

# Impact of Resilience and Environmental Stress on Burnout of Students in Public and Private Dental Schools in Western Saudi Arabia

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**Received:** 16-Jan-2022;  
**Revision:** 30-Oct-2022;  
**Accepted:** 14-Dec-2022;  
**Published:** 27-Feb-2023

## INTRODUCTION

Undergraduate dental education involves a unique pedagogical process; it requires students to develop clinical and interpersonal skills and competencies, such as personal responsibility for patient health, which can subject students to stress. The links between the demanding nature of contemporary dental curricula and manifestations of psychological stress are well established in the literature.<sup>[1,2]</sup> Lovallo<sup>[2]</sup> defined ‘occupational stress’ as a state of physical and mental tension resulting from diverse and excessive burdens or a shortage of resources that surpasses an individual’s coping capacity. Perceived periods of

### ABSTRACT

**Background:** Dental students’ burnout has been repeatedly reported in the literature; however, there is little information about the contributing factors in different contexts and settings. **Aims:** This study aimed to investigate the correlation between burnout among undergraduate dental students and sociodemographic (specifically gender), psychological (resilience), and structural factors (dental environment stress). **Subjects and Methods:** An online cross-sectional survey questionnaire was distributed among a convenience sample of 500 undergraduate Saudi dental students. The survey included questions about sociodemographic factors (gender, level of education, academic achievement, type of school [public or private], and living arrangements). The study also included items that allowed assessment of students’ burnout using the Maslach Burnout Inventory (MBI) and assessment of student environmental stress and resilience using the Dental Environment Stress Scale (DESS) and the Brief Resilience Scale (BRS). Descriptive statistics, univariate, and linear regression analyses were performed. **Results:** The response rate was 67% (male = 119, female = 216). Univariable analysis showed that gender, level of education, and DESS and BRS scores correlated significantly ( $P < .05$ ) with MBI scores. Adjusted multiple linear regression lends further support to that the MBI scores negatively correlated with the BRS score but positively correlated with the DESS score ( $\beta = -0.29, P < .001$ ;  $\beta = 0.44, P < .001$ , respectively). **Conclusions:** Within the limitations of this study, the findings demonstrated that increases in resilience correlated significantly with decreases in burnout and increases in environmental stress correlated significantly with increases in burnout among dental students. However, gender had no influence on burnout.

**KEYWORDS:** Burnout, dental students, gender, resilience, stress

prolonged psychological and physical work-related stress can intensify a wide range of negative outcomes, such as burnout, mental disability, reduced academic performance, and unprofessional conduct.<sup>[3,4]</sup>

Burnout, a term first coined by Maslach *et al.*<sup>[5]</sup> in the 1970s, is a syndrome resulting from the unsuccessful management of chronic workplace stress.

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**How to cite this article:** Alsharif M, Almadani N, Mahmoud RY, Alsharif A, Al-Maweri SA, Kassim S. Impact of resilience and environmental stress on burnout of students in public and private dental schools in Western Saudi Arabia. *Niger J Clin Pract* 2023;26:162-8.

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> www.njcponline.com
	<b>DOI:</b> 10.4103/njcp.njcp_35_22

Depersonalisation, emotional exhaustion, and a diminished sense of accomplishment are common manifestations of burnout. Burnout is also significantly associated with poor performance.<sup>[6]</sup> Several reports in the literature cited a range of factors that contribute to burnout among dental students, including sociodemographic factors, the student's psychology, and structural factors (e.g., dental environment stress; DES). Regarding sociodemographic factors, the role of gender in burnout is still inconclusive. A systematic review<sup>[7]</sup> in 2012 reported that women were more emotionally exhausted than men, while men were more depersonalised than women. However, a recent systematic review reported that men were more likely to show burnout than women.<sup>[8]</sup> In Saudi Arabia, female students were significantly more likely to perceive stress than males.<sup>[9-11]</sup> In addition, a number of studies have reported that students at the academic clinic level in different settings (public or private schools) were more likely to demonstrate burnout compared to counterparts at preclinical levels.<sup>[8,12-14]</sup> Notably, students at public schools demonstrated more burnout than their counterparts at private schools.<sup>[13]</sup> It has also been reported that married dental students were more likely than single students to report burnout<sup>[15,16]</sup> and this has been attributed to the responsibilities they have (e.g., children and financial responsibilities).<sup>[17]</sup> Living conditions (i.e., living with family vs. living elsewhere) and not working to earn a living tend to reduce burnout among dental and medical students.<sup>[12,18]</sup>

Notably, within a student's psychology, resilience (as an intrinsic factor) is an influential personal resource for coping with stressful experiences and this is a long-established concept.<sup>[19]</sup> The definitions of resilience vary substantially across studies; for example, one study defines resilience as 'the capacity to bounce back from stress'.<sup>[20]</sup> There is a paucity of research exploring the correlation between burnout and resilience among dental students. However, it was found that resilience offered protection from burnout among medical students and promoted psycho-behavioural health in college students facing coronavirus disease (COVID-19) stressors.<sup>[21,22]</sup> As for structural factors, namely, the dental environment, the academic environment is challenging for dental students and contains multiple sources of stress (e.g., competition for grades, a high workload, the demanding nature of the training, intensive curriculum).<sup>[23,24]</sup> Dental environmental stress (DES) has been reported in different countries including Saudi Arabia<sup>[17]</sup> and has been suggested to be a more prominent cause of stress for dental students than demographic factors.<sup>[25,26]</sup>

In Saudi Arabia, there are reports that an alarmingly high proportion of dental students may be in the

clinical range of psychological disturbance. Notably, 40.9%–72.7% of dental students have been found to experience burnout and a study conducted in a public dental school determined that the contributing factors are sociodemographic, psychological, and stress factors collectively among preclinical and clinical students.<sup>[3,9,10,27,28]</sup> The current period of reform of Saudi dental education prioritises the improvement of the learning environment and the learner's overall learning experience.<sup>[29]</sup> In addition, over the past 10 years, Saudi Arabia has undertaken many social reforms that are empowering women in different sectors, including education.<sup>[30]</sup>

Therefore, further assessment of dental students' burnout at different academic levels in diverse dental schools (public and private) in Saudi Arabia is warranted. It is also worthwhile examining the role of gender in burnout in the context of the recent reforms. The aim of this study was to investigate the correlation between burnout and sociodemographic (specifically gender), psychological (resilience), and structural factors (DES).

## MATERIALS AND METHODS

### Study design and setting

This cross-sectional study was conducted during the 2017–2018 academic year at five conveniently selected dental schools located in western Saudi Arabia. The selected schools belonged to both the public and private sectors. Generally, the dental curriculum in Saudi Arabia spans over five years, of which the first three years are preclinical and the remaining are clinical years. In addition, there is a preparatory year and an internship training year at the end, adding up to a total of seven years.

The Saudi undergraduate dental program's curriculum is very similar across schools in terms of objectives, methods of teaching, academic assessment, clinical competencies, and years of study.<sup>[29]</sup> Accreditation requirements by the Commission on Dental Accreditation and National Commission for Academic Accreditation and Assessment focus primarily on improving the quality of the program's activities, which will then improve the students' experiences. Both agencies' requirements are similar and neither applies any criteria regarding the number of clinical requirements. Therefore, being accredited with either agency will not impact students' stress or burnout.<sup>[31,32]</sup>

The ethics committee of Taibah University Dental College and Hospital, Al-Madinah, Saudi Arabia approved the study protocol (TUCDREC/20171217/Al Madani). Participation was voluntary and personal information was not collected to ensure confidentiality

as recommended by the World Medical Association of Helsinki guidelines. Informed consent to participate in the study was waived by the committee; however, responding to the questionnaire implied consent to participate. The reporting of the study followed the STROBE guidelines.<sup>[33]</sup>

### Recruitment of participants, data collection approach, and variables

The required sample size was calculated based on previous relevant prevalence (65%)<sup>[34]</sup> of burnout among clinical students in Saudi Arabia using the software PASS.<sup>[35]</sup> Considering 95% confidence level, 80% power, and a Z value of 1.96, the estimated sample size was 350, which increased to 500 to account for nonresponses and incomplete questionnaires. A convenience sample of students was recruited via representatives at every academic level in the five dental schools. Dental students at the five levels of the bachelor dental program were invited to participate in the study. Surveys were distributed from April to June 2018. Each class representative distributed the questionnaire to their classmates by sending them a direct link to the survey administration software (Forms, Google Inc., California, USA) via an instant messaging platform (WhatsApp, Facebook Inc., California, USA). The respondents were instructed to submit the web form to the web server upon completing the questionnaire. The web server then transferred the data to a spreadsheet for analysis (Excel, Microsoft Corp., New Mexico, USA). Approximately 15 minutes were needed to complete the questionnaire.

The anonymous closed-ended questionnaire was in English as this is the language of teaching in dental schools, included a covering page that explained the purpose of the study, the voluntary nature of participation, the confidentiality of the obtained data, and the institutional review board approval. In case further questions arose, information about the researchers was also provided.

The questionnaire items asked about covariates, including sociodemographic characteristics and explanatory psychological variables, specifically DES, burnout, and resilience, using validated inventories in SA and relevant contexts.<sup>[17,28,36-38]</sup>

The sociodemographic characteristics collected included the participant's gender, marital status (married or other [single, divorce, widow]), type of dental institute (private or public), academic level (preclinical or clinical) and academic achievement (GPA [grade point average] dichotomised around the median; high or low), student residence during studying (with family or elsewhere) and whether they were working

while studying (yes or no). For academic level, the five levels were dichotomised into preclinical (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years) and clinical (4<sup>th</sup> and 5<sup>th</sup> years). This latter categorisation was based on the fact that clinical students are exposed to the burnout risk factors that affect health care workers (e.g., appointments with patients) and those that affect university students (e.g., academic requirements).<sup>[6,12,13]</sup> As mentioned above, the bachelor dental programme spans over seven years; however, students enrolled in the preparatory year and internship programme training were excluded from this study because the preparatory year has additional challenges (e.g., autonomy and responsibility),<sup>[39]</sup> and the internship is a training period with less academic demands, and was reported recently in relevant context in Saudi Arabia not associated with burnout in multivariable analysis.<sup>[28]</sup>

Student burnout, which was the dependent variable, was assessed using the Maslach Burnout Inventory Human Services Survey–Medical Personnel. This inventory is well established for assessing burnout and is based on 22 items that measure three components of burnout: nine items measure emotional exhaustion; five items measure depersonalisation (or loss of empathy); and eight items measure personal achievement. The responses to each item were based on a 7-point Likert-type scale (ranging from 0 = never to 6 = every day). A total MBI score is calculated by adding the scores for each dimension, thereby reversing the direction of the accomplishment dimension score so that burnout is measured.<sup>[5]</sup>

Student stress was assessed using the DESS.<sup>[40]</sup> This included questions about academic performance, difficulties, insecurities regarding their professional future, responsibilities with patients, interpersonal relationships, and individual and institutional factors. Responses to each item were based on a 4-point Likert-type scale (1 = not stressful at all, 2 = somewhat stressful, 3 = quite stressful, and 4 = very stressful).

Students' ability to bounce back or recover from stressful circumstances (i.e., resilience) was assessed using the BRS.<sup>[41]</sup> The scale consists of six items (e.g., 'I tend to bounce back quickly after hard times' and 'I have a hard time making it through stressful events'). The responses to each item were based on a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). The reverse scoring of negative items was performed prior to analysis.<sup>[38]</sup>

### Data analysis

After the survey closed, the spreadsheets were downloaded and imported into the statistical software program for data analysis (SPSS 21 Inc., Armonk, NY,

USA). Sociodemographic categorical characteristics of the entire sample were classified by burnout level and were summarized and reported as frequencies and percentages. Regarding the psychological assessment, the MBI (dependent variable) adhered to a normal distribution (Shapiro-Wilk  $P = 0.267$ ). The psychometric properties (internal consistency reliability [Cronbach's alpha]) of the MBI and DESS were evaluated and deemed excellent (0.900 and 0.937, respectively). However, Cronbach's alpha was low for the BRS (0.402), which could be due to the small number of scale items.<sup>[42]</sup> Correlations of sociodemographic characteristics and DESS and BRS scores with MBI scores were examined using an independent samples  $t$ -test and Pearson's correlation coefficient.

Variables that correlated statistically significantly ( $P < .05$ ) with the MBI score in the univariate analysis were entered into linear multivariable regression models to determine the variable(s) that correlated with the MBI score. Multicollinearity between independent variables was checked (tolerance  $> 0.7$ ) and the variance inflation factor (1.131–1.251). The significance level was set at  $P < .05$ .

## RESULTS

### Sample characteristics and univariate results of factors associated with MBI

Of the 500 questionnaires distributed, 335 (response rate = 67%) were completed and returned; 64.5% of respondents were female and 81.2% and 80.9% of respondents were at clinical levels and in public dental schools, respectively. The total sample mean  $\pm$  SD of the MBI was  $58.8 \pm 20.7$ . Table 1 presents the characteristics of the studied sample and the univariable analysis of the MBI score with the sociodemographic, psychological (resilience [BRS]), and structural characteristics (environmental dental stress [DESS]). The univariate analyses [Table 1] show that females were more likely to report higher burnout levels (MBI) than males and students at clinical levels were more likely to report higher burnout levels than nonclinical students ( $59 \pm 20.6$  vs.  $51 \pm 19.7$ ,  $P < .001$ ;  $58.16 \pm 20.94$  vs.  $50.83 \pm 18.15$ ,  $P = 0.011$ , respectively). However, the BRS score negatively correlated in a statistically significant manner with the MBI score and the DESS score positively correlated in a statistically significant manner with the MBI score (Pearson's correlation coefficient -0.441, 0.541 and  $P < .001$ , respectively).

### Multivariable linear regression results of factors correlated with MBI

Adjusted multivariable linear regressions [Table 2] show that the MBI score statistically significantly

negatively correlated with the BRS score and statistically significantly positively correlated with the DESS score ( $\beta = -0.29$ ,  $P < .001$ ;  $\beta = 0.44$ ,  $P < .001$ , respectively). The total variance (adjusted  $R^2$ ) explained by the variables gender, level of education, DESS score, and BRS score was 35.6%,  $F(4, 330) = 47.25$ ,  $P < .001$ .

**Table 1: Characteristics of the sample and univariate analysis results**

Categorical Variables	Total F (%)	MBI Mean $\pm$ SD	P
Gender			< 0.001
Male	119 (35.9)	51.43 $\pm$ 19.68	
Female	216 (64.5)	59.73 $\pm$ 20.58	
Marital status			0.050
Married	20 (6.0)	65.55 $\pm$ 17.18	
Other status	315 (94.0)	56.22 $\pm$ 20.69	
Academic levels			0.011
Preclinical	63 (18.8)	50.83 $\pm$ 18.15	
Clinical	272 (81.2)	58.16 $\pm$ 20.94	
Achievement (GPA <sup>#</sup> )			0.242
High	227 (82.7)	57.38 $\pm$ 20.59	
Low	58 (17.3)	53.89 $\pm$ 20.68	
Type of dental school			0.522
Public	271 (80.9)	56.42 $\pm$ 20.48	
Private	64 (19.1)	58.27 $\pm$ 21.32	
Work and study			0.845
Yes	17 (5.1)	55.82 $\pm$ 16.65	
No	318 (94.9)	56.83 $\pm$ 20.83	
Living place			0.116
With family	297 (88.7)	56.15 $\pm$ 20.75	
Elsewhere	38 (11.3)	61.74 $\pm$ 19.20	
Continuous Variables	Total sample Mean $\pm$ SD	PCC <sup>†</sup>	
BRS <sup>§</sup>	17.6 $\pm$ 3.2	-0.440	< 0.001
DESS <sup>*</sup>	74.9 $\pm$ 17.6	0.541	< 0.001

<sup>#</sup>GPA=Grade point average; <sup>†</sup>PCC=Pearson correlation coefficient; <sup>§</sup>BRS=Brief Resilience Scale <sup>\*</sup>DESS=Dental Environment Stress Scale

**Table 2: Results of adjusted multivariable linear regression analysis predicting burnout**

Explanatory variables	Standardized Coefficients $\beta$	P
Gender		
Male	-0.007	0.883
Female		
Academic levels		
Preclinical	-0.024	0.603
Clinical		
BRS <sup>§</sup>	-0.29	< 0.001
DESS <sup>*</sup>	0.444	< 0.001

<sup>§</sup>BRS=Brief Resilience Scale; <sup>\*</sup>DESS=Dental Environment Stress Scale (DESS)

## DISCUSSION

The aim of this study was to investigate the correlation between burnout and the sociodemographic, psychological (resilience), and structural factors (DES) of undergraduate dental students attending public and private dental schools in western Saudi Arabia. Particularly, the study also aimed to examine the role of gender in burnout. The key finding was that in the univariate analysis, gender, academic level, resilience (BRS), and DES correlated statistically significantly with burnout. However, when these variables were modelled in the regression, burnout correlated significantly with only two modifiable factors: resilience and DES. Thus, it was found that resilience buffered the impact of burnout.

These findings oppose those of a recent study conducted among dental students in one dental school in Saudi Arabia.<sup>[28]</sup> It is worth noting that our study included participants from five diverse schools (public and private) who might have had different levels of resilience. However, our findings are aligned with those of another study that examined the role of resilience in the psycho-behavioural health of college students during the COVID-19 pandemic and a study among medical students elsewhere.<sup>[20-22]</sup> Regarding DES, it was observed in this study that DES had a prominent impact (standardized  $\beta = 0.444$ ) compared to other factors in the multivariable model. Such findings are not surprising and are aligned with those from a number of studies conducted in different contexts.<sup>[17,26]</sup>

Finally, the correlation between gender and burnout is a matter of debate. A number of studies that were cited in a systematic review showed inconsistency in the correlation<sup>[7]</sup> and others have reported a correlation.<sup>[7,8]</sup> However, in alignment with several other studies, no correlation was found in the present study.<sup>[3,6,24]</sup> This gender-specific trend might vary depending on the scale used, the use of decompositions of MBI, the target population, and the methods used to assess burnout level.<sup>[7,8]</sup>

As for the strengths of the present study, previously validated questionnaires were used for the assessment. To the best of our knowledge, this study is unique in studying burnout (MBI), stress (DES), and resilience (BRS), particularly within the field of dentistry in Saudi Arabia. The data were collected in the middle of the academic year, so the responses clearly represented the emotional status of the participants during the examined year and more likely were not affected by their experience in previous years. As a multicentre study, the findings are not restricted to a single dental

college. Rather, they are derived from data collected from five different institutions in Saudi Arabia, including both private and public dental schools. Nonetheless, this study has some limitations. Since the data collection was limited to a self-administered questionnaire, it was not possible to rule out self-report bias. Moreover, the students' self-selection, specifically high achievers, to participate may have influenced the study's findings as reported elsewhere.<sup>[43]</sup> In addition, students who may have had pre-existing or undiagnosed mental health problems, such as anxiety and depression, may have inflated the findings of this study. Furthermore, the cross-sectional nature of this study excluded causation and the nonprobability sampling (convenience sample) limited the generalizability of the study findings to all dental students in Saudi Arabia. Age data were not collected; however, students in Saudi Arabian dental programs are aged 18–25 years and we used the academic level of students as a proxy for age. Finally, the absence of knowledge of the estimated population of all dental students in Saudi Arabia may have rendered the findings not representative to whole dental students. Likewise, the calculated sample of this study was not powered enough to allow the regression model to dedicate significant variables associated with burnout, including all common plausible explanatory factors for burnout. Future research is guided by a theoretical model that includes more relevant factors (e.g., first-degree relative death, personality) and is required to gain a deep understanding of dental student burnout. In addition, burnout should be explored among a representative and diverse sample of academic achievements.

Despite these limitations, dental educators should be made aware of this study's findings because early detection of symptomatic levels of burnout can be a good indicator of potential difficulties in terms of both academic and professional achievement. To promote dental students' educational experiences, the results of this study can be used to develop internal and external support systems and institutional programmatic development. Furthermore, it should be mandatory for dental programs to screen students experiencing burnout symptoms for possible clinical depression. In fact, the findings of this study could pave the way for the development of preventive and coping intervention measures tailored to the specific characteristics of individual burnout cases. These might include psychological counselling, support for extracurricular activities, and the establishment of an encouraging learning environment. Finally, a resilience program should be included to reduce burnout and aid students in dealing with environment dental stress.

In conclusion, taking into account the limitations of this study as cross-sectional with convenient sample, the findings demonstrated that increases in resilience were associated significantly with decreases in burnout and increases of environment dental stress were associated significantly with increases in burnout among dental students. However, in this study sample, gender has no influence on burnout.

### Acknowledgments

We would like to thank all the participating students in this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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