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PHARMACY EDUCATION AND MENTAL HEALTH: AN INQUIRY INTO DEPRESSION AND ANXIETY AMONG STUDENTS

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Abstract: Depression is a prevalent global mental health concern, with a substantial impact on college students, particularly those in health sciences professions. Pharmacy students, despite being a significant subgroup, have limited research on their mental health. This study aims to address this gap by examining the levels of depression and anxiety among pharmacy students, as well as exploring self-help strategies that could enhance their well-being. Understanding the mental health status of pharmacy students and identifying potential self-help approaches is crucial for creating supportive academic environments and improving the overall well-being of future healthcare professionals.

Keywords: Pharmacy students, Depression, Anxiety, Mental health,Well-being.

1. Introduction

Depression is a common mental health disorder affecting more than 300 million people globally.[1] According to the National Institute of Mental Health (NIMH), 7.1% of all United States (U.S.) adults had at least one major depressive episode in 2017 with the highest prevalence occurring among adults between the ages of 18 and 25, college age adults.[2] Depression rates among university students are reported to be substantially higher than among the general population.[3] Similarly, studies assessing mental health of graduate and health sciences professional students such as those in medical and dental schools have reported elevated levels of depression and anxiety among these student populations.[4-6]Information related to depression and anxiety levels among pharmacy students is limited.[7]

In addition, there is an absence of information on self-help methods to assist professional students with improving wellbeing so faculty and institutions often focus change on program or curricular adjustments to address or alleviate programmatic stressors (e.g., heavy coursework, exam scheduling, tutoring availability, time management, financial or loan counseling).Many programs also encourage students to incorporate exercise as an outlet for stress/anxiety. In addition, institutions support students socially by providing space for social gatherings in student lounges and financial support for organizational activities. Most programs also have fall and spring breaks for student visitation with friends and family.

Silva and Figueiredo-Braga reported that students in the first two years of pharmacy school had higher academic satisfaction and lower stress, anxiety and depression compared to those in the third and fourth years of the professional program.[8]In contrast, other studies have reported higher levels of academic distress and poor mental health among second year pharmacy students.[9,12]When examining stress and health-related quality of life (HRQOL), pharmacy students exhibited high stress and low HRQOL scores.[9-11]Using the Patient Health

Original Article

Questionnaire-9 (PHQ-9),Hunt and Gable reported that 52% of pharmacy students in their program had depressive symptoms[12]and Sabourin et al reported that more than 25% of pharmacy students in their study scored in the high severity range for depression, generalized anxiety and eating concerns.[13]These findings are troubling given that mental health problems interfere with learning and, in turn, can lead to poor academic performance.[14-17] Furthermore, mental health problems that persist past graduation could potentially interfere with future patient care.

2. Objectives

With the growing concerns over the wellbeing of student pharmacists, the American Association of Colleges of Pharmacy and the Accreditation Council for Pharmacy Education have emphasized the need to address student wellbeing within pharmacy education.[18,19]With this in mind,the prevalence of depression and anxiety among pharmacy students at a four-year, private school of pharmacy was examined using the PHQ-9, and the GAD-7, two most widely used diagnostic tools for depression and anxiety, respectively.[20,21] Additionally, the potential relationships between depression and/or anxiety and key demographics as well as use of university counseling services were also examined.

3. Methods

This study was a single-center, cross-sectional survey conducted at a four-year, private school of pharmacy in the Southeastern U.S. An online survey was administered anonymously by email invitation to all student pharmacists enrolled in the program over a three-week period in fall 2018.The investigators took care to evaluate the exam schedules of all Doctor of Pharmacy (PharmD) class years and identified a time outside of exams to administer the survey. The survey (Appendix A) was comprised of demographic items and both the PHQ-9 questionnaire and GAD-7 scale. This study received Institutional Review Board approval.

Data was compared between groups to find significance based on gender, age, relationship status and whether students had children or not. Depression symptoms were assessed using PHQ-9 which is a reliable and valid tool for detecting depression.[20,22]The PHQ-9 questionnaire asked respondents to rate how often in the prior two weeks they have been bothered with problems such as "feeling down, or depressed, or hopeless" using a four-point scale that ranges from "not at all" to "nearly every day". The higher the score the more depressive symptoms experienced by the student. Anxiety was assessed using GAD-7, a validated tool used to screen for Generalized Anxiety Disorder.[21]The GAD-7 asked respondents to rate how often in the prior two weeks they have been bothered by "feeling nervous, anxious, or on edge" using a four point scale also ranging from "not at all" to "nearly every day". The higher the score the more anxiety experienced by the student. Both the PHQ-9 and GAD-7 instruments use clinical threshold scores indicating major depression and GAD, respectively. Depression was categorized as either mild (PHQ-9 score of 5-9), moderate (PHQ-9 score of 10-14), moderately severe (PHQ-9 score of 15-19), or severe (PHQ-9 score of 20-27); anxiety was categorized as either mild (GAD-7 score of 5-9), moderate (GAD-7 score of 10-14), or severe (GAD-7 score of 15 or higher). Studentt-tests and Analysis of Variance (ANOVA) tests were used to compare data between demographic cohorts as appropriate using GraphPad Prism version 8.0.0 for Windows (GraphPad Software, San Diego, California).

4. Results

Two hundred fifty-five pharmacy students voluntarily initiated the anonymous survey (53.8% response rate). Three responders did not complete the survey in full and thus were included in the demographics table only. The demographic characteristics of the study sample are included in Table 1. The majority of the participants were

Age range in years	
< 22	49 (19.2)
22-25	148 (58)
26-30	38 (15)
> 30	19 (7.4)
Not stated	1 (0.4)
Race/Ethnicity	
American Indian or Alaska Native	0 (0)
Asian	13 (5.1)
Black or African American	20 (7.8)
Latino/Hispanic	5 (2)
Native Hawaiian or Pacific Islander	0 (0)
White	217 (85.1)
Gender	
Female	174 (68.2)
Male	80 (31.4)
Not stated	1 (0.4)
Relationship status	
Single	194 (76)
Married	57 (22.4)
Divorced	4 (1.6)
Children	
Yes	21 (8)
No	234 (92)

4.1 Depression and Anxiety Prevalence

Overall responses for the PHQ-9 and the GAD-7 are included in Table 2. Overall, 40% of respondents reported moderate to severe depression and 41% reported moderate to severe anxiety. Depression and anxiety scores by gender and age are included in Table3. Female students reported more anxiety than male students but this did not achieve statistical significance. Older students (over 30 years of age) reported less anxiety, while those under 22 years of age reported more; neither reached statistical significance. Students between the ages of 26 and 30 reported more depression but this too did not reach statistical significance.

Table 2. Indicators of Depressive and Anxiety Symptoms among Pharmacy Students

Indicator	n (%)
Depression - Classification by PHQ-9[a] score	
Not depressed	80 (32)
Mild depression	71 (28)
Moderate depression	50 (20)
Moderately severe depression	30 (12)
Severe depression	21 (8)
[a]PHQ-9 score $\geq$ 10	101 (40)
Anxiety - Classification by GAD-7[b] score	
Not anxious	75 (30)
Mild anxiety	74 (29)
Moderate anxiety	48 (19)

Original Article

Severe anxiety	55 (22)
[b]GAD-7 score ≥ 10	103 (41)

[a] PHQ-9=Patient Health Questionnaire-9. Recommended cutoff score for major depression is ≥10.[19,21] [b]GAD-7=Generalized Anxiety Disorder 7-item. Recommended cutoff score for generalized anxiety disorder.[20]

Table 3. Depression and Anxiety Scores by Gender and Age

	All	Gender			Age range in years				
		Female	Male	P value	< 22	22-25	26-30	>30	p value
Mean PHQ-9	8.86	8.81	8.75		8.84	8.55	10.41	8.21	
(SD)	(6.52)	(6.39)	(6.55)	0.945	(5.60)	(6.46)	(7.55)	(7.02)	0.450
Mean GAD-7	8.64	8.93	7.86		9.67	8.56	8.69	6.47	
(SD)	(6.21)	(6.23)	(6.02)	0.200	(5.63)	(6.31)	(6.48)	(6.16)	0.300

aPHQ-9=Patient Health Questionnaire-9 bGAD-7=Generalized Anxiety Disorder 7-item

Depression and anxiety scores by relationship status and having children are included in Table 4. Of particular note, single students with children reported more depression and anxiety compared to married students with or without children or single students without children. Due to the small sample size, statistical analysis was not possible.

Table 4. Depression and Anxiety Scores by Relationship Status and Having Children

	All	Marri ed		Singl e	
		Children[a]	No children[b]	Children[c]	No children[d]
PHQ-9[e]Mean(SD)	8.86 (6.52)	6.23 (6.25)	8.39 (6.51)	16.17 (4.36)	8.88 (6.37)
GAD-7[f]Mean(SD)	8.64 (6.21)	6.15 (5.97)	7.73 (5.55)	17.17 (5.04)	8.68 (6.16)

[a]Married with children n=13
[b]Married no children n=44
[c]Single with children n=6 [d]Single no children n=188
[e]PHQ-9=Patient Health Questionnaire-9 [f]GAD-7=Generalized Anxiety Disorder 7-item

4.2 Campus Counseling Center Usage
During the 2017-2018 academic year, 14 pharmacy students visited the University Counseling Center; this number increased to 36 during 2018-2019.

5. Discussion
The present study examined the prevalence of depression and anxiety among pharmacy students at a four-year private school of pharmacy using the PHQ-9 and the GAD-7. Overall, prevalence rates for both depression and anxiety were substantially higher in this student population than those reported for the U.S. general population.[1,2] Other studies have similarly reported high rates of depression and anxiety not only among pharmacy students, but

Original Article

also among graduate students and other health professions students as compared to the general population.[3-6]A large percentage of students in our study met the clinical cutoff for depression (40%) and anxiety (41%),underscoring the need to evaluate further the mental health needs of pharmacy students.

In line with other studies, female students in our study had higher GAD scores than their male counterparts though the difference was not statistically significant. While it is possible that this observation is associated with more female students in our sample than males, higher anxiety rates among women compared to men has been reported by NIMH.[2]N-MHSS reports that outpatient mental health treatment services were utilized by males and females 51% and 49%, respectively. Comparison studies examining differences between female and male students may be needed to determine if anxiety-causing factors specific to female or male students exist. Such studies could aid in the development of monitoring tools or stress-reducing interventions that are genderbased.

According to N-MHSS data, 63% of outpatient mental health services are utilized by persons 18 to 64 years of age. Differences between age groups were also noted in the current study though not statistically significant; however, less depression and anxiety was observed in older students (over30 years of age).

This difference may reflect experience and ability to cope with academic stress by older students. Definitive conclusions cannot be made without further evaluation.

According to the Substance Abuse and Mental Health Services (SAMHSA)2018 National Mental Health Services Survey (N-MHSS),adult persons who identified themselves as White, Black or African American, or Hispanicuseds outpatient mental health services more than other races/ethnicities (American Indian or Alaska Native, Asians) and persons identifying with two or more races; however, 32% of those surveyed did not report race.[23]Consistent with SAMHSA data, this study was made up of a larger percentage of Whites (85.1%) and Black or African American (7.8%)adults. A limitation to this study is the uncertainty if students sought mental health services off-campus. However, since the race/ethnicity of the student population is consistent with national demographics of health-seeking adults, it is possible that student health services were underutilized in preference to off-campus services.

Lastly, substantial differences in depression and anxiety scores by relationship status and having children were observed. Single students with children had PHQ-9 and GAD-7 scores that were at least two times higher than the scores for married students with children; of note, all single parents in our sample were female. While statistical significance could not be determined due to small sample size, the observations are of interest and provide another factor to consider when evaluating student mental health and developing stress-reducing interventions.

5.1 Help-seeking and Initiatives Undertaken

It is unclear why our students underutilized counseling services. One anecdotal reason stated by several students at the institution is the physical distance between the location of the school building and university counseling services offices at the study institution. However, barriers to help-seeking were not specifically examined in our study. In light of the high prevalence of depression and anxiety among our students, identifying barriers to seeking help will be critical to ensure access to and utilization of mental health services.

The institution has undertaken several wellness-related initiatives to address the mental health problems of our students highlighted by our findings. The university counseling staff will be offering wellness-themed cadres each semester specifically developed for our pharmacy students. These cadres are optional small groups that meet for eight consecutive weeks at the start of each semester. Additionally, one to two pharmacy faculty also offer cadres

Original Article

each semester with a wellbeing theme. Research on the impact of these cadres is currently in progress at the institution.

Additionally, small group interprofessional discussions on stress, anxiety, and self-care have been added to the first- and second- years of the program in collaboration with the university counseling staff and the School of Public Health social work faculty. Regarding new student orientation, a session on wellness and self-care has been added to the programming for new students. Lastly, a four-semester Professional Development and Wellness course sequence is being developed as part of our new curriculum to be implemented in fall 2021.

5.2 Limitations

The current study is not without limitations. Measuring mental health at one time point during the school year could be misleading; factors that could have influenced responses at the time of the survey are unknown; however, care was taken to avoid administering the survey during the same time frame as major exams. Measuring depression and anxiety at various time points over the academic year may provide a better picture of the mental health of our pharmacy students.

Additionally, baseline data on the prevalence of anxiety or depression in the students prior to starting the doctoral program was not available. It is unclear whether students had preexisting anxiety or depression and whether they were already established with off-campus mental health professionals. Another limitation is that respondents were not asked to identify their class year and, therefore, prevalence of depression and anxiety in each academic year was not evaluated. Existing data on the prevalence of poor mental health among second year pharmacy students is conflicting.[8,10,13]The results of this study is consistent with previous data in pharmacy students.[10,13]Iorga et al reported higher depression scores among medical students during their preclinical years, especially in the first year of study.[24] Further research is needed to understand the contribution made by year of study to depression and anxiety among pharmacy students.

5.3 Future studies

Are differences in mental health problems reported among pharmacy students reflective of the type of curriculum in which they study and/or wellness programing provided? Individual programs may need to determine student wellness upon entry into the program and then longitudinally to identify persistent mental health problems versus mental health problems associated with the program's curriculum.

Such analysis could potentially allow programs to better tailor wellness programs to meet the needs of their students. It is worth noting that stress, anxiety and depression among pharmacy faculty could potentially affect student mental health and thus might need to be evaluated. Additionally, as most educators do not have counseling training, faculty development in these areas is needed.

Since the original distribution of this survey, the academy and the world has been impacted by COVID19. It remains to be seen what the impact of the management of this virus in society has on pharmacy student mental health will be. Therefore, this too will be worthy of future study.

6. Conclusions

Given the rigor and high levels of academic stress associated with PharmD programs, it might be expected to see poor mental health among pharmacy students. Academic stress, perfectionistic traits, "imposter" phenomenon, family, finances, and the job market contribute towards the poor mental health of pharmacy students.[16,24,25] While pursuing a doctoral degree in pharmacy can be a stressful time for students, mental and emotional health problems can interfere with learning and can lead to poor academic performance[14]and unhealthy coping mechanisms such

Original Article

as alcohol or other drug use.[10,26]Our findings underscore the need to better understand mental health problems among students and the need for wellness programing.

Acknowledgements

7. References

World Health Organization. Depression (2019).[Online] Available athttps://www.who.int/news-room/factsheets/detail/depression.(August 12, 2019).

National Institute of Mental Health. Major depression (2019).

https://www.nimh.nih.gov/health/statistics/major-depression.shtml. [Online] (August 12, 2019).

Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C (2013). A systemic review of studies of depression prevalence in university students. *J Psychiatr Res*. 47, 391-400.

Evans TM, Bira L, Gastelum JB, Weiss LT, Vanderford NL (2018). Evidence for a mental health crisis in graduate education. *Nat Biotechnol*. 36, 282-284.

Dyrbye LN, West CP,Satele D,Boone S, Tan L, Sloan J, Shanafelt (2014). Burnout among US medical students, residents, and early career physicians relative to the general US population. *Acad Med*. 89(3), 443–451.

Elani HW, Allison PJ, Kumar RA, Mancini L, Lambrou A, Bedos C (2014). A systematic review of stress in dental students. *J Dent Educ*. 78(2), 226-242.

Haas J, Pamulapati LG, Koenig RA, Keel V,Caldas LM (2020). CPTL.12, 489-492.A call to action: Pharmacy students as leaders in encouraging physical activity as a coping strategy to combat student stress. *Curr Pharm Teach Learn* (2020). 12(5), 489-492.

Silva RG,Figueiredo-Braga M (2018). Evaluation of the relationships among happiness, stress, anxiety, and depression in pharmacy students. *Curr Pharm Teach Learn*.10 (7), 903–910.

Marshall LL, Allison A, Nykamp D, Lanke S. Perceived stress and quality of life among doctor of pharmacy students (2008). *Am J Pharm Ed*. 72(6), Article 137.

Hirsch JD, Do AH, Hollenbach KA, Manoguerra AS, Adler DS. Students' health-related quality of life across the preclinical pharmacy curriculum (2009). *Am J Pharm Educ*. 73(8), 147–153.

Gupchup GV, Borrego ME, Konduri N (2004). The impact of student life stress on health related quality of life among doctor of pharmacy students. *Coll Stud J*. 38(2), 292-304.

Original Article

Hunt K, Gable KN (2013). Prevalence of depressive symptoms and obsessive-compulsive personality traits among pharmacy students. *Curr Pharm Teach Learn.*5(6), 541–545.

Sabourin AA, Prater JC, Mason NA (2019). Assessment of mental health in doctor of pharmacy students. *Curr Pharm Teach Learn.*11(3), 243–250.

Richardson M, Abraham C, Bond R (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychol Bull.*138(2), 353-387.

Payakachat N, Gubbins PO, Ragland D, Flowers SK, Stowe CD (2014). Factors associated with health-related quality of life of student pharmacists. *Am J Pharm Educ*. 78(1), Article 7.

Votta RJ, Benau EM (2013). Predictors of stress in doctor of pharmacy students: results from a nationwide survey. *Curr Pharm Teach Learn*.5(5), 365-372.

Leblanc VR (2009). The effects of acute stress on performance: implications for health professions education. *Acad Med*. 84(10 Suppl), S25-33.

Miller ML, Boyer C, Emerson MR, et al (2018). Report of the 2017-2018 Student Affairs Standing Committee. *Am J Pharm Educ*. 82(7), Article 7159.

Accreditation Council for Pharmacy Education (2019). Accreditation standards and key elements for the professional program in pharmacy leading to the Doctor of Pharmacy degree. Available at https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf. (August 12, 2019).

Kroenke K, Spitzer RL, Williams JB (2001). The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 16(9):606-13.

Spitzer RL, Kroenke K, Williams JB, Löwe B (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 166(10), 1092-7.

Manea L, Gilbody S, McMillan D (2012). Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. *CMAJ*.184(3), E191-196.

Substance Abuse and Mental Health Services Administration (2019). National Mental Health Services Survey (NMHSS): 2018. Data on Mental Health Treatment Facilities. Rockville, MD: Substance Abuse and Mental Health Services Administration, 46.

Iorga M, Dondas C, Zugun-Eloae C (2018). Depressed as freshmen, stressed as seniors: The relationship between

depression, perceived stress and academic results among medical students. *Behav Sci*. 8(8), Article 70.https://www.mdpi.com/2076-328X/8/8/70/htm. (August 12, 2019)

Original Article

Henning K, Ey S, Shaw D (1998). Perfectionism, the impostor phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ*. 32(5), 456–464.

Hirsch JD, Nemlekar P, Phuong P, Hollenbach KA, Lee KC, Adler DS, Morello CM (2019). Patterns of stress, coping and health-related quality of life in doctor of pharmacy students: a five year cohort study [published online ahead of print August 30 2019]. *Am J Pharm Educ.*

https://www.ajpe.org/doi/pdf/10.5688/ajpe7547. (September 11, 2019).