



# Factors influencing burnout in millennial medical students during the COVID-19 pandemic!

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Received: 11 February 2022 / Accepted: 22 April 2022

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## Abstract

**Background** Burnout among millennial medical students is an important health issue with a possibility of potential professional dissatisfaction. The reason for burnout is multifactorial. The gender of the medical student may play a significant role when choosing a residency specialty and making a career choice. Gender may also influence while establishing the burnout seen in students. Here we tested the association between burnout in medical students based on gender and residency specialty choice during COVID-19.

**Methods** A multicentric cross-sectional study, using a questionnaire-based survey on the items related to gender, educational interest, status, residency aspiration, changes to career aspiration based on gender, and COVID-19 and an indigenous burnout assessment tool that was administered to all the medical students in the study. Reliability and validity of the tool were assessed, and the burnout was calculated for emotional exhaustion, personal achievement, and depersonalization domain.

**Results** A total of 487 medical students (42.5% males, 57.2% females) completed the survey. A higher number of female participants felt that COVID-19 affected their energy levels (68.9%), interest in education (53.2%), and developed reservations about residency specialty of choice (46%); emotional and physical exhaustion ( $2.88 \pm 0.69$  &  $2.34 \pm 0.76$ ) was higher than the male participants ( $3.16 \pm 0.67$  &  $2.75 \pm 0.85$ ).

**Conclusion** More female participants experienced emotional distress, depersonalization or professional disengagement, and psychological and physical stress and exhaustion due to the COVID-19 pandemic. An important association observed in the study was between residency choice and burnout.

**Keywords** Burnout · Emotional exhaustion · Gender · Medical students · Residency specialty choice

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## Introduction

Burnout is an occupational phenomenon, which can be defined as a syndrome resulting from chronic workplace stress that has not been successfully managed. It is one of the common reasons why people contact health services. Though burnout is included in the 11th revision of the International Classification of Diseases, it is not a medical condition. It is a multidimensional phenomenon that is characterized by feelings of exhaustion, enhanced negativity towards one's job, and decreased professional efficacy [1, 2]. It is observed in individuals required to be in close interactions with other people such as individuals in healthcare, students, and/or management [2, 3].

Numerous studies have reported the increase in adverse effects due to burnout in medical professionals at all career stages. This is not just an observation seen in professionals, but it can affect an individual as early as medical school.

Researchers have noted several reasons for a higher incidence of burnout in medical students, which include excessive pressure to excel academically, intense cognitive load and isolation, feelings of apathy, and depersonalizations [4–7].

Many researchers have investigated the origins of burnout in different professions, and some studies have reported that nearly half of all medical students may be suffering from burnout. Many authors, such as Dyrbye et al., have observed that the content of medical knowledge has doubled every 3 months since the early part of 2010, which may be significant to the occurrence of burnout in medical students [5]. In comparison to an attending physician or resident, the medical student has limited responsibilities as the knowledge base and clinical exposure are still evolving, but they are expected to perform at a higher academic level which is often unachievable [6, 7, 24].

The reason for a higher incidence of burnout in medical students is multifactorial spanning between student-level variables to specialty levels. These variables span from emotional intelligence, personality, intellectual ability, lifestyle controllability, expected income, prestige, respect, amount of direct patient care in a particular specialty, and gender [5]; these variables are responsible for medical students' choice of specialty for residency and can act as triggers towards developing burnout in them. The millennial medical students have moved away from primary care medicine and towards specialty medicine, lifestyle controllability, and income are known factors responsible for this trend [5, 10]. Burnout has been well documented in doctors, residents, and medical students, which can be linked with depressive symptoms, suicidal ideation, low self-esteem, unprofessionalism towards work, a higher attrition rate, and low empathy. Based on these observations' burnout may emerge as the single most important psychosocial factor in medical students [8–10]. Adding further psychological factors was the emergence and continuation of COVID-19. This pandemic has been the single most important stressor affecting the medical students in their educational endeavors and quality of education attained; also, they hide their psychological struggles due to the perceived stigma associated with utilizing mental help [11]. All these above factors interplay in the emergence of burnout in medical students.

To date, very few literatures has studied the association between specialty choice aspiration and burnout in medical students; furthermore, no study has linked the association between gender and burnout based on residency choice aspiration during the COVID-19 pandemic [10–14]. As the gender of the medical student may play a significant role while choosing a residency specialty and making a career choice, it can also play a crucial factor when establishing its association with burnout in students, doctors, and residents. The purpose of this study was to investigate the association

between burnout in medical students based on their gender and the choice of specialty residency aspiration during the COVID-19 pandemic.

## Methods

### Participants and design

This was a multicentric cross-sectional survey-based study of the medical students enrolled at medical colleges in the USA, Saudi Arabia, and India. Following the institutional review board approval from all three universities, a secure, anonymous, survey using Survey Monkey was administered to all the students in the medical schools indicated. The study was conducted from March 2021 to July 2021. A non-probability sampling method was used by sending several campus-wide notifications to students, requesting their voluntary participation in the survey study. The study followed the policy determined by strengthening the reporting of observational guidelines for observational studies (STROBE) throughout its duration. A total of 512 respondents completed the survey, 25 respondents did not consent to the study survey and the rest of the 487 respondents who started the survey consented to the study and completed it.

### Exclusion criteria

The students who did not consent to the study were excluded from the data analysis. The incomplete surveys were also excluded.

### Survey content

The survey inquired about the age, gender, family status, the educational status of the parents or guardian, the academic orientation of the household partner, and the kind of support the partner provides during the educational endeavor. The students were then asked a few questions about the factors responsible for them choosing a medical career. Students then answered questions on how COVID-19 has affected them in their educational activities. The students next indicated their choice of residency specialty, and if it has changed post the effects of the COVID-19 pandemic.

The students were required to complete a Burnout Assessment Tool, which was developed using the Maslach Burnout Inventory (MBI) and Oldenburg Burnout Inventory (OBI), which is a validated tool used to measure burnout in medical students [3, 4]. This inventory contains 22 items for MBI, and the OBI contains 16 questions asking the participants who provide care, treatment, service, or instruction, and to rate how often they experience different feelings. We developed an indigenous burnout assessment tool (provided in

the supplementary file), and the questionnaire was divided into three domains (emotional exhaustion (EE), disengagement from work or depersonalization (DP), and personal achievement or accomplishment (PE)). This inventory contains 13 items encompassed by 22 questions (*5 items in EE domain, 4 items each in DP and PE domain*) and are scored on a Likert scale ranging from strongly agree to strongly disagree (4-point Likert scale). The survey which was to be used for this research was validated by people working in the healthcare field and those best equipped to provide feedback regarding any bias, misrepresentation, or misinterpretation of the hypothesis. The feedback provided by the reviewers was utilized in improving and validating the survey. The survey was also piloted before administering to students. Once both the procedures were satisfactorily performed, the survey was then used for this research study.

### Residency specialty

In addition to the survey, participants were also asked questions about their residency choice from several options provided. The participants were required to choose the residency specialty of choice they wished to pursue and indicate if that choice would be different if they were of the opposite gender and if their choice has changed since the COVID-19 pandemic. The participants were also asked about their preferred workplace.

### Internal consistency of survey

Cronbach's alpha was used to determine the internal consistency of all the modified OBI inventory questions. Reliability scores of 0.7 or higher were accepted for the study.

### Data collection and analysis

All the responses and data from the anonymous web-based survey were exported to Microsoft excel 365 and were stored using encryption and security for protecting privacy. Baseline characteristics of the results were summarized using the mean and standard deviation for burnout questions. The summary statistics of the demographic survey items were reported using numbers and percentages or means scores and standard deviations. One-way ANOVA was used to compare quantitative data. To simplify the reporting of the results, participants' perception of burnout items received on 4-point Likert scale, percent agreement (strongly agree + agree), and percent disagreement (strongly disagree + disagree) categories were combined. Independent sample *t*-tests were performed to determine the significant differences between the male and female participants' scores for the Burnout assessment Tool survey items. This tool consisted of the Emotional Exhaustion, Professional Achievement, and

Depersonalization domain. All the analyses were performed using SPSS (Statistical Package for Social Science) v25 (IBM Corporation, NY).

## Results

### Reliability of study

The internal reliability of the survey items used in this study was compared with previous reliable data found in several literatures. The Cronbach's alpha obtained for this study was 0.72, 0.81, and 0.72 for the three categories of items which were emotional exhaustion, depersonalization, and professional efficacy. These values are similar to Cronbach's alpha (being 0.76, 0.90, and 0.76) observed in a study by Dyrbye et al. [17] and (0.76, 0.85, and 0.76) by Jumat et al. [2].

**Demographic statistics** This study was distributed to medical students of three different universities in the USA, the Middle East, and India. A total of 487 medical students participated in the survey at all time points, 207(42.5%) students were male, and 280 students (57.5%) were females. The various demographic details are shown in Table 1. Most of the participants in both groups were in the age group of 27 and younger (77.8% and 86.1%). All the information in this study is self-reported by the participants. The majority of participants in both groups agreed that their spouse/partner are academically oriented (90.0% and 82.1%) and fully supportive of their educational needs (95.9% and 98.7%). However, a significant percentage of female participants felt that their partners are not academically oriented themselves but were supportive of the educational requirements or needs of the participant.

### Descriptive and univariate items

Table 2 represents the descriptive data for study variables for the entire sample for the career choice aspiration based on gender, choice of residency, the motivation behind the choice of residency and career path, and the effect of the COVID-19 pandemic on their personal life. We found a higher percentage of female (68.9) participants compared to male (46.9) participants who felt that the COVID-19 pandemic affected their energy levels ( $p < 0.000$ ) and 53.2% of females compared to 38.6% of males felt that COVID-19 had affected their interest in educational activities ( $p < 0.001$ ). Our analysis determined that a significant percentage of female participants (46.0%) had doubts about their ability to succeed in their specialty when compared with male participants (32.4%) ( $p < 0.003$ ). Another interesting observation was that a remarkably high percentage of male (99.0%) and female (98.6%) participants were inspired by the ability of

**Table 1** Showing the demographic data of participants

	Male (%)	Female (%)
<b>Participants' number</b>	<b>207 (42.5%)</b>	<b>280 (57.5%)</b>
<b>Group</b>		
US Medical School	53.6%	39.3%
Middle East Medical School	21.3%	32.1%
International Medical Schools	25.11%	28.6%
<b>Age</b>		
27 years and younger	77.8%	86.1%
28 years and older	22.2%	13.9%
<b>Family status</b>		
Single	68.9%	76.0%
Married	17.3%	12.8%
Divorced	2.0%	1.2%
In partnership	11.7%	10.0%
First generation	16.9%	16.4%
<b>Spouse/partner is academically oriented</b>		
Yes	90.0%	82.1%
No	5.5%	14.5%
Don't know	4.5%	3.4%
Not applicable	46.9%	48.2%
<b>Spouse/partner is fully supportive of my educational needs/endeavors</b>		
Yes	95.9%	98.7%
No	3.3%	0.0
Don't know	0.8%	1.3%
Not applicable	41.5%	46.1%

medical professionals to help improve people's health and to have occupational independence. Though statistically insignificant, a higher percentage of female (34.8%) participants chose a primary care residency as their preferred choice with private practice (36.6%) rather than a hospital placement as their desired place of occupation.

### Multivariate comparisons

Table 3 represents the results from the student's survey for the Burnout assessment tool; the study indicated that the items demonstrating the emotional and physical exhaustion in females (item 1:  $2.88 \pm 0.69$ , item 2:  $2.34 \pm 0.76$ ) were significantly higher than the male participants (item 1:  $3.16 \pm 0.67$ , item 2:  $2.75 \pm 0.85$ ). The other item demonstrating the emotional domain indicated that the female participants required more time away from work to feel refreshed ( $3.52 \pm 0.60$  in females versus  $3.32 \pm 0.69$  in males). Also, the item demonstrating the depersonalization was significantly higher in female participants when compared to male participants ( $1.65 \pm 0.62$  versus  $1.47 \pm 0.68$ ). The other observation made in the study analysis was, a

greater number of male participants felt that they were energized and emotionally stable during school in comparison to female participants ( $2.85 \pm 0.71$  versus  $2.59 \pm 0.71$ ).

### Discussions

This cross-sectional study investigated the prevalence of burnout in medical students and explored the association between the prevalence of burnout based on gender, the support system available during their educational endeavors, and the effect of the COVID-19 pandemic on their energy, residency choice, specialty choice, and workplace preference. Our findings indicate that the medical students suffer from burnout in one or the other domain and might be associated with their family educational background, the support system available to them, the marital status and spousal support, and the choice of residency they aspire to enter after medical school. Similar observations have been reported by Enoch et al., who observed the association between burnout and controllable lifestyle involving family support (OR = 1.77, 95% confidence interval), income, and specialty residency choice (OR = 0.56, 95% confidence interval) [10].

A principal factor that was associated with burnout in our study was the gender of the participants, specifically females. The univariate or descriptive variables suggest a higher percentage of female participants are doubtful about their career choice or future aspirations. Similar findings were observed by Liang et al. and Bustran et al., who observed a significant percentage of females doubtful about the residency specialty choice ( $n = 114/172$ , 66.3% changed the specialty) [28, 29]. These associations were found in a few variables. As COVID-19 is a recent pandemic affecting populations all over the globe, the evidence indicating the association between COVID-19 stressors and its effect on energy in the individual and the impact it may have on educational activities is limited and has not yet been reported. Further study may be required to clarify the association of COVID-related stress and its impact on educational activities and energy in medical students [30].

Furthermore, our study has demonstrated a higher percentage of female participants felt that they have doubts about their success in the specialty field of choice (Bustran et al., 64.8% who changed their residency), but a significantly higher percentage of male participants were interested to pursue a career in academic medicine in comparison to female participants. In our study, a significant percentage of female participants chose a specialty residency choice in comparison to primary care, which signifies that the effort and dedication during medical school will be tremendous, which, should have an impact on their emotional aspect and professional efficacy. This is an important variable that has not been looked at extensively but does merit some detailed

**Table 2** Participants responses to Career Choice Aspirations

Questions	Male (%)	Female (%)	p value
I was advised by parents or others to choose this field	47.3%	45.4%	0.664
I was motivated by the level of earning potential in this field	79.7%	77.1%	0.497
I was inspired by occupational independence choices	93.2%	91.4%	0.462
I chose this field because of the good social position of fraternity in the community	60.4%	55.7%	0.302
I chose this field because of the ability to help people improve their health	99.0%	98.6%	0.647
COVID-19 has adversely affected my energy level	46.9%	68.9%	0.000
COVID-19 has adversely affected my interest in educational activities	38.6%	53.2%	0.001
COVID-19 has adversely affected my progress in career goals	42.0%	46.8%	0.297
Desired residency placement after completing school			
Primary care	30.2%	34.8%	0.295
Specialty care	69.8	65.2	
Desired post-residency type			
Private practice	34.3%	36.6%	
Hospital staff	31.9	32.6	
Commercial medicine	1.5	0.7	0.123
Academic medicine	6.9	2.2	
Don't know	25.5	27.9	
I took advice from a physician about my future residency/job profile choice	57.8%	58.0%	0.978
I have doubts about my ability to succeed in my specialty field of choice	32.4%	46.0%	0.003
My residency subject choice would be different if I were a member of the opposite sex	11.8%	16.3%	0.161
I think it is possible to teach medicine, do clinical practice, and be involved in research concurrently	78.9%	75.4%	0.361
The COVID-19 pandemic changed my choice of residency placement that I wanted to apply for?	8.3%	4.3%	0.070

analysis. One must make an important consideration when interpreting these results, as the directionality of the association of varied factors cannot be determined statistically but can be done so logically. Thus, although it is logical to assume that medical students in general experience some

amount of burnout, what is debatable is: does the student's choice of residency cause burnout or does burnout drive the choice of residency?

Other studies have reported a significant prevalence of burnout in the medical profession (Prins et al., 18–20%

**Table 3** Participants' responses to burnout questions (items quoted in the supplemental file)

Questions	Strongly agree/agree	Disagree/strongly disagree	Strongly agree/agree	Disagree/strongly disagree	Male (Mean ± SD)	Female (Mean ± SD)	p value
EE domain	88.4%	11.6%	76.5%	23.5%	3.16 ± 0.67	2.88 ± 0.69	0.000
EE domain	64.6%	35.4%	42.2%	57.8%	2.75 ± 0.85	2.34 ± 0.76	0.000
EE domain	89.4%	10.6%	95.9%	4.1%	3.32 ± 0.69	3.52 ± 0.60	0.001
EE domain	46.5%	53.5%	43.7%	56.3%	2.49 ± 0.88	2.47 ± 0.76	0.763
EE domain	8.6%	91.4%	9.7%	90.3%	1.54 ± 0.67	1.67 ± 0.71	0.050
PA domain	84.8%	15.2%	84%	16%	3.08 ± 0.71	3.03 ± 0.62	0.456
PA domain	70.2%	29.8%	74.3%	25.7%	2.79 ± 0.69	2.90 ± 0.68	0.098
PA domain	75.3%	24.7%	57.8%	42.2%	2.85 ± 0.71	2.59 ± 0.71	0.000
PA domain	67.2%	32.8%	69.8%	30.2%	2.80 ± 0.90	2.88 ± 0.82	0.280
DP domain	25.3%	74.7%	26.5%	73.5%	2.12 ± 0.83	2.10 ± 0.78	0.787
DP domain	8.6%	91.4%	7.1%	92.9%	1.47 ± 0.68	1.65 ± 0.62	0.003
DP domain	18.7%	81.3%	9.7%	90.3%	1.79 ± 0.85	1.63 ± 0.69	0.034
DP domain	10.6%	89.4%	8.6%	91.4%	1.56 ± 0.68	1.65 ± 0.68	0.183

Values in mean ± standard deviation (Mean ± SD). The percentage for Likert scale

EE emotional exhaustion, PA professional/personal achievement domain, DP depersonalization domain



and Cecil et al., 26.7%). Our study indicates that burnout exists in this study sample with a substantial number of participants indicating a higher level of impact on an emotional domain. Our study observed that a higher percentage of female participants indicated burnout in most of the items in an emotional domain when compared to their male counterparts. This variable has given inconsistent results as some studies indicate no association between burnout and gender, but other studies have differing views. The studies by Worly et al. and Alberti et al. have observed that female participants are more likely to report emotional exhaustion ( $15.6 \pm 5.9$  versus  $14.4 \pm 5.9$ ,  $p < 0.013$ ); females are more likely to report depersonalization effect when compared to male counterparts ( $9.0 \pm 4.4$  versus  $7.6 \pm 3.8$ ,  $p < 0.001$ ); and younger physicians are more likely to burnout in comparison to older physicians [15–19]. Our study also observed that a considerable proportion of male participants were able to handle the emotional stress better than their female counterparts and were also more energized and focused during medical school compared to female participants [20]. Similar observations have been reported by Cecil et al., who reported a higher percentage of burnout in EE (54.8%) and DP domain (34%), and Paro et al. (Empathy concern scores Males,  $r = -0.3$ ;  $p < 0.001$ ) depersonalization scores ( $r = -0.3$ ;  $p < 0.001$ ). This observation may be associated with the demographic data suggesting a higher percentage of female participants felt that their spouse is not academically oriented or was living alone and lacking a support system. These factors can play a significant role in the ability to handle emotional survival, the feeling of depersonalization, and the ability towards personal accomplishment. Other studies such as Colliver et al. or Thomas et al. have found a significant increase in emotional exhaustion and a decrease in personal accomplishment in female participants [21–25].

## Conclusion

Altogether, our study indicates that millennial females and male medical students may experience stress and burnout during their academic endeavors, which is a principal factor affecting their academic performance and future career aspirations. In many cases, the results are akin but in others, they may be significantly higher in one gender compared to another. Female participants experienced a higher percentage of emotional distress, depersonalization or professional disengagement, and psychological and physical stress and exhaustion due to the COVID-19 pandemic. The most important association that can be observed in the study was between residency choice and burnout. A significant percentage of female participants wanted to enter competitive specialty residency in comparison to primary care and the female participants also scored higher on the emotional

domain or depersonalization domain in the burnout assessment questionnaire in comparison to male participants. What is important is to further analyze longitudinally the association of medical residency and gender on the burnout of medical students entering specific specialty residencies. While identifying the burnout and the several domains affected is important, the next step should be able to better understand the reasons for those effects and how can we better equip the students to overcome these shortcomings. One way to decrease the incidence of burnout is by including programs for mental health in the medical curriculum, spreading awareness about burnout in medical students and aspirants, indulging in personal interests often, maintaining a work-life balance, and adapting coping mechanisms when faced with stressors [25–27].

## Limitations

Our study has certain limitations: the data was gathered at a particular point in time and not over an entire academic year and there was no follow-up survey to assess the feeling for descriptive or multivariable items. We recognize that this study focuses on the burnout in medical students based on their gender and residency choice, but does not consider the social, geopolitical, psychological, or genetic factors influencing these variables nor the differences in curriculum structure, design, or delivery in their respective medical schools. It also does not consider the differences in admission procedures or pathways taken to enter medical school. The other limitation of this study being online administration leads to a shorter attention span for the participants.

**Supplementary information** The online version contains supplementary material available at <https://doi.org/10.1007/s11845-022-03016-8>.

**Acknowledgements** The authors thank the medical students who volunteered their time and energy to participate in this research. Dr. Meg Wright Sidle, Ph.D., for the support and assistance in the administration of survey and data management.

**Author contribution** All the authors would like to acknowledge that everyone contributed to the study design and in the collection of the survey, analysis, and interpretation of the data. VJ, SD, and JMY conceptualize the plan. VJ, JMY, SD, and BMG wrote the first draft of the article. KP, JMY, VJ, and BMG collected the data and analyzed the results. All the authors (VJ, BMG, SD, KP & JMY) contributed to its administration, discussion, conclusion, and critical revision. All authors approved the final manuscript for submission.

## Declarations

**Ethical approval** This study was reviewed and approved by the institutional review board for exemption.

**Conflict of interest** The authors declare no competing interests.

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