



THE PRIMARY CARE COMPANION FOR CNS DISORDERS

Supplementary Material

Article Title: Mental Health Symptoms Among US Medical School Applicants During the COVID-19 Pandemic

Author(s): Matthew P. Light, MD; Deepti Gunge, BS; Jamie Nicole LaBuzetta, MD, MSc, MPh^c; Ira Advani, BS; Laura E. Crotty Alexander, MD; and Biren B. Kamdar, MD, MBA, MHS

DOI Number: <https://doi.org/10.4088/PCC.20br03024>

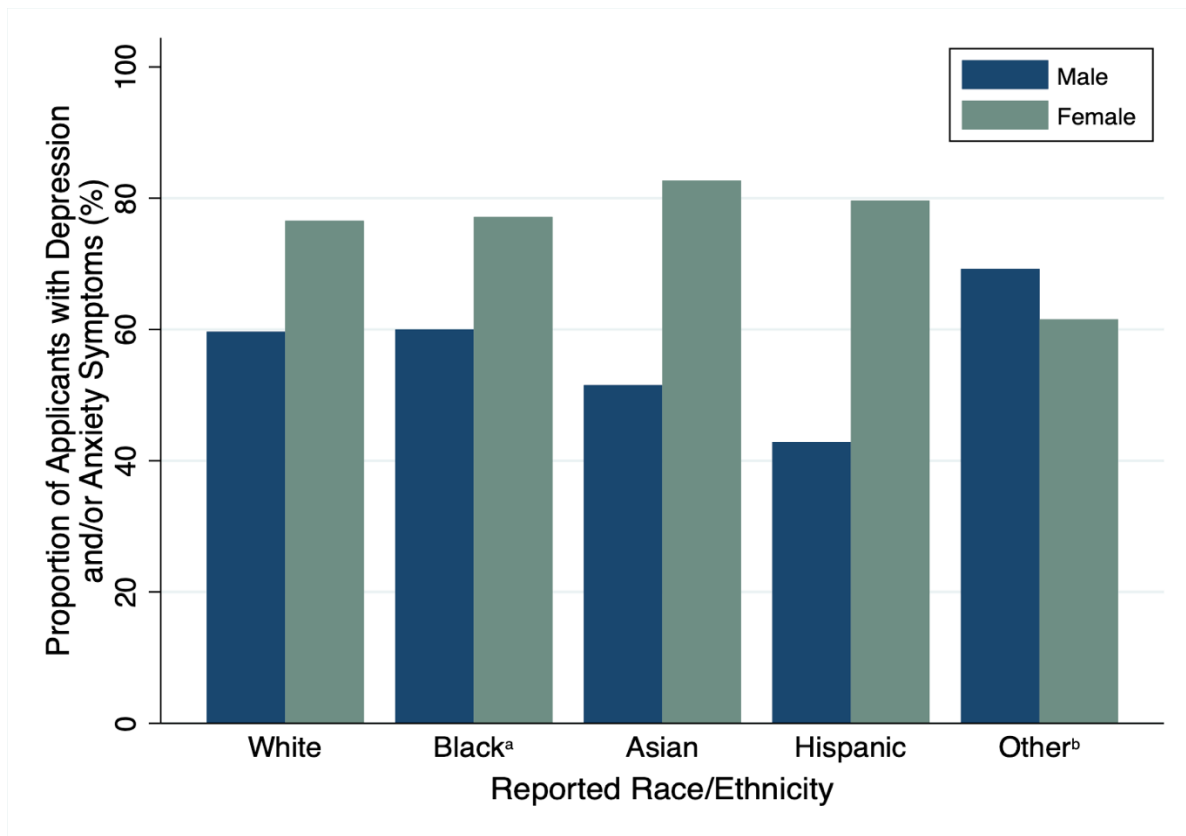
List of Supplementary Material for the article

1. [Supplementary Figure 1](#)
2. [Appendix 1: Survey Distribution](#)
3. [Appendix 2: Survey](#)
4. [Appendix 3: Depression and Anxiety Scoring](#)

Disclaimer

This Supplementary Material has been provided by the author(s) as an enhancement to the published article. It has been approved by peer review; however, it has undergone neither editing nor formatting by in-house editorial staff. The material is presented in the manner supplied by the author.

Supplementary Figure 1. Major Depressive Disorder (MDD) and/or Generalized Anxiety Disorder (GAD) symptoms among medical school applicants completing the Patient Health Questionnaire (PHQ-9) and Hospital Anxiety and Depression Scale–Anxiety subscale (HADS-A), stratified by race/ethnicity and sex. Bars represents the proportion of respondents within each sub-category.



^a Black or African American

^b Includes Native American, Pacific Islander, Middle Eastern/North African, biracial/mixed/other/unknown

Appendix 1. Survey Distribution

We posted a link to our survey on popular prehealth and premedical applicant group pages using the following social media platforms: Facebook (Menlo Park, CA), Twitter (San Francisco, CA), Reddit (San Francisco, CA), Slack (San Francisco, CA). Posting permission was obtained when necessary. Additionally, 170 college/university prehealth advising and postbaccalaureate program offices were contacted directly via email and asked to distribute the survey to interested students.

Appendix 2. Survey

The survey “The Impact of the COVID-19 Pandemic on US Medical School Applicants” consisted of 54 items. Responses necessary for a survey to be considered complete are indicated as “Essential”. Responses for items with multiple options are provided below each question; all other items involved free text responses. Items 40 and 41-55 correspond to the Patient Health Questionnaire and Hospital Anxiety and Depression Scale, respectively; these surveys were presented in standard fashion.^{1,2}

1. (Essential) Thank you for participating in this research study on the effects of COVID-19 on health care field applicants. As described in the Informed Consent, all research data from this online survey is anonymous and will be kept confidential. Please click "I agree to participate" to start this UCSD IRB approved survey. No provider will review your data from this survey in the coming days. If you are feeling very stressed, anxious and/or depressed, please contact your therapist, mental health provider, or primary care physician. If you are feeling suicidal, please call the national suicide hotline.

I agree to participate

I'm not interested in participating in this survey (this will end the survey)

2. (Essential) What is your age?

3. (Essential) To which gender identity do you most identify with? (choose 1)

Female

Male

Transgender female

Transgender male

Gender variant/non-conforming

Prefer not to answer

Not listed (please specify)

4. (Essential) What is your race or ethnicity?

White or Caucasian

Black or African American

Hispanic or Latino

Asian or Asian American

American Indian or Alaska Native

Native Hawaiian or other Pacific Islander

Prefer not to answer
Other (please specify)

5. Were both of your parents born in the United States?
Yes
No
6. Have you contracted COVID-19?
Yes, and tested positive
No, but I was a person under investigation (PUI)
No
Unsure
7. Have any friends or family members contracted COVID-19?
Yes, and tested positive
No, but I was a person under investigation (PUI)
No
Unsure
8. Are any of your friends or family members frontline healthcare workers caring directly for COVID-19 patients?
Yes
No
Unsure
9. (Essential) What year did you begin your undergraduate education?
10. (Essential) What is your expected or actual year of graduation (undergraduate)?
11. What is the name of the most recent undergraduate college you attend(ed)?
12. (Essential) What is your cumulative undergraduate GPA (unweighted)?
13. (Essential) If you have already completed your undergraduate education, have you pursued any postgraduate studies? (e.g., postbaccalaureate premedical program, master's program, etc.)
No
Yes - please specify which program(s)
14. Which pre-health entrance examination(s) have you taken, if any? (e.g., None, MCAT, DAT, PCAT)
15. How many times have you taken a pre-health entrance examination? (Please respond using the examination you have taken the most.)
16. (Essential) What is your ideal healthcare profession? Choose one.

Dentist
Dietician or Nutritionist
Hygienist
Nurse
Nurse Practitioner
Optometrist
Pharmacist
Physical or Occupational Therapist
Physician
Physician Assistant
Radiology Technician
Respiratory Therapist
Speech Therapist
Other (please specify)

17. What other careers are you considering? Choose all that apply.

Dentist
Dietician or Nutritionist
Hygienist
Nurse
Nurse Practitioner
Optometrist
Pharmacist
Physical or Occupational Therapist
Physician
Physician Assistant
Radiology Technician
Respiratory Therapist
Speech Therapist
Other (please specify)

18. How will you finance your healthcare education? (Check all that apply)

Student loans
Parental/family assistance
Personal funds
Gift/scholarship
Prefer not to answer
Other (please specify)

19. How competitive do you consider these elements of your pre-health application?

Not competitive
Somewhat competitive
Competitive
Highly competitive
N/A

a) Participation in research

- b) Volunteer experience (non-clinical)
- c) Volunteer experience (clinical)
- d) Shadowing or other clinical experience (including paid positions)
- e) Letters of recommendation

20. I decided to pursue a premedical education:

- Before high school*
- During high school*
- After high school, before college/university*
- During college/university*
- After graduating from college/university*
- Unsure*

21. I decided to pursue a career in medicine:

- Before the COVID-19 pandemic began*
- After the COVID-19 pandemic began*
- Unsure*

22. (Essential) In terms of my motivation to become a physician, the COVID-19 pandemic has made me:

- Much less motivated*
- Less motivated*
- Equally as motivated*
- More motivated*
- Much more motivated*

23. (Essential) In terms of my motivation to apply to medical school, the COVID-19 pandemic has made me:

- Much less motivated*
- Less motivated*
- Equally as motivated*
- More motivated*
- Much more motivated*

24. Prior to the COVID-19 pandemic, I was committed to pursuing a particular medical specialty (e.g., cardiology, neurosurgery, pediatrics, etc.)

- Yes, I had a specific specialty in mind*
- No, I was planning to learn about different options in medical school*

25. Prior to the COVID-19 pandemic, which medical specialties were you considering?
(Please rank three)

- Anesthesiology*
- Cardiology*
- Critical care*
- Dermatology*
- Emergency medicine*

Family medicine
General internal medicine
Infectious disease
Neurology
Obstetrics and gynecology
Oncology
Ophthalmology
Pediatrics
Psychiatry
Pulmonology
Surgery
Other (please specify)

26. The COVID-19 pandemic has made me reconsider my choice of specialty.

Yes
No

27. Which medical specialties are you now considering? (Please rank three)

Anesthesiology
Cardiology
Critical care
Dermatology
Emergency medicine
Family medicine
General internal medicine
Infectious disease
Neurology
Obstetrics and gynecology
Oncology
Ophthalmology
Pediatrics
Psychiatry
Pulmonology
Surgery
Other (please specify)

28. Since the COVID-19 pandemic began, the following people have been ____ regarding my future career in healthcare.

More supportive
No change in support
Less supportive
N/A

- a) Parents/Family
- b) Spouse/Partner
- c) Friends/Peers
- d) Career Mentor(s)

e) Career Counselor(s)

29. My medical school application timeline has been ____ by the COVID-19 pandemic.
Significantly delayed
Somewhat delayed
Unaffected
Somewhat accelerated
Significantly accelerated
30. (Essential) I anticipate the COVID-19 pandemic will:
Add more than 1 gap-year to my timeline
Add 1 gap-year to my timeline
Add less than 1 year to my timeline but not affect my intended application cycle
31. (Essential) I anticipate the COVID-19 pandemic will:
Accelerate my application timeline by more than 1 year
Accelerate my application timeline by 1 year
Reduce the time I need to submit my application but not affect my application cycle
32. (Essential) The quality of my medical school application (i.e., candidacy) has been ____ by the COVID-19 pandemic.
Adversely affected
Unaffected
Enhanced
33. Please explain (briefly) how your application has been enhanced by the COVID-19 pandemic.
34. I am most concerned that the COVID-19 pandemic will adversely affect my application in the following ways (rank up to three):
GPA issue (e.g., I cannot raise my GPA because my college has changed to a pass/ fail system)
MCAT delay
New financial limitations
College graduation delay
Difficulty completing prerequisite coursework
Difficulty obtaining letters of recommendation
Difficulty completing community service/volunteer work
Difficulty completing physician shadowing/clinical observation requirements
Difficulty fulfilling a research commitment
Decreased access to premedical school advisors
35. (Essential) Before the COVID-19 pandemic, I had planned to:
Take more than 1 gap-year
Take 1 gap-year

Start professional school immediately
My plans are undecided

36. Why were you planning on taking one or more gap-years? (Select all that apply)

Financial reasons

Take the MCAT

Improve my MCAT score

Conduct research

Community service/volunteer work

Shadowing/clinical observation

To get another graduate degree

To complete a postbaccalaureate program or additional prerequisite coursework

Other (please specify)

37. (Essential) Because of the COVID-19 pandemic I now plan to:

Take an additional gap-year(s)

Take fewer gap-year(s)

My plans have not changed

My plans are now undecided

38. Why are you now taking an additional gap-year(s)? (Select all that apply)

Financial reasons

Take the MCAT

Improve my MCAT score

Conduct research

Community service/volunteer work

Shadowing/clinical observation

To get another graduate degree

To complete a postbaccalaureate program or additional prerequisite coursework

Other (please specify)

39. Please explain (briefly) why you are taking fewer gap-year(s) due to the COVID-19 pandemic.

40. Patient Health Questionnaire (PHQ-9).¹

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Not at all

Several days

More than half the days

Nearly every day

- a. Little interest or pleasure in doing things
- b. Feeling down, depressed, or hopeless
- c. Trouble falling or staying asleep, or sleeping too much
- d. Feeling tired or having little energy
- e. Poor appetite or overeating

- f. Feeling bad about yourself - or that you are a failure or have let yourself or your family down
- g. Trouble concentrating on things, such as reading the newspaper or watching television
- h. Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual
- i. Thoughts that you would be better off dead, or of hurting yourself

41-54. Hospital Anxiety and Depression Scale (HADS)² (questions used for HADS-A anxiety score highlighted in **bold**)

In the following questions, please tick the box beside the reply that is closest to how you have been feeling in the past week.

41. I feel tense or "wound up":

- Most of the time*
- A lot of the time*
- From time to time, occasionally*
- Not at all*

42. I still enjoy the things I used to enjoy:

- Definitely as much*
- Not quite so much*
- Only a little*
- Hardly at all*

43. I get a sort of frightened feeling as if something awful is about to happen:

- Very definitely and quite badly*
- Yes, but not too badly*
- A little, but it doesn't worry me*
- Not at all*

44. I can laugh and see the funny side of things:

- As much as I always could*
- Not quite so much now*
- Definitely not so much now*
- Not at all*

45. Worrying thoughts go through my mind:

- A great deal of the time*
- A lot of the time*
- From time to time, but not too often*
- Only occasionally*

46. I feel cheerful:

- Not at all*

Not often
Sometimes
Most of the time

47. I can sit at ease and feel relaxed:

Definitely
Usually
Not often
Not at all

48. I feel as if I am slowed down:

Nearly all the time
Very often
Sometimes
Not at all

49. I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all
Occasionally
Quite often
Very often

50. I have lost interest in my appearance:

Definitely
I don't take as much care as I should
I may not take quite as much care
I take just as much care as ever

51. I feel restless as I have to be on the move:

Very much indeed
Quite a lot
Not very much
Not at all

52. I look forward with enjoyment to things:

As much as I ever did
Rather less than I used to
Definitely less than I used to
Hardly at all

53. I get sudden feelings of panic:

Very often indeed
Quite often
Not very often
Not at all

54. I can enjoy a good book or radio or TV program:

Often

Sometimes

Not often

Very seldom

Appendix 3. Depression and Anxiety Scoring

Depression was assessed using the Patient Health Questionnaire (PHQ-9),¹ with the presence of major depressive disorder (MDD) symptoms defined as having 5 of 9 PHQ items with a score ≥ 2 including either item #1 (anhedonia), and/or item #2 (feeling depressed).³ Generalized anxiety disorder (GAD) was evaluated using the Hospital Anxiety and Depression Scale-Anxiety subscale (HADS-A), with a score of ≥ 8 indicating GAD symptoms.²

REFERENCES

1. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606-613.
2. Olsson I, Mykletun A, Dahl AA. The Hospital Anxiety and Depression Rating Scale: a cross-sectional study of psychometrics and case finding abilities in general practice. *BMC Psychiatry.* 2005;5:46.
3. Fang DZ, Young CB, Golshan S, Fellows I, Moutier C, Zisook S. Depression in premedical undergraduates:a cross-sectional survey. *Prim Care Companion J Clin Psychiatry.* 2010;12(6).