

Cross-Sectional Study

The Psychological Burden of Dental Education: Analyzing Stress and Burnout Factors

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ABSTRACT

This study aimed to investigate the relationship between academic burnout in dental students and stress in the dentistry environment, considering issues arising from job stress and burnout. Analytical-cross-sectional in nature, the present study used available sampling approaches. Data from dental students were gathered for this study using the dental environment stress (DES) and Burnout clinical subtype questionnaire (BCSQ-12-SS). Kruskal-Wallis, Mann-Whitney U, linear regression tests, and Spearman's correlation coefficient were used to analyze the data using SPSS23 software. The participants in this study had an average age of 24.25. According to reports, the average academic burnout score was 2.61 out of a possible 5. The overload dimension had the greatest impact on burnout. It was found that the clinical education feature of DES was the most influential with a mean score of 2.80 out of a possible 4. Academic burnout and dental environment stress were found to be directly correlated ($P < 0.001$). The study's findings suggest that stress levels in the dental field are high and academic burnout among dental students is average. Given the clear link between stress and burnout, more work needs to be done to reduce stress in the dental setting, particularly in the area of clinical education.

Keywords: Stress, Dental, Environment, Burnout, Students

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Introduction

Every human being goes through training and education at some point in their lives since learning and education are vital aspects of existence. Accuracy in the design of the environment should be taken into consideration because it has a significant impact on learning [1, 2]. Students may become dissatisfied and eventually exhausted if their classrooms are not challenging and offer an appropriate learning opportunity, pay attention to their opinions, help them build positive relationships with one another, and address their issues while they are studying [3, 4]. The psychological phenomenon known as job burnout, which has three dimensions—overload, lack of progress, and neglect—occurs when there is extreme

job stress. Burnout, which is defined as the sense of inadequacy and mental exhaustion brought on by the incapacity to complete all prescribed duties, is referred to as academic burnout in student research [5].

Academic burnout has decreased learning and teaching effectiveness, which can impede universities' efforts to meet their educational objectives [6, 7]. A student's cognitive commitment, interest in the course material, and engagement in class activities are all negatively impacted by academic burnout, which also impairs learning [8].

Being exposed to stressful elements in the academic setting leads to academic burnout. Burnout is a long-term phenomenon that will remain stable and permanent if pupils continue to study in the same

environment [9]. In the past few years, there has been a surge in research on dentistry student burnout, with a greater emphasis on the clinical phase [10].

Long-term exposure to these stressful factors and the accumulation of negative effects caused by stress can lead to burnout [11]. In recent years, healthcare researchers have focused on the development and improvement of the higher education system, with dental training among other high-risk groups being particularly important due to the long and hard training period [12]. Dental students have been found to have moderate to high levels of burnout [5, 11, 13].

Job burnout may result from a persistent misalignment between situational demands and personal stress-reduction capabilities [14]. Thus, perceived stress is one of the factors that influences academic burnout [15]. Stress is a normal psychological reaction to frightening or anxious situations. According to medical definitions, stress is an emotional characteristic that can lead to a variety of psychosomatic diseases [16]. Numerous studies have revealed that dentistry students consider stress to be relatively high. According to research, dental students in Saudi Arabia report 54.7% stress [17], 43% in India [18], 99.4% in France [19], and 83% in Canada [20]. Additionally, fewer studies examine academic burnout and stress simultaneously in dental students; in the Jiménez-Ortiz *et al.* study [21], all students who experienced stress also experienced burnout; Shetty *et al.* [13] also reported moderate to high levels of stress and burnout in specialized dental students; furthermore, the majority of studies found that the biggest sources of stress in the dental environment were exams and the fear of failing the course or not receiving a passing grade in the exam [14, 22].

The goal of this study is to ascertain the degree of academic burnout between dental students and its correlation with the stress of the dental environment, taking into account the issues brought on by occupational stress and the burnout that results from it [15, 23] as well as the comparatively high prevalence of stress among dental students.

Materials and Methods

To carry out the present analytical-cross-sectional study, students were invited to enter the study using the available sampling method. The sample size required to determine the simple correlation coefficient between academic burnout and stress at the error level of $\alpha = 0.05$, the power of the test is 80% ($\beta = 0.2$) and the minimum value of the correlation coefficient for the significance of the relationship is 20%. Additional sample due to the possible confusion of the

questionnaires, at least 230 people were determined to be in the sample.

Data collection was done using a questionnaire. Questionnaires were completed online by students through social networks. To increase trust and attract participation in the text of the sent invitation, the students were informed about the identity of the researcher as well as the goals and necessity of the research. All students eligible to enter the study had access to the questionnaire through virtual networks and the possibility to enter the study, and the volunteers answered the questionnaires until the desired sample size was reached. The questionnaires were completed over three months.

A burnout clinical subtype questionnaire (BCSQ-12-55) was used to investigate academic burnout. The said questionnaire is designed for dental students [24]. This questionnaire includes three areas: 1- overload (4 questions), 2- lack of development (4 questions), and 3- neglect (4 questions). Using a five-point Likert scale, students express their agreement with each statement from “strongly disagree” (score 1) to “strongly agree” (score 5). Therefore, the academic burnout score for each individual is between 12 and 60. In addition, the scaled average score of academic burnout was calculated by dividing the total scores of each dimension by the number of questions, which is a number between 1 and 5. According to the maximum possible score of 5, up to a score of 2.4, the burnout level is low, between 2.4 and 3.8 is medium, and above 3.8 is high.

The dental environment stress questionnaire, which is a standard tool to determine the sources of stress and the stress level of students in the dental school, was used to investigate the stress of the dental environment [14]. This questionnaire includes 32 questions in 6 areas: academic performance (7 questions), treatment of patients (4 questions), internal beliefs (4 questions), academic factors (2 questions), clinical education (11 questions), and other matters (4 questions). This questionnaire is used to identify and classify student stressors in the dental school environment. Students' stress levels are evaluated using a four-point Likert scale from no stress (score 1) to extreme stress (score 4). Therefore, the dental environment stress score for each individual is between 32 and 128.

Due to the difference in the number of questions of different dimensions in the dental environment stress questionnaire, to enable the comparison between dimensions, a scaled average was used, which means that the sum of the scores of each dimension was divided by the number of questions. The scaled average of dental environment stress scores is between 1 and 4.

According to the maximum possible score of 4, the stress level up to 2 is low, between 2 and 3 is medium, and above 3 is high. In addition, questions were asked about the demographic characteristics of the participants, including gender, age, marital status, residential status, and economic status, and also questions about their educational characteristics, including the type of university, place of study, academic year, and last year's GPA. After collecting the data, the data was entered into SPSS software version 23.

According to the result of the Kolmogorov Smirnov test, due to the non-normality of the distribution of the variables of academic burnout and stress in the dental environment, from the Mann-Whitney U test to examine the status of the variables of academic burnout and stress in the dental environment among the two-mode variable classes of gender, marital status and type of university, the test Kruskal–Wallis to investigate the status of the variables of academic burnout and stress in the dental environment among the classes of multi-mode variables of residence status and economic status, Spearman's correlation coefficient to investigate the relationship between the variables of academic burnout and stress in the dental environment with the variables of age, academic year and last year's GPA and

also Linear regression (Enter method) was used to examine the factors affecting each of the variables of academic burnout and stress in the dental environment at the error level of 0.05.

Results and Discussion

The current study comprised 300 dental students in total (response rate: 64%). According to the participants' demographic and academic data, the students' ages ranged from 20 to 38 years old, with an average age of 24.25 ± 2.72 years. Women made up more than half of the participants (54.7%). The majority of the sample lived with their families (70.6%) and were unmarried (88.9%). Additionally, 67% of the population had an average economic position.

The findings showed that, on a scale of 12 to 60, the average score of dentistry students was 31.24 ± 7.91 . The overflow had the highest average (13.35 ± 3.51). At the average level, the maximum possible score for academic burnout was 5, while the scaled average score was 2.61 ± 0.66 . The median and interquartile range are also shown in **Table 1** based on the educational burnout variable's non-normal distribution.

Table 1. The characteristics of academic burnout as perceived by 300 dental students

| Variable | Dimensions | Mean \pm SD | Min. | Max. | Range | Interquartile range |
|------------------|---------------------|------------------|------|------|-------|---------------------|
| Academic burnout | Overload | 13.35 ± 3.51 | 4 | 20 | 14 | 6 |
| | Lack of development | 8.96 ± 4.30 | 3 | 20 | 8 | 6 |
| | Neglect | 8.96 ± 3.65 | 4 | 20 | 8 | 3 |
| | Total | 31.24 ± 7.91 | 12 | 60 | 31 | 10 |

Students' marital status and gender variable groups did not significantly differ in their levels of academic burnout, as indicated by the non-parametric Mann-Whitney U test ($P > 0.05$). Additionally, the non-parametric Kruskal-Wallis test revealed no statistically significant difference in academic burnout between the resident status and economic status groups of students ($P > 0.05$). The Spearman correlation test revealed a direct and significant relationship between the

academic burnout variable and the students' age ($P = 0.30$, $r = 0.06$) and their GPA from the previous year ($P = 0.42$, $r = -0.05$). There was a weak connection ($P = 0.01$, $r = 0.14$) between academic year and academic burnout. The academic burnout variable was not significantly impacted by any of the independent variables, according to the multivariate linear regression model ($P > 0.05$).

Table 2. Dental environment stress and its dimensions from the point of view of dental students ($n = 300$)

| Variable | Dimensions | Mean \pm SD | Min. | Max. | Range | Interquartile range |
|---------------------------|-------------------------------------|------------------|------|------|-------|---------------------|
| Dental environment stress | Academic performance (7 questions) | 19.97 ± 4.05 | 7 | 28 | 21 | 5 |
| | Treatment of patients (4 questions) | 11.05 ± 2.56 | 1 | 16 | 11 | 4 |
| | Inner beliefs (4 questions) | 11.36 ± 3.26 | 4 | 16 | 12 | 5 |
| | Academic factors (2 questions) | 5.14 ± 1.59 | 2 | 8 | 5 | 2 |

| | | | | | |
|----------------------------------|---------------|----|-----|----|----|
| Clinical training (11 questions) | 31.56 ± 7.06 | 8 | 44 | 33 | 8 |
| Other cases (4 questions) | 10.39 ± 2.62 | 4 | 16 | 11 | 4 |
| Total | 89.43 ± 16.29 | 32 | 126 | 93 | 20 |

Table 2 shows that the average stress score of the dental environment from the perspective of the student was 89.43 ± 16.29 with a range of 32 to 126. Because each dimension had a different number of questions, the scaled average was used to compare the scores of the various dimensions; the highest average was associated with clinical education (2.88 ± 0.63), academic efficiency (2.86 ± 0.57), internal beliefs (2.84 ± 0.81), and treatment of patients (2.77 ± 0.62), other cases (2.60 ± 0.65), and academic factors (2.57 ± 0.79). The scaled mean was used to determine the total stress score of the dental environment, which was 2.80 ± 0.51 .

The stress of the dental environment did not significantly differ between the variables of the type of university where the students studied and their marital status ($P > 0.05$), but there was a significant difference between the two sexes ($P = 0.003$), according to the non-parametric Mann-Whitney U test.

Additionally, the Kruskal-Wallis non-parametric test revealed no significant difference in the dental environment stress between the variables of the student's economic status and residence status ($P > 0.05$), and Spearman's correlation test revealed no significant relationship between the dental environment stress variable and the students' age ($P = 0.80$, $r = -0.02$), their GPA from the previous year ($P = 0.388$, $r = 0.05$), or academic year ($P = 0.69$, $r = -0.02$). A multivariable linear regression model was employed to examine the concurrent impact of students' academic and demographic characteristics on their perceptions of the dental environment stress.

According to this model, the stress variable of the dental environment was significantly impacted by the variables of gender and economic position. Female students reported higher levels of stress in the dental setting than boys, and students with lower socioeconomic positions reported higher levels of stress than those with higher socioeconomic status ($P < 0.001$). Academic burnout and dental environment stress are directly and significantly correlated ($P < 0.001$, $r = 0.33$).

Long-term exposure to physical and emotional pressures makes the dentistry profession difficult, and the cumulative negative consequences of this stress can result in burnout [11]. Thus, the goal of the current study was to look into academic burnout and how it relates to dental students' stress levels in the dentistry environment.

According to the report of Shetty *et al.* [13], among the reasons given for the occurrence of moderate to high academic burnout in specialized dental students are exams and evaluations, lack of time for leisure activities, and insecurity about the future. Kwak *et al.* [11] reported high academic burnout among final-year dental students at Seoul National University in Korea. Given that dentists have more time to deal with stressful factors and accumulate more negative effects from stress than dental students [11], it is reasonable to assume that dentists have a higher level of academic burnout than students.

Multivariate analysis revealed no relationship between any of the demographic characteristics under investigation and the degree of academic burnout experienced by dentistry students. In a study of academic burnout among fourth and fifth-year students at 10 Sudanese institutions, Ghali and Awooda [25] found that burnout components had a similar impact on male and female students in these years. Students experienced a moderate amount of stress in the dentistry setting. Similarly, mild dental environment stress was documented by Gambetta-Tessini *et al.* [22] in dental students from Australia, New Zealand, and Chile. However, according to Al-Sowygh's study, Saudi Arabian dental students were under a lot of stress [26]. Because of the nature of the dentistry profession and the need to provide clinical care and treatment, dental students naturally experience significant levels of stress. The environment of dentistry and learning in this subject leads to stress, which is one of the prevalent issues among dentists and students in this field [27].

According to the current study, female students were more stressed than their male counterparts. In their study on Indian dentistry students, only Kumar *et al.* [28] found that guys felt more stress. Girls' increased stress levels may be linked to their sense of pressure and more concern for success [29]. Furthermore, students with low economic status reported more dental environment stress in the current study than students with high economic status; in contrast, Shahravan *et al.* study found no relationship between economic status and dental environment stress [30]. Haushofer and Fehr [31], who reviewed the scientific literature on the psychological effects of poverty, also identified poverty as a contributing factor to stress.

The area of clinical education was where the students in this study experienced the most stress. Nevertheless, academic efficiency was the most common cause of

stress among the elements that generate stress in the majority of the current studies, such as the study conducted by Kumar *et al.* [28] and Polychronopoulou and Divaris [14] on Greek dentistry students. The primary stressors were identified as passing tests and receiving a passing grade.

Academic burnout and stress in the dentistry setting were found to be positively and significantly correlated in the current study. Few studies have looked at these two factors in dentistry students at the same time. Jiménez-Ortiz *et al.* [21] found that all students who experienced stress also experienced burnout, even though they did not identify a significant association between the two among Mexican dentistry students. Shetty *et al.* [13] noted a moderate to high degree of stress and burnout among Indian dentistry students, although not look at the relationship between the two factors simultaneously.

Conclusion

The goal of this study was to ascertain the association between academic burnout in dental students and stress in the dentistry environment, taking into account the issues brought on by occupational stress and the burnout that results from it. The study's findings suggest that stress levels in the dental field are high and academic burnout among dental students is average. More should be done to lessen stress in the dental setting, particularly in the area of clinical education, given the clear link between stress and burnout.

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References

1. Jahangiri L, Mucciolo TW. Characteristics of effective classroom teachers as identified by students and professionals: a qualitative study. *J Dent Educ.* 2008;72(4):484-93.
2. Bin Rubaia'an MA. Dental education: a guide for novice tutors. *Cureus.* 2023;15(8):e43227. doi:10.7759/cureus.43227
3. Estrada-Araoz EG, Paredes-Valverde Y, Quispe-Herrera R, Larico-Uchamaco GR, Paricahua-Peralta JN. Examining the relationship between academic burnout and the university student's engagement: a cross-sectional study on the return to face-to-face classes. *J Law Sustain Dev.* 2023;11(2):e424. doi:10.55908/sdgs.v11i2.424
4. Wang J, Bu L, Li Y, Song J, Li N. The mediating effect of academic engagement between psychological capital and academic burnout among nursing students during the COVID-19 pandemic: a cross-sectional study. *Nurse Educ Today.* 2021;102:104938. doi:10.1016/j.nedt.2021.104938
5. Mohebbi SZ, Yazdani R, Talebi M, Pakdaman A, Heft MW, Bahramian H. Burn out among Iranian dental students: psychometric properties of burnout clinical subtype questionnaire (BCSQ-12-SS) and its correlates. *BMC Med Educ.* 2019;19(1):388.
6. Qu R, Ding N, Li H, Song X, Cong Z, Cai R, et al. The mediating role of general academic emotions in burnout and procrastination among Chinese medical undergraduates during the COVID-19 pandemic: a cross-sectional study. *Front Public Health.* 2022;10:1011801. doi:10.3389/fpubh.2022.1011801
7. Liu Z, Xie Y, Sun Z, Liu D, Yin H, Shi L. Factors associated with academic burnout and its prevalence among university students: a cross-sectional study. *BMC Med Educ.* 2023;23(1):317. doi:10.1186/s12909-023-04316-y
8. Li R, Che Hassan N, Saharuddin N. Psychological capital related to academic outcomes among university students: a systematic literature review. *Psychol Res Behav Manag.* 2023;16:3739-63. doi:10.2147/PRBM.S421549
9. Cheng X, Lin H. Mechanisms from academic stress to subjective well-being of Chinese adolescents: the roles of academic burnout and internet addiction. *Psychol Res Behav Manag.* 2023;16:4183-96. doi:10.2147/PRBM.S423336
10. Galán F, Ríos-Santos JV, Polo J, Ríos-Carrasco B, Bullón P. Burnout, depression and suicidal ideation in dental students. *Med Oral Patol Oral Cir Bucal.* 2014;19(3):e206-11. doi:10.4317/medoral.19281
11. Kwak EJ, Ji YA, Baek SH, Baek YS. High levels of burnout and depression in a population of senior dental students in a school of dentistry in Korea. *J Dent Sci.* 2021;16(1):65-70.
12. Hakanen JJ, Bakker AB. Born and bred to burn out: a life-course view and reflections on job burnout. *J Occup Health Psychol.* 2017;22(3):354-64.
13. Shetty A, Shetty A, Hegde MN, Narasimhan D, Shetty S. Stress and burnout assessment among

- postgraduate dental students. *Nitte Univ J Health Sci.* 2015;5(1):31-6.
14. Polychronopoulou A, Divaris K. A longitudinal study of Greek dental students' perceived sources of stress. *J Dent Educ.* 2010;74(5):524-30.
15. Watson R, Deary I, Thompson D, Li G. A study of stress and burnout in nursing students in Hong Kong: a questionnaire survey. *Int J Nurs Stud.* 2008;45(10):1534-42.
16. Divaris K, Polychronopoulou A, Taoufik K, Katsaros C, Eliades T. Stress and burnout in postgraduate dental education. *Eur J Dent Educ.* 2012;16(1):35-42.
17. Basudan S, Binanzan N, Alhassan A. Depression, anxiety and stress in dental students. *Int J Med Educ.* 2017;8:179-86.
18. Aishwarya AS, Gurunathan D. Stress level in dental students performing pedodontic procedure. *J Adv Pharm Educ Res.* 2017;7(1):34-8.
19. Inquimbert C, Tramini P, Alsina I, Valcarcel J, Giraudeau N. Perceived stress among French dental students and their opinion about education curriculum and pedagogy. *J Int Soc Prev Community Dent.* 2017;7(Suppl 2):S92-8.
20. Hayes A, Hoover JN, Karunanayake CP, Uswak GS. Perceived causes of stress among a group of Western Canadian dental students. *BMC Res Notes.* 2017;10(1):714.
21. Jiménez-Ortiz JL, Islas-Valle RM, Jiménez-Ortiz JD, Pérez-Lizárraga E, Hernández-García ME, González-Salazar F. Emotional exhaustion, burnout, and perceived stress in dental students. *J Int Med Res.* 2019;47(9):4251-9.
22. Gambetta-Tessini K, Mariño R, Morgan M, Evans W, Anderson V. Stress and health-promoting attributes in Australian, New Zealand, and Chilean dental students. *J Dent Educ.* 2013;77(6):801-9.
23. Cheng WLS, Chow PPK, Wong FMF, Ho MM. Associations among stressors, perceived stress, and psychological distress in nursing students: a mixed methods longitudinal study of a Hong Kong sample. *Front Psychol.* 2023;14:1234354. doi:10.3389/fpsyg.2023.1234354
24. Montero-Marin J, Monticelli F, Casas M, Roman A, Tomas I, Gili M, et al. Burnout syndrome among dental students: a short version of the "burnout clinical subtype questionnaire" adapted for students (BCSQ-12-SS). *BMC Med Educ.* 2011;11(1):103. doi:10.1186/1472-6920-11-103
25. Ghali SM, Awooda AM. Burnout syndrome among undergraduate clinical dental students in Sudan. *J Educ Ethics Dent.* 2013;3(2):71-5.
26. Al-Sowaygh ZH. Academic distress, perceived stress and coping strategies among dental students in Saudi Arabia. *Saudi Dent J.* 2013;25(3):97-105.
27. Yap AU, Bhole S, Teo CS. A cross-cultural comparison of perceived sources of stress in the dental school environment. *J Dent Educ.* 1996;60(5):459-64.
28. Kumar S, Dagli RJ, Mathur A, Jain M, Prabu D, Kulkarni S. Perceived sources of stress amongst Indian dental students. *Eur J Dent Educ.* 2009;13(1):39-45.
29. Polychronopoulou A, Divaris K. Perceived sources of stress among Greek dental students. *J Dent Educ.* 2005;69(6):687-92.
30. Shahravan A, Karimi Afshar M, Torabi M, Safari S. Assessment of dental environment stress among clinical dentistry students in Kerman dental school, Iran, in 2014. *Strides Dev Med Educ.* 2016;12(4):486-95.
31. Haushofer J, Fehr E. On the psychology of poverty. *Science.* 2014;344(6186):862-7.