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Authors

Lee, Kelly C
Huang, Robin
Tal, Ilanit R
[et al.](#)

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RESEARCH

Comparison of Suicidal Ideation and Depressive Symptoms Between Medical and Pharmacy Students

Kelly C. Lee, PharmD, MAS,^a Robin Huang, PharmD,^b Ilanit R. Tal, PhD,^c Nancy Downs, MD,^c Sidney Zisook, MD^c

^a University of California San Diego, Skaggs School of Pharmacy and Pharmaceutical Sciences, La Jolla, California

^b VA Loma Linda Healthcare System, Loma Linda, California

^c University of California San Diego, School of Medicine, La Jolla, California

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Objective. The purpose of the study was to compare suicidal ideation among medical and pharmacy students and characterize related symptoms.

Methods. The authors conducted a cross-sectional, retrospective study to compare suicidal ideation among medical and pharmacy students at a single public university during 2009 to 2020. Respondents' voluntary and anonymous responses to the Interactive Screening Program (ISP) Stress and Depression Questionnaire are reported.

Results. The authors analyzed responses from 619 medical and 214 pharmacy students collected over 11 academic years. There was no significant difference between medical and pharmacy students who endorsed suicidal ideation (13.5% vs 17.3%, respectively). The Patient Health Questionnaire-9 (PHQ-9) scores were significantly different between medical and pharmacy students, with more pharmacy students reporting moderate to severe depression (24.3% for medical vs 35.1% for pharmacy). Compared to medical students, more pharmacy students also endorsed anhedonia, a reduced capacity for pleasure (13.4% vs 24.3%, respectively), sleep problems (29.6% vs 42.6%, respectively), and fatigue (46% vs 64.4%, respectively). Pharmacy students also reported more intense affective states such as "feeling your life is too stressful" and "feeling intensely anxious or having anxiety attacks." Relationships and physical/mental health/substance abuse were common themes that emerged from the qualitative data.

Conclusion. While there was no significant difference in suicidal ideation between pharmacy and medical students, the prevalence is alarming compared to the general population. More pharmacy students endorsed symptoms of depression and intense affective states that could impair functioning. Future studies may focus on mitigation strategies for suicidal ideation among health professions students.

Keywords: suicidal ideation, pharmacy, medical, students, depression

INTRODUCTION

In 2020, suicide was the 12th leading cause of death in the United States.¹ In the same year, 47,511 Americans died by suicide, and there were an estimated 1,400,000 suicide attempts.^{1,2} Rates of suicide have steadily increased from 1999 to 2017,³ and suicide is the second-leading cause of death among young adults between the ages of 25 to 34. Depression is a major risk factor for suicide; in a meta-analysis, the prevalence of depression and suicidal ideation among medical students have been estimated to be 27%

(95% CI, 24.7%-29.9%) and 11% (95% CI, 9.0%-13.7%), respectively.⁴ This is significantly higher than the national prevalence of 4.7% and 4% for depression and suicidal ideation, respectively, among adults in the United States.⁵ In a cross-sectional study of medical and pharmacy students during one academic year, 18% of students met diagnostic criteria for depression.⁶ In the same study, more pharmacy students met diagnostic criteria for anxiety and had higher levels of stigma toward mental health treatment.⁶ A recent study among pharmacy students showed that one in four pharmacy students reported moderate to severe symptoms of depression and anxiety.⁷ While rates of depression and stress levels among health professions students have been reported,^{6,8} there are currently no studies comparing suicidal ideation, thoughts, or behaviors between medical and

Corresponding Author: Kelly C. Lee, University of California San Diego, Skaggs School of Pharmacy and Pharmaceutical Sciences, 9500 Gilman Dr., La Jolla, CA 92093-0657.
Tel: 858-822-3462. Email: kellylee@health.ucsd.edu

pharmacy students. In addition, there is limited data for these two cohorts on other known conditions related to suicide risk, such as hopelessness, helplessness, despair, loneliness, and intense affective states.

Clinician burnout, depression, and suicidality have garnered national attention along with urgent calls to prioritize clinician emotional and mental health.⁹ At the University of California, San Diego (UCSD), the Healer Education Assessment and Referral (HEAR) program was established in 2008 to destigmatize mental health care and prevent suicide among medical and pharmacy students, trainees, and faculty.¹⁰ Implementing the American Foundation for Suicide Prevention's Interactive Screening Program (ISP), the HEAR program proactively and anonymously screens for suicide risk as a means to provide prompt confidential referrals to those in need. The questionnaire collects information on participants' mental health, evidence-based suicide risk factors, and current mental health treatment.

We aimed to compare suicidal ideation, thoughts, planning, and behaviors between medical and pharmacy students from anonymous data that were collected between 2009 and 2020. In addition, depressive symptoms, intense affective states, substance use, and eating-related behaviors were also examined. We also evaluated the qualitative free responses and compared themes for potential stressors associated with depression and suicidal ideation between the two groups. To our knowledge, this is the first study to compare the rates of suicidal ideation, thoughts, planning, and behaviors and associated features between medical and pharmacy students at a health sciences campus.

METHODS

We conducted a cross-sectional, retrospective study of the ISP Stress and Depression Questionnaire data that were collected by HEAR counselors between 2009 and 2020. Our study's authors were not involved in the administration of the surveys, and no identifiable information was collected. The study was approved by the UCSD Human Subjects Research Protections office.

Participants in this study were limited to medical and pharmacy students in all levels enrolled between 2009 and 2020. The entering annual budgeted enrollment sizes for medical and pharmacy students during this period were 137 for medical and 60 for pharmacy students. We excluded those who did not complete the survey, who completed the survey more than once, or who reported incongruent demographic information (eg, age less than feasible for medical and pharmacy students) identified during data cleaning. No additional exclusion criteria applied, such as previous mental or physical health problems, age, or race.

The Interactive Screening Program (ISP) Stress and Depression Questionnaire is an anonymous questionnaire completed online by the student. The ISP has been identified by the Suicide Prevention Resource Center Best Practices Registry for Suicide Prevention for identifying students in or verging on suicide or depression.¹¹ Since 2008, the HEAR committee has administered the ISP Stress and Depression Questionnaire to all faculty and students at the schools of medicine and pharmacy on an annual (January of each year) and voluntary basis. The questionnaire includes items modified from the Patient Health Questionnaire-9 (PHQ-9),¹² as well as questions surrounding anxiety, suicidal ideation, medication, and substance use and eating behaviors.

Suicidal ideation was measured using four questions, asking respondents whether they had thoughts about taking their own life, planned ways of taking their own life, done things to hurt themselves, and had thoughts of death or physically harming themselves (this last question was taken from the PHQ-9 suicide ideation measure). Students were grouped into two categories, suicidal or nonsuicidal, with students classified as suicidal if they endorsed even one of the four items in the previous two weeks. Endorsement was defined as responding "some of the time," "a lot of the time," or "most of the time." An additional item asked participants to answer yes or no as to whether they had ever had a past suicide attempt.

The PHQ-9 is a commonly used instrument for screening, monitoring, and measuring the severity of depression.¹² This questionnaire consists of nine questions that incorporate diagnostic criteria and major signs or symptoms of depression from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).¹³ The PHQ-9 scores range from 0-27, where cutoffs for scoring for depression severity are as follows: 0-4 (none), 5-9 (mild), 10-14 (moderate), 15-19 (moderately severe), and 20-27 (severe). The ISP uses the PHQ-9 questions but changed the response scale (0="not at all," 1="several days," 2="more than half the days," 3="nearly every day") to be consistent with the rest of the ISP questionnaire items (0="not at all," 1="some of the time," 2="a lot of the time," 3="most or all of the time"). The PHQ-8 represents all of the PHQ-9 questions without the suicidality item, which was used for the analysis of suicidal ideation.

In addition to the PHQ-9, students were asked 10 questions about intense affective states, including anxiety, irritability, feeling intensely lonely or angry, and feeling hopeless or "out of control." Students were asked, "During the last 4 weeks, how often have you been bothered by any of the following?" with response options of "not at all," "some of the time," "a lot of the time," and "most of the

time.” Endorsement was defined as responding to “a lot of the time” or “most of the time.”

Students were also asked four questions about substance use using the stem, “During the last 4 weeks have you experienced any of the following?” and the Likert scale, “not at all,” “some of the time,” “a lot of the time,” and “most or all of the time,” where any positive response other than “not at all” were considered endorsement. Students were asked three questions about unhealthy eating behaviors or thoughts using the same Likert scale. Finally, students were asked about current mental health treatments. A series of demographic questions at the end of the survey gathered information on age, race, gender, school (medical vs pharmacy), and year in school.

The ISP Stress and Depression Questionnaire was emailed to the school email addresses of all students attending either the medical or pharmacy school (regardless of year of study) during fall or winter quarter of each year during 2009 through 2020. Students were not required or given an incentive to complete the survey but were informed of the potential positive outcomes that could result in their honest participation, including receiving a personalized risk analysis and option to engage anonymously with a program counselor. If the risk analysis indicated a high risk for suicidality, a program counselor would reach out to the student through an anonymous portal to provide assistance (counseling, referral). For such a program to be successful, the need for screening and identifying individuals at risk for suicidality is balanced by the need for anonymity of disclosing such sensitive information. All information received was kept anonymous through a unique identifier that the participant created upon completion of the survey.

A section for free responses was available for students to explain any stressful situations the student might have been experiencing during that time in school. The free-text responses included the prompt, “Please take a minute to let us know about anything that has been particularly stressful for you lately – death of a loved one, relationship break-up, academic stressors, family or money problems, difficulty with your living situation – or anything else that might be contributing to how you are feeling.” Two investigators coded the free-text responses independently using a predetermined set of themes. During the coding process, additional themes emerged which were then used to recode the free text responses.

Group comparisons were exploratory and analyzed using *t* test and chi-square/Fisher exact tests for linear and nominal data, respectively. Qualitative data were analyzed using Microsoft Excel. All quantitative data were analyzed using SPSS version 25 (IBM Corp).

RESULTS

Quantitative Data

A total of 833 (619 medical and 214 pharmacy) students responded to the ISP Stress and Depression Questionnaire during 2009-2020. The response rates for medical and pharmacy students were 30.1% (619/2057) and 25.5% (214/840), respectively. We excluded responses from 22 medical and 12 pharmacy students due to repeat submissions or incongruence to program and year, which reduced our sample to 799 student responses (597 medical, 202 pharmacy students). There were a higher percentage of female student respondents in the pharmacy school compared to medical school (79% vs 58%, $F=27.31$, $p<.001$). The average (SD) ages of respondents were 25.6 (3.10) years old for medical students and 24.7 (2.81) years old for pharmacy students ($F=10.98$, $p=.001$) (Table 1). In medical school, White student respondents were predominant (43.5%) versus Asian student respondents in pharmacy school (59.5%) ($F=53.15$, $p<.001$).

We found no significant differences between medical students and pharmacy students with respect to suicidal ideation. Overall, 13.5% ($n=80$) of medical students and 17.3% ($n=35$) of pharmacy students endorsed at least one suicidal ideation item for at least some of the time in the last two weeks ($p=.20$) (Figure 1). There were differences between medical and pharmacy students for the four items related to suicidal ideation; while not significantly different, 11.4% and 15.8% of medical and pharmacy students, respectively, endorsed having self-injurious behavior in the previous two weeks.

The average (SD) PHQ-9 total scores for medical and pharmacy students were 6.68 (4.76) and 8.66 (5.56), respectively ($p<.001$). The average (SD) PHQ-8 total scores (without suicidal ideation item) for medical and pharmacy students were 6.56 (4.53) and 8.39 (5.21), respectively ($p<.001$). More pharmacy students reported having moderate to severe depression (35.1%) than medical students (24.3%, $p=.001$).

There were statistically significant differences in six of eight individual items of the PHQ-8 between medical and pharmacy students (Table 2). For example, more pharmacy students endorsed anhedonia, a reduced capacity for pleasure¹³ (24.3% vs 13.4%, $p=.001$), sleep difficulties (42.6% vs 29.6%, $p=.001$), decreased concentration (30.7% vs 16.9%, $p<.001$), and feeling tired (64.4% vs 46%, $p<.001$), compared to medical students. In general, a greater number of pharmacy students endorsed all symptoms of major depression compared to medical students.

With respect to the intense affective state items, more pharmacy students than medical students endorsed feeling nervous or worrying a lot (41.6% medical, 57.9% pharmacy,

Table 1. Demographics of Medical and Pharmacy Respondents to the ISP Stress and Depression Questionnaire^a

	Medical (n=597)	Pharmacy (n=202)	p value
Age, mean (SD), y	25.6 (3.10)	24.7 (2.81)	.001
Gender, No. (%)			<.001
Female	342 (58)	157 (79)	
Male	249 (42)	43 (21)	
Race/ethnicity, No. (%)			<.001
White (non-Hispanic)	255 (43.5)	47 (23.5)	
Latino American/Hispanic	41 (7.0)	7 (3.5)	
Black or African American	14 (2.4)	1 (0.5)	
Asian or Pacific Islander	183 (31.2)	119 (59.5)	
Other (American Indian, Alaskan Native, Multiracial, other)	81 (13.9)	23 (11.5)	
Prefer not to answer	12 (1.5)	3 (1.5)	
Previously attempted suicide, ^b No. (%)	11 (1.8)	7 (3.5)	.18

^a Missing data represented less than 3% of the total sample in each group except for year in school (58% of pharmacy and 79% of medical students did not report).

^b Previous suicide attempt was indicated by respondents responding yes to the question, “Have you ever made a previous suicide attempt?”

$p < .001$), feeling annoyed (40.3% pharmacy, 25.5% medical, $p < .001$), feeling that life is too stressful (36.0% medical, 53.7% pharmacy, $p < .001$), feeling intensely anxious or having anxiety attacks (11.1% medical, 23.9% pharmacy, $p < .001$), feeling intensely angry (4.4% medical, 9.0% pharmacy, $p = .019$), feeling hopeless (11.1% medical, 17.9% pharmacy, $p = .015$), and feeling desperate (9.5% medical, 15.9% pharmacy, $p = .019$) (Table 3). There were no significant differences between medical and pharmacy students across other items.

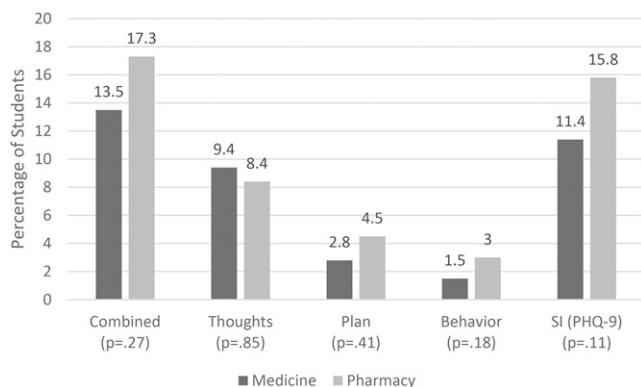


Figure 1. Endorsement of Suicidal Thoughts, Planning, Self-Injurious Behavior, and Suicidal Ideation Between Medical and Pharmacy Students

Legend: Percentage of students in medicine (dark gray) and pharmacy (light grey) who endorsed suicidal thoughts, suicidal planning, or suicidal behavior or who indicated a suicidal ideation on the Patient Health Questionnaire-9 (PHQ-9). The x-axis label *Combined* represents those who responded “a lot of the time” or “most of the time” for questions about suicidal thoughts, suicidal planning, and suicidal behavior. The label *SI* represents those who responded “a lot of the time” or “most of the time” to the last item of the PHQ-9.

While there were no differences between pharmacy and medical students regarding substance use and eating-related thoughts and behaviors, approximately one-fifth of medical and pharmacy students endorsed drinking alcohol more than usual from baseline (20.4% medical, 19.3% pharmacy, $p = .762$), and felt that they were “drinking too much” (15.6% medical and 12.9% pharmacy, $p = .363$) (Table 4). Approximately 40% of pharmacy and medical students endorsed feeling that they could not control what or how much they eat (38.4% medical, 46.0% pharmacy, $p = .057$) or feeling concerned about staying thin or losing weight (42.7% medical, 48.5% pharmacy, $p = .164$).

Of the respondents, 18.9% of medical and 15.9% of pharmacy students reported being in treatment ($p = .40$). For the types of treatment, students reported taking medication(s) for anxiety or depression (9.7% medical, 10.0% pharmacy, $p = .89$) and receiving counseling (14.1% medical, 10.4% pharmacy, $p = .19$).

Qualitative Data

Of the 597 medical and 202 pharmacy students, 252 (42.2%) and 99 (49.0%) students, respectively, entered a free response. Upon analysis of our qualitative data, nine themes emerged. The nine themes along with examples of issues reported by students included the following items: family: any stress due to a loss of a family member, health issues with family members, difficulty spending time, connecting to or feelings of disapproval or pressure from family; financial: stress induced by the worry of loans, fees, or other impending monetary issues; relationship: worry or stress due to difficulties with a present or past

Table 2. Patient Health Questionnaire-9^a Items Endorsed by Pharmacy and Medical Students

Questionnaire item ^{b,c}	Medical (n=597), No. (%)	Pharmacy (n=202), No. (%)	p value
Feeling tired or having little energy	273 (46.0)	130 (64.4)	<.001
Having trouble falling or staying asleep, or sleeping too much	176 (29.6)	86 (42.6)	.001
Having a poor appetite or overeating	105 (17.6)	47 (23.3)	.079
Having trouble concentrating on things, such as reading the newspaper or watching television	101 (16.9)	62 (30.7)	<.001
Feeling bad about yourself — or that you are a failure or have let yourself or your family down	110 (18.5)	57 (28.2)	.005
Moving or speaking so slowly that other people could have noticed? Or the opposite — being so restless that you have been moving around a lot more than usual	19 (3.2)	11 (5.4)	.20
Feeling a lack of interest or pleasure in doing things	80 (13.4)	49 (24.3)	.001
Feeling down or depressed	105 (17.6)	48 (24.0)	.062

Abbreviations: PHQ-9=Patient Health Questionnaire-9.

^a The last item for suicidal ideation was removed from this analysis.

^b Positive response defined as those who responded “a lot of the time” or “most of the time” for each item.

^c Missing data represented less than 1% of the total sample in each group.

relationship or stress from the lack of relationship; schoolwork: stress from rotations, residency matching, course load, application processes, future job prospects postgraduation, career path in general including whether medicine/pharmacy was the “right choice”; religion/race/sexuality: stress from difficulties finding acceptance regarding religion, race, or sexuality from peers or family members; physical or mental health: any underlying, developing health conditions, in addition to poor eating, sleeping, or exercise patterns, issues with body image, substance use; social support: lack of social support, not “fitting in,” difficulty with transition; work-life balance; other (not all listed to protect anonymity): cultural differences, lack of autonomy, self-confidence/imposter syndrome, and living situation.

For pharmacy students, the three most common themes from above that emerged in order of decreasing frequency were work-life balance, physical/mental health and substance abuse, and relationship. For medical students, the most common themes in order of decreasing frequency were schoolwork, relationship, and then physical/mental health and substance abuse.

DISCUSSION

The prevalence of depression and suicidal thoughts that have been previously reported among medical students are alarming^{4,14} and are higher than the reported annual prevalence of 4% for suicidal ideation in adults in

Table 3. Comparison of Intense Affective States Between Medical and Pharmacy Students^a

Questionnaire item ^b	Medical (n=597), No. (%)	Pharmacy (n=202), No. (%)	p value
Feeling nervous or worrying a lot	248 (41.6)	117 (57.9)	<.001
Feeling easily annoyed or irritable	152 (25.5)	81 (40.3)	<.001
Feeling your life is too stressful	215 (36.0)	108 (53.7)	<.001
Having arguments or fights	40 (6.7)	20 (10.0)	.16
Feeling intensely anxious or having anxiety attacks	66 (11.1)	48 (23.9)	<.001
Feeling intensely lonely	118 (19.8)	50 (24.9)	.13
Feeling intensely angry	26 (4.4)	18 (9.0)	.019
Feeling hopeless	66 (11.1)	36 (17.9)	.015
Feeling desperate	57 (9.5)	32 (15.9)	.019
Feeling out of control	71 (11.9)	34 (16.9)	.071

^a Missing data represented less than 1% of the total sample in each group.

^b Positive response defined as those who responded “a lot of the time” or “most of the time” for each item.

Table 4. Pattern of Substance Use and Eating-Related Behaviors Between Medical and Pharmacy Students^a

Questionnaire item ^b	Medical (n=597), No. (%)	Pharmacy (n=202) No. (%)	p value
Drinking alcohol (including beer or wine) more than usual	122 (20.4)	39 (19.3)	.76
Feeling like you were drinking too much	93 (15.6)	26 (12.9)	.36
Feeling that your work or school attendance or performance was affected by your drinking	21 (3.5)	6 (3.0)	.82
Taking drugs or prescription medications without supervision	54 (9.0)	13 (6.4)	.30
Feeling that you can't control what or how much you eat	229 (38.4)	93 (46.0)	.057
Feeling overly concerned about staying thin or losing weight	255 (42.7)	98 (48.5)	.16
Making yourself vomit after eating	12 (2.0)	6 (3.0)	.42

^a Missing data represented less than 1% of the total sample in each group.

^b Positive response defined as those who responded “a lot of the time” or “most of the time” for each item.

the United States.⁵ This is the first report that compares depression, suicidal ideation, and other risk factors between pharmacy and medical students over an 11-year period. Mean PHQ-9 scores from this study suggest that pharmacy students are more depressed than medical students. In a study by Fischbein and colleagues, 18% of pharmacy and medical students met clinical cutoffs for depression,⁶ which were less than rates found in this study of 24.3% and 35.1% of medical and pharmacy students, respectively, who met criteria for moderate to severe depression. While not significantly different, current data also suggest trends toward higher suicide risk (especially with respect to suicide planning and behavior) among pharmacy students compared to medical students. Previous studies have shown that non-suicidal self-injury (NSSI) is associated with a 3.46-fold increased risk of suicidal attempts later on in the life of a student.¹⁵ Another study showed that NSSI may suggest higher risk of suicide attempt in adolescents and college students not reporting suicidal ideation compared to those endorsing suicidal ideation in the past year.¹⁶ The current ISP does not directly query NSSI but instead asks about past attempts and self-injurious behavior. It is unknown whether the self-injurious behavior occurred recently or in a distant past based upon the cross-sectional nature of the ISP administrations examined in this study. Kieckens and colleagues found that recent NSSI was associated with a dose-response relationship with the number of mental disorders and suicidal thoughts and behaviors in a 12-month period.¹⁷ In Germany, a lifetime prevalence of NSSI was estimated to be 14.3% for NSSI and 1.5% for suicide attempt among medical students.¹⁸

Data surrounding the prevalence of depression and suicidal ideation among pharmacy students are limited, although they are emerging. In 2017, the American Association of Colleges of Pharmacy (AACP), representing all schools/colleges of pharmacy in the United States and Canada, issued a policy statement stating that “AACP

encourages schools and colleges of pharmacy to proactively promote overall wellness and stress management techniques to students, faculty, and staff.”¹⁹ The AACP convened two national conferences (Strategies to Promote a Culture of Well-being among Students and Faculty) to draw attention to the issue of student well-being, burnout, depression, and suicidality at schools/colleges of pharmacy across the Academy.²⁰ Pharmacy institutions and academics gathered to brainstorm ways to mitigate the growing and disturbing trends in student suicide and referrals to counseling/psychiatric care. Suicide generally is caused by the convergence of multiple risk factors, the most common being untreated or inadequately managed mental health conditions.²¹ At this public university, the schools of medicine and pharmacy employ a variety of strategies and resources to enhance student well-being, such as improved access to psychiatric care,²² drop-in counseling services and wellness symposia, and annual screenings. At the school of pharmacy, quality of life surveys are also administered each year for all students, and a faculty guide has been developed for students in distress as a resource. While mental health resources are important, this current study suggests that pressures within the program to maintain work-life balance may also be contributors for student well-being.

Pharmacy students also reported higher levels of anhedonia, impaired sleep, and decreased concentration compared to medical students. It should also be noted that more than 60% of medical and pharmacy students endorsed feeling tired or having little energy. Levey²³ reported that tiredness and lack of energy are both risk factors for depression and suicide ideation in medical residents. More pharmacy students reported fatigue compared to medical students, which could be explained by the fact that most pharmacy students at this institution are employed during pharmacy school. Employment is encouraged for pharmacy students so that they obtain hands-on skills and preparation for

careers, especially if they do not pursue postgraduate training (that is not currently required for pharmacists). More pharmacy students also endorsed feeling nervous, feeling easily annoyed or irritable, and feeling that life is too stressful compared to medical students. There has been a change in the pharmacy workforce that may generate nervousness and high stress. Issues such as insufficient number of residency positions compared to the number of applicants,²⁴ lack of job growth,²⁵ and shortage of jobs along with decreased salary in some sectors²⁶ have all led to uncertainties in the pharmacy profession. A recent National Pharmacist Workforce Study in 2019 showed that more pharmacists rated their workload as high or excessively high compared to previous years, especially in the retail pharmacy setting, and that students had higher debt at the time of graduation.²⁷

In a study of various health professions, stress has been directly linked to depression and suicidal ideation²³ and is detrimental to physical and mental health, which can lead to poor performance and lowered self-esteem and self-value.^{28,29} Among medical students, chronic stress and anxiety negatively affected mental health and were associated with suicidal ideation.³⁰

For medical students, the high rate of response for academic difficulties is consistent with previously reported risk factors for suicidal ideation, which include poor performance, difficulty coping with long study hours, and emotional distress brought on from failure in examinations.³¹ In addition, stressors for medical students are commonly found to be heavy course loads, pressures of family and society to be academically flawless, and difficulty accepting lower grades or academic standings from undergraduate years.³² To our knowledge, risk factors correlating with depression and/or suicidality among pharmacy students have yet to be described.

In the qualitative data, for both pharmacy and medical students, themes about relationship and physical/mental health and substance abuse were common between the two professional student groups.^{33,34} Relationship issues are not surprising considering the age of the students (mid-20s) who are at prime ages of building relationships with partners or adjusting to relationship issues with the rigors of pharmacy or medical school academic life. Per recent review, incorporating peer and faculty-led support to build a well-being curriculum are needed to prevent and manage distress and depression that students and practitioners may develop.³⁵

About a fifth of both medical and pharmacy students reported drinking alcohol more than usual, and more than a third of students reported eating-related behaviors that could be concerning. Increased alcohol consumption among medical students has been previously reported.³⁶ These results emphasize the need for student health services to

be available at all pharmacy and medical schools. The combined risk of academic rigors along with transition difficulties (ie, geographical, social structure, housing) associated with health professions school students cannot be ignored, especially given that the emergence of depression, anxiety disorders, and other physical ailments often occur during the years between the 20s and 30s.³⁷ Substance use has been shown to be a risk factor for burnout and suicidality among health professions students.³⁸ Self-medication for anxiety, sleep disorders, and other symptoms that are untreated have been shown to increase the risk of suicide among physicians.³⁹

The majority of pharmacy student respondents were female, which is representative of pharmacy students nationwide, with a national percentage of 63% female.⁴⁰ During 2014 to 2019, approximately 50% of enrolled medical students were female.⁴¹ Of the pharmacy students, Asian or Pacific Islander and White students were the majority in the study, while nationally, Asian students make up only 28% of students (Table 1).⁴⁰ Most of the medical students in this sample were White or Asian/Pacific Islander students, which somewhat resembles the demographic makeup of medical students across the country. According to the Association of American Medical Colleges, medical students comprise 54% White and 21% Asian students.⁴¹ In this study sample, Asian and female students were overrepresented in both pharmacy and medical schools. The average ages for both pharmacy and medical students were similar but significantly different. The average ages are consistent with the profile of medical and pharmacy students across the country.^{40,41} While studies have not conclusively linked race/ethnicity with rates of burnout among medical and pharmacy students, studies have found that minority medical students experience discrimination, prejudice, and isolation, which may result in burnout.¹⁴

The study was limited by the relatively low response rates for both cohorts. Therefore, the prevalence rates found in this sample might be over- or underrepresentations of the actual rates in the target population if we consider the possibility that more depressed students chose to complete the survey or that fewer depressed students filled it out for fear of stigma or lack of motivation. Shea and colleagues surveyed University of Pennsylvania medical students and found that only one-fourth of those who were depressed had sought treatment. In addition to stigma and fear of disclosure, students cited reasons such as lack of time and cost.²⁹ Our study was also limited to the students attending the School of Medicine and School of Pharmacy at one public university, so generalizability to all medical and pharmacy students is limited. In addition, our questionnaire was purely voluntary, so we faced sampling bias

in which students with suicidal ideation could opt out of responding to the survey. The study was also cross-sectional in nature; therefore, students' report of suicidal ideation could have changed after they responded to the survey. It should be noted, however, that the data presented here represent 11 years of survey administration.

CONCLUSION

The rates of suicidal ideation and depressive symptoms among medical and pharmacy students in this study are alarming. Future investigations should focus on replicating this study with additional cohorts of medical, pharmacy, and other health professions students in different geographic regions. With increased samples, the potential contribution of socioeconomic status and other risk factors may be further explored. We hope that this will be the next step to more mental health and well-being studies in all fields of medicine. With further insights, educators can proactively intervene and support health professions students who are affected by depression, other mental illness, and suicidal thoughts, behaviors, and plans. Ultimately, the goal is to empower health communities to decrease the suffering and tragic loss of life caused by suicide.

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