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Prevalence and risk factors of burnout among medical students during coronavirus disease 2019 pandemic online teaching: Cross-section

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ABSTRACT

Background: Burnout is considered a work-related stress syndrome. We investigate the burnout prevalence and the risk factors associated with burnout during the coronavirus disease-2019 (COVID-19) pandemic online teaching at Umm Al-Qura University (UQU) medical school. *Method:* During online teaching, an analytical cross-sectional study was conducted among UQU medical students. Data were collected between February to March 2021. Burnout was assessed using a validated tool. *Result:* About 568 students from year two to six medical school completed the survey. The study revealed that a total of 224 (39.44%) students experience burnout. Multiple logistic regression exhibited students with chronic disease were 2-times likely to have burnout. Moderate GPA students (GPA of 3–3.4 out of 4) scored high burnout compared to peers with GPA 3.4–4. There was a statistically higher likelihood between burnout and students who reported negative effects of studying on their social life, high family expectation, and dissatisfaction with blended learning experience. *Conclusion:* The overall burnout prevalence was 39.44% among UQU medical students. Many factors were associated with student's burnout, such as chronic disease, moderate GPA, and high family expectations.

Keywords: Mental health; burnout; study-related stress; COVID-19; online teaching.

1. INTRODUCTION

Burnout is contemplated as a work-related stress syndrome. It was first introduced by the American Psychologist Freudenberger in the 1970s. Burnout is extremely widespread amongst health practitioners. It is characterized by emotional exhaustion, depersonalization and a low sense of personal accomplishment (Maslach et al., 1996). The challenge of burnout extends from

health practitioners to medical trainees, including medical students. Among medical students, burnout affects overall well-being, academic achievements and may lead to withdrawing from the program or suicide ideation (Ishak et al., 2013).

A systematic review estimates the burnout prevalence rate of 44.2% among undergraduate medical students in related researches (Frajerman et al., 2019). Studies from many medical schools report that at least 50% of medical students suffer from burnout during their training (Ishak et al., 2013). In the United States, a study reported that about 50% of the study population meets burnout (Armstrong and Reynolds, 2020). Many studies in China also report elevated burnout levels amongst medical students, affecting over 40% of the studies' population (Ishak et al., 2013). In Saudi Arabia, many studies report elevated burnout prevalence amongst undergraduate students ranging from 55% to 62% (Al-Jehani et al., 2020; Almalki et al., 2017). The burnout prevalence in medical school is associated with many demographical, social and psychological factors: age, gender, marital status, and year of study are the most common demographic factors (Ishak et al., 2013; Frajerman et al., 2019; Armstrong and Reynolds, 2020). Some study outlined other factors like lack of confidence, felt uncomfortable with the course work and who did not have any source of pleasure (Costa et al., 2012).

The consequence of COVID-19 on medical education is unprecedented. There has been universal cessation of clinical placements, face-to-face education sessions, and examinations requiring physical presence (Franklin et al., 2021). Medical schools redesign the learning and assessments activities from the traditional approach to incorporate many e-learning platforms. The consequences of these actions pose substantial issues for the learning experience and professional development of medical students. It provokes many challenges associated with student burnout, such as social isolation and loneliness, loss of motivation and interest, lack of effective communication, and stress of limited clinical training in clinical settings (Khalil et al., 2020; Mahdy, 2020).

From the literature review, no study has assessed the burnout prevalence during the COVID-19 era among medical students in Saudi Arabia. Therefore, this study investigates the burnout prevalence and the risk factors associated with burnout during the COVID-19 at the medical school UQU, Makkah campus, Saudi Arabia. It also investigates possible related risk elements of medical students' burnout and any possible correlations between students' burnout and their satisfaction with the current teaching and assessment methodology during the COVID-19 era.

2. METHOD

Study design and setting

This is an analytical cross-sectional study that was performed in the medical school UQU, Makkah Campus, to investigate the burnout prevalence and associate factors amongst the students and was approved by the institutional research board of Umm Al-Qura University. An anonymous self-administrated electronic survey was demonstrated using the Goggle Forms online survey platform. The survey items were developed to fulfill research questions based on a comprehensive literature review. The content validity was demonstrated by reviewing the initial survey draft on a group of experts in the educational research (five). They were inquired to review survey items and their alignment to the research questions and evaluated their relevance to the measured construct. Then, a pilot study was administered on 15 student's candidates to evaluate the relevance and comprehensibility of the survey. Candidates were invited to accomplish the online survey and gave remarks on the clarity of items and the relevance of response options. The ultimate draft of the survey considered the highlighted issues from the pilot study.

The online survey consists of 32 items that measured fourfold: respondents' sociodemographic data; students' social and academic satisfaction; students' perceptions of teaching and assessment during the pandemic; and burnout inventory of Maslach burnout inventory-student survey (MBI-SS). The survey was disseminated amongst all UQU medical students between February to March 2021.

Measurement

The Maslach Burnout Inventory-Student Survey (MBI-SS) is a valid tool to assess the burnout level in medical students.(Maslach et al., 1996) It consists of 16 items that constitute three scales: emotional exhaustion (EX) (five items), cynicism (CY) (five items), and academic efficacy (AE) (six items). Items are scored by using a 7-Point Likert scale [from 0 (never) to 6 (always)]. Each subscale is categorized into low, moderate, and high according to the sum of the total score. For EX a score of 0–9 is low, 10–14 is moderate, and more than 14 is considered high. At the same time, CY is categorized into 0–1low, 2–6 moderate and high when the students score > 6. Finally, AE is categorized into < 22 low, 23–27 moderate and high when the students score > 28. A high score for EE, CY, and a low for AE suggest burnout (Maslach et al., 1996).

Students' perceptions of the blended learning experiences during the pandemic were evaluated on eight items, using a 5-Point Likert scale [from 1 (Strongly Disagree) to 5 (Strongly Agree)]. Students' high score of 40 indicates a positive perception, while a

score of 8 indicates a negative perception. The total perception score was calculated by summating each item score across respondents. A total score of 28 (70%) or more was considered satisfactory. Whereas, scores less than 28 were consider as unsatisfied. The assessment of online perception was checked for face validity and edited by experts in medical education.

Data analysis

SPSS 25 (IBM Corporation, Armonk, NY) was used for data analysis. Descriptive summary statistics were calculated and submitted as frequency, percentage, mean, and standard deviation (SD). Cronbach's alpha was used to calculate the internal consistency of the survey, all MBI-SS subscales and perception of online teaching. Reliability scores of ≥ 0.5 were considered acceptable, with greater scores reflecting greater internal consistency. The comparison of categorical variables was performed using the chi-square tests. For the prediction of significant predictors for burnout, multiple logistic regressions were used. Since the data showed high multicollinearity between the ages and the year of study, the age was not included in the model. A p-value of < 0.05 was deemed statistically significant.

3. RESULTS

About 568 UQU Medical students accomplished the survey, with their ages ranging from 18 to 25 years old (mean = 21.3, SD = 1.6). The majority of respondents were male 321 (56.5 %), unmarried 562 (98.9%), and in their second and fourth year of the study, 175 (30.8%), and 135 (23.8%) respectively; also, the majority of respondents reported do not have chronic disease 504 (88.7%). Demographic characteristics are illustrated in Table 1.

Table 1 Sociodemographic characteristics of respondents

Characteristic	Category	Frequency (%)
Age (years)mean ± SD	21.3 ± SD 1.6	
Gender	Male	321 (56.5)
	Female	247 (43.5)
Marital status	Single	562 (98.9)
	Married	6 (1.1)
Year of study	2nd	175 (30.8)
	3rd	94 (16.5)
	4th	135 (23.8)
	5th	91 (16)
	6th	73 (12.9)
History of Chronic disease	Yes	64 (11.3)

Reliability of subscale MBI-SS and perception of learning experiences was measured using Cronbach's alpha. The MBI-SS subscales of the entire sample were satisfactory exhaustion (0.83), cynicism (0.70), and efficacy (0.77). The internal consistencies for items related to students' perception of their learning experience during the pandemic were 0.67. The study also investigated students' social, lifestyle, and academic factors: The majority of respondents reported negative effects of study on their social life (67%), poor physical activity (61%), and stress-related to high family expectations (52%). Also, about (43%) of respondents declared inadequate sleeping (Table 2).

Eight items measured students' perception of the blended learning experiences during the pandemic. The majority of respondents were unsatisfied with their current learning experience (397, 69.9%), total scores ranged from 12 to 37, with a mean ± SD of 25 ±4.92 (Table 2). Their most concern was related to the limited training time and its impact on their clinical skills competence, with a mean of 2.06 ± 1.04. However, most of the respondents indicated their confidence that pandemic will not affect their learning process and being a competent doctor, with a mean of 3.6 ± 1.13.

The burnout prevalence was measured by the MBI-SS 16 items and three subscales. Mean ± SD for all MBI-SS items and subscale scores were as the follows: exhaustion (18 ± 7.2), cynicism (15 ± 6.5), and low efficacy (22 ± 7). Analysis showed that 392 (69%) had a high score in exhaustion, 515 (90.7%) in cynicism, and 315 (56%) low in efficacy. A total of 224 (39.44%) students reported self-perceived burnout (figure1, Table 3).

Table 2 Lifestyle, social, academic factors and students' perception of online teaching.

items	response	
lifestyle and social factors		
Question	Yes n (%)	No n (%)
Do you usually sleep enough (7 hours or more)?	325 (57.2)	243 (42.8)
Are you physically active (do exercise at least twice a week)?	223 (39.3)	345 (60.7)
Does your study have a negative effect on your social relationships?	382 (67.3)	186 (32.7)
Do your high family expectations put you under stress?	296 (52.1)	272 (47.9)
During the pandemic, do you have a fear of infection during clinical rotations?	260 (45.8)	308 (54.2)
Presence of a physician in the family	174 (30.6)	394 (69.4)
Academic factors		
Question	Yes n (%)	No n (%)
Do you usually study more than 3 hours per day?	404 (71.1)	164 (28.9)
Do you usually meet your academic goals?	285 (50.2)	283 (49.8)
Do you usually participate in extracurricular activities (volunteering /community services, research, arts, or cultural activities)?	228 (40.1)	340 (59.9)
Students perceptions of the teaching and assessment approaches during the covid-19 pandemic		
Question	Mean /5	SD
Changing face-face activities to online is effective	3.28	1.25
The clinical training (clerkship) arrangement during the pandemic is convenient	3.11	1.06
The updated assessment policy and regulation during the pandemic are reasonable and fair	3.45	0.99
I feel quite confident about passing the final successfully this year	3.46	1.12
I am satisfied with my knowledge and cognitive in this academic year	3.25	1.20
I am satisfied with my clinical skills and competencies in this academic year	2.86	1.17
However, covid-19 Pandemic is a challenge, it will not affect my future career and clinical skills, and I will be a competent Doctor	3.62	1.13
Limited training time make me nervous about my clinical skills level *	2.06	1.04
Total perception score	25.09/40	4.92

Table 3 MBI-SS subscales and risk of burnout.

Subscale	Severity	N	%
Exhaustion	Low	77	13.6
	Moderate	99	17.4
	High	392	69
Cynicism	Low	11	1.9
	Moderate	42	7.4
	High	515	90.7
Academic Efficacy	Low	315	55.5
	Moderate	127	22.4
	High	126	22.2
Risk of burnout [a]		224	39.4

[a], Burnout a high score on emotional exhaustion, cynicism, and low score in academic efficacy

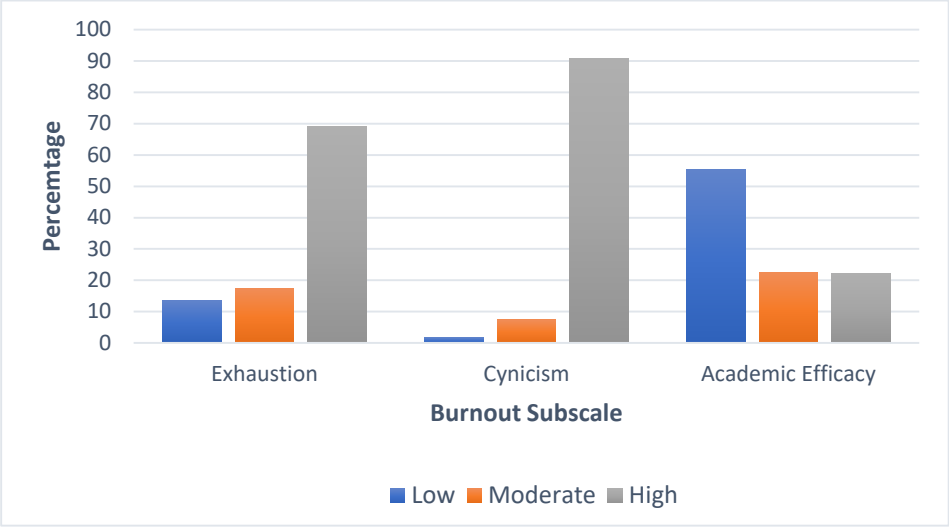

Figure 1 Prevalence of Burnout subscale among medical students during Covid-19 pandemic online teaching.

The study also investigated possible burnout-associated factors. The study investigated the correlations between burnout and students' demographical, social and academic status. There were no significant statistical differences in the burnout subscales and respondents' age, year of training, and marital status. However, year six students reported the highest risk of burnout prevalence in exhaustion and cynicism subscales. Nevertheless, there are significant discrepancies in the prevalence of risk of exhaustion and cynicism subscales regarding students' gender at (P < 0.001). Female students reported the highest burnout subscale risk in emotional exhaustion and cynicism compared to male colleagues.

Analysis showed that students' history of chronic disease made a significant difference in the level of burnout risk (P< 0.001) and emotional exhaustion subscale (P < 0.005). The prevalence of high emotional exhaustion was significantly higher among students with a history of chronic disease (85.9%) than peers (66.9%). They were also significantly higher for burnout risk than peers (59.4% and 36.9%, respectively) (Table 4).

Table 4 Subclass of MBI score and comparison with sociodemographic factors

Factors		Emotional exhaustion		Cynicism		Academic efficacy		Risk Burnout	
		High EE score n (%)	P-value	High CY score n (%)	P-value	Low AE score n (%)	P-value	High burnout risk n (%)	P-value
Age	18 -20	149 (72.0%)	0.62	192 (92.8%)	0.14	111 (53.6%)	0.40	82 (39.6%)	0.78
	21 – 22	138 (66.0%)		184 (88.0%)		125 (59.8%)		79 (37.8%)	
	23 – 25	105 (69.1%)		139 (91.4%)		79 (52%)		63 (41.4%)	
Gender	Male	205 (63.9%)	0.01	276 (86.0%)	< 0.001	179 (56.8%)	0.98	119 (37.1%)	0.20

	Female	187 (75.7%)		239 (96.8%)		136 (43.2%)		105 (42.5%)	
Marital status	Single	386 (68.7%)	0.26	509 (90.6%)	0.73	313 (55.7%)	0.25	222 (39.5%)	0.75
	Married	6 (100.0%)		6 (100.0%)		2 (33.3%)		2 (33.3%)	
Years of study	2nd	120 (68.6%)	0.40	164 (93.7%)	0.039	94 (53.7%)	0.74	63 (36%)	0.22
	3rd	70 (74.5%)		83 (88.3%)		58 (61.7%)		43 (45.7%)	
	4th	86 (63.7%)		119 (88.1%)		78 (57.8%)		52 (38.5%)	
	5th	60 (65.9%)		78 (85.7%)		46 (50.5%)		31 (34.1%)	
	6th	56 (76.7%)		71 (97.3%)		39 (53.4%)		35 (47.9%)	
History of Chronic disease	No	337 (66.9%)	0.005	457 (90.7%)	0.72	273 (54.2%)	0.11	186 (36.9%)	0.001
	Yes	55 (85.9%)		58 (90.6%)		42 (65.6%)		38 (59.4%)	

Multiple logistic regressions are an odds ratio (AOR) that controls other predictor variables in the model. It was applied to explore the dynamic between predictors. Many variables are associated with respondents' elevated risk of burnout. AOR Statistic showed that students who reported a history of chronic disease scored two times higher in burnout than peers (AOR = 2.59, 95% CI: 1.52–4.44). Students with moderate GPA (3.4–3.0) scored higher for burnout in comparing to peers with GPAs between 4 and 3.5 (AOR = 1.69, 95% CI: 1.03–2.77). Students who reported a negative effect of studying on their social life or stress because of high family expectations were more likely to have high burnout risk (AOR = 2.73, (95% CI: 1.83–4.07), AOR =1.83 (95% CI: 1.30-2.59), respectively. Also, unsatisfied students of current blended learning experience reported having high burnout risk AOR = 2.86 (95% CI: 1.864.2–8).

On the contrary, students who had adequate sleeping, regular exercising, study more than 3 h, or usually met their academic goals were less prone to have high burnout risk compare with other (AOR = 0.64, (95% CI: 0.45–0.91), AOR = 0.57 95% (CI: 0.40–0.81), AOR = 0.40 (95% CI: 0.27–0.60), AOR = 0.28 (95% CI: (0.16–0.33)), respectively). In addition, students with family members as physicians were 39% less likely to have high burnout risk (AOR = 0.61, 95% CI 0.41–0.90). Other investigated variables such as marital status, year of study, and participation in extra curriculum activity were statistically insignificant for a elevated level of burnout, as shown in Table 5.

Table 5 Simple and multiple logistic regression for prediction of high burnout level

Variable	Category	OR (95% CI)	AOR (95% CI)
Gender	Male	R	R
	Female	1.26 (0.89 – 1.76)	1.28 (0.89 -1.83)
Marital status	Single	1.31 (0.24 – 7.19)	1.21 (0.22 - 6.78)
	Married	R	R
Year of study	Preclinical years	1 (0.71 – 1.40)	0.93 (0.66 -1.32)
	Clinical years	R	R
Chronic disease	No	R	R
	Yes	2.50 (1.47 -4.25)	2.59 (1.52 – 4.44)
Physician in the family	No	R	R
	Yes	0.64 (0.44 -0.93)	0.61 (0.41 – 0.90)
GPA	Less 2.9	1.41(0.42 – 4.68)	1.34 (0.38 – 4.71)
	3.4 – 3.0	1.57 (1.03 2.39)	1.69 (1.03 – 2.77)
	4 – 3.5	R	R
Sleep enough	No	R	R
	Yes	0.67 (0.48 – 0.95	0.64 (0.45 – 0.91)
Regular exercising	No	R	R
	Yes	0.59 (0.41-0.83)	0.57 (0.40 – 0.81)
Presence of negative effect of studying on the social life	No	R	R
	Yes	2.66 (1.80 – 3.92	2.73 (1.83 – 4.07
High family expectations put you under stress	No	R	R
	Yes	1.89 (1.34 – 2.66)	1.83 (1.30 -2.59)
Fear of infection during clinical rotation	No	R	R
	Yes	0.82 (0.59-1.16)	0.81 (0.57 – 1.14)
Study more than 3 hours	No	R	R
	Yes	0.44 (0.30 – 0.63)	0.40 (0.27 -0.60)
Usually meet academic goals	No	R	R
	Yes	0.23 (0.16 – 0.33)	0.28 (0.16 – 0.33)
Participation in extra curriculum activity	No	R	R
	Yes	078 (0.55 -1.11)	0.72 (0.49 – 1.05)
Perception of online teaching	Unsatisfied	2.71 (1.81 – 4.06)	2.86 (1.86 -4.28)
	Satisfied	R	R

OR: odds ratio, AOR: adjusted odds ratio for gender and year of study, R: reference category.

4. DISCUSSION

The study indicated that the burnout prevalence among UQU medical students on the Makkah campus was more than one-third (39.44%). Studies of burnout prevalence in Saudi medical schools show variable results; Almalki et al., (2017) reported a high level of burnout 67.1%, at King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia. A study from Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia report a high burnout prevalence of 55.5% with no difference between the type of curricula (classic or Problem-Based Learning) (Al-Jehani et al., 2020). Another study reported a moderate level of burnout; a Cross-sectional study at Alfaisal University, Riyadh, Saudi Arabia, reported an overall burnout prevalence of 13.4%

(Altannir et al., 2019). Also, a study from Medical College at Hail University reported an overall high burnout prevalence of 27.1%. Considering the time of the study, which was conducted within challenges of COVID-19 pandemic, when all medical schools classical teaching were transferred to blended learning format, and the clinical training was jeopardized to a certain level, this may affect burnout prevalence. Nevertheless, the study indicated a positive correlation between unsatisfied students of current blended learning experience and high burnout risk [AOR = 2.86 (95% CI: 1.86–4.28)].

The prevalence of UQU medical students during the pandemic challenges was considered relatively higher than a study demonstrated within the same challenge of the pandemic at the medical school of the University of Cyprus (18.2%) (Zis et al., 2021). The difference could be due to population, lifestyle, social and academic factors like curriculum requirements and different teaching methods. Unfortunately, to our knowledge, no study investigated the burnout in medical schools in Saudi Arabia during COVID-19 online teaching to compare it with. The following aim was to determine possible risk and protecting elements that contributed to burnout, which showed that female students reported the highest prevalence of burnout risk subscale in emotional exhaustion and cynicism compared to male colleagues. This is similar to the findings of some prior studies (Thun-Hohenstein et al., 2021; Grace, 2018; Vidhukumar and Hamza, 2020).

However, the literature is controversial regarding gender as a risk factor, as Almalki et al., (2017) found male students are more liable to high burnout levels, and Al-Jehani et al., (2021) found no difference between them Also, the year of study as a risk factor showed different results in different studies; some studies showed the students at high risk for burnout in their clinical years while others showed more in preclinical years (Aljadani et al., 2021; Shrestha et al., 2021). The recent study exhibits that the year of study was not a risk element for burnout. This discrepancy could be due to different curriculum and the study population. Nevertheless, this study design is limited in power to catch the differences. Further longitudinal comparison studies are essential. Different age groups were not associated with burnout; this outcome is parallel to some results in prior studies (Almalki et al., 2017; Njim and Makebe, 2019). While being married was associated with burnout, as in a previous study (Njim and Makebe, 2019). However, in this study, marital status did not show any association, which could be due to the smaller number of married students in these populations. On the contrary, students with chronic disease were significantly higher for burnout risk than peers. This has to our knowledge as never before been studied in the literature.

The study showed many factors that reduced the threat of burnout. Students with a physician in their family were less prone to have elevated burnout; those students may have a social support system that reduces any possible stress of burnout. On the contrary, Almalki et al., (2017) found an elevated level of exhaustion and cynicism among students with a physician in their family. This is because physicians' parents were documented as the second-highest origin of stress in a previous related study (Gupta, 2016). The study showed that adequate sleeping and regular exercise were linked with a low risk of burnout. This concurs with familiar studies (Costa et al., 2012; Asghar et al., 2019). Students who reported a negative effect of studying on their social life or stress because of high family expectations were more prone to have higher burnout; this is compatible with a study in Douala, which reported a negative effect of studying that resulted in relationship difficulties and high family expectation could result in more pressure on students and causing a negative psychological effect (Njim and Makebe, 2019).

Students with moderate GPA (3.4–3.0 out of 4) scored higher for burnout compared to peers with a good GPA (4–3.5 out of 4). Also, students who reported regular study more than three hours a day or usually met their academic goals were less prone to have burnout. Similar findings reported that students with GPAs < 4.5 out of 5.0 had higher burnout rates than students with GPAs ≥ 4.5 and lower burnout associated with good academic performance (Almalki et al., 2017; Vidhukumar and Hamza, 2020). The GPA could leave the students under high pressure because of high competition between medical students to join the desired residency program, which could be a sufficient cause for high burnout levels. The majority of respondents were unsatisfied with their current learning experience. This high level of dissatisfaction showed a considerable predictor of the elevated level of burnout. Moreover, online teaching could add to students' burnout and lead to these results. As we mentioned before, no study was performed in UQU that measured burnout before the COVID-19 era, so we cannot be conclusive about the reason behind their dissatisfaction.

The study attempts to determine the burnout prevalence and its related factors during the COVID-19 era. Yet, numerous limitations should be awarded; it involved one university while many universities in the kingdom have different teaching methods and atmospheres, restricting the generalizability of the results. On the contrary, due to the nature of the study design and recruitment method, the study is vulnerable to nonresponse bias, self-reported bias, and confounding biases. However, we minimized them by distributing the survey among all the students, which might help to provide an equal probability, anonymizing students' names and explaining the significance of the study, which might enhance well-reported data and conducting multiple logistic regression for the well-known confounders (age and gender). Finally, future research should investigate some of the issues raised in these limitations. Despite these limitations, the finding is intended to benefit decision-makers in the university to make the learning atmosphere more suitable for healthcare students and to implement appropriate interventions.

This study showed that more than one-third (39.44%) of UQU medical students on the Makkah campus had burnout within the COVID-19 era and academic challenges. This could have a considerable effect on student careers and patient care. Burnout may lead to other mental and physical health problems, such as depression, drug abuse, and alcoholism (Jackson et al., 2016; Koutsimani et al., 2019). Therefore, several mitigations could be implemented to reduce student risk of burnout in UQU medical school. The school may develop a support system to cope with stressors and manage burnout. Strategies that include the engagement process, such as problem-solving, positive reflection, and emotional expression, allow students to adapt, reducing anxiety and depression and their effects on students' mental integrity and physical well-being (Moffat et al., 2004; Park and Adler, 2003; Demerouti et al., 2001). Extracurricular activities, such as physical exercise and music, have been associated with lower levels of burnout and stress in medical students (Fares et al., 2016). This study also showed adequate sleeping, and regular exercise is associated with a low level of burnout, which might help decrease the level of burnout, and this will help students to increase their performance and well-being. Strategies have been shown to significantly reduce burnout among medical doctors (West et al., 2016). The continuous assessment of mental health findings across all years of the curriculum is a critical component of these strategies. Endeavours should be directed toward altering educational and clinical environments to reduce burnout, control stressors, and create better environments in medical college (Frajerman et al., 2019).

We recommend that medical colleges should work on the perspective of burnout detection and management among medical students by creating a program of psychological assessment. The American Medical Association recommended that education in the medical field incorporate programs to aid the health and well-being of learners (Wasson et al., 2016). From this study, aadequate sleep, regular exercising, studying for more than 3 h, or meeting academic goals played an essential role in decreasing the risk of high burnout. Also, a mentorship program is crucial to decrease the burnout risk as this conclusion comes from students who have a physician in their family showing less risk of acquiring burnout.

5. CONCULSION

The burnout rate among Umm Al-Qura medical students is 39.44% level, and it was associated with female students, students with chronic disease, and students with moderate GPA (3.4–3.0). Our study is the first study to estimate the burnout prevalence in UQU and during the COVID-19 era in Saudi Arabia. Therefore, this will help recognize the significance of this result and take further measures to prohibit and decrease burnout among medical students. Further studies should be conducted to specify the association between burnout and its related elements.

Ethical approval

The study was approved by the Ethics and Research Review Committee of Umm Al-Qura University, Faculty of Medicine (Approval number: HAPO-K-012-2021-02-556), Date of approval was Feb 14, 2021.

Author's contribution

Abdulmohsen Alqurashi: Developing the idea and literature review, data collection, analysis, interpretation of the data, manuscript writing, editing and revision of the manuscript. Approved for publication and agreed to take responsibility for the content; Turki Alhassani: Developing the idea and literature review, data collection, interpretation of the data, manuscript writing, editing and revision of the manuscript. Approved for publication and agreed to take responsibility for the content; Emad Alsaeedi: Developing the idea and literature review, data collection, interpretation of the data, manuscript writing, editing and revision of the manuscript. Approved for publication and agreed to take responsibility for the content; Abdulrahman Alhassani: Developing the idea and literature review, data collection, interpretation of the data, manuscript writing, editing and revision of the manuscript. Approved for publication and agreed to take responsibility for the content; Saif Alqurashi: Developing the idea and literature review, data collection, interpretation of the data, manuscript writing, editing and revision of the manuscript. Approved for publication and agreed to take responsibility for the content; Rania Zaini: criticize the idea and develop Study design, result evaluation, manuscript writing, reviewing and editing. Approved for publication and agreed to take responsibility for the content

Abbreviation

UQU, Umm Al-Qura University; COVID-19, coronavirus disease 2019; AOD, Adjusted Odd ratio; CI, Confidence Interval; MBI-SS, Maslach burnout inventory-student survey; EX, Emotional Exhaustion; CY, Cynicism; AE, academic efficacy; SPSS, Statistical Package for the Social Sciences; SD, standard deviation.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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