The quality of life among the dentists in this study was significantly influenced by the number of MSD sites and BMI. The more MSDs locations or higher BMI, the lower the WHOQOL overall and its component scores. Gender and dental specialty had no significant effect on quality of life in this study. This with Abraham et concurs al. (2018) regarding gender, while the reverse outcome was observed for the specialty of UAE dentists. Specialized dentists had a significantly better quality of life than general dentists. Qualification, health problems, and years after graduation were shown to be significant influences on WHOQOL scores among 313 dentists in Saudi Arabia by Alrayes et al. (2020).

This study had some strong points, such as elucidating how common MSDs were among the participating dentists and how they affected their quality of life. It also reported the qualityof-life predictors, and the factors linked to MSDs. However, there are certain restrictions, such as the limited sample size.

Conclusion:

There was a high prevalence of MSDs among the studied dentists that lowered their quality-of-life score. The factors linked to MSDs and decreased QOL included higher BMI, increased weekly working hours, and prolonged standing or sitting.

Recommendations

> An educational initiative should target the modifiable risk factors of MSDs, including BMI and extended periods of work in either a seated or upright position. This program encourages dentists to reduce overweight and obesity through clarifying the link between BMI and MSDs and its effect on their quality of life.

➤ Providing and implementing occupational policies aimed at enhancing working conditions. For instance, a health education program based on ergonomics that aims to prevent these diseases, e.g., taking regular breaks, exercising frequently, using ergonomic tools, and keeping appropriate ergonomic postures.

Further research

> To evaluate the impact of different preventive measures on dentists' QOL.

> To assess the causal relationship between quality of life or MSDs and the predictors using longitudinal investigation such as cohort study.

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