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A Cross-Sectional Study of Environment Stress Among Undergraduate Dental Students

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Abstract

Objective: Stress is a prevalent issue in the field of dental education, with numerous studies highlighting its impact on students. Creating a supportive and stress-free environment is vital in dental education, not only for the well-being of students but also to minimize hazards which are frequently linked to stress. The main objective of the study was to investigate the top stressors among the clinical years' dental students.

Material and Methods: A modified "Dental Environment Stress" questionnaire-based convenient sample from fourth- and fifth-year dental students in the University of Wasit and Kut University College was collected from November 2023 to December 2023. Prior to data collection, an ethical approval was taken from the Kut University College Research Ethics Committee (KREC) and each participant provided a written informed consent. The data were analysed using the Statistical Package for the Social Sciences statistical software (SPSS version 25.0).

Results: 392 students participated with a female to male ratio (2.4: 1). The "Self-efficacy Belief" domain emerged as the most impactful stressor. Fifth-year students experience higher stress related to time management and clinical requirements compared to fourth-year students. Stress levels are similar between students from private and public universities.

Conclusion: The study highlights that dental education induces significant stress among students. Efforts to improve patient organization and engagement are recommended to alleviate stress among students.

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Introduction

The term "stress" according to WHO, refers a state of worry or mental tension caused by a difficult situation. Stress is a natural human response that prompts us [1]. The brain plays a crucial role in perceiving and responding to stress with exceptional plasticity. " Eustress" is a positive form of stress that can motivate and energize individuals, helping them to perform better and achieve their goals. On the other hand, when stressors overwhelm an individual's ability to cope, stress can transform into a negative form " distress" that can lead to anxiety, depression, and other health issues [2,3]. The crisis behind being stressed is the endless physical and mental consequences and finally, burnout [4]. Physical consequences can be fatigue/tiredness, mood alteration, effect on performance, headaches and sleep disturbance. Psychological distress manifests in terms of showing higher levels of depression, obsessive-compulsive disorders, and interpersonal sensitivity than age-matched norms [5,6]. Stress is not exclusive to medical and dental students but is more pronounced among them. What worsens the

condition is the high expectation that they are capable of handling stress and not be greatly affected by it [5]. The current dental school curricula strongly emphasize developing a wide range of skills among students, such as theoretical knowledge, clinical expertise, and the ability to effectively interact with anxious patients and supervisors. [7]. In Iraq, the cost of studying dentistry is the highest among all undergraduate programs, even at governmental universities, which adds another burden on dental students. Many studies reported that dental students, compared with their counterparts in the medical field, experience more stress particularly during their clinical study years [8-10]. Stress among dental students has been assessed using various stress scales, including "Dental Environment Stress Scale" (DES), the "Maslach Burnout Inventory" (MBI), and the "Psychosocial Stress Inventory" (PSSI). Among these, DES is commonly used [11]. Fourth-year dental students are anxious about their career prospects, while newly arrived students are greatly concerned about having little time for rest [12]. When investigating the main stressors in a multi-country study, Divaris and Polychronopoulou concluded that performance pressure, workload, and self-efficacy beliefs constituted the students' main concerns [13]. Another study reported that the major stressors for fifth-year students were: examinations, patients being late to appointments and the amount of assigned work [14]. Creating a healthy and relaxed environment without hazards is a priority in the dental setting. Stress has been shown to be a common cause (50%) of needle-stick injuries [9], which can lead to disease transmission and harm to practitioners. The prevalence, frequency and the main contributors of stress among dental students in Wasit governorate have not been previously investigated. Wasit currently has two Universities. Therefore, an attempt was made to study the mental health issues among this population particularly the clinical years students.

Materials and Methods

A cross-sectional study conducted in the 1st semester of the academic year 2023/2024 during the period from November 2023 to December 2023. A convenience sampling of participants was recruited from fourth- and fifth year dental students in the University of Wasit and Kut University College, Wasit Province, Iraq. The questionnaire used in the study was the modified "Dental Environment Stress" (DES) questionnaire by Al-Sowygh [2], which was selected due to the religious and cultural similarities between the two societies. Prior to data collection, the questionnaire underwent translation into Arabic by a professional language translator. The Arabic version was then tested on a small sample of students (10%) to ensure that the questions were clear, understandable, and culturally relevant. The translated questionnaire in Arabic showed a satisfactory Cronbach's alpha of 0.84. The questionnaire consisted of demographic data (the student's gender, stage, and university) and 32 stress-provoking items. Each item had five potential responses: not stressful, slightly stressful, moderately stressful, severely stressful, and very severely stressful. These items were grouped into 6 major domains: academic challenge, workload, performance pressure, Self–efficacy beliefs, clinical training and patient treatment. However, the distributed questionnaire among the participants did not include the grouped domains. The researchers received approval to conduct the study from the Kut University College Research Ethics Committee (KREC). Also, each participant provided a written informed consent. The questionnaires were distributed anonymously, and participants were assured that all information would be kept strictly confidential and used solely for research purposes. The data were analysed using the Statistical Package for the Social Sciences statistical software (SPSS version 25.0). Descriptive statistics (Proportion, mean and standard deviation) were used to describe the study and outcome variables. Independent sample t-test for difference of means between two groups for the categorial variables. All tests were conducted with a confidence level of 95% and a significant level of 0.05.

Results

The research examined the stress levels among 392 dental students, with most participants being female (70.20%) compared to male (29.80%), as shown in Table 1. Regarding academic stage, more students were from the 5th grade (56.4%) compared to the 4th grade (43.6%). Age of participants ranged from 21 to 24 years old, the mean age was 22.30 years, with a standard deviation of 0.763 years. Most of participants (57.4%) pursued education in private institution.

As demonstrated in Table 2, the "Self-efficacy Belief" domain emerges as the most significant stressor among the domains, recording a mean of 3.25±0.893. Following closely is the domain of " Academic Challenge" with a mean score of 2.50±0.615. Conversely, the domain of "Patient Management" registered the lowest stress levels with a mean score of 1.59±0.509, indicating relatively lesser concerns among participants in this aspect of their education.

In Table 3, significant stress level differences were observed across domains based on gender, grade, and type of education. Specifically, males exhibited lower stress in the "Academic Challenge" domain (mean: 2.39, p = 0.015) compared to females (mean: 2.55). While no significant gender differences were found in "Time Management" (p = 0.393), males reported lower stress in "Self-efficacy Belief" (mean: 3.29, p = 0.58) than females (mean: 3.24). Significant grade disparities were noted in "Time Management" (p = 0.003), with 4th-grade participants reporting lower stress (mean: 2.03) compared to 5th-grade participants (mean: 2.21). No significant grade differences were found in "Self-efficacy Belief" or "Academic Performance." Regarding the comparison between stressors among the type of education, it is obvious that the "Performance Pressure "is higher in the pubic than the private colleges (mean: 2.50 vs. 2.34, p=0.003).

Stressor responses varied between genders. Notably, males reported lower stress in "Lack of confidence in being a successful dental student" (mean: 3.64, p = 0.626) compared to females (mean: 3.71), as found in Table 4, while no significant gender differences were found in "Thinking about the possibility of not succeeding in the profession in the future" (p = 0.212) or "Lack of cooperation among colleagues" (p = 0.436), males exhibited lower stress levels in "Facing criticism in how you do your work" (mean: 2.21, p = 0.006) compared to females (mean: 2.56). No significant differences were noted in other stressors between genders.

Stressor responses also differed between grades. Notably, significant grade disparities

were observed in "Lack of cooperation among colleagues" (p = 0.000), with 4th-grade participants reporting lower stress (mean: 3.16) compared to 5th-grade participants (mean: 2.55), as shown in Table 5. Similarly, significant grade differences were noted in "Some teachers treated students inappropriately" (p = 0.002), with 4th-grade participants exhibiting lower stress levels (mean: 2.56) compared to 5th-grade participants (mean: 2.90). No significant grade differences were found in other stressors.

Table 6 demonstrates varying stress levels between types of education. Participants from private universities reported higher stress in domains such as "Lack of confidence in being a successful dental student" (mean: 3.84 vs. 3.48, p = 0.003), "Thinking about the possibility of not succeeding in the profession in the future" (mean: 3.48 vs. 3.20, p = 0.019), and "Language barrier and difficulty learning medical terminology" (mean: 2.92 vs. 3.24, p = 0.011) compared to those from public universities. Conversely, public university students experienced higher stress levels in "Fear of failure in the semester or academic year" (mean: 2.87 vs. 2.60, p = 0.022). However, no significant differences were observed in domains such as "Facing criticism in how you do your work," "Some teachers treated students inappropriately," and "Responsibility for obtaining suitable patients."

Discussion

Previous studies have found that dental education induces stress among students, regardless of the country or educational system. This highlights the challenging nature of dental education, which requires students to acquire extensive knowledge and professional hand skills while maintaining a positive attitude towards patient care within a limited timeframe. The primary goal of this study was to determine the perceived factors causing stress among dental students in their clinical study years, Wasit governorate, Iraq.

Out of the total 392 dental students, 70% were females. Low participation rate of males was also observed in several studies [8,9,15]. Female students scored higher level of stress than males in the overall mean score with significance observed in both "academic challenge" and "clinical training" domains. This is consistent with most of the studies regardless of the main stressor and coinciding with the fact that stress level is higher in females in the general population due to the hormonal,_physiological, and stressor variations between the genders. [2,8,16]. In contrast, findings reported by Tangade et al. indicated that males had stress more than females and attributed that to the socioeconomic burden on men in Indian society [7]. The mean scores of 4th and 5th-year students did not show a significant difference. However, 5th-year students reported higher stress levels in "time management" and "clinical training" compared to 4th-year students. This could be due to the increased number and complexity of case requirements for 5th-year students. A study conducted in Jordan yielded similar results. [9]. When considering the top ten stressors, "Being treated inappropriately by teachers" was a significant source of stress for 5th-year students. These findings agree with an Indian study by Tangade et al. but contradict the findings of Al-Sowygh et al. study conducted in Saudi Arabia, where the mentioned stressor was more significant among 4th-year students [2,7]. Regarding the type of education, the average scores were almost the same for students in private and public universities, which was concordant with a study from Pakistan in 2024 [17]. This proximity may be due to the comparable social and financial support, as well as similar challenges experienced by both groups. However, it was observed that in terms of domains, "performance pressure" and particularly "Lack of cooperation among colleagues. ", "Language barriers" and "Fear of being unable to catch up with colleagues" were significantly higher among public university students. Furthermore, "Lack of technical laboratories", one of the perceived top 10 stressors, was surprisingly significantly more prominent among private university students. This could be because the private university has a larger student population than the public university. "Fear of failure in the course'' ranked among the top 10 stressors and was found to be significantly higher among public university students. A study conducted in Russia showed that it was among the top stressors but had no significant difference regarding to the type of education [15]. The "Self-efficacy Belief" domain has emerged as the most impactful stressor among all the domains, which was inconsistent with most of the perceived local and outside studies where "workload " domain was the most significant stressor [2,8,11,15]. This may be attributed to the social and academic stigma associated with private universities in Iraq, as the majority of the present study participants were from a private university. In fact, the top two stressors "Lack of confidence in being a successful dental student" and "Thinking about the possibility of not succeeding in the profession in the future" that fall under the umbrella of "Self-efficacy Belief" domain were significantly higher among private compared to public university students. Continuing in the list of the top stressors in the current study, females experienced higher levels of stress from being criticized by teachers and treated inappropriately compared to males, and fifth-year students reported feeling even more stressed by this criticism. However, a study by AL-Sowygh et al. found that males and fourth-year students experienced this fear more [2]. The difference could be due to variations in staff, rules, and other factors among the universities. Patient-related factors and difficulty finding a suitable patient were listed the last of the top stressors among both 4th and slightly less in 5th-year students, regardless of gender, coinciding with the findings of a Jordanian study in 2024 [9]. Despite being insignificant, private university students were more stressed about this issue. This discrepancy might be due to being away from the city centre. Therefore, Kut University could improve efforts to organize the process of obtaining patients and consider offering incentives to promote patients' engagement.

Finally, each university may have unique stressors depending on various factors related to students, the university and society environment. Identifying these factors might help alleviate students' anxiety and, hence, improve their performance.

Conclusion

The study highlights that dental education induces significant stress among students, particularly female students, due to academic challenges and clinical training. Fifth-year students experience higher stress related to time management and clinical requirements compared to fourth-year students. Stress levels are similar between

students from private and public universities, though specific stressors like performance pressure and lack of technical laboratories vary. The "Self-efficacy Belief" domain emerged as the most impactful stressor. Efforts to improve patient organization and engagement are recommended to alleviate stress among students.

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Table 1. Characteristics of all participants.

	Frequency	Percent
Gender		
Male	117	29.80%
Female	275	70.20%
Grade		
4th	171	43.60%
5th	221	56.40%
Type of education		
Public	167	42.6%
Private	225	57.4%
Age Mean ± SD. (Years)	22.30 ± 0.763	

Table 2. Dental environment stress domains scores (n=392).

Domains	Mean ± SD
Academic Challenge	2.50 ± 0.615
Time Management	2.12 ± 0.608
Self-efficacy Belief	3.25 ± 0.893
Clinical Training	2.09 ± 0.627
Patient Management	1.59 ± 0.509
Performance Pressure	2.41± 0.530

Table 3. Comparison between responses by domain according to gender, grade, and education.

Domain	Male (Mean ± SD)	Female (Mean ± SD)	Gender (p-value)	4th Grade (Mean ± SD)	5th Grade (Mean ± SD)	Grade (p-value)	Public (Mean ± SD)	Private (Mean ± SD)	Education (p-value)
Academic Challenge	2.39 ± 0.63	2.55 ± 0.60	0.015	2.46 ± 0.60	2.54 ± 0.62	0.18	2.51 ± 0.63	2.49 ± 0.64	0.794
Time Management	2.17 ± 0.62	2.11 ± 0.60	0.393	2.03 ± 0.59	2.21 ± 0.60	0.003	2.14 ± 0.64	2.11 ± 0.56	0.556
Self-Efficacy Belief	3.29 ± 0.84	3.24 ± 0.92	0.58	3.27 ± 0.94	3.24 ± 0.86	0.758	3.18 ± 0.97	3.30 ± 0.82	0.185
Clinical Training	1.96 ± 0.56	2.15 ± 0.65	0.008	1.99 ± 0.62	2.17 ± 0.62	0.007	2.02 ± 0.63	2.14 ± 0.61	0.075
Patient Management	1.59 ± 0.51	1.59 ± 0.51	0.926	1.62 ± 0.46	1.57 ± 0.54	0.344	1.62 ± 0.50	1.56 ± 0.51	0.307
Performance Pressure	2.38 ± 0.51	2.44 ± 0.54	0.312	2.47 ± 0.53	2.38 ± 0.53	0.088	2.50 ± 0.53	2.34 ± 0.51	0.003

Table 4. Comparison between responses by top ten stressors according to gender.

Top Ten Stressors	Mean ± SD (Male)	Mean ± SD (Female)	p-value
Lack of confidence in being a successful dental student	3.64 ± 1.200	3.71 ± 1.198	0.626
Thinking about the possibility of failing in the profession in the future	3.48 ± 1.103	3.32 ± 1.204	0.212
Lack of cooperation among colleagues	2.74 ± 1.212	2.85 ± 1.263	0.436
Language barrier and difficulty learning medical terminology	2.97 ± 1.249	3.09 ± 1.192	0.369
Fear of not being able to catch up with colleagues if you fall behind them	2.75 ± 1.299	2.91 ± 1.237	0.269
Facing criticism in how you do your work	2.21 ± 1.097	2.56 ± 1.146	0.006
Fear of failure in the semester or academic year	2.76 ± 1.215	2.69 ± 1.187	0.617
Some teachers treated students inappropriately	2.64 ± 1.178	2.80 ± 1.052	0.178
Lack of qualified technical laboratories	2.26 ± 1.054	2.62 ± 1.125	0.004
Responsibility for obtaining suitable patients	1.71 ± .881	1.72 ± .939	0.915

Table 5. Comparison between responses by top ten stressors according to grade.

Top Ten Stressors	Mean ± SD (4th Grade)	Mean ± SD (5th Grade)	P-value
Lack of confidence in being a successful dental student	3.71 ± 1.192	3.67 ± 1.204	0.756
Thinking about the possibility of failing in the profession in the future	3.44 ± 1.218	3.31 ± 1.142	0.275
Lack of cooperation among colleagues	3.16 ± 1.287	2.55 ± 1.149	0.000
Language barrier and difficulty learning medical terminology	3.08 ± 1.248	3.04 ± 1.181	0.739
Fear of not being able to catch up with colleagues if you fall behind them	2.96 ± 1.285	2.78 ± 1.231	0.169
Facing criticism in how you do your work	2.43 ± 1.203	2.47 ± 1.093	0.745
Fear of failure in the semester or academic year	2.67 ± 1.178	2.75 ± 1.209	0.488
Some teachers treated students inappropriately	2.56 ± 1.117	2.90 ± 1.051	0.002
Lack of qualified technical laboratories	2.54 ± 1.189	2.50 ± 1.056	0.723
Responsibility for obtaining suitable patients	1.75 ± .957	1.69 ± .893	0.478

Table 6. Comparison between responses by top ten stressors according to education.

Top Ten Stressors	Mean ± SD (Public University)	Mean ± SD (Private University)	p-value
Lack of confidence in being a successful dental student	3.48 ± 1.246	3.84 ± 1.138	0.003
Thinking about the possibility of failing in the profession in the future	3.20 ± 1.205	3.48 ± 1.142	0.019
Lack of cooperation among colleagues	2.99 ± 1.289	2.69 ± 1.202	0.021
Language barrier and difficulty learning medical terminology	3.24 ± 1.142	2.92 ± 1.242	0.011
Fear of not being able to catch up with colleagues if you fall behind them	3.01 ± 1.331	2.75 ± 1.189	0.039
Facing criticism in how you do your work	2.43 ± 1.159	2.47 ± 1.130	0.732
Fear of failure in the semester or academic year	2.87 ± 1.257	2.60 ± 1.134	0.022
Some teachers treated students inappropriately	2.69 ± 1.081	2.80 ± 1.101	0.300
Lack of qualified technical laboratories	2.28 ± 1.124	2.69 ± 1.078	0.000
Responsibility for obtaining suitable patients	1.69 ± .883	1.73 ± .950	0.681