

Occupational stressors and associated factors among dentists in Erbil City, Kurdistan Region-Iraq

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ABSTRACT

Background. The health and well-being of dentists are essential components of a successful dental practice. Many studies showing high levels of stress, burnout, and psychological distress reported by dental professionals.

Objective. To assess the main occupational stressors among dentists practicing in Erbil city and to identify the associated factors that lead to or aggravate these stressors experienced in the work environment.

Subjects, materials and methods. This was a cross-sectional study conducted from August to October 2023. Data were collected from private and two government dental teaching institutions, along with accessible dental clinical practices. A total of 220 dentists were recruited. A modified version of the Occupational Stress Indicator questionnaire was used to assess the stressors. The study was approved by the Research Ethics Committee of the Kurdistan Board for Medical Specialties. The questionnaire consisted of two sections, the first gathering demographic and professional data of the participants, while the second section contained 33 items assessing the causes of stress. Participants rated the frequency of stressors using a scale of "never", "seldom", "sometimes", "often", "very often", and "always".

Results. The response rate was 199/220 (90.5%). 64.3% of participants were younger than 38 years. Males contributed for 57.3%. The mean total stress score was 90 ± 17.6 . Higher stress score was significantly associated with the presence of health problems, ($p < 0.05$). A lower mean stress score was reported among dentists who were practicing their job only in private clinics, ($p < 0.05$). No other factors showed a significant correlation with stress scores.

Conclusion. Dentistry is a stressful profession and there are significant stressors that dental professionals face in their daily work, which can have implications for their overall well-being and the quality of patient care. There is a significant association between stress levels and the presence of health problems, as well as the place of employment.

Keywords: stress, dentists, risk factors, Erbil city

INTRODUCTION

Occupational health is vital for public health, dedicated to promoting the optimal physical, mental, and social well-being of workers across diverse occupations. Key objectives include maintaining and enhancing workers' health and capacity, improving working conditions for safety and health, and fostering organizational cultures with essential values and principles [1].

Occupational stress is often viewed as the dependent variable, representing a cognitive state that arises when job demands don't align with an employee's capabilities, knowledge, resources, and needs, leading to feelings of stress and strain [2].

Stress is a well-established concern in the dental field, impacting dental staff and contributing to work-related stress and occupational burnout. This can have adverse effects on the well-being of staff members and potentially compromise the quality of patient care [3-8].

Long-term exposure to stress in dentistry can lead to various physical and psychological health problems, including anxiety, depression, cardiovascular diseases, digestive issues, insomnia, and headaches [3-5,7,9-11]. The overall stress level is influenced by various factors such as patient-dentist relationship dynamics, job satisfaction, high work demands, exposure to toxic substances, and long

working hours. Dentists often experience elevated stress attributed to patient load, workload, financial pressures, managing patient demands, years of work experience, aspects related to dental procedures, the pursuit of technological perfection, and concerns about litigation and potential errors [3-6,8,9,11-13].

Reducing stress among dentists is essential for improving the quality of dental care. Implementing measures such as support programs, work-life balance promotion, and stress management resources can contribute to a healthier and more resilient dental workforce [5,13].

Several studies in various regions have assessed stress among general dentists, but there is a prominent lack of such studies in Erbil City. Hence, the primary objective of this study is to investigate the sources of occupational stress and associated factors for general dentists in Erbil. The findings from this research can be crucial in developing targeted interventions and support programs to address stress and promote well-being among dentists in the area.

MATERIALS AND METHODS

Research design

This study utilized a cross-sectional survey with a convenience sampling technique to collect data from dental professionals in Erbil City. Participants were drawn from private and two government dental teaching institutions and accessible dental clinical practices. This study obtained ethical approval from the Research Ethics and Scientific committees of the Kurdistan Higher Council of Medical Specialties. Before participation, all subjects were thoroughly briefed on the study's objectives, and informed consent was secured from each participant, ensuring their voluntary participation and understanding of their role in the research. The survey was conducted between August 2023 and October 2023, during which participants were given a questionnaire to complete immediately. The primary objective was to assess stress levels and related factors among dental professionals in the specified region within the specified time frame.

Sample

The sample size for this study was determined using a prevalence-based formula. Based on the 86% prevalence reported in a previous study by Sidiqui et al. [14] and a confidence limit of 10%, the required sample size for the current study was estimated to be 185. To minimize the chance of sampling error, a total of 220 dentists employed in both private and government centers from Erbil city were invited to participate in the study. The study included dentists who had a minimum of one year of clinical experience and expressed their willingness to participate.

Questionnaires were distributed to all participants by hand, without any gender or age restrictions. Dentists who were not actively working at the time of data collection were excluded from the study. The main focus was on evaluating stress levels among actively practicing dentists.

Instrument

A modified version of the Occupational Stress Indicator questionnaire, which was originally developed by Cooper et al, [15] was used. The questionnaire was customized to fit the specific context and objectives of the research on stress among dental professionals. This adaptation facilitated the collection of relevant and specific data related to occupational stress experienced by dentists in this particular study population. The questionnaire comprised two sections: the first section aimed to collect demographic and professional variables related to the dentists, including age, sex, marital status, working sector, dental specialty, designation, year of graduation, and years of experience. The second section comprised 33 items designed to assess the causes of stress and coping behaviors. Respondents rated the frequency of stressors using a scale that included the following response options: "never", "seldom", "sometimes", "often", "very often", and "always". General stress scores were derived by summing the responses to the items.

The internal consistency of the modified and revised questionnaire was evaluated using Cronbach's alpha ($\alpha = 0.88$), indicating high reliability [5]. This scale has demonstrated good reliability and validity in previous studies, making it acceptable for use in both research and practice [14].

Participants were given a self-assessment questionnaire to fill out within three days. They returned the filled questionnaire to the researcher, ensuring timely data collection.

Statistical analysis

Data were managed and analyzed using the statistical package for social sciences version 28, descriptive statistics presented as mean, standard deviation, frequencies, and percentages according to the variable type.

Analytic statistics were performed using non-parametric tests for scale variables that did not follow the normal statistical distribution. Mann-Whitney U test and Kruskal-Wallis tests were applied. The chi-square test was used to compare nominal variables. A significance level of $P < 0.05$ is considered statistically significant.

RESULTS

In this study a total of 220 questionnaires were distributed to be self-administered by dentists, of

them, 199 were filled and returned by the dentists and fulfilled the analysis requirement. The response rate was 90.5%. Among the participant 199 dentists, 128 (64.3%) were younger than 38 years old, males were relatively dominant and contributed 57.3%. Most participants, 75.4%, had Dentists' Bachelor degree. Health problems reported by 41 participants (20.6%) and 78.9% of the participant dentists stated that they sleep for 7 or more hours per night (Table 1).

TABLE 1. Baseline characteristics of the participant dentists (N=199)

Variable		No.	%
Age	< 38	128	64.3
	38-52	59	29.6
	> 52	12	6.0
Gender	Male	114	57.3
	Female	85	42.7
Marital status	Single	73	36.7
	Married	124	62.3
	Others	2	1.0
Education	Bachelor	150	75.4
	Master and PHD	42	21.1
	Other	7	3.5
Health problems	Yes	41	20.6
	No	158	79.4
Hours of sleep per night	4-6	42	21.1
	7 or more	157	78.9

Job-related variables of the participant dentists are shown in Table 2; where 54.3% of dentists worked at both governmental and private clinics and the years of experience ranged between one to more than 20 years. Only 15.6% of dentists worked for more than 12 hours a week, 35.7% treated more than 12 patients a day and 41.2% of participant dentists were not satisfied with their current job.

TABLE 2. Job-related variables of the participant dentists (N=199)

Variable		No.	%
Place of employment	Private clinic	45	22.6
	Governmental clinic	46	23.1
	Both	108	54.3
Years of experience	< 10	85	42.7
	10-20	97	48.7
	> 20	17	8.5
Working hours per week	Less than 20	65	32.7
	20-40	103	51.8
	More than 40	31	15.6
Number of patients treated per day	Less than 12	128	64.3
	More than 12	71	35.7
Job satisfaction	Yes	117	58.8
	No	82	41.2

TABLE 3. Distribution of stressors of participant dentists (N=199)

	Stressor			
	Yes		No.	
	No.	%	No.	%
Maintaining high levels of concentration during working hour	54	27.1	145	72.9
Time pressures	53	26.6	25	73.4
Concern over their ability to provide dental services in future	50	25.1	19	74.9
Rising costs	43	21.6	14	78.4
Earning enough money to meet lifestyle needs	74	37.2	38	62.8
Quoting fees/ collecting payments	50	25.1	22	74.9
Supply of dentists	49	24.6	26	75.4
Unsatisfactory Laboratory services from technicians	48	24.1	13	75.9
Coping with difficult patients	75	37.7	32	62.3
Repetitive nature of work	63	31.7	39	68.3
Conflicts between profit and professional ethics	40	20.1	14	79.9
Cancellation/no-shows	32	16.1	11	83.9
Equipment breakdown / defective materials	45	22.6	11	77.4
Decisions about future career directions	60	30.2	31	69.8
Possible contraction of viral infections	63	31.7	36	68.3
Long working hours	62	31.2	30	68.8
Working with children	58	29.1	25	70.9
Finding time for family and friends	68	34.2	31	65.8
Causing pain	50	25.1	23	74.9
Treating extremely nervous patients	47	23.6	20	76.4
Lack of patient appreciation	42	21.1	12	78.9
Unsatisfactory auxiliary help	23	11.6	7	88.4
Staff-related problems	23	11.6	13	88.4
Inability to meet own expectations/standards	33	16.6	14	83.4
Seeing more patients for income-related reasons	40	20.1	16	79.9
Feeling isolated	32	16.1	12	83.9
Interruptions during work	29	14.6	8	85.4
Medical emergencies during surgery	38	19.1	12	80.9
Possibility of making mistakes	37	18.6	10	81.4
Perceived problems with colleagues	25	12.6	7	87.4
Keeping up with new developments and updates	64	32.2	33	67.8
The workplace is not pleasant	46	23.1	18	76.9
Performing multiple tasks at the same time	53	26.6	25	73.4
Overall mean total stress score for all items				

Distribution of stressors of participant dentists revealed that the main stressor was coping with patients which was reported by 75 (37.7%) dentists, followed by earning enough money to meet lifestyle needs, (37.2%), finding time for family and friends, (34.2%), keeping up with new developments and updates, (32.2%), repetitive nature of work (31.7%), the possible contraction of viral infections, (31.7%), and long working hours which was reported by (31.2%). The frequency of other stressors ranged from the least stressor which was the staff-related problems and unsatisfactory auxiliary help, each reported by 11.6% of dentists. The frequency of other stressors ranged between 12.6% to 30.2% (Table 3).

Descriptive statistics of the overall mean stress score are shown in (Table 4). Where the mean stress score was 90 out of 165 and a standard deviation of 17.6. However, the median was 89 and the inter-quartile range was 19 (80 – 99).

TABLE 4. Descriptive statistics of the overall mean stress score

Statistics	Value
Mean	90.0
SD	1.25
Median	89.0
First Quartile	80.0
Third Quartile	99.0
Inter-quartile range	19.0

SD: Standard deviation of the mean

This study examined the mean total stress score based on the baseline characteristics of the participating dentists. No significant differences were found in the mean total stress score according to age, gender, education, and hours of sleep per night ($P > 0.05$). However, a significant difference was ob-

served concerning the presence of health problems among participants. The mean total stress score was significantly higher ($p = 0.001$) in participants with health problems (95.1 ± 24.6) compared to those without health problems (88.1 ± 13.3) (Table 5).

TABLE 5. Comparison of mean total stress score according to baseline characteristics of the participant dentists (N=199)

		No.	%	Total stress score		p-value
				Mean	SD	
Age	<38	128	64.3	90.3	18.6	0.189*
	38-52	59	29.6	91.0	15.1	
	>52	12	6.0	82.2	18.0	
Gender	Female	85	42.7	91.4	16.0	0.494**
	Male	114	57.3	88.9	18.8	
Education	Bachelor	150	75.4	91.0	16.6	0.403*
	Master and PhD	42	21.1	87.6	21.1	
	Other	7	3.5	83.4	15.4	
Health problems	Yes	41	20.6	95.1	24.6	0.001**
	No	158	79.4	88.1	13.3	
Hours of sleep per night	4-6	42	21.1	90.5	23.0	0.810**
	7 or more	157	78.9	89.9	16.0	

*Kruskal Wallis test, **Mann-Whitney test, SD=Standard deviation. Significant at $p < 0.05$

Regarding the comparison of mean total stress score according to the job-related variables, a significant difference was reported between the total stress score and place of employment; participants of private clinic only had the lowest stress scores, (mean = 84.9 ± 16.6) than those of governmental and both sectors, respectively, ($P = 0.014$). No other significant differences were reported across other job-related variables, ($P > 0.05$) (Table 6).

TABLE 6. Comparison of mean total stress score according to the job-related variables of the participant dentists (N=199)

		No.	%	Total stress score		p-value
				Mean	SD	
Place of employment	Private clinic	45	22.6	84.9	16.6	0.014*
	Governmental clinic	46	23.1	91.2	16.8	
	Both	108	54.3	91.6	18.2	
Years of experience	<10	85	42.7	89.3	17.3	0.146*
	10-20	97	48.7	92.2	16.8	
	>20	17	8.5	81.2	19.5	
Working hours per week	Less than 20	65	32.7	89.4	14.1	0.113*
	20-40	103	51.8	91.7	17.2	
	More than 40	31	15.6	85.6	24.3	
Number of patients treated per day	Less than 12	128	64.3	89.5	14.5	0.500**
	More than 12	71	35.7	90.9	22.4	
Job satisfaction	Yes	117	58.8	89.8	17.4	0.588**
	No	82	41.2	90.3	18.0	

*Kruskal Wallis test, **Mann-Whitney test, SD=Standard deviation. Significant at $p < 0.05$

DISCUSSION

Dentistry is widely recognized as a challenging occupation, with numerous studies showing high levels of stress, burnout, and psychological distress reported by dental professionals. This alarming trend has raised significant concerns within the profession [6,7,11,16]. The present study aimed to identify the main occupational stressors among dentists practicing in Erbil city and determine the factors that are possibly associated with or aggravate these stressors. Hence a total of 220 questionnaires were distributed and the returned ones were 199 with a response rate of almost 90.5%. This response rate meets and exceeds the minimal requirement for statistical analysis that provides enough power and avoids the non-response bias [17]. The findings of this study indicated that a considerable number of dentists exhibited signs of stress, aligning with previous international studies, which further emphasize the stressful nature of the dental profession worldwide [7,14].

In this study various stressors were reported, nonetheless, they were varied in their frequency distribution; we found that coping with patients was the more frequent stressor followed by earning enough money to meet lifestyle needs, finding time for family and friends, keeping up with new developments and updates, repetitive nature of work, the possible contraction of viral infections, and long working hours. The least frequent stressors were the staff-related problems and unsatisfactory auxiliary help. The frequency distribution of stressors varied among different studies, and this variation could be attributed to diverse populations and work environments across regions and countries. For instance, in the study by Pouradeli et al., 58.9% of surveyed dentists experienced stress, with the most common stressors reported as maintaining concentration, constant time pressures, concerns about their ability to provide dental services in the future, and rising costs [5]. These findings emphasize the challenging nature of the dental profession and the potential impact of stress on dentists' well-being. Two previous studies documented that patient relation was the most significant stressor, followed by time-related stressors [8, 16, 18]. However, other studies showed different findings [3].

The psychological well-being of dentists is influenced by factors such as their age, educational background, and professional experience [19]. In the present study, although statistically insignificant, younger dentists experienced higher levels of stress compared to senior dentists. Previous studies have documented a significant inverse correlation between age and stress scores [4,8,9,14]. The increased stress among younger dentists could be attributed to the uncertainty and challenges they face due to

their relatively limited practical experience compared to their more experienced counterparts. This lack of experience may lead to feelings of anxiety and stress as they navigate their roles and responsibilities in their dental practice. Younger dentists often concentrate their endeavors on refining their skills, broadening their knowledge foundation, and nurturing their self-confidence.

Choy and Wong's findings suggested that dentists with more experience, advanced postgraduate qualifications, and specialized training tend to have lower average scores in the category of stressors associated with patient interactions. Their heightened skills and extensive knowledge likely contribute to their ability to effectively manage stressors arising from patient interactions [18].

The study results indicated a relatively higher stress level among female dentists compared to males, although the difference was not statistically significant. It's noteworthy that other studies have reported no significant differences in stress levels between male and female dentists [5,14]. Conversely, other studies reported that female dentists tend to experience higher levels of stress [10,16,18].

This difference may be attributed to the additional responsibilities the female dentists may have in taking care of their families alongside their dental profession. Additionally, there might be biological differences in vulnerability to mental health issues between genders, leading to higher susceptibility to mental stressors among women and potentially lower adaptation possibilities [10,16].

The study revealed that dentists with bachelor's degrees had higher stress scores, while those with longer nightly sleep durations had lower stress scores. However, these differences did not achieve statistical significance. The observed decrease in stress levels among specialist dentists with higher postgraduate degrees could be linked to the advantages of specialized training and post-graduation. Specialists often occupy higher-ranking positions with increased remuneration, potentially fostering job security and satisfaction, which may contribute to stress reduction. It's important to note that the disparity in stress levels between specialists and non-specialists in our study was not significant enough to reach statistical significance.

A significant difference was reported in the presence of health problems where those with health problems had significantly higher stress scores, this could be related to the inter-correlation between stress and health well-being. According to the nature of this study, we could not approve the direction of this correlation, in other words, the temporal relationship between stress and health problems.

Concerning job-related factors, the study revealed that participant dentists practicing in their

private clinics had lower stress scores compared to those in the governmental sector or both. This outcome was anticipated, as dentists in private clinics are not exposed to governmental workloads and are not affected by work timing according to governmental legislation.

It had been observed earlier that work stress was associated with increased workloads, reduced job satisfaction, unhealthy intake, higher work-related pain, lower perceived health, and insufficient sleep. Job satisfaction emerged as the strongest predictor of work stress scores. A Yemeni study reported patient-related factors as the lowest cause of stress [16].

The nationwide anonymous cross-sectional survey of 2,441 General Dental Practitioners (GDPs) in the UK yielded crucial insights into the overall stress, work stress, and health of dental practitioners [3]. These stressors can lead to burnout, decreased job satisfaction, and even negative effects on the quality of patient care.

Therefore, recognizing and addressing the challenges of stress in dentistry can have broader implications for the dental profession as a whole. It can lead to the implementation of policies and practices aimed at improving the working conditions and mental health support for dentists, ultimately benefiting the quality of dental care provided to patients and fostering a healthier and more sustainable dental workforce.

Strengths and limitations

Strengths of this study include the diversity of the participating dentists, who practiced in various primary care settings (private, governmental, mixed) and had a wide range of experience (1–25 years). This diversity enhances the applicability of the study's findings. Additionally, the use of counterbalancing and randomization procedures ensured that the tasks' complexity and order remained bal-

anced and unaffected by participants' learning or potential fatigue throughout the study.

Limitations

The study has some limitations. Information was collected through self-report questionnaires, but anonymity was ensured to encourage honest responses. While the study provides valuable insights into the stress experienced by dentists at a particular time, a longitudinal study would offer more comprehensive information. It could provide crucial insights for developing targeted interventions and support systems to promote better mental and physical well-being for dental professionals throughout their careers. Despite the limitations, this research is comprehensive and uses validated measures, providing valuable insights into the stress and well-being of the dental population in Erbil City.

CONCLUSION

This study strengthens the accumulating evidence that dentistry is a conspicuously stressful profession. It reveals significant stressors in the daily work of dental professionals, suggesting potential implications for their overall well-being and the quality of patient care. Particularly, a significant association was identified between stress scores and both the presence of health problems and the place of employment. These findings underscore the critical importance of acknowledging and addressing stress among dental professionals to safeguard their well-being and uphold the standard of patient care.

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