

Mental Health of US Medical Students During the COVID-19 Pandemic



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INTRODUCTION

The coronavirus pandemic has increased mental health distress among health professionals.^{1, 2} Residents, pre-pandemic, already had elevated rates of depression, burnout, and suicide.³ However, there are no studies quantifying the effects of the COVID-19 pandemic on the mental health of medical students in the USA. Our purpose was to conduct a multi-institution survey to assess mental health among US medical students.

METHODS

An online questionnaire was distributed to students enrolled in all 16 allopathic medical institutions located in Washington and New York states between June 17 and July 17, 2020. The questionnaire emphasized questions focused on individual mental health during the first months of the COVID-19 pandemic, between March and April 2020. We assessed for depressive (Patient Health Questionnaire, PHQ-8) and anxiety (Generalized Anxiety Disorder, GAD-7) symptoms, in addition to asking about self-rated mental health compared to before the pandemic on a scale of 0 to 100%. The PHQ-8 was scored as none (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–24), while the GAD-7 was scored using none (0–4), mild (5–9), moderate (10–14), and severe (15 or greater). The linear covariance between depression and anxiety was analyzed using Microsoft Excel and reported as Pearson's correlation coefficient (*R*). This study was approved by the Weill Cornell Medicine Institutional Review Board (IRB# 20-04021790) and follows STROBE guidelines for cross-sectional studies.

RESULTS

A total 1139 completed the survey (Washington: 174, 14%; New York: 1065, 86%; Table 1). Our response rate was 12%. Students who reported symptoms of COVID-19 or who reported a close contact (family member, friend, or romantic partner) with symptoms constituted 40% (*n*=457) of all participants. Approximately 7% (*n*=80) reported a COVID-19-related death of at least one close contact. Most participants (*n*=718, 70%) rated their mental health as worse than baseline following the initial months of the COVID-19 pandemic. One-fifth of respondents (*n*=202, 20%) reported experiencing improved mental health in the initial months of the COVID-19 pandemic.

Depressive and anxiety symptoms were common (Table 2). The majority (61%) of respondents reported experiencing some depressive symptoms, 371 (37%) were mild, 151 (15%) were moderate, 65 (6%) had moderately severe, and 34 (3%) had severe with 250 (24%) meeting criteria for major depression. Similarly, most respondents (58%) reported some symptoms of anxiety: 385 (38%) mild, 130 (13%) moderate, and 68 (7%) severe with 198 (20%) meeting criteria for an anxiety disorder. There was significant correlation between the PHQ-8 and the GAD-7 scores among participants (*R*=0.7, *P*<.001).

DISCUSSION

We found that over two-thirds of medical students who completed our survey believed their mental health had deteriorated following the start of the COVID-19 pandemic, with most students reporting one or more symptoms of depression and anxiety. This suggests that mental health disorders may have been higher during the pandemic than previously reported.⁵ The results of the survey suggest a higher prevalence of major depressive disorder or symptoms of depression among US medical students than previously reported.⁵ This is particularly concerning as this group has previously shown higher prevalence of depression compared to the general population.⁶ Anxiety is common among medical students; previous studies have found that it is diagnosed up to eight times more frequently than in the general US population.⁶ In our study, nearly one out of five US medical students had moderate to severe anxiety symptoms. Our findings also highlight that medical students experienced depression and anxiety

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Table 1 Sample Demographics

	n (%)
No. of respondents	1139
Class year	
Year 1	363 (32)
Year 2	311 (27)
Year 3	298 (26)
Year 4	87 (8)
Graduate studies or research year	62 (5)
Time off/other	17 (2)
Gender	
Woman	830 (66)
Man	385 (31)
Trans	4 (0.3)
Gender queer/non-conforming	19 (2)
Non-binary	7 (0.1)
From a group traditionally underrepresented in medicine*	321 (26)
Specialty of interest	
Anesthesiology	38 (3)
Dermatology	15 (1)
Emergency medicine	98 (9)
Family medicine	62 (5)
Internal medicine	199 (17)
Neurological surgery	12 (1)
Neurology	34 (3)
Obstetrics and gynecology	63 (6)
Orthopedic surgery	33 (3)
Otolaryngology	23 (2)
Pathology	8 (1)
Pediatrics	100 (9)
Physical medicine and rehabilitation	14 (1)
Plastic surgery	8 (1)
Psychiatry	55 (5)
Radiation oncology	7 (1)
Radiology	16 (1)
Surgery	57 (5)
Thoracic surgery	4 (0)
Undecided	275 (24)
Urology	15 (1)
Vascular surgery	2 (0)

*Based on the definition by the Association of American Medical Colleges⁴

symptoms at a similar rate as frontline workers during the COVID-19 pandemic despite not necessarily being exposed to in-person patient care.⁷ Our study has several limitations. First, our response rate was low. Second, we solicited participation from the most afflicted areas during the study period. Third, baseline PHQ-8 and GAD-7 scores were not obtained, and policy changes affecting daily life continued well beyond the date of data collection. Our study raises concern about mental health issues as medical students become residents and enter the workforce. More research and support for medical student and

Table 2 Mental Health Questionnaires Scores

Question	n (%)
Patient Health Questionnaire-8	1013
None	394 (39)
Mild	371 (37)
Moderate	151 (15)
Moderately severe	64 (6)
Severe	34 (3)
Questions	
Reduced interest	605 (60)
Feeling down	635 (63)
Sleep alterations	577 (79)
Feeling tired	625 (86)
Changes in appetite	483 (64)
Feelings of guilt	386 (53)
Difficulty concentrating	540 (74)
Feeling slow or restless	136 (19)
General Anxiety Disorder Questionnaire-7	1011
None	429 (42)
Mild	385 (38)
Moderate	130 (13)
Severe	68 (7)
Questions	
Feeling nervous	818 (81)
Non-stop worrying	559 (55)
Worrying about different things	682 (68)
Trouble relaxing	684 (68)
Feeling restless	324 (32)
Easily annoyed or irritated	668 (66)
Afraid of awful things happening	504 (50)

resident mental health is needed, particularly in the wake of the COVID-19 pandemic.

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REFERENCES

1. **Rossi R, Soggi V, Pacitti F, et al.** Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open.* 2020;3(5):e2010185. doi:<https://doi.org/10.1001/jamanetworkopen.2020.10185>
2. **Pearman A, Hughes ML, Smith EL, Neupert SD.** Mental Health Challenges of United States Healthcare Professionals During COVID-19. *Front Psychol.* 2020;11:2065. doi:<https://doi.org/10.3389/fpsyg.2020.02065>
3. **Schernhammer E.** Taking Their Own Lives – the High Rate of Physician Suicide. *N Engl J Med.* 2005;352(24):2473-2476. doi:<https://doi.org/10.1056/NEJMp058014>
4. Underrepresented in Medicine Definition. Association of American Medical Colleges. <https://www.aamc.org/what-we-do/mission-areas/diversity-inclusion/underrepresented-in-medicine> Accessed 01 Jun 2021.
5. **Rotenstein LS, Ramos MA, Torre M, et al.** Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: a Systematic Review and Meta-analysis. *JAMA.* 2016;316(21):2214-2236. doi:<https://doi.org/10.1001/jama.2016.17324>
6. **Mousa OY, Dhamoon MS, Lander S, Dhamoon AS.** The MD Blues: Under-Recognized Depression and Anxiety in Medical Trainees. *PLoS One.* 2016;11(6):e0156554. doi:<https://doi.org/10.1371/journal.pone.0156554>
7. **Hennein R, Mew EJ, Lowe SR.** Socio-Ecological Predictors of Mental Health Outcomes Among Healthcare Workers During the COVID-19 Pandemic in the United States. *PLoS One.* 2021;16(2):e0246602. doi:<https://doi.org/10.1371/journal.pone.0246602>

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