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The Relationship Between Depression, Anxiety, and Burnout Among Physician Assistant Students: A Multi-Institutional Study

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Abstract

Purpose: Burnout, depression and anxiety are common in medical students; however, there is limited research on these outcomes in Physician Assistant (PA) students. With a growing number of PA education programs, examining this issue in PA students can provide important information that can ultimately affect the quality of educational outcomes and future health care delivery.

Methods: All Virginia PA programs ($n = 8$) in 2018 participated in a cross-sectional study. Students received a recruitment email providing a link to an anonymous survey. Participants completed the Maslach Burnout Inventory (MBI-SS) student version, Generalized Anxiety Disorder Screener (GAD-7), and the Patient Health Questionnaire (PHQ-2) and provided demographic information. We used two hierarchical linear regression models to assess the ability of depression and anxiety to predict emotional exhaustion and cynicism, respectively, while controlling for sociodemographic variables. The first regression model utilized emotional exhaustion as the dependent variable while the second examines cynicism.

Results: The sample consisted of 320 PA students (response rate = 32%). Twenty-three percent were at risk for depression; 43% met criteria for moderate to severe anxiety. Both anxiety ($\beta = 0.53$; $p < .001$), and depression ($\beta = .91$; $p < .001$), significantly predicted emotional exhaustion. There was a significant association between depression cynicism ($\beta = 2.1$; $p < .001$).

Conclusion: To our knowledge, this is the first examining the relationship between depression, anxiety and burnout in PA students. Our findings are similar to those from studies among medical students indicating these issues need to be addressed in PA students.

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Keywords: Anxiety; Burnout; Depression; Physician assistant

1. Introduction

There is a well-established body of literature demonstrating that medical students are at an increased risk for depression, anxiety, and burnout compared to the general population.^{1–3} Burnout is characterized as emotional exhaustion, depersonalization, and a decreased sense of personal accomplishment. Several

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multi-institutional studies indicate that at least 50% of medical students experience burnout.^{1,4,5} In addition to burnout, a high proportion of students and residents across multiple countries experience depression^{3,5–11} and anxiety.^{6,12,13} Despite the wide variety of health professionals and pre-professional students that may experience burnout, depression, and anxiety, research has focused primarily on physicians and medical students. Physician Assistants (PAs) have become an increasingly important part of the health care delivery system; however, research studies examining the relationship between depression, anxiety, and burnout are lacking in the PA student population.

Burnout is a significant independent predictor of suicidal ideation and withdrawal from medical school.^{5,14} Burnout is associated with mental and physical exhaustion from rigorous course work and time constraints. With an increase in burnout, there also appears to be a decrease in professionalism among medical students.^{15–17} A recent review identified that burnout is related to residents' self-reported medical errors.¹⁸ Furthermore, in practicing physicians, burnout is linked to sub-optimal patient care,^{19–22} lower patient satisfaction, and longer post-discharge recovery times.²³ Due to these aforementioned consequences of burnout in both medical education and practice, research is now examining issues that contribute to burnout. Understanding the risk factors associated with the onset of burnout within pre-professional health programs allows faculty and administration to plan curriculum and provide information to students to understand, recognize, and create opportunities to decrease burnout.

In attempts to elucidate risk factors for burnout, many studies have examined the relationship between various aspects of psychological distress, most notably depression and anxiety, and burnout. Prevalence of depression among medical students is difficult to ascertain due to the dissimilarities between the studies and use of different instruments to measure depression. A recent prospective, longitudinal study found that 19.7% of students sustained high levels of depression throughout their medical training.³ These findings suggest that personal factors (anxiety traits, personal relationships and burnout) contribute to high levels of depression during medical training.⁹ Two recent meta-analyses examined exploring depression among medical students found a 28.0% global prevalence of depression in this population.²⁴ A second meta-analysis from 43 countries found similar prevalence estimates of depression (27.2%).²⁵ Furthermore, it has been shown that medical students suffering from

burnout or mental health problems may not seek out the appropriate medical care. The meta-analysis revealed only 12.9% of depressed medical students sought treatment. Common reasons for not seeking care include fear of negative impact on the student's academic record, perceived stigma, negative personal experiences, fear of judgement, and medical curriculum rigor.

Depression is commonly comorbid with other mental health issues, most notably anxiety.^{8,26–28} Among adults with depression or anxiety, approximately 50% experience symptoms of both.²⁹ Given the prevalence of depression in medical students it is likely they would experience anxiety at similar rates. The research on anxiety in medical students is generally limited to examining state and trait anxiety and lacking in the use of clinical measures. Studies using more comprehensive clinical indicators of anxiety in medical students are scarce in the United States. A study demonstrated a 19.1% prevalence of anxiety in Pakistan medical students⁶; a similar prevalence of 16.5% was found in Australia.⁷ Bassols et al. found 30.4% of first-year medical students reported symptoms of anxiety, and the prevalence of anxiety decreased by the sixth year of study to 9.4%.¹³ Professional outcomes linked to anxiety are not reported in the current literature.

Few studies have examined the interplay between depression, anxiety, and burnout among pre-professional health students. Research has shown that depression is predicative of both emotional exhaustion and cynicism in medical students; an earlier study found depression and negative life events contribute significantly to burnout.^{1,14} Greater levels of burnout are generally identified in senior medical students and those who have poor psychological functioning at baseline.^{3,30} In providers, depression not only increases the risk of burnout,¹⁹ but also is linked with reduced adherence to best practice standards for patient safety and increased risk of medical errors.³¹ To our knowledge, no studies have examined the relationship between burnout and anxiety in medical students. These studies elucidate the problem of depression and burnout among medical students and provide prevalence data for anxiety in medical students. As the utilization of PAs in the healthcare system increases, so does the number of PA education programs. With this understanding, examining the relationship between depression, anxiety, and burnout among PA students is imperative, yet no studies have done this. The objectives of this present study are: 1) to establish the prevalence of depression and anxiety among PA

students across multiple institutions; 2) to identify whether depression and anxiety can predict emotional exhaustion; 3) to identify whether depression and anxiety can predict cynicism.

2. Materials and methods

2.1. Study design and setting

All PA programs in Virginia participated in the study ($n = 8$). Students received a recruitment email providing a link to an anonymous Qualtrics survey. Participants had the option to submit their name into a raffle drawing for a \$20 Visa gift certificate. This study was approved by the researchers' Institutional Review Board.

2.2. Study instruments

The Maslach Burnout Inventory (MBI-SS) student version³² was used to measure burnout. The MBI-SS is comprised of three subscales measuring emotional exhaustion (5 items), cynicism (5 items), and professional efficacy (6 items). The emotional exhaustion subscale assesses emotional fatigue due to academic demands, and cynicism refers to reduced enthusiasm about program studies. Finally, professional efficacy refers to feelings of personal accomplishment in academics. A seven-point Likert scale (0 = never to 6 = always) is used for each question.

To assess depression, the Patient Health Questionnaire-2 (PHQ-2),³³ validated depression screening tool, was used. The two items, which ask if the respondent has felt little interest or pleasure in doing things or has felt down, depressed, or hopeless over the past 2 weeks, rank responses on a scale from 0 to 3, for a tallied score that ranges from 0 to 6. A score of 3 or higher is generally considered to be suggestive of possible depression (specificity 92%—sensitivity 83%).³³

The Generalized Anxiety Disorder Scale³⁴ (GAD-7; score 0–21) was used to screen for anxiety. A score of 10–14 indicates moderate anxiety, and scores greater than 15 indicate severe anxiety (sensitivity 89%—specificity 82%).³⁴

2.3. Statistical analysis

Frequencies were applied to describe baseline characteristics, and descriptive statistics were used to summarize continuous data. Descriptive statistics, including means and frequencies, were used to provide

an overview of the prevalence of anxiety and depression. Total emotional exhaustion scores and cynicism scores were used as dependent variables. Previous research has indicated that the professional efficacy construct correlates less with psychological distress²; thus, only the link between depression, cynicism and emotional exhaustion was explored. In order to examine the factors predicting burnout, we conducted bivariate analyses to determine which predictors to include in the final regression model ($p < .05$). Variables included in the final analysis were: age, gender, year in program (year 1, year 2, rotations), depression total, and anxiety total score. We employed a hierarchical linear regression to assess the ability of depression and anxiety to predict burnout while controlling for sociodemographic variables. Two separate hierarchical multiple regressions were conducted with emotional exhaustion and cynicism as the dependent variable, respectively. For each model, gender, age and year in program were entered at stage one of the regression as control variables. For stage 2 of each multiple regression model, depression (PHQ-2 scores) and anxiety (GAD-7 scores) were entered as predictors. All predictor variables were parameterized as continuous variables except for year in program and gender, which were treated as categorical variables. An alpha of 0.05 criterion was set to denote statistical significance. All analyses were conducted using SPSS 25 (IBM Corp., Armonk, New York).

3. Results

3.1. Participant characteristics

The sample consisted of 320 PA students (response rate = 32%). Majority of the sample identified as female ($n = 253$, 79%) and Caucasian ($n = 275$, 86%). Mean age of participants was 26.7 years ($SD = 4.38$), with ages ranging from 21 to 54. The total sample consisted of 137 first-year students (42.81%), 122 second-year students (38.10%), and 56 third-year students (17.51%).

3.2. Descriptive statistics

Depression scores derived from the PHQ-2 ranged from 0 to 6, with a mean score of 1.6 ($SD = 1.62$). According to the PHQ-2 scoring criterion, 23.12% ($n = 74$) of PA students' scores suggested a risk for depression. Anxiety scores ranged from 0 to 21, with a mean of 8.81 ($SD = 5.33$). According to the GAD-7 scoring criteria, 27.81% ($n = 89$) and 15.30%

Table 1

Descriptive statistics and internal consistency coefficients of measures from a cross-sectional study of physician assistant students, 2018.

Measure	Minimum	Maximum	Mean	Standard Deviation	Cronbach's α
MBI-SS-EE ^a	0	30	20.9	6.6	0.90
MBI-SS-C ^b	0	30	11.9	7.1	0.86
MBI-SS-PE ^c	0	36	26.4	5.9	0.85
PHQ-2 ^d	0	6	1.6	1.6	0.83
GAD-7 ^e	0	21	8.8	5.3	0.90

^a Maslach Burnout Inventory Student Survey Emotional Exhaustion.^b Maslach Burnout Inventory Student Survey Cynicism.^c Maslach Burnout Inventory Student Survey Professional Efficacy.^d Patient Health Questionnaire- 2.^e Generalized Anxiety Disorder-7.

($n = 49$) met criteria for moderate and severe anxiety, respectively.

Summary scores were computed for each of the MBI-SS subscales. For emotional exhaustion, scores ranged from 0 to 30, with a mean of 20.91 ($SD = 6.62$). Scores ranged from 0 to 30 for cynicism, with a mean of 11.91 ($SD = 7.12$). Higher scores indicated greater levels of emotional exhaustion and cynicism for each respective scale. The average score for professional efficacy was 26.45 ($SD = 5.91$). Higher scores on this scale indicated high levels of perceived academic achievement. Table 1 summarized the descriptive statistics and internal consistency coefficients for each study measure.

3.3. Predictors of emotional exhaustion

The hierarchical multiple regression revealed at stage one, gender, age, and year in program contributed

significantly to the regression model, $F(3, 309) = 9.71, p < .001$ and accounted for 7.7% of the variance in emotional exhaustion scores. Adding depression and anxiety as predictor variables explained 40.0% of the variation in emotional exhaustion, $F(5, 307) = 43.31, p < .001$. In the final model, significant predictors of emotional exhaustion were depression ($\beta = .91; p < .001$), anxiety ($\beta = 0.53; p < .001$), gender ($\beta = 1.9; p = .009$) and age ($\beta = -0.14; p = .038$). Results of the hierarchical multiple regression are summarized in Table 2.

3.4. Predictors of cynicism

The hierarchical multiple regression revealed at stage one, gender, age, and year in program did not yield a significant regression model and accounted for only 0.2% of the variance in cynicism scores. With the addition of depression, anxiety as predictor variables

Table 2

Hierarchical Linear Regression Results Examining Associations with Burnout from a Cross-sectional Study of 320 Physician Assistant Students, 2018.

Variable	Emotional Exhaustion					Cynicism				
	B	Std β	95% CI	R^2	ΔR^2	β	Std β	95% CI	R^2	ΔR^2
Step 1										
Year in program	-0.98*	-0.11	(-1.98, -0.20)	0.077	0.08	0.27	0.02	(-0.82, 1.3)	0.002	0.02
Gender	3.6***	0.23	(1.89, 5.38)			0.37	0.02	(-1.62, 2.37)		
Age	-0.21*	-0.14	(-0.36, -0.42)			0.021	0.01	(-0.16, 0.20)		
Step 2										
Year in program	2.2	0.02	(-0.57, 1.01)	0.40	0.33	1.35**	0.14**	(0.41, 2.30)	0.29	0.31
Gender	1.9**	0.12**	(0.48, 3.35)			-0.75	-0.04	(-2.46, 0.95)		
Age	-0.14**	-0.10	(-0.27, -0.007)			0.06	0.04	(-0.86, 0.22)		
PHQ-2 ^a	0.91***	0.22***	(0.43, 1.37)			2.11***	0.48***	(1.56, 2.66)		
GAD-7 ^b	0.53***	0.42***	(0.38, 0.68)			0.16	0.12	(-0.11, 0.33)		

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.^a Patient Health Questionnaire- 2.^b Generalized Anxiety Disorder-7.

explained 29.5% of the variation in cynicism scores, $F(5, 304) = 26.91, p < .001$. In the final model, significant predictors of cynicism were depression ($\beta = 2.1; p < .001$) and year in program ($\beta = 1.35; p = .005$). Anxiety was not significant in the final model for cynicism. Results of the hierarchical multiple regression are summarized in Table 2.

4. Discussion

Distress among pre-professional health students has been noted as an important factor that impacts education and professional development.^{14,35–37} Results of the present study demonstrate a high prevalence of anxiety and depression among PA students compared to general population estimates. Further, the results suggest a strong relationship between anxiety, depression, and emotional exhaustion. While there is growing literature examining depression, anxiety, and burnout in medical students, few studies have examined these in other pre-professional health student populations. To our knowledge, this is the first study examining the relationship between depression, anxiety, and burnout in PA students. Our findings, similar to those found in medical school burnout studies, indicate a high prevalence of depression, compared to the general population, and poor mental health.^{14,35,38,39} Rates of depression and anxiety in the US population are estimated at 7.1% and 19.1%, respectively,^{40,41} and the rates found in this sample of PA students was higher. Consistent with research among medical students and practicing providers,^{14,19} the results from this study indicate depression is significantly associated with emotional exhaustion and cynicism, while anxiety is significantly related to emotional exhaustion.

Burnout is becoming an increasingly crucial issue to address in healthcare students and providers. In medical students, it is thought that the demands of medical school inhibit students' attention to personal wellness.^{42,43} As medical students transition into residency and practice, burnout is linked with decreased satisfaction and a greater risk of medical errors.^{18,44,45} Thus, as the number of PAs providing healthcare continues to grow, it is imperative that we recognize and understand factors that contribute to burnout in PA students.

Depression is associated with burnout in both medical students¹⁴ and practicing physicians.⁴⁶ Specifically, in practicing physicians, depression and burnout are associated with job dissatisfaction and intention to relocate.^{19–22,46} Consequences of depression for physical and mental health include cognitive

dysfunction, increased risk of heart disease,⁴⁷ inflammatory biomarkers,⁴⁸ and a higher risk of suicidal ideation.⁵ Consequences can also be seen in healthcare settings as the co-occurrence of burnout and depression is most greatly associated with increased medical errors, decreased patient satisfaction,^{23,49} and low adherence to best practice standards.^{31,50} This line of research has extended to practicing PAs. In a sample of rural PAs, burnout prevalence was 64%⁵¹ which is associated with depression in rural PAs.⁴⁶ PAs experiencing depression had greater intention to relocate and decreased job satisfaction. A more recent study in the US found that as many as 15,000 PAs are considering leaving their job due to stress.⁵² However, the relationship between burnout, anxiety and depression in PAs and the impact of anxiety and depression on professional outcomes has yet to be examined among PAs in the United States.

While fewer studies have examined the effects of anxiety, there are consistent reports that medical students' anxiety levels are more than one standard deviation higher than general population norms.¹⁴ However, much of the research focuses on depression and burnout among medical students, and few studies have examined the prevalence of anxiety. Anxiety traits are associated with increased burnout in healthcare⁵³; further, high stress work environments increase the risk of both emotional exhaustion and cynicism.⁵⁴ Our results also indicate both anxiety and depression have a strong relationship with emotional exhaustion in students. Given the link between anxiety and emotional exhaustion established by the present study as well as the well-documented negative consequences of burnout in both pre-professional health students and practicing providers, the relationship between depression, anxiety, and burnout in PA students is an important issue to address.

Despite efforts to recruit a diverse sample, selection bias is a limitation. Most participants were Caucasian females, which is comparable to the national matriculation data in terms of gender, race, and age.⁵⁵ Since the sample was limited to Virginia responses may not be representative of other programs or may not be generalizable to other settings. The reliance on self-report is also a limitation, especially considering the sensitive nature of some of the questionnaires. Though there are many different instruments for measuring depression and anxiety, the PHQ-2 and GAD-7 were chosen. While other measures may have provided a more comprehensive assessment of anxiety and depression, these measures were specifically chosen to reduce survey burden and fatigue. While all Virginia

PA programs were represented in the present study, we did not have an adequate number of clusters to conduct multi-leveling modeling. While this type of model could have offered useful information, multi-levels models are highly subject to bias when fewer than 20 clusters are included.⁵⁶ Finally, there are other confounding factors that may influence burnout that were not examined in this study including grade point average or grade reporting policies (e.g., pass/fail versus ranked grades). Future research is needed to examine additional confounding variables.

5. Conclusion

Addressing depression, anxiety, and burnout in PA students has implications for student health, educational outcomes, and ultimately professional outcomes. The large amount of literature on the effects of poor mental health and burnout in medical students elucidates the importance of this issue. Medical students exhibiting high levels of burnout, anxiety, and depression are at greater risk for poor academic performance, cynicism, academic integrity infractions, substance abuse, and suicide.¹⁴ However, these issues are rarely studied in PA students. Future research should focus on early identification of depression and anxiety in PA students and providing appropriate resources. Medical schools, in response to high rates of psychological distress and the demanding nature of the field, have begun providing student wellness programs to reduce anxiety, depression, and stress, as well as to improve self-efficacy and empathy in health professional students; these programs have yielded mixed results. For instance, a required longitudinal mindfulness-based intervention did not lead to significant change in medical student well-being.⁵⁷ However, other volunteer-based programs have led to measurable reductions in burnout and stress.^{58,59} It appears that these types of interventions can have success in pre-professional health students, but further research needs to be done regarding best practices for implementation and delivery. Additionally, research is needed to clarify how these interventions could be tailored for PA programs. Ultimately, future work should aim to promote the development of resources for PA students and other pre-professional health students. Given the stressful nature of the academic and work environments in the healthcare fields, wellness should be emphasized early in the healthcare students' curriculum to allow students to understand, recognize, and create opportunities to improve their mental health and reduce burnout. This new knowledge and skill set

then can be transferred to practice with the ultimate hope that it will increase job satisfaction and quality of patient care.

Ethical approval

Ethical approval has been granted by the James Madison University IRB on 7/17/2018, protocol number: 19–0053.

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