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# Frequency of burnout in dental students and its relationship with stress level, depressive, and anxiety state

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## Abstract

**Background** This study aimed to identify the prevalence of burnout in dental students at the Dentistry School of University of Qadisiya, Iraq. All students at the dentistry school were invited to participate in the study. Medical and dental education is a highly demanding endeavor. Burnout is associated with anxiety, depression, and stress levels. Addressing these psychological factors and manage them early will improve the well-being of students.

**Material and methods** A cross-sectional questionnaire survey was conducted with the participation of 147 dentistry school students. The students completed a sociodemographic data form, the Depression Anxiety Stress Scale-21 (DASS-21), and the Maslach Burnout Inventory (MBI).

**Results** The DASS-21 scale scores for all three components (depression, anxiety, and stress) were high in 74.1%, 90.4%, and 98% of the respondents, respectively. The results also showed that high scores of emotional exhaustion, depersonalization, and personal accomplishment were reported in 50.3%, 67.3%, and 89.8% respectively. MBI revealed a significant association with presence of an established diagnosis of a mental illness or a chronic illness, but not with sociodemographic characteristics. Students had a high stress perception but had relatively lower than depression and anxiety. Almost half of the students reported that they were moderately or severely depressed or anxious.

**Conclusion** All MBI subscales had statistically significant correlation with scores of mental health or chronic physical illnesses. The respondents reported high percentages of all components of MBI. Prevalence of depression, anxiety, and stress is much higher in dental students compared to the general population. They also have a very high prevalence of all components of the MBI. Further research is warranted to explore additional factors contributing to burnout and mental health issues among dental students and to develop effective strategies for prevention and intervention.

**Keywords** Burnout, Depression, Anxiety, Stress, Dental students

## Introduction

Students in the medical and dentistry fields often experience burnout, stress, anxiety, and depression due to the hard and stressful nature of their studies [1]. Therefore, these psychological aspects may have a big influence on students' academic success, interpersonal connections, and career prospects [2]. Since studies have shown that medical students are more prone to mental health illnesses than the general population, burnout and stress

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among medical students have drawn more attention in recent years [3].

According to Chennoufi [4], burnout is a state of physical, emotional, and mental fatigue brought on by frequent, intense stress. Medical students frequently work long hours, experience intense academic pressure, and have little free time, which contributes to a serious problem known as burnout. According to a study done in 2016 by Shanafelt et al., 51.1% of medical students feel burnout, compared to 43.2% of practicing doctors [5].

Medical students frequently experience anxiety and despair. According to Rotenstein et al.'s 2016 study [6], medical students had a depression prevalence of 27.2%, which was higher than the general population's 8.7%. Similar to this, there was a higher prevalence of anxiety in medical students (22.1%) than in the general population (10.7%).

According to research, university and dental students in the Middle East experience similar levels of burnout, stress, anxiety, and depression as those in Western nations. In the Middle East, studies conducted in 2016 and 2018 by Alzahem et al. and Almalki et al. indicated that 68.9% of dental students in Saudi Arabia reported having burnout and 62.9% of medical students in the same nation, Saudi Arabia [7, 8], reported experiencing burnout. Also, 41.9% of Yemeni medical students, according to a 2016 study by Al-Dubai et al. [9], showed signs of anxiousness.

The MBI-A was utilized in another study [10] to evaluate burnout among medical professionals in Egypt. The study discovered that burnout was widespread among Egyptian healthcare professionals and that the MBI-A had strong construct validity and internal consistency. The MBI-A was suggested by the authors as a tool for detecting burnout among Egyptian healthcare professionals.

The MBI-A used in a study to evaluate burnout among Yemeni medical doctors [11]. The study discovered that burnout was common among medical doctors in Yemen and that the MBI-A had strong internal consistency and construct validity.

## Materials and methods

### Study design and participants

This cross-sectional questionnaire study was conducted at the college of dentistry of University of Qadisiya in Iraq during May and June of 2022. All undergraduate dental students were eligible to participate. In total, 147 out of 596 students from all study years were invited to participate (Response rate 24.7%). Data were collected by using an electronic self-administered questionnaire that was prepared in Arabic and was sent via e-mail to the target students towards the end of the academic year

2020/2021 (from May 15 to June 5, 2022). The survey was prepared initially in English and was translated to Arabic. Thereafter, it was back translated from Arabic to English to verify accuracy of translation.

### Target population and sample size

The target population was all dental students (male and female) from all five years were enrolled in the dentistry program at the University of Qadisiya in Iraq. The study sample is calculated using the formula for the simple random sampling approach, where  $Z=1.96$ ,  $P=0.15$ , and  $E=\text{margin of error}=0.05$ . The total estimated sample size was 196.

### Study instruments

The questionnaire consisted of three main sections, the first section included 13 questions related to socio-demographic characteristics such as age, gender, year of study, marital status, household income, whether their parents were still living, whether they worked in addition to their studies, and whether they had a chronic illness or a mental health condition. The second section represent the short version of DASS-21 questionnaire and has demonstrated good to excellent internal consistency, adequate reliability [12], and construct validity [13]. It is used to assess the three associated negative emotional states of depression, anxiety, and stress.

It included seven items from each of the three subscales to measure the negative emotional states of depression, anxiety, and stress [14]. Each of the three subscales contains 7 items scored on a Likert scale from 0 to 3 (with 0 indicating "did not apply to me at all" and 3 indicating "applied to me very much"). The interpretation of the results for the Depression subscale scores 0–4, normal; 5–6, mild; 7–10, moderate; 11–13, severe; and  $\geq 14$ , extremely severe. Anxiety Subscale (questions 2, 4, 7, 9, 15, 19, 20). The interpretation of the results for the Anxiety subscale scores 0–3, normal; 4–5, mild; 6–7, moderate; 8–9, severe; and  $\geq 10$ , extremely severe. Stress Subscale (questions 1, 6, 8, 11, 12, 14, 18). The interpretation of the results for the Stress subscale scores 0–7, normal; 8–9, mild; 10–12, moderate; 13–16, severe; and  $\geq 16$ , extremely severe. The third section represent the MacLeish Burnout Inventory (MBI) is a popular measure for measuring burnout in several professions, including healthcare, and is regarded as the "gold standard" in the field. MacLeish and Jackson created the MBI, which has three subscales that measure emotional weariness, depersonalization, and personal accomplishment (MacLeish 1996) [15]. Maslach Burnout Inventory-Arabic version (MBI-A) is the Arabic version of the MBI, which is one of the languages that the MBI has been certified in and translated into and approved. The three subscales of the

MBI-A showed strong reliability, and the authors concluded that the instrument had good construct validity and internal consistency [16]. The survey also discovered that emotional weariness was the most frequently reported sign of burnout among healthcare professionals in Saudi Arabia.

### Statistical analysis

The statistical analysis was performed using Statistical Package for Social Science version 29 to enter and analyze the survey's data. In the summary tables, descriptive statistics for categorical variables were presented as frequencies and percentages and for continuous variables were presented as means and standard deviations. Pearson correlation coefficient was used to measure the related between the scores of MBI Chronic physical condition and scores of mental health. The chi-square test was utilized to show any potential connections between participant characteristics and levels of burnout, depression, anxiety, and stress. The Kolmogorov–Smirnov test, the independent sample *t* test, and the analysis of variance ANOVA were employed to analyze the data, which met the parametric requirements (Normal Distribution). A 0.05 *p*-value is regarded as statistically significant.

### Results

A total of 147 students participated in the study in all five years of studying. The total number of students invited to participate in the study was 596 students. Slightly less than three-quarters of the student participants were female (74.1%). The mean age was  $20.56 \pm 1.88$  years, and the majority of the student participants were less than or equal to 20 years (55.1%). Regarding household income, more than three-quarters of participants (79.6%) were average income, (14.3%) above average, and (6.1%) below average (Table 1).

### Percentages of emotional, depersonalization, and personal and burnout scores

Abnormal levels of emotional exhaustion, depersonalization, and personal accomplishment were observed in 74.1%, 90.4%, and 98% of the respondents respectively (Fig. 1). The mean total scores for the respondents were 26.71 (12.12) for emotional exhaustion, 13.11 (6.67) for depersonalization, and 24.57 (8.24) for personal accomplishment. Alarming, high scores for emotional exhaustion, depersonalization, and personal accomplishment were reported in 50.3%, 67.3%, and 89.8% of dental students respectively. The results of Pearson correlation coefficient indicated that all Maslach Burnout Inventory (MBI) subscales (emotional exhaustion, depersonalization, and personal accomplishment) had statistically significant correlation ( $P < 0.05$ ) with depression (0.615,

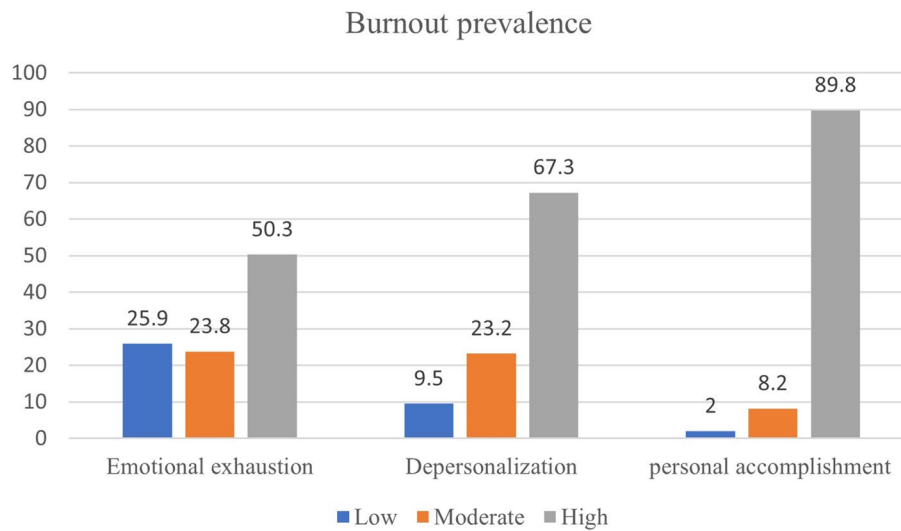
**Table 1** Sociodemographic characteristics of the study participants ( $n = 147$ )

	<i>n</i> (%)
<b>Gender</b>	
Male	38 (25.9)
Female	109 (74.1)
<b>Age in years</b>	
≤ 20	81 (55.1)
> 20	66 (44.9)
<b>Current years</b>	
Year 1	40 (27.2)
Year 2	23 (15.6)
Year 3	32 (21.8)
Year 4	27 (18.4)
Year 5	25 (17.0)
<b>Household income</b>	
Below average	9 (6.18)
Average	117 (79.6)
Above average	21 (14.3)
<b>Are your parents alive</b>	
Yes	134 (91.2)
No (father/mother dead)	13 (8.8)
<b>Working in addition to studying</b>	
I only study and do not work	121 (82.3)
I have apart time work and study to help myself to study	19 (12.9)
I helped with my family business while studying	3 (2.0)
I have to work and study to help others in my family	4 (2.7)
<b>Chronic illness or health problem</b>	
Yes	19 (12.9)
No	128 (87.1)
<b>Suffered from a mental health problem</b>	
Yes	43 (29.3)
No	104 (70.7)

0.454, and 0.197); anxiety (0.440, 0.504, and 0.226); and stress (0.639, 0.482, and 0.204), respectively.

### The relationship between component of MBI and socio-demographic characteristics of students

The association between the responses towards Maslach Burnout Inventory (MBI) subscales, i.e., emotional exhaustion, depersonalization, and personal accomplishment and participants characteristics, are shown in Table 2 below. The results of the Chi-square test showed that there was a statistically significant relationship (association) between emotional exhaustion and chronic illness ( $\chi^2 = 7.146$ ,  $df = 2$ ,  $p = 0.028$ ). Regarding the mental health prob, the results revealed that there was a statistically significant relationship between mental health and each of emotional exhaustion



**Fig. 1** Percentage of burnout syndrome in dental students by MBI subscales

**Table 2** Distribution of the Maslach Burnout Inventory according to sociodemographic characteristics of participants (n = 147)

Characteristics	Emotional exhaustion n (%)			Depersonalization n (%)			Personal achievement n (%)		
	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
<b>Gender</b>									
Male	10 (26.3)	8 (22.9)	20 (27)	5 (35.7)	10 (29.4)	23 (23.2)	0 (0)	5 (41.7)	33 (25)
Female	28 (73.7)	27 (77.1)	54 (73)	9 (64.3)	24 (70.6)	76 (76.8)	3 (100)	7 (58.3)	99 (75)
	$\chi^2=0.221, p=0.895$			$\chi^2=1.290, p=0.525$			$\chi^2=2.662, p=0.264$		
<b>Age group</b>									
≤ 20	19 (50)	22 (62.9)	40 (54.1)	9 (64.3)	16 (47.1)	56 (56.6)	2 (66.7)	6 (50)	73 (55.3)
> 20	19 (50)	13 (37.1)	34 (45.9)	5 (35.7)	18 (52.9)	43 (43.4)	1 (33.3)	6 (50)	59 (44.7)
	$\chi^2=1.284, p=0.526$			$\chi^2=1.452, p=0.484$			$\chi^2=0.291, p=0.865$		
<b>Years of studies</b>									
Year 1	9 (23.7)	12 (34.3)	19 (25.7)	5 (35.7)	10 (29.4)	25 (25.3)	0 (0)	6 (50)	34 (25.8)
Year 2	5 (13.2)	4 (11.4)	14 (18.9)	2 (14.3)	5 (14.7)	16 (16.2)	2 (66.7)	1 (8.3)	20 (15.2)
Year 3	9 (23.7)	7 (20)	16 (21.6)	3 (21.4)	4 (11.8)	25 (25.3)	0 (0)	2 (16.7)	30 (22.7)
Year 4	9 (23.7)	10 (28.6)	8 (10.8)	1 (7.1)	9 (26.5)	17 (17.2)	0 (0)	1 (8.3)	26 (19.7)
Year 5	6 (15.8)	2 (5.7)	17 (23)	3 (21.4)	6 (17.6)	16 (16.2)	1 (33.3)	2 (16.7)	22 (16.7)
	$\chi^2=11.127, p=0.195$			$\chi^2=11.299, p=0.185$			$\chi^2=11.299, p=0.185$		
<b>Household income</b>									
Below average	2 (5.3)	3 (8.6)	4 (5.4)	1 (7.1)	1 (2.9)	7 (7.1)	0 (0)	1 (8.3)	8 (6.1)
Average	27 (71.1)	30 (85.7)	60 (81.1)	10 (71.4)	27 (79.4)	80 (80.8)	2 (66.7)	10 (83.3)	105 (79.5)
Above average	9 (23.7)	2 (5.7)	10 (13.5)	3 (21.4)	6 (17.6)	12 (12.1)	1 (33.3)	1 (8.3)	19 (14.4)
	$\chi^2=5.165, p=0.271$			$\chi^2=1.961, p=0.743$			$\chi^2=1.425, p=0.840$		
<b>Chronic illness</b>									
Yes	2 (5.3)	2 (5.7)	15 (20.3)	0(0)	2 (5.9)	17 (17.2)	0 (0)	2 (16.7)	17 (12.9)
No	36 (94.7)	33 (94.3)	59 (79.7)	14 (100)	32 (94.1)	82 (82.8)	3 (100)	10 (83.3)	115 (87.1)
	$\chi^2=7.146, p=0.028$			$\chi^2=5.163, p=0.076$			$\chi^2=0.595, p=0.743$		
<b>Mental health prob</b>									
Yes	5 (13.2)	4 (11.4)	34 (45.9)	4 (28.6)	2 (5.9)	37 (37.4)	1 (33.3)	3 (25)	39 (29.5)
No	33 (86.8)	31 (88.6)	40 (54.1)	10 (71.4)	32 (94.1)	62 (62.6)	2 (66.7)	9 (75)	93 (70.5)
	$\chi^2=20.094, p<0.001$			$\chi^2=12.131, p=0.002$			$\chi^2=0.134, p=0.935$		

and depersonalization ( $\chi^2=20.094$ ,  $df=2$ ,  $p<0.001$ ;  $\chi^2=12.131$ ,  $df=2$ ,  $p=0.002$ ) respectively (Table 2).

**The relationship between component of MBI and chronic physical condition of dental students**

The association of the responses towards Depression Anxiety Stress Scale-21 (DASS-21) components, which include the severity of symptoms of depression, anxiety, and stress and participants characteristics, are shown in Table 3. Our results revealed that there was a statistically significant relationship between anxiety and years of studies ( $\chi^2=16.781$ ,  $df=8$ ,  $p=0.032$ ). Regarding the chronic illness, the results showed that there was a statistically significant relationship between chronic illness and the levels of each of anxiety and stress ( $\chi^2=7.658$ ,  $df=2$ ,  $p=0.022$ ;  $\chi^2=12.097$ ,  $df=2$ ,  $p=0.002$ ) respectively. According to the mental health prob, the results also indicated that there was a statistically significant

relationship between mental health and the levels of each of anxiety and stress ( $\chi^2=15.632$ ,  $df=2$ ,  $p<0.001$ ;  $\chi^2=14.683$ ,  $df=2$ ,  $p<0.001$ ) respectively (Table 3).

The results of the independent sample *t*-test showed (Table 4) that there are statistically significant differences in the mean response of dental students Those who have chronic diseases and psychological problems towards each of the following: Emotional exhaustion, Depersonalization, depression, anxiety, and stress according to the status of chronic illness, and mental health. ( $p < 0.05$ ).

**Discussions**

Students are admitted are to dental schools in Iraq directly from high school, following a very high of competition based on grades. Studying dentistry is 5 years long at the Dentistry School of University of Qadisiya. The majority of the first year’s curriculum is in basic, medical, and dental sciences. In the subsequent years,

**Table 3** Distribution of the depression, anxiety, and stress according to sociodemographic characteristics of participants (n = 147)

Characteristics	Depression n (%)			Anxiety n (%)			Stress n (%)		
	Normal	Moderate	Severe	Normal	Moderate	Severe	Normal	Moderate	Severe
<b>Gender</b>									
Male	21 (28.4)	4 (14.8)	13 (28.3)	23 (32.4)	4 (14.3)	11 (22.9)	18 (22.8)	10 (30.3)	10 (28.6)
Female	53 (71.6)	23 (85.2)	33 (71.7)	48 (67.6)	24 (85.7)	37 (77.1)	61 (77.2)	23 (69.7)	25 (71.4)
	$\chi^2=2.102, p=0.350$			$\chi^2=3.755, p=0.153$			$\chi^2=0.864, p=0.649$		
<b>Age group</b>									
≤ 20	45 (60.8)	10 (37)	26 (56.5)	44 (62)	12 (42.9)	25 (52.1)	44 (55.7)	19 (57.6)	18 (51.4)
> 20	29 (39.2)	17 (63)	20 (43.5)	27 (38)	16 (57.1)	23 (47.9)	35 (44.3)	14 (42.4)	17 (48.6)
	$\chi^2=4.574, p=0.102$			$\chi^2=3.228, p=0.199$			$\chi^2=0.284, p=0.868$		
<b>Years of studies</b>									
Year 1	23 (31.1)	4 (14.8)	13 (28.3)	26 (36.6)	1 (3.6)	13 (27.1)	24 (30.4)	9 (27.3)	7 (20)
Year 2	12 (16.2)	3 (11.1)	8 (17.4)	13 (18.3)	5 (17.9)	5 (10.4)	12 (15.2)	5 (15.2)	6 (17.1)
Year 3	16 (21.6)	9 (33.3)	7 (15.2)	12 (16.9)	10 (35.7)	10 (20.8)	18 (22.8)	7 (21.2)	7 (20)
Year 4	14 (18.9)	6 (22.2)	7 (15.2)	13 (18.3)	5 (17.9)	9 (18.8)	14 (17.7)	5 (15.2)	8 (22.9)
Year 5	9 (12.2)	5 (18.5)	11 (23.9)	7 (9.9)	7 (25)	11 (22.9)	11 (13.9)	7 (21.2)	7 (20)
	$\chi^2=7.804, p=0.453$			$\chi^2=16.781, p=0.032$			$\chi^2=2.675, p=0.953$		
<b>Household income</b>									
Below average	5 (6.8)	0 (0)	4 (8.7)	4 (5.6)	2 (7.1)	3 (6.3)	5 (6.3)	0 (0)	4 (11.4)
Average	59 (79.9)	21 (77.8)	37 (80.4)	56 (78.9)	24 (85.7)	37 (77.1)	64 (81)	26 (78.8)	27 (77.1)
Above average	10 (13.5)	6 (22.2)	5 (10.9)	11 (15.5)	2 (7.1)	8 (16.7)	10 (12.7)	7 (21.2)	4 (11.4)
	$\chi^2=3.812, p=0.432$			$\chi^2=1.514, p=0.824$			$\chi^2=5.139, p=0.273$		
<b>Chronic illness</b>									
Yes	8 (10.8)	1 (3.7)	10 (21.7)	4 (5.6)	4 (14.3)	11 (22.9)	4 (5.1)	5 (15.2)	10 (28.6)
No	66 (89.2)	26 (96.3)	36 (78.3)	67 (94.4)	24 (85.7)	37 (77.1)	75 (94.9)	28 (84.8)	25 (71.4)
	$\chi^2=5.509, p=0.064$			$\chi^2=7.658, p=0.022$			$\chi^2=12.097, p=0.002$		
<b>Mental health prob</b>									
Yes	15 (20.3)	7 (25.9)	21 (45.7)	10 (14.1)	11 (39.3)	22 (45.8)	15 (19)	9 (27.3)	19 (54.3)
No	59 (79.7)	20 (74.1)	25 (54.3)	61 (85.9)	17 (60.7)	26 (54.2)	64 (81)	24 (72.7)	16 (45.7)
	$\chi^2=9.007, p=0.011$			$\chi^2=15.632, p<0.001$			$\chi^2=14.683, p<0.001$		

**Table 4** The differences in the Maslach Burnout Inventory and depression, anxiety, and stress according to sociodemographic among dental students

Sociodemographic characteristics	Emotional exhaustion Mean ± S.D	Depersonalization Mean ± S.D	Personal achievement Mean ± S.D	Depression Mean ± S.D	Anxiety Mean ± S.D	Stress Mean ± S.D
<b>Gender</b>						
Male (n=38)	27.53 ± 13.58	12.47 ± 7.16	24.00 ± 8.83	14.84 ± 15.25	9.84 ± 9.41	17.21 ± 11.06
Female (n=109)	26.43 ± 11.62	13.33 ± 6.51	24.77 ± 8.06	15.25 ± 11.17	12.59 ± 10.16	18.26 ± 10.17
P-value	P=0.633	P=0.497	P=0.621	P=0.847	P=0.146	P=0.594
<b>Age group</b>						
≤ 20 (n=81)	26.47 ± 11.76	13.05 ± 6.68	25.17 ± 8.49	14.62 ± 11.73	11.43 ± 10.51	17.04 ± 10.96
> 20 (n=66)	27.02 ± 12.63	13.18 ± 6.70	23.83 ± 7.92	15.79 ± 10.40	12.42 ± 9.42	9.58 ± 1.18
P-value	P=0.787	P=0.905	P=0.329	P=0.528	P=0.552	P=0.220
<b>Years of studies</b>						
Year 1 (n=40)	25.75 ± 11.74	12.53 ± 7.02	25.03 ± 7.88	13.85 ± 11.98	10.40 ± 10.97	15.05 ± 10.69
Year 2 (n=23)	27.04 ± 10.87	13.43 ± 6.15	26.91 ± 8.99	16.26 ± 12.77	10.35 ± 9.53	19.48 ± 10.77
Year 3 (n=32)	27.41 ± 11.67	13.59 ± 6.66	23.38 ± 8.64	15.06 ± 9.74	12.75 ± 9.95	18.50 ± 10.02
Year 4 (n=27)	23.48 ± 12.72	11.96 ± 6.06	21.81 ± 8.81	13.41 ± 10.42	11.26 ± 9.55	18.59 ± 11.42
Year 5 (n=25)	30.56 ± 13.44	14.36 ± 7.36	26.20 ± 6.22	18.16 ± 10.69	15.20 ± 9.27	20.00 ± 8.41
P-value	P=0.309	P=0.703	P=0.155	P=0.519	P=0.345	P=0.312
<b>Household income</b>						
Below average (n=9)	28.78 ± 13.19	14.11 ± 6.21	26.44 ± 5.66	17.11 ± 12.57	14.44 ± 13.74	18.67 ± 14.76
Average (n=117)	27.03 ± 12.02	13.15 ± 6.61	24.29 ± 8.03	15.19 ± 11.41	11.74 ± 9.85	17.83 ± 10.36
Above average (n=21)	24.09 ± 12.42	12.48 ± 7.40	25.33 ± 10.30	14.00 ± 9.09	11.52 ± 9.55	18.57 ± 8.69
P-value	P=0.520	P=0.822	P=0.680	P=0.779	P=0.729	P=0.937
<b>Chronic illness</b>						
Yes (n=19)	36.58 ± 12.65	17.21 ± 5.99	26.21 ± 7.87	20.11 ± 11.71	19.37 ± 11.37	25.89 ± 8.09
No (n=128)	25.25 ± 11.38	12.50 ± 6.57	24.33 ± 8.30	14.41 ± 10.90	10.77 ± 9.34	16.81 ± 10.19
P-value	<b>P&lt;0.001</b>	<b>P=0.004</b>	P=0.355	<b>P=0.037</b>	<b>P&lt;0.001</b>	<b>P&lt;0.001</b>
<b>Mental health problem</b>						
Yes (n=43)	34.72 ± 11.15	17.00 ± 6.70	25.44 ± 7.29	20.37 ± 11.56	17.53 ± 10.96	23.95 ± 9.58
No (n=104)	23.40 ± 10.94	11.50 ± 5.98	24.21 ± 8.61	12.98 ± 10.25	9.54 ± 8.62	15.52 ± 9.71
P-value	<b>P&lt;0.001</b>	<b>P&lt;0.001</b>	P=0.412	<b>P&lt;0.001</b>	<b>P&lt;0.001</b>	<b>P&lt;0.001</b>

students become progressively more involved in clinical practice. Stress and emotional exhaustion have an impact on dental students' academic performance. Mental illnesses usually have a chronic course, and students become emotionally exhausted with it, and depersonalization is often seen in those who suffer from a mental illness [17]. Hopelessness often accompanies symptoms of anxiety and depression; this results in severe compromise in personal achievement, as it has been reported in this study. Stigma is associated with mental illness particularly in a country like Iraq, which hinders attempts of patients to address their mental health needs. High prevalence of anxiety, depressive symptoms, and burnout in any cohort of patients can obscure that sociodemographic factor associates with these symptoms. This may explain that in this study, the sociodemographic factors did not show a significant influence on burnout or psychiatric symptoms.

Individual with depressive symptoms might unconsciously or consciously understate their dissatisfaction or stress level, and potentially mask their symptoms, due to various social pressures, leading to an inaccurate representation in their responses [18].

Depression can be manifested differently in some cultures or individuals or may present with atypical symptoms that are not covered by the DASS-21. That is a possible reason for the significant relation of DASS-21 components' distribution in the students reported chronic physical and mental illness, with anxiety and stress but not depression component of the DASS-21.

The stress and exhaustion in students may vary according to the years of their studies. For example, final year students feel the additional burden of finding employment after graduation and transition from being students to dental practitioners. Also, students in the middle years can feel that they are under more pressure due to a

more condensed curriculum and starting involvement in clinical practice. This explains the variation of stress and emotional exhaustion in this study according to which year they are studying.

Chronic illnesses are more likely to cause chronic sufferings such as emotional exhaustion [19]. The presence of chronic physical or mental illness are significantly related to the burnout MBI and its subscales' distribution. This study supports that suffering from a chronic physical condition is significantly related to the emotional exhaustion and that presence of a mental health problem has a significant association with both emotional exhaustion and depersonalization, but not the personal achievement.

Individuals suffering from a chronic physical or mental illness may be more vulnerable to experiencing burnout symptoms. Therefore, having these conditions is related to higher levels of all DASS-21 components and emotional distress, including emotional exhaustion and depersonalization. However, the presence of these two illnesses was not associated with a compromise in personal achievement in this study.

Extremely high levels of emotional exhaustion, depersonalization, and personal accomplishment observed is likely to be the result of the high stress due to pressures of dentistry studying but also reflects high prevalence of mental disorders in Iraq due to traumas of the wars [20], and high anxiety prevalence was also observed during COVID-19- pandemic [21].

Although burnout is empirically distinct from depression and anxiety, these distinct clinical conditions should be appropriately diagnosed and offered appropriate treatment [22]. Many studies have also shown that there is a positive correlation between burnout and depression [23]; therefore, it is not surprising to see a high correlation of burnout and MBI components with depression and anxiety. A study has shown that dental students have a higher tendency to be suffering more frequently from anxiety, depression, burnout, and depersonalization than students of medicine [24].

### Strengths

This research adds more evidence to the notion that burnout in undergraduate dental students is common. The practical implication of this research is to encourage and implement policies and interventions to reduce student burnout.

### Limitations

Since this study is cross-sectional in nature, it is difficult to determine causality because data are only collected at a certain point in time. It is possible to see relationships between variables, but it can be challenging to ascertain whether a third variable is impacting the observed

associations. Only one dental school student was included in the study; more dental schools from throughout Iraq should be included in further research.

The study included one dental school students only; a future study should include more dental schools from all geographical areas in Iraq.

### Conclusion

Students studying dentistry frequently experience depression, stress, and worry. Moderate to severe levels of burnout are seen in a very high percentage of students. Anxiety, stress, and burnout are all linked to previous mental or physical health issues in dental students. The most susceptible students are those who are in the midst and end of their education. It is important to take steps to offer assistance that students who are struggling with their mental and physical health need as soon as they begin their studies at dental schools.

Overall, these findings highlight the importance of addressing burnout, depression, anxiety, and stress among dental students. Efforts should be made to provide support and resources for students with chronic physical and mental illnesses, as well as to reduce the stigma surrounding mental health issues. Additionally, interventions should be tailored to the unique needs and cultural contexts of dental students, taking into account the different manifestations of depression and the specific stressors associated with different academic stages.

### Abbreviations

DASS-21	Depression Anxiety Stress Scale-21 (DASS-21)
MBI	Maslach Burnout Inventory
MBI-A	Maslach Burnout Inventory-Arabic version

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### Authors' contributions

All authors contributed to conception, analysis, and manuscript writing. K.A. asked the dental students and dental school permission to participate in the study.

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### Availability of data and materials

We have the Google form for the study and the excel data available anonymously if needed.

### Declarations

#### Ethics approval and consent to participate

This was provided by the Vice Dean for Academics and Ethics, Dentistry School of University of Qadisiya who approved the study.

#### Consent for publication

All authors consent to publish this manuscript. Participants are not identified and are anonymous; therefore, no formal consent were taken from them. The participants were aware that the result of this study is going to be published.

**Competing interests**

The authors declare that they have no competing any financial and non-financial competing interests.

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