

# Stress Among Dental Students: A Cross-sectional Study in Saudi Arabia

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## Abstract

**Introduction:** Professional dental training can be a stressful experience. Dental education can be very demanding unlike anything students have faced in the past.

**Purpose:** A cross-sectional study was conducted to determine the level of psychological stress as well as its perceived sources among undergraduate dental students at King Khalid University, Abha, Saudi Arabia.

**Materials and Methods:** A total of 389 questionnaires were sent to dental students of the 2<sup>nd</sup> year up to 6<sup>th</sup> year and internship year through Google Forms application. Overall, the response rate was 77.3%. The questionnaire was based on dental environment stress survey with modification to suit Saudi Arabian culture. Descriptive statistics, Cronbach's alpha reliability test, Mann-Whitney U test, and Kruskal-Wallis test were performed with the resultant data. The significance level was set at 0.05.

**Results:** Dental students of King Khalid University College of Dentistry displayed high levels of perceived stress. Examination and distribution of grades, course requirements, days' long schedule, lack of time for relaxation, and insecurity concerning future were found to be biggest stressors. Male and female students exhibited similar mean overall DES scores, and students belonging to the 2<sup>nd</sup> year showed less perceived stress compared to the students of higher academic years.

**Conclusion:** High level of stress was found among the study subjects. The main reasons of stress were examination and distribution of grades, course requirements, days' long schedule, and lack of time for relaxation. It is essential for dental schools to ensure an environment that reduces stress and promotes the well-being of students.

**Key words:** Dental psychology, Dental students, Education, Stress, Stressors

## INTRODUCTION

By and large professional dental training is perceived as extremely challenging and enormously stressful experience worldwide. Dental students have to undergo extensive preclinical, clinical and interpersonal skills, training to acquire a plethora of knowledge, clinical, and problem-solving competencies.<sup>[1]</sup> Dental students experience more stress than medical students as have been documented

in one of the previous studies.<sup>[2]</sup> Since the turn of the 21<sup>st</sup> century, educationists have increased their attention towards understanding stress and stressors among dental students within their educational environment. This has resulted in several published studies that have identified stressors and their physical and psychological consequences during various stages of dental training.<sup>[3-7]</sup> The type of stressor and the level of stress-induced varies among individuals depending on the psychological makeup, stage of training, curricular aspects, institutional factors, and several other non-academic factors.<sup>[8]</sup> Individual's personality, emotional intelligence, and societal support profoundly affect the way stress is perceived in dental academic environment.<sup>[5,9-11]</sup> The commonly reported academic and non-academic sources of dental environment stress (DES) include frequent examinations, clinical and laboratory course requirements, meeting course deadlines,

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dealing with patients, high academic expectations, lack of sufficient leisure time, and financial status.<sup>[12,13]</sup> These stressors are well known to cause a long list of physical and psychological distress symptoms including anxiety, depression, tension, fear, cynicism, headaches, dizziness, fatigue, insomnia, tachycardia, and impairment of immune system.<sup>[12-19]</sup> All these consequences have a potential to end up in professional burnout<sup>[3]</sup> and in extreme conditions even suicide. Therefore, it is essential to identify potential stressors in every academic environment, to understand the way students perceive, react and respond to dental stress and plan effective strategies to alleviate them. With this perspective, a study was undertaken with the prime objective of determining the level of psychological stress as well as its perceived sources among undergraduate dental students at King Khalid University.

## MATERIALS AND METHODS

A cross-sectional study design with non-probable convenient sampling was used to distribute self-administered questionnaires through “Google Forms application.” The study population comprised undergraduate dental students of King Khalid University College of Dentistry (KKUCOD), Bachelor of Dental Surgery (BDS) program. These students were from the 2<sup>nd</sup> year to the 6<sup>th</sup> year and internship year of the BDS program. The 1<sup>st</sup> year students were excluded because it forms the preparatory year, which technically does not belong to the BDS program. Ethical approval for conducting the survey was obtained from the Scientific Research and Ethics Committee KKUCOD, and the study was conducted for 5 months from April 2017 to August 2017. The objectives of the study were communicated in advance to the students, and it was made sure the student participation was voluntary.

The survey was based on DES questionnaire<sup>[20]</sup> with modifications keeping in mind the Saudi Arabian culture and the targeted undergraduate student population [Table 1]. Before making the modification, several versions of DES questionnaire were reviewed that are already published in the literature<sup>[21-26]</sup> The modified questionnaire comprised 29 questions related to stress and two questions related to the gender and academic year of the sample population. For ease of understanding, the questionnaire was translated into Arabic language and a “How to answer the questionnaire” was included at the beginning. The responses were divided into five-point Likert scale as “not relevant,” “not stressful,” “slightly stressful,” “moderately stressful,” and “very stressful.”

The data obtained from Google Forms was analyzed using the Statistical Package for the Social Sciences software (SPSS

**Table 1: Questionnaire items**

#	Question/stressor
1	Amount of assigned work
2	Difficulty of coursework
3	Competition with classmates
4	Examination and distribution of grades <sup>†</sup>
5	Completion of course requirements
6	Fear of failing the examination
7	Lack of time to do assigned coursework <sup>†</sup>
8	Fear of being unable to keep up with workload
9	Learning environment created by faculty
10	Receiving criticism about work
11	Rules and regulations of the school
12	Do you grind your teeth (bruxism)
13	Difference in feedback from different instructors
14	Lack of sufficient break between sessions
15	Long days schedule and lack of time for relaxation
16	Atmosphere at home
17	Taking care of children
18	Postponement of engagement, marriage, or having children
19	Increase in weight and appetite
20	Multiple roles as a spouse, parent, and professional
21	Lack of self-confidence
22	Expectations of professional school versus reality
23	Insecurity concerning professional future
24	Patients inability to complete the prescribed treatment plan
25	Responsibility for comprehensive patient care
26	Patients not available at prescribed times
27	Difficulty in learning appropriate clinical procedures
28	Working on patients with poor personal hygiene
29	Multitasking as student, clinical work, and research

PC + version 24.0). The reliability of the questionnaire items was assessed by employing Cronbach’s alpha test. Descriptive statistics along with Mann–Whitney U test was performed to determine the significant differences between the responses based on gender. Kruskal–Wallis test was performed to ascertain any significant differences of responses based on the academic year; the respondents belong to. The level of significance was set at  $P < 0.05$ .

## RESULTS

The survey questionnaire was sent to a total of 389 undergraduate students, out of whom 301 responded by way of answering all the questions. The total response rate was 77.3%. The response rate of male and female students was 72.5% and 82.8%, respectively. Maximum respondents belonged to the third academic year (26%) while the least number of respondents belonged to the fifth academic year (12%). The details of the distribution of respondents according to gender and the academic year are given in Table 2. The overall reliability of the questionnaire items was assessed by calculating Cronbach’s alpha [Table 3]. Significant internal consistency was observed with all the 29 items of the questionnaire (Cronbach’s alpha score = 0.896). In general, the respondents displayed high DES scores for all the stressors appearing in the

**Table 2: Distribution of respondents according to gender and academic year**

Gender	n (%)
Male	151 (50)
Female	150 (50)
Total	301 (100)

  

Academic year	Total n (%)	Male n (%)	Female n (%)
2 <sup>nd</sup>	44 (15)	12 (8)	32 (21)
3 <sup>rd</sup>	79 (26)	36 (24)	43 (29)
4 <sup>th</sup>	57 (19)	29 (19)	28 (19)
5 <sup>th</sup>	35 (12)	7 (5)	28 (19)
6 <sup>th</sup>	48 (16)	34 (23)	14 (9)
Interns	38 (13)	33 (22)	5 (3)
Total	301 (100)	151 (100)	150 (100)

**Table 3: Cronbach's alpha reliability test**

Number of items in questionnaire	Cronbach's alpha based on standardized items	Cronbach's alpha
29	0.899	0.896

questionnaire. The mean DES values for each stressor are presented in Table 4. Questions: Fourth (examination and distribution of grades), fifth (course requirements), 15<sup>th</sup> (long day's schedule and lack of time for relaxation), and 23<sup>rd</sup> (insecurity concerning future) were considered the biggest stressors. Similarly, stressors from questions: Third (competition with classmates), 12<sup>th</sup> (bruxism), 16<sup>th</sup> (atmosphere at home), 17<sup>th</sup> (taking care of children), 18<sup>th</sup> (postponement of engagement, marriage, or having children), 19<sup>th</sup> (increase in weight and appetite), and 20<sup>th</sup> (multiple roles as a spouse, parent, and professional) were perceived to be least stressful. Comparing the level of stress between male and female students with Mann–Whitney U test [Table 5] a significant difference was observed for questions: Fourth (examination and distribution of grades), 10<sup>th</sup> (receiving criticism about work), 11<sup>th</sup> (rules and regulation of the school), 14<sup>th</sup> (lack of sufficient break between sessions), 16<sup>th</sup> (atmosphere at home), 18<sup>th</sup> (postponement of engagement, marriage, or having children), and 21<sup>st</sup> (lack of self-confidence). Overall, male and female students exhibited similar mean DES scores [Table 4]. Comparison of means of DES scores between all six academic years by Kruskal–Wallis test [Table 6] revealed a significant difference in responses to all questions except question number three (competition with classmates), six (fear of failing examinations), eight (fear of being unable to keep up with workload), 12 (bruxism), 16 (atmosphere at home), 17 (taking care of children), 19 (increase in weight and appetite), 20 (multiple roles as a spouse, parent, and professional), and 21 (lack of self-confidence). Students from all the academic years considered questions: 13 (difference in feedback from different instructors) and 23<sup>rd</sup> (insecurity concerning

future) as most stressful and questions: 17<sup>th</sup> (taking care of children) and 20<sup>th</sup> (multiple roles as a spouse, parent, and professional) as least stressful ones. Students belonging to the 2<sup>nd</sup> year showed less perceived stress compared to that of other academic years [Table 7].

## DISCUSSION

The results of this study indicate that students of KKUCOD displayed high level of perceived DES. This is revealed in their ratings for almost all the items of the questionnaire. Ratings were considerably higher for stressors related to examination, grades, course requirements, long day's schedule, lack of time for relaxation, and insecurity concerning future. Stress related to examination and grades are a universal phenomenon and may have been present since the inception of examinations system. Brown and Van Gelder<sup>[27]</sup> of University Chicago in a series of publications in 1938 reported of the physiological changes and emotional reactions experienced by students before examinations. Students surveyed in our study are no exception to this stressor. However, the process of examination can be made less stressful by employing alternate methods to conventional examination procedures. One such alternative to written examination scan be online examinations, which is, in fact, being increasingly utilized by dental schools through learning management systems such as Blackboard<sup>®</sup> and Moodle<sup>®</sup>. The semester system followed in our school can be a burden on complete course requirements. Steps are being taken to shift from semester system to annual system to ease out the schedule for course requirements.

Moreover, students reported stress due to insecurity concerning their professional future as well. There can be multiple factors responsible for this kind of stress, but in our opinion, increasing competition in Saudi Arabia for joining higher studies may be the foremost one. Stressors that have less influence on one individual can be more stressful for another and vary corresponding to geographic locations. European students reported more concern regarding their professional future,<sup>[28]</sup> while as examinations and their related stressors were more stress provoking for Japanese students.<sup>[29]</sup> Men from the upper class reported insecurity about professional failure,<sup>[28]</sup> also significant stress has been reported due to fear of not being able to endure long hours of clinical chores and due to the challenges of professional life.<sup>[30]</sup> In the present study too, the students perceived long day's work without enough time for relaxation as a source of stress. The school schedules a break of 1 h at noon; nevertheless, short breaks can be included between clinical and laboratory sessions for students to relax and recuperate.

**Table 4: Mean (±SD) DES Scores of respondents according to gender**

Respondents	Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
All respondents		3.78±0.87	3.76±1.0	2.89±1.15	4.14±1.00	4.07±1.03	3.75±1.24	3.84±1.12	3.53±1.19	3.71±1.14	3.72±1.25
Male respondents		3.82±0.83	3.75±0.99	2.90±1.07	4.02±1.05	4.19±0.88	3.87±1.23	3.82±1.12	3.40±1.18	3.73±1.09	3.50±1.29
Female respondents		3.74±0.92	3.77±1.04	2.89±1.23	4.25±0.95	3.95±1.16	3.63±1.26	3.86±1.14	3.65±1.20	3.70±1.21	3.95±1.19
	Questions	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
All respondents		3.42±1.21	2.23±1.47	3.9±1.25	3.82±1.23	4.12±1.09	2.93±1.70	2.07±1.49	2.63±1.60	2.89±1.63	2.18±1.61
Male respondents		3.59±1.21	2.14±1.43	3.90±1.26	3.52±1.32	4.15±1.10	3.25±1.64	2.02±1.43	2.91±1.60	2.81±1.55	2.06±1.50
Female respondents		3.24±1.20	2.32±1.52	3.91±1.26	4.12±1.07	4.09±1.09	2.61±1.72	2.11±1.57	2.35±1.56	2.97±1.72	2.29±1.73
	Questions	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	-
All respondents		3.35±1.38	3.28±1.34	4.17±1.11	3.19±1.52	3.36±1.40	3.58±1.51	3.16±1.33	3.34±1.46	3.86±1.54	-
Male respondents		3.05±1.41	3.23±1.37	4.09±1.16	3.11±1.47	3.30±1.28	3.54±1.41	3.10±1.19	3.38±1.42	3.90±1.43	-
Female respondents		3.65±1.30	3.33±1.31	4.25±1.07	3.28±1.58	3.41±1.52	3.63±1.62	3.23±1.47	3.29±1.50	3.82±1.65	-

DES: Dental environment stress, SD: Standard deviation

**Table 5: Mann–Whitney U Test**

Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Mann–Whitney U	11012.5	11077.5	11058.5	9868.5	10327.5	10045	11054	9906.5	11280.5	9048.5
Significant (two-tailed)	0.656	0.731	0.715	0.038	0.16	0.077	0.708	0.053	0.951	0.002
	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Mann–Whitney U	9435	10659	11291	8382	10877	9044.5	11165	9120	10799.5	10746
Significant (two-tailed)	0.01	0.344	0.962	0	0.521	0.002	0.811	.002	0.474	0.383
	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	-
Mann–Whitney U	8622.5	10871.5	10396.5	10488	10397	10382.5	10336.5	10989.5	11018.5	-
Significant (two-tailed)	0	0.539	0.176	0.255	0.206	0.192	0.179	0.648	0.656	-

**Table 6: Kruskal–Wallis Test**

Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Chi-square	26.942	13.769	11.697	16.681	54.785	7.303	27.178	2.374	11.953	17.432
Df	5	5	5	5	5	5	5	5	5	5
Asymp. significant	0	0.017	0.039	0.005	0	0.199	0	0.795	0.035	0.004
	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Chi-square	44.026	7.361	28.885	13.606	27.141	8.714	6.898	13.636	7.943	6.552
Df	5	5	5	5	5	5	5	5	5	5
Asymp. significant	0	0.195	0	0.018	0	0.121	0.228	0.018	0.159	0.256
	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	-
Chi-square	5.192	28.876	6.846	75.53	39.751	50.092	30.044	31.374	38.689	-
Df	5	5	5	5	5	5	5	5	5	-
Asymp. significant	0.393	0	0.232	0	0	0	0	0	0	-

It was interesting to note that the level of perceived stress was similar between male and female students. This finding was in contrast to those found in previous studies<sup>[31-33]</sup> wherein female medical/dental students reported higher stress levels. Saxena *et al.*<sup>[34]</sup> reported that female medical students were able to cope with stress better than males, citing good social

support as a reason there for. The number of universities offering dental programs to female students has drastically increased over the years in Kingdom of Saudi Arabia and also the society is opening up, perhaps neutralizing stress on female students. Similar to Al-Saleh *et al.* studied<sup>[31]</sup> the 2<sup>nd</sup> year students showed less perceived stress compared to



**Table 7: Mean DES scores according to the level of academic year**

Academic year	Questions	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
2 <sup>nd</sup>	Mean±SD	3.18±1.02	3.39±1.20	2.57±1.07	3.98±1.02	3.43±1.09	3.55±1.30	3.36±1.14	3.55±1.30	3.36±1.14	3.25±1.46
3 <sup>rd</sup>	Mean±SD	3.72±0.85	3.75±1.01	2.80±1.08	4.27±0.89	3.84±1.02	4.01±1.26	3.91±1.20	3.57±1.27	3.68±1.19	3.72±1.30
4 <sup>th</sup>	Mean±SD	3.91±0.76	3.67±1.06	3.02±1.29	4.19±0.97	3.93±1.00	3.75±1.20	3.60±1.03	3.54±1.20	3.63±1.25	3.89±1.06
5 <sup>th</sup>	Mean±SD	4.09±0.70	4.11±0.83	3.34±1.26	4.60±0.69	4.51±0.98	3.80±1.13	4.40±0.88	3.63±1.06	4.11±0.99	4.29±0.89
6 <sup>th</sup>	Mean±SD	4.02±0.73	4.06±0.76	2.98±1.02	3.88±1.02	4.60±0.61	3.67±1.15	4.15±0.95	3.58±1.09	4.00±0.95	3.92±1.11
Interns	Mean±SD	3.82±0.90	3.68±0.99	2.76±1.15	3.87±1.30	4.42±0.98	3.47±1.41	3.71±1.21	3.24±1.22	3.58±1.15	3.26±1.35
Academic year	Questions	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
2 <sup>nd</sup>	Mean±SD	2.68±1.07	1.73±1.19	3.02±1.59	3.36±1.40	3.64±1.14	2.32±1.65	1.86±1.29	2.32±1.64	2.73±1.58	2.14±1.62
3 <sup>rd</sup>	Mean±SD	3.18±1.23	2.15±1.44	4.04±1.28	3.62±1.34	3.89±1.23	2.81±1.66	1.86±1.33	2.30±1.56	2.89±1.59	1.97±1.58
4 <sup>th</sup>	Mean±SD	3.60±1.25	2.42±1.64	4.30±1.02	4.12±1.04	4.47±0.87	3.14±1.68	2.07±1.55	2.63±1.57	2.65±1.58	2.11±1.62
5 <sup>th</sup>	Mean±SD	3.77±1.03	2.51±1.72	4.23±0.97	4.09±1.09	4.34±0.94	3.17±1.74	2.60±1.85	3.09±1.63	3.57±1.85	2.71±1.84
6 <sup>th</sup>	Mean±SD	4.19±0.84	2.40±1.35	4.02±1.02	4.10±1.04	4.50±0.74	3.13±1.72	2.35±1.59	3.15±1.54	2.67±1.59	2.44±1.69
Interns	Mean±SD	3.18±1.23	2.21±1.45	3.61±1.13	3.68±1.25	3.92±1.22	3.08±1.78	1.87±1.40	2.61±1.60	3.11±1.64	1.92±1.30
Academic year	Questions	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	-
2 <sup>nd</sup>	Mean±SD	3.27±1.45	2.34±1.14	4.02±1.19	2.00±1.57	2.32±1.65	2.41±1.76	2.41±1.59	2.48±1.76	2.66±1.89	-
3 <sup>rd</sup>	Mean±SD	3.46±1.43	3.28±1.34	4.16±1.06	2.47±1.40	3.01±1.48	3.04±1.64	2.82±1.45	2.91±1.51	3.39±1.75	-
4 <sup>th</sup>	Mean±SD	3.37±1.38	3.51±1.34	4.04±1.21	3.44±1.32	3.67±1.27	3.88±1.25	3.58±1.18	3.54±1.32	4.16±1.19	-
5 <sup>th</sup>	Mean±SD	3.63±1.26	3.60±1.12	4.57±0.74	4.11±1.11	4.06±1.11	3.97±1.25	3.86±1.12	4.06±1.11	4.57±1.01	-
6 <sup>th</sup>	Mean±SD	3.35±1.25	3.67±1.24	4.35±0.96	4.04±1.07	3.94±0.91	4.48±0.74	3.27±0.98	3.73±0.92	4.52±0.82	-
Interns	Mean±SD	2.92±1.48	3.24±1.42	3.95±1.39	3.79±1.23	3.45±0.95	4.13±0.96	3.34±0.97	3.74±1.37	4.29±1.06	-

DES: Dental environment stress, SD: Standard deviation

students studying in higher academic years. Students in early years of training are still soaking up the nitty-gritty of the program. As they advance to higher academic levels, their competition increases and so does stress levels.

Tertiary studies are always considered as very stressful for students. DES is no exception to this. The magnitude and sources of DES are dynamic that change over time. It has direct influence on the academic performance, general health, and professional success of a student.<sup>[35]</sup> Therefore, it is indispensable for dental schools to ease out stress causing factors and ensure an environment that promotes the well-being of students.

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