

BRIEF

Prevalence of Anxiety and Depressive Symptoms Among Pharmacy Students

Ann M. Shangraw, PharmD, Jacob Silvers, PharmD, Terri Warholak, PhD, RPh, Nina Vadie, PharmD

University of Arizona, College of Pharmacy, Tucson, Arizona

Corresponding Author: Ann M. Shangraw, University of Arizona College of Pharmacy, 605 N Euclid Ave, 34 Tucson, AZ 85719. Tel: 480-316-4667. Email: shangraw@pharmacy.arizona.edu

Submitted May 13, 2020; accepted November 11, 2020; ePublished November 2020

Objective. To explore and compare the prevalence of anxiety and depressive symptoms between first-, second-, and third-year pharmacy students.

Methods. This was a repeated-measures study conducted at the University of Arizona College of Pharmacy at two campuses (main and satellite). Surveys were administered in February 2019 and April 2019 during mandatory courses for first-, second-, and third-year pharmacy students to collect seven-item Generalized Anxiety Disorder (GAD-7) scores, nine-item Patient Health Questionnaire (PHQ-9) scores, and demographic information. A Chi-square test with a Bonferroni correction was performed to compare the number of students in a class year with clinically significant symptoms, defined as scores of ≥ 10 for both the GAD-7 and PHQ-9.

Results. The survey response rate was 82%. Thirty percent of students self-reported clinically significant anxiety symptoms and 22% of students self-reported clinically significant depressive symptoms. More second-year pharmacy students self-reported anxiety and depressive symptoms as the semester progressed.

Conclusion. About one in four pharmacy students self-reported clinically significant symptoms of anxiety and depression, and more second-year pharmacy students reported anxiety and depressive symptoms later in the semester. These findings support the need for optimizing the delivery of well-being resources to pharmacy students.

Keywords: depression; anxiety; prevalence; pharmacy students

INTRODUCTION

Depression and anxiety disorders are common in the United States (U.S.)^{1,2} The most recent National Institute of Mental Health (NIMH) data available from 2017 estimates that about 7% of U.S. adults experienced one major depressive episode or more in the past year, and other data show that one in three adults experience an anxiety disorder in their lifetime.^{1,2} In 2017, the highest prevalence of depression was among adults aged 18-25 and the highest rate of anxiety was among adults aged 18-29.^{1,2} People with depression or anxiety may experience reduced functioning in school, sleep, and cognitive focus.^{1,2} In addition, the Centers for Disease Control and Prevention (CDC) reports that since 1999, suicide rates have progressively increased in 49 out of 50 states.³ Based on results from the 2017 National Survey on Drug Use and Health (NSDUH), the prevalence of serious suicidal thoughts and suicide attempts in the past year was also highest among adults aged 18-25.⁴ Since this is the most common age group among colleges and universities, it is important for campuses to be prepared to provide care and resources to students who may be struggling with functional impairments due to depression and/or anxiety.⁵

The average age of students entering the University of Arizona College of Pharmacy is 25; therefore, it is likely these students are at an increased risk of developing anxiety and depressive symptoms with subsequent impairment in their schoolwork, job performance, or personal relationships.^{6,7} To tackle this issue, pharmacy organizations such as the American Association of Colleges of Pharmacy (AACCP) encourage colleges of pharmacy to proactively promote wellness and stress management techniques to students.⁸ Results from a nationwide survey conducted between 2015-2016 found that almost 40% of pharmacy residents self-reported symptoms of moderate-to-severe depression, with symptoms worsening as time progressed in the residency year.⁹ This study demonstrated depressive symptoms are common among pharmacy trainees; therefore, similar studies are also needed for pharmacy students.

Since pharmacy students are often under a significant amount of stress, they are at risk of developing anxiety and depressive symptoms that can impede their ability to perform successfully.¹⁰ To help pharmacy students be successful, it is important to evaluate the extent of this problem. The purpose of this study is to explore and compare the prevalence of anxiety and depressive symptoms between first-, second-, and third-year pharmacy students at the University of Arizona College of Pharmacy.

METHODS

This was a repeated-measures study that used surveys. This study was approved by the University of Arizona Human Subjects Protection Program. The college of pharmacy has a main campus and satellite campus located in different cities. At the time of the study, the class size for the main campus ranged from 82 to 98 students, while the satellite campus ranged from 25 to 39 students.

The survey was administered in-person during a mandatory class for first-, second-, and third-year students in February and April 2019. The same survey was administered twice to assess if a pharmacy class year's overall anxiety and depressive symptom score changed as the semester progressed. Each student was provided an anonymous, unique identifier code they were supposed to record and report on the second survey administration. We aimed to anonymously match individual responses. This method was abandoned due to students not recording or reporting their identifier code. Surveys were administered in written form and manually entered into a password protected data sheet.

Students were eligible to participate if they were at least 18 years old and enrolled at the University of Arizona College of Pharmacy as first-, second- and third-year pharmacy students. Students were not required to participate, and they did not receive a grade or credit for participation. No make-up surveys were provided if the student was not in attendance for administration. Responses were included in the analysis if the student participated in one of the two surveys.

The survey consisted of the seven-item Generalized Anxiety Disorder (GAD-7) to assess anxiety symptoms, the nine-item Patient Health Questionnaire (PHQ-9) to assess depressive symptoms, and 12 questions pertaining to demographic information and lifestyle behaviors related to well-being. Anxiety and depressive symptoms were defined as clinically significant if the participant had a score of 10 or more on the GAD-7 or PHQ-9, respectively.^{8,11,12,13,14}

The GAD-7 and PHQ-9 are instruments that help classify symptom severity and aid practitioners in diagnosing anxiety and depression, respectively.^{11,12} Patients reflect on symptom frequency over the past two weeks and select a response on a Likert scale of zero (not at all) to three (nearly every day) for both instruments.^{11,12} The GAD-7 has seven-items, and severity is categorized as mild, moderate, and severe based on scores of 5-9, 10-14, and 15-21, respectively.¹¹ For generalized anxiety disorder, the GAD-7 has demonstrated 89% sensitivity and 82% specificity.^{11,13} The PHQ-9 has nine-items, and severity is categorized as mild, moderate, moderately severe, and severe based on scores of 5-9, 10-14, 15-19, and 20-27, respectively.¹² For major depressive disorder, the PHQ-9 has demonstrated 88% sensitivity and 88% specificity.^{12,14}

The prevalence of clinically significant anxiety and depressive symptoms for each class year were reported as frequencies. A Chi-square test with a Bonferroni adjusted alpha of .016 compared the prevalence of clinically significant anxiety and depressive symptoms across time for each class cohort. Demographic and lifestyle data responses were excluded from analysis for consistency.

RESULTS

A total of 596 surveys were collected over both administrations. There were 304 participants in February 2019 and 292 participants in April 2019. The response rates for February and April were 84% and 80%, respectively. Demographic and lifestyle characteristics stratified per class year are shown in Table 1. Across all class years, 30% of students reported clinically significant anxiety symptoms and 22% of students reported clinically significant depressive symptoms (Table 2).

The number of students in each class year with clinically significant anxiety and depressive symptoms are shown in Table 3. More second-year pharmacy students experienced clinically significant anxiety symptoms ($GAD-7 \geq 10$) in April compared to February ($\chi^2=8.16, p=.01$). More second-year pharmacy students experienced clinically significant depressive symptoms ($PHQ-9 \geq 10$) in April compared to February ($\chi^2=11.82, p=.01$). There was no difference in the proportion of students who experienced clinically significant anxiety and depressive symptoms across time for first-year and third-year pharmacy students ($p>.016$).

DISCUSSION

Our study findings reveal that about 1 in 4 pharmacy students enrolled in the didactic curriculum at a Southwestern college of pharmacy self-reported symptoms of anxiety and depression that are considered moderate to severe. The number of second-year pharmacy students who reported clinically significant anxiety and depressive symptoms was significantly higher later in the semester.

This study evaluated the prevalence of anxiety and depressive symptoms solely in pharmacy students, and our findings are fairly consistent with previous studies conducted among health science graduate students. Melnyk et al. evaluated the relationship between physical health, lifestyle behaviors, and mental health among incoming first-year health science graduate students at a large, Midwestern university.¹⁵ Based on PHQ-9 and GAD-7 scores, 41% of students

had depressive symptoms and 28% of students had anxiety symptoms.¹⁵ In a separate study, Fischbein and Bonfine assessed the prevalence of clinically significant depressive and anxiety symptoms in medical and pharmacy students using the PHQ-9 and GAD-7.¹⁶ For depressive symptoms, 19% of pharmacy students and 18% of medical students reported clinically significant scores.¹⁶ For anxiety symptoms, 21% of pharmacy students and 11% of medical students reported clinically significant scores.¹⁶ Our study and the current literature confirm that it is common for pharmacy and other health graduate students to experience clinically significant symptoms of depression and anxiety. Therefore, administrators of health-science graduate programs should strive to ensure adequate provision of mental health resources for students.

Another recent survey of 30,725 undergraduates and 15,346 graduate students was conducted in 2020 across 9 public universities during the COVID-19 pandemic. This survey used the PHQ-2 and GAD-2 to assess mental health, which are shortened versions of the surveys used in our study. For graduate students, 32% reported symptoms of major depression and 39% reported symptoms of generalized anxiety disorder.¹⁷ Our data was collected before the COVID-19 pandemic and yielded only slightly lower rates for anxiety and depressive symptoms. This highlights how it will be important for universities to continue working on strategies to help students cope with these symptoms in the future.

Williams et al. evaluated the prevalence of clinically significant depressive symptoms (defined as a PHQ-9 score of 10 or higher), among pharmacy residents from 2015-2016.⁹ Rates of clinically significant depressive symptoms ranged from 34-40% at three time points during the residency year.⁹ Our study detected rates of clinically significant depressive symptoms ranging from 14-23% in third-year pharmacy students, which are lower than the values seen in the Williams et al. study. Depressive and anxiety symptoms were not measured among fourth-year pharmacy students since these students were on clinical rotations and not available to participate in the in-person survey. Our findings suggest depressive symptoms may begin prior to pharmacy residency training and support the need to tackle this issue during pharmacy school.

Knowing the prevalence of anxiety and depressive symptoms in pharmacy students is important since these can negatively impact academic performance. For example, the 2019 National College Health Assessment reported that about 28% and 20% of students felt their anxiety and depression negatively affected their academic performance and Eisenberg et al. found that anxiety and depression resulted in a significant drop in grade point average (GPA).^{18,19} Anxiety and depression have also been shown to influence work performance.^{20,21} Since our findings demonstrate that a significant proportion of pharmacy students suffer from symptoms of anxiety and depression, future studies should aim to investigate the impact this may have on pharmacy students' academic and work performance.

There were several limitations to this study. The study was only conducted at one college of pharmacy; thus, the results are not generalizable to other pharmacy schools. Data were collected during one semester of the four-year curriculum; therefore, we were unable to determine changes in the prevalence of reported anxiety and depressive symptoms as students progressed through the curriculum. Some pharmacy students reported a diagnosis of anxiety/depression with or without treatment, which may have influenced the number of students with significant anxiety and depressive symptoms. Lastly, our study did not include fourth-year pharmacy students completing their advanced pharmacy practice experiences (APPEs); therefore, we were unable to compare the prevalence of anxiety and depressive symptoms between students undergoing the didactic curriculum versus APPEs. Future studies should assess the impact of anxiety and depressive symptoms on academic and work performance. Given our findings highlight the need for interventions that will improve symptoms of depression and anxiety in pharmacy students, future studies should also assess the impact of delivering specific well-being resources on these symptoms.

CONCLUSION

One in four pharmacy students at a Southwestern college of pharmacy reported moderate to severe symptoms of depression and anxiety. These findings highlight the importance of optimizing the delivery of well-being resources to pharmacy students and can increase awareness of the prevalence of anxiety and depressive symptoms in pharmacy students. Results of the study were presented to the college's Wellness Committee in order to open a dialogue on ways to improve student wellness. Future studies should investigate the impact of interventions designed to improve pharmacy students' mental health and well-being.

REFERENCES

1. National Institute of Mental Health. Major Depression. <https://www.nimh.nih.gov/health/statistics/major-depression.shtml>. Accessed Feb 29, 2020.
2. National Institute of Mental Health. Any Anxiety Disorder. <https://www.nimh.nih.gov/health/statistics/any-anxiety-disorder.shtml>. Accessed Aug 24, 2018.
3. Centers for Disease Control and Prevention. Suicide Rising Across the US. <https://www.cdc.gov/vitalsigns/suicide/index.html>. Accessed Aug 29, 2018.
4. National Institute of Mental Health. Suicide. <https://www.nimh.nih.gov/health/statistics/suicide.shtml>. Accessed Apr 24, 2020.
5. National Center for Education Statistics. Total fall enrollment in degree-granting postsecondary institutions, by control and level of institution, attendance status, and age of student: 2017. https://nces.ed.gov/programs/digest/d19/tables/dt19_303.55.asp?current=yes. Accessed May 4, 2020
6. The University of Arizona College of Pharmacy. Class of 2020 Statistics. <http://www.pharmacy.arizona.edu/academics/pharmd/about-pharmd/pharmd-profiles/class-2020-statistics>. Accessed Aug 24, 2018.
7. The University of Arizona College of Pharmacy. Class of 2021 Statistics. <http://www.pharmacy.arizona.edu/academics/pharmd/pharmd-profiles/class-2021-statistics>. Accessed Aug 24, 2018.
8. American Association of Colleges of Pharmacy. Wellness and resilience in pharmacy education. <https://www.aacp.org/resource/wellness-and-resilience-pharmacy-education>. Accessed Apr 24, 2020.
9. Williams E, Martin SL, Fabrikant A, Wang A. Rates of depressive symptoms among pharmacy residents. *Am J Health-Syst Pharm*. 2018;75(5):292-297. <https://doi.org/10.2146/ajhp161008>. Accessed July 20, 2018.
10. Marshall LL, Allison A, Nykamp D, Lanke S. Perceived stress and quality of life among doctor of pharmacy students. *Am J Pharm Educ*. 2008;72(6):137. doi:10.5688/aj7206137
11. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006;166(10):1092-1097. doi:10.1001/archinte.166.10.1092
12. 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. doi:10.1046/j.1525-1497.2001.016009606.x
13. Löwe B, Decker O, Müller S, et al. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Med Care*. 2008;46(3):266-274. doi:10.1097/MLR.0b013e318160d093
14. Martin A, Rief W, Klaiberg A, Braehler E. Validity of the Brief Patient Health Questionnaire Mood Scale (PHQ-9) in the general population. *Gen Hosp Psychiatry*. 2006;28(1):71-77. doi:10.1016/j.genhosppsy.2005.07.003
15. Melnyk B, Slevin C, Militello L, Hoying J, Teall A, McGovern C. Physical health, lifestyle beliefs and behaviors, and mental health of entering graduate health professional students: Evidence to support screening and early intervention. *J Am Assoc Nurse Pract*. 2016;28(4):204–211. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7164545/>. Accessed July 21, 2018.
16. Fischbein R, Bonfine N. Pharmacy and Medical Students' Mental Health Symptoms, Experiences, Attitudes and Help-Seeking Behaviors. *Am J Pharm Educ*. 2019;83(10):7558. doi:10.5688/ajpe7558
17. Chirikov I, Soria K, Horgos B, Jones-White D. Undergraduate and Graduate Students' Mental Health During the COVID-19 Pandemic. UC Berkeley SERU Consortium Reports. Accessed September 11, 2020
18. American College Health Association. American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2019. https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_US_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf. Accessed April 3, 2020.
19. Eisenberg D, Golberstein E, Hunt JB. Mental health and academic success in college. *BE J Econ Anal Policy*. 2009;9(1):1-35. <https://www.degruyter.com/view/journals/bejeap/9/1/article-bejeap.2009.9.1.2191.xml.xml>. Accessed April 3, 2020.
20. Erickson S, Guthrie S, VanEtten-Lee M, et al. Severity of anxiety and work-related outcomes of patients with anxiety disorders. *Depress Anxiety*. 2009;26(12):1165-1171. <https://doi.org/10.1002/da.20624>. Accessed April 3, 2020.
21. Woo JM, Kim W, Hwang TY, et al. Impact of depression on work productivity and its improvement after outpatient treatment with antidepressants. *Value Health*. 2011;14(4):475-482. <https://doi.org/10.1016/j.jval.2010.11.006>. Accessed April 3, 2020.

Table 1. Student Self-Reported Demographic and Lifestyle Characteristics

	Class Year		
	First-Year Students N=224	Second-Year Students N=210	Third-Year Students N=148
Campus (%)			
Main Campus	73	69	72
Satellite Campus	27	31	28
Sex (%)			
Female	56	71	60
Male	44	29	40
Age Range (%)			
18-25	71	64	43
26-33	20	28	47
34+	10	8	10
Anxiety Diagnosis (%)			
Anxiety Diagnosis	12	22	22
No Diagnosis	88	78	78
Depression Diagnosis (%)			
Depression Diagnosis	8	13	11
No Diagnosis	92	87	89
Current Treatment for Anxiety and/or Depression (%)			
Yes	8	18	14
No	6	9	14
Not Applicable	86	74	72
Binge Drinking (%)			
Never	38	35	41
Once per year	12	30	32
Once per month	34	26	14
Every other week	8	5	8
Once a week	7	4	3
More than once a week	1	0	1
Avg # of Alcoholic Drinks Consumed per Weekend, mean (SD)	1.9 (2.7)	1.4 (1.9)	1.5 (2.5)
Avg # of Hours of Exercise per Week, mean (SD)	3.6 (4.1)	3.3 (3.1)	3.7 (5.1)
Avg # of Hours of Sleep per Night, mean (SD)	6.0 (1.3)	6.7 (5.4)	6.9 (2.2)

N represents the number of surveys returned in February and April 2019 for that class year unless otherwise specified

Percentages may not total 100 because of rounding

Data were excluded if demographic and lifestyle questions were left blank

Avg=average, #=number, SD=standard deviation

First-Year Students=Class of 2022, Second-Year Students=Class of 2021, Third-Year Students=Class of 2020

Table 2. Overall Prevalence of Clinically Significant Anxiety and Depressive Symptoms

	February Surveys N=304 %	April Surveys N=292 %	Combined Surveys N=596 %
Clinically Significant Anxiety Symptoms ^a	28	32	30
Clinically Significant Depressive Symptoms ^b	19	25	22

^aclinically significant anxiety symptoms defined as a GAD-7 score of 10 or higher

^bclinically significant depressive symptoms defined as a PHQ-9 score of 10 or higher

Table 3. Prevalence of Clinically Significant Anxiety and Depressive Symptoms per Class Year in February and April

	Class Year		
	First-Year Students N=227	Second-Year Students N=214	Third-Year Students N=155
Anxiety Symptoms^a %(n)			
February	30 (n=115)	24 (n=105)	32 (n=84)
April	29 (n=112)	42 (n=109)	20 (n=71)
<i>p</i> -value ^b	.87	.01*	.08
Depressive Symptoms^c %(n)			
February	21 (n=115)	15 (n=105)	23 (n=84)
April	22 (n=112)	36 (n=109)	14 (n=71)
<i>p</i> -value ^b	.79	.01*	.18

N represents the number of surveys returned in February and April 2019 for that class year unless otherwise specified

^aclinically significant anxiety symptoms is defined as a GAD-7 score of 10 or higher

^b*p*-value is for a 2x2 Chi-square test

^cclinically significant anxiety symptoms is defined as a PHQ-9 score of 10 or higher

*significance was determined with a Bonferroni adjusted alpha of 0.016

First-Year Students=Class of 2022, Second-Year Students=Class of 2021, Third-Year Students=Class of 2020