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Burnout and Adverse Outcomes in Athletic Training Students: Why All Healthcare Educators Should Be Concerned

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Abstract

Background: Burnout is linked to various adverse outcomes (i.e., thoughts of dropout, depression, unprofessional behaviors) in healthcare students (i.e., nursing students, medical students). However, potential adverse outcomes associated with burnout in athletic training students, a subset of healthcare students, have yet to be identified. **Objective:** To adapt a previously tested theoretical model to explore relationships between student workload, burnout, and potential adverse outcomes in a sample of graduate athletic training students. **Methods:** An online survey assessing the variables of interest and study information was sent to program directors of graduate-level athletic training programs at their publicly accessible email addresses with a request to forward the opportunity to their students. This was a nationwide sample of graduate athletic training students with 320 graduate athletic training students completing the survey. Descriptive statistics and structural equation modeling was used in our analysis. **Results:** Structural equation modeling confirmed that our hypothesized model successfully described relationships between academic workload, burnout, and adverse outcomes in athletic training students. Specifically, academic workload predicted burnout, and burnout in turn predicted various adverse outcomes (i.e., thoughts of dropout, depression, unprofessional behaviors) in athletic training students. Educators should be aware of the potential adverse outcomes identified in this sample of athletic training students that have also been reported in other healthcare students. **Conclusions:** Methods to combat symptoms of burnout to enhance student well-being and avoid potential adverse outcomes should be identified. Future research should use the adapted theoretical model discussed in this article within other healthcare students' samples to understand further the complex network of relationships between academic workload, burnout, and adverse outcomes in the educational environment.

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ABSTRACT

Background: Burnout is linked to various adverse outcomes (i.e., thoughts of dropout, depression, unprofessional behaviors) in healthcare students (i.e., nursing students, medical students). However, potential adverse outcomes associated with burnout in athletic training students, a subset of healthcare students, have yet to be identified. **Objective:** To adapt a previously tested theoretical model to explore relationships between student workload, burnout, and potential adverse outcomes in a sample of graduate athletic training students. **Methods:** An online survey assessing the variables of interest and study information was sent to program directors of graduate-level athletic training programs at their publicly accessible email addresses with a request to forward the opportunity to their students. This was a nationwide sample of graduate athletic training students with 320 graduate athletic training students completing the survey. Descriptive statistics and structural equation modeling was used in our analysis. **Results:** Structural equation modeling confirmed that our hypothesized model successfully described relationships between academic workload, burnout, and adverse outcomes in athletic training students. Specifically, academic workload predicted burnout, and burnout in turn predicted various adverse outcomes (i.e., thoughts of dropout, depression, unprofessional behaviors) in athletic training students. Educators should be aware of the potential adverse outcomes identified in this sample of athletic training students that have also been reported in other healthcare students. **Conclusions:** Methods to combat symptoms of burnout to enhance student well-being and avoid potential adverse outcomes should be identified. Future research should use the adapted theoretical model discussed in this article within other healthcare students' samples to understand further the complex network of relationships between academic workload, burnout, and adverse outcomes in the educational environment.

Keywords: burnout, athletic training, healthcare educators

INTRODUCTION

Burnout is a three-dimensional psychological syndrome that includes sensations of emotional exhaustion (EE), depersonalization (DP), and a lack of personal accomplishment (PA).[1,2] Many healthcare professionals have reported symptoms of burnout, including athletic trainers (i.e., physicians, physician assistants, dentists).[3-5] Athletic trainers are a subset of healthcare professionals that also report burnout symptoms.[6] Adverse outcomes (i.e., leaving the profession, reports of medical errors, diminished physical and mental health) have been linked with increased burnout reports in healthcare professionals, including athletic trainers.[3,4,7-9] Research suggests that burnout is also prevalent in students training to become full-time healthcare professionals (i.e., medical students, dental students, physician assistant students, athletic training students).[10-14] Adverse outcomes (i.e., decreased academic achievement, cheating, and dishonest clinical behaviors) have also been linked with burnout in healthcare students.[15,16]

Authors of one study developed and tested a theoretical model that identified that academic workload predicts burnout and burnout predicts adverse outcomes in a sample of dental students.[15] However, this model has not been tested in other samples of healthcare students. Continued use of this model to explore relationships between academic workload, burnout, and adverse outcomes and other samples of healthcare students could further solidify the predicted relationships between these variables. Furthermore, to our knowledge, potential adverse outcomes of burnout have yet to be identified in athletic training students. Therefore, the objective of this study was to determine the prevalence of burnout and test an adapted theoretical model to determine the relationships between academic workload, burnout, and adverse outcomes in our sample of athletic training students.

History and Measurement of Burnout

Prolonged exposure to chronic workplace stress led to the initial description of the burnout phenomenon in the early 1970s.[2] Initial reports of burnout scores (i.e., EE, DP, PA) were limited to people-oriented occupations, historically referred to as human service professions.[1] Freudenberger provided one of the first reports of burnout that described feelings of exhaustion, fatigue, irritability, and frustration in healthcare providers.[17] Since the initial description of burnout, several survey scales have been created to assess symptoms of burnout in various populations. The Maslach Burnout Inventory - Human Services Survey (MBI-HSS) is the most widely used quantitative measurement of burnout in human service professionals.[2] The MBI-HSS measures burnout on three dimensions, including emotional exhaustion, depersonalization, and personal accomplishment. Several adaptations to the original scale exist to measure burnout in various populations, including the MBI-HSS for medical professionals, the MBI Educators Survey (MBI-ES), the MBI General Survey (MBI-GS), and the MBI Student Survey (MBI-SS).[18] The creators of the MBI-HSS report normative means for each subscale of burnout (i.e., EE, DP, PA) and have established cut-off scores for each dimension that represent high levels of burnout (MBI-HSS). For example, a score of 27 or higher on the EE subscale, a 10 or higher score on the DP subscale, or a score of 33 or lower on the PA subscale on the MBI-HSS indicates high levels of burnout.[18]

Burnout and Adverse Outcomes in Healthcare Professionals

Many authors have utilized the MBI-HSS to assess burnout among various healthcare professionals. For example, 32 % of a sample of physicians were found to have high burnout scores on the EE subscale.[19] Further, 26% of physicians in this sample reported high burnout on the DP subscale, and 13% reported high levels of burnout on the PA subscale of the MBI-HSS.[19] Similarly, Aiken et al identified that 43% of nurses reported high burnout scores on at least one burnout dimension.[4] Within athletic trainers, 38.9% of a recent sample met cut-off scores for high levels of burnout on the EE subscale, 33% for the DP subscale, and 17.7% for the PA subscale.[6]

The continued study of burnout in healthcare providers is imperative due to the adverse outcomes associated with its onset. For example, in one study, researchers identified that 33% of nurses in the sample had intentions to leave their current job, indicating retention concerns.[4] Additionally, Shanafelt et al identified that major medical errors reported by surgeons were strongly related to a surgeon's degree of burnout.[3] Further, reports of fatigue, frequent headaches, illness, GI disorders, sleeplessness, shortness of breath, frustration, anger, cynicism, and depression are described in healthcare professionals with increased burnout scores.[7,17,20-22] Diminished physical health has also been identified alongside increased burnout scores in athletic trainers. For example, two reports describe diminished physical health relating to burnout, including headaches, high blood pressure, weight issues, fatigue, indigestion, and sleeplessness within ATs.[8,9]

Burnout and Adverse Outcomes in Healthcare Students

Students preparing to enter various healthcare professions also report high burnout scores. For example, Johnson et al identified that 79.69% of physician assistant students in their sample reported high burnout scores.[23] Within a sample of dental hygiene students, 22% of the sample had high levels of burnout on the EE subscale, 22% on the DP subscale, and 25% on the PA subscale.[11] Additionally, a recent study by Vineyard et al. found that 62.9% of graduate athletic training students had high EE scores, and 100% of the sample reported high levels of DP.[13] Just like healthcare professionals, students also report adverse

outcomes in relation to increased burnout scores. Authors of one study identified that medical students who had increased burnout scores were more likely to demonstrate unprofessional clinical behaviors.[16] These behaviors included omitting physical examination findings on patient documentation and cheating.[16] Thoughts of dropout were also reported in medical students who reported increased burnout.[24]

The authors of one study of dental students proposed and tested a theoretical model that hypothesized that academic workload predicted burnout and that burnout predicted adverse outcomes.[15] The authors used path analysis within a structural equation modeling (SEM) framework to identify if the model successfully explained the proposed chains of relationships between academic variables, burnout, and adverse outcomes in a sample of dental students. Identifying a theoretical model to explain the relationships between burnout and adverse consequences is helpful to understand the complex network of predicted relationships between workload, burnout, and adverse outcomes. While the model proposed by Atalayin et al successfully explained the relationship between academic variables, burnout, and adverse consequences in a sample of dental students, this model has not been tested in other healthcare student populations, including athletic training students.[15] Further testing of this model and its proposed relationships would help educators further understand if academic workload is an antecedent of burnout and if the presence of burnout predicts adverse outcomes in other healthcare students. Furthermore, to our knowledge, no other study has assessed links between burnout and adverse outcomes identified in different samples of healthcare students (i.e., thoughts of dropout, depressive symptoms, decreased academic achievement, unprofessional behaviors). Therefore, this study aimed to identify the prevalence of burnout and determine if a theoretical model adapted from Atalayin and colleagues[15] was also able to predict relationships between academic workload, burnout, and adverse outcomes in our sample of athletic training students.

METHODS

Design

We adapted a theoretical model initially tested by Atalayin et al to test our predicted relationships between academic workload, burnout, and adverse outcomes. Our adapted theoretical model included an academic variable (i.e., study time) as a predictor of increased burnout scores, similar to the model proposed by Atalayin et al.[15] We also added clinical education time as a hypothesized predictor of burnout scores in our adapted model due to the demands of academic course load and clinical caseload experienced by athletic training students. Additionally, burnout scores (i.e., EE, DP, and PA) and the potential outcomes of burnout previously identified by Atalayin and colleagues (i.e., thoughts of dropping out, decreased academic achievement) were added as the outcome variables within the model. We also entered other adverse outcomes variables (i.e., depressive symptoms, cheating behaviors, unprofessional clinical behaviors) that have been previously associated with burnout in other samples of healthcare students that were not previously tested in the Atalayin et al model.[15,16,24] Our theoretical model adapted from Atalayin et al for use in this study is displayed in Figure 1. The hypothesized paths (i.e., proposed relationships) were tested utilizing structural equation modeling (SEM). The SEM procedures used are further described in the statistical analyses section.

Participants

Three hundred and seventy-four students enrolled in master's level athletic training programs accredited by the commission of accreditation on athletic training education (CAATE) initiated our survey. Participants who were not currently enrolled in a CAATE accredited program or did not complete the survey portions required for statistical analyses were excluded from the study resulting in the removal of 54 partial responses from the final analysis. This adjustment resulted in 320 student responses utilized in data analysis and a completion rate of 85%. This study was submitted to the Institutional Review Board (IRB) from the sponsoring institution and was classified as exempt.

Procedures

We recruited athletic training students to participate in the study by emailing program directors of CAATE accredited professional master's level programs. This process resulted in 196 programs that were contacted. Program directors of athletic training programs were contacted at their publicly accessible email addresses. The email provided background information on the study and requested that the program director forward a recruiting email to their students, including a link to the survey. The online survey contained 98 questions. The survey was generated in Qualtrics (Provo, UT) utilizing previously validated survey instruments outlined below. Two weeks after the initial email to program directors, a follow-up email was sent, asking them to remind students about participation in the study.

Questionnaire

The online questionnaire was composed of various scales that measured each of the following variables of interest for this study. Each survey component is described in further detail below.

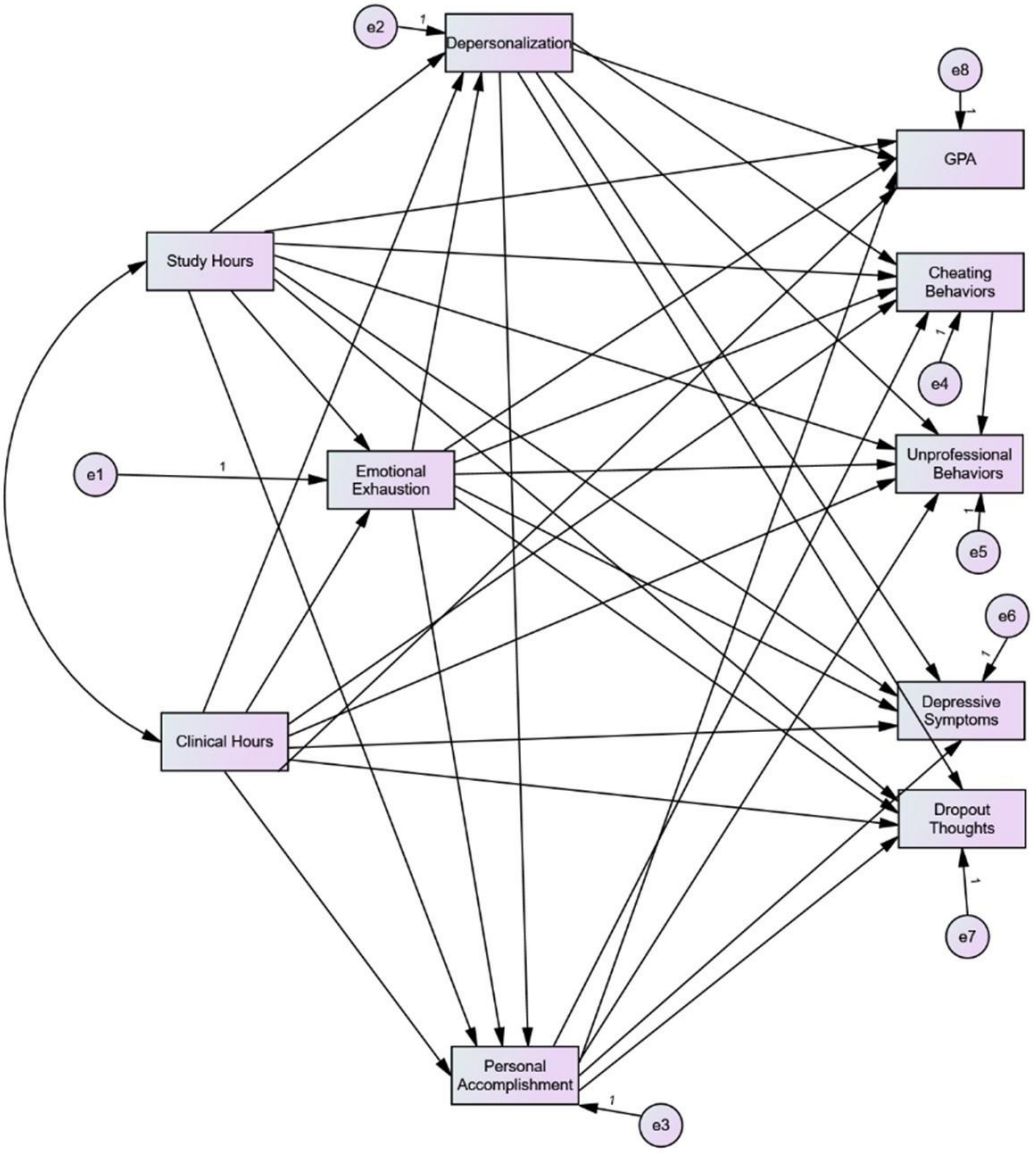

Figure 1. Theoretical model adapted from Atalayin et al

Demographic and Situational Factors

Demographic questions included personal and situational factors, including sex, year in school, ethnicity, relationship status, and NATA district. The student's level of education was assessed by asking, "What year are you in your master's-level professional athletic training program?" Responses for this question included "1st-year graduate student," "2nd or 3rd-year graduate student," or "undergraduate student enrolled in a "3+2 education program" options.[25,26] The average number of hours spent at the student's current clinical site each week and average hours studying per week were both assessed on a six-point Likert scale with answer choices including "0-10", "10-15", "15-20", "20-25", "25-30", "30+".[27] Lastly, students were asked to self-report their current grade point average (GPA) to assess academic achievement. Answer choices included "lower than 2.0"," 2.0-2.49"," 2.5-2.99", "3.0-3.49", "3.5-3.99", "4.0 or higher". The conversion of GPA into a categorical variable for model testing is similar to procedures documented in another research report.[28]

Burnout

The Maslach Burnout Inventory-Health Human Services Edition (MBI-HHS) assessed burnout among participants.[18] The MBI-HSS is a 22-item scale that measures the three constructs of burnout (i.e., EE, DP, and PA). Nine survey items measured EE, five

measured DP, and eight measured PA constructs. The EE scale includes statements such as "I feel emotionally drained from my work." The DP scale includes statements such as "I feel I treat some patients as if they were impersonal objects." Lastly, the PA scale includes statements such as "I feel I am positively influencing other people's lives through my work." Responses for each item are provided on a 7-point Likert scale ranging from "Never" to "Every day." Item scores were summed to create a score for each dimension of burnout.[18] Higher scores on the EE and DP burnout scales indicate an increased level of burnout, whereas decreased scores on the PA subscale represent increased burnout. High levels of burnout for each dimension (i.e., EE, DP, PA) were established using previously identified cut-off scores.[18] A score of 27 or higher on the EE subscale, a 10 or higher score on the DP subscale, or a score of 33 or lower on the PA subscale was established as having a high level of burnout.[18] The three subscales of the MBI-HSS have reported internal reliability coefficients of .89 (EE), .77 (DP), and .74 (PA).[29]

Dishonest Clinical Behaviors and Cheating Behaviors

Questions relating to cheating and dishonest clinical behaviors were adapted from a previous study on medical students.[16] Questions related to cheating assessed if students had ever copied off another student or allowed a student to copy off them. Students were asked if they had ever taken credit for another person's work. Dishonest clinical behaviors were assessed by asking if students had ever lied to their preceptor or falsified patient records. Each "yes" to a dishonest clinical behavior was combined and converted into a variable that included coding for no reports of dishonest clinical behaviors as "0", one report of cheating or dishonest clinical behavior as "1", and two reports of cheating or dishonest clinical behaviors being recorded as "2".

Thoughts of Dropout

Questions specific to students' thoughts about dropout from their athletic training education program were adapted from a previous study assessing dropout intentions in samples of healthcare students.[30] Two questions were asked regarding dropout. The first question was dichotomous, asking students to answer "yes" or "no" to ever having thoughts of dropping out of their current academic program. A second question asked students to indicate the seriousness of these thoughts on a scale of 0-5, with "0" indicating no thoughts of dropout and "5" indicating serious thoughts of dropout.

Depressive Symptoms

The two-item PRIME MD scale was used to screen for depressive symptoms.[31] This scale was previously used in burnout studies on medical students.[16] Answers were coded as "0 – no reports of depressive symptoms, 1 – responded yes to one depressive symptom, and 2 – responded yes to two depressive symptoms" Reporting one or more answers of "yes" to a depressive symptom resulted in a positive screen for depressive symptoms.[31] The PRIME-MD performs similar to scales that assess depressive symptoms and has a sensitivity of 86% to 96% and a specificity of 57% to 75% for major depressive disorder.[31,32]

Statistical Analyses

Statistical analyses were conducted using SPSS and AMOS version 27 (IBM) programs. Listwise deletion was utilized to address missingness in surveys that were determined incomplete. Linearity and homogeneity of variance assumptions were assessed by visual analysis of Q-Q and P-P plots for variables of interest. Descriptive statistics were utilized to provide information on the profile of our respondents and burnout prevalence. Path analysis was used to estimate the impact of workload (i.e., average study time per week, clinical hours per week) on burnout scores (i.e., EE, DP, PA).

Additionally, path analysis identified if increased burnout scores predicted potential adverse outcomes of burnout (i.e., thoughts of drop out, decreased academic achievement, cheating behaviors, dishonest clinical behaviors, and depressive symptoms). Overall model fit was assessed utilizing Chi-square (x^2), fit indices, comparative fit index (CFI), incremental fit index (IFI), the goodness of fit index (GFI), and normed fit index (NFI) to assess how well our adapted model from Atalayin et al. describe the relationships of interest. Structural equation modeling was determined as an acceptable method to assess model fit and test the relationships of interest using maximum likelihood estimation. The variables were assumed to be normally distributed based on ocular analysis of P-P charts and had relatively minimal skewness and kurtosis. Additionally, each variable included three or more ordinal levels indicating that any failure to address the ordinality of the data is likely negligible.[33,34]

RESULTS

Demographics

Three hundred and twenty participants were included in the final analysis. The mean age of students was 23.83 (*SD* = 2.517). Students were primarily female (*n* = 241, 75.3%) and Caucasian (*n* = 249, 77.8%). Most students were single or never married (n =177, 55.3%). The respondents represented a national sample, with all ten National Athletic Trainers Association districts being represented. A breakdown of districts represented and demographic data is further described in Table 1.

Table 1. Demographic and situational variables

Variables	*n* (%)
Sex	
Male	79 (24%)
Female	241 (75%)
Race	
Caucasian	249 (71%)
Hispanic	34 (10%)
African American	21 (6%)
Asian/Pacific Islander	20 (6%)
Multiracial	7 (2%)
American Indian	6 (2%)
Program Year	
1st-year graduate student	161 (50%)
2nd or 3rd-year graduate student	134 (42%)
Undergraduate enrolled in a combined 3+2 program	25 (8%)
Weekly Clinical Hour Average	
0-10 hours per week	14 (4%)
10-15 hours per week	23 (7%)
15-20 hours per week	53 (16%)
20-25 hours per week	62 (19%)
25-30 hours per week	64 (20%)
30+ hours a week	104 (32%)
Weekly Study Hour Average	
0-5 hours per week	25 (7%)
5-10 hours per week	134 (42%)
10-15 hours per week	82 (26%)
15-20 hours per week	49 (15%)
20-25 hours per week	15 (5%)
25+ hours a week	15 (5%)
NATA District	
1 (CT, ME, MA, NH, RI, VT)	9 (2%)
2 (DE, NJ, NY, PA)	49 (15%)
3 (DC, MD, NC, SC, VA, WV)	38 (11%)
4 (IL, IN, MI, MN, OH, WI)	68 (21%)
5 (IA, KS, MO, NE, ND, OK, SD)	39 (12%)
6 (AK, TX)	49 (15%)
7 (AZ, CO, NM, UT, WY)	13 (4%)
8 (CA, Guam, American Samoa, HI, NV)	6 (2%)
9 (AL, FL, GA, Puerto Rico, Virgin Islands, KY, LA, MS, TN)	25 (8%)
10 (AK, ID, MT, OR, WA)	25 (7%)

Variables	*n* (%)
GPA	
2.0-3.49	103 (32%)
3.5-3.99	186 (58%)
4.0 or higher	31 (9%)
Unprofessional Clinical Behaviors Reported	
None	260 (81%)
Admitted one unprofessional behavior	43 (13%)
Admitted two unprofessional behaviors	17 (5%)
Cheating Behaviors Reported	
None	255 (79%)
One cheating behavior reported	60 (18%)
Two cheating behaviors reported	5 (2%)
Thoughts of Drop out	
No	178 (55%)
Yes	142 (44%)
Positive Depressive Symptom Screen	
No	93 (29%)
Yes	227 (71%)
Participants Reporting High Burnout	
High Emotional Exhaustion	128 (40%)
High Depersonalization	67 (21%)
High Personal Accomplishment	60 (19%)

Burnout Prevalence

Mean burnout scores for EE, DP, and can be viewed in table 2. A total of 128 students had high EE (40%). Low PA scores, indicating increased burnout, were seen in 67 students (20.94%). Lastly, high DP scores were identified in 60 students (18.75%).

Table 2. Mean burnout scores

Burnout Dimension	Mean (SD)
Emotional Exhaustion (EE)	24.33 (± 10.1)
Depersonalization (DP)	5.25 (± 4.4)
Personal Accomplishment (PA)	38.20 (± 6.1)

Adverse Outcomes Model

When initially testing our adapted theoretical model, initial fit indices indicated that the clinical education time variable was insignificant and detracted from the model's overall fit. Therefore, this variable was removed from our final model. A predictive relationship between burnout and GPA was also not identified in our model. Therefore, fit indices recommended the removal of this path to improve overall model fit. All other paths depicting the relationships between burnout scores and adverse outcomes were maintained in the final model. Our final parsimonious model is depicted in Figure 2. The final model was accepted as adequate based on absolute fit values (x^2) and other measures of relative fit including x^2 (16, n = 320) = 20.888 and p = .183, GFI = .984, adjusted GFI = .964, RMSEA = .031 (.000; .065), CFI = .983, Tucker-Lewis Index = .970, IFI= .983, NFI = .932. Increased study hours predicted increased EE scores (β = .139, p = .012). Increased EE scores predicted adverse outcomes including increased depressive symptoms (β= .475, p < .001) and increased thoughts of drop out (β= .310, p = .005).

Additionally, the path between DP and unprofessional clinical behaviors was statistically significant *(*β= .156, p = .004). Lastly, the path between PA and depression *(*β= -.107, p = .028) was significant. All the relationships between variables entered in the model were direct relationships only. Any indirect or mediating relationships between variables included in the model were statistically insignificant (p < .05).

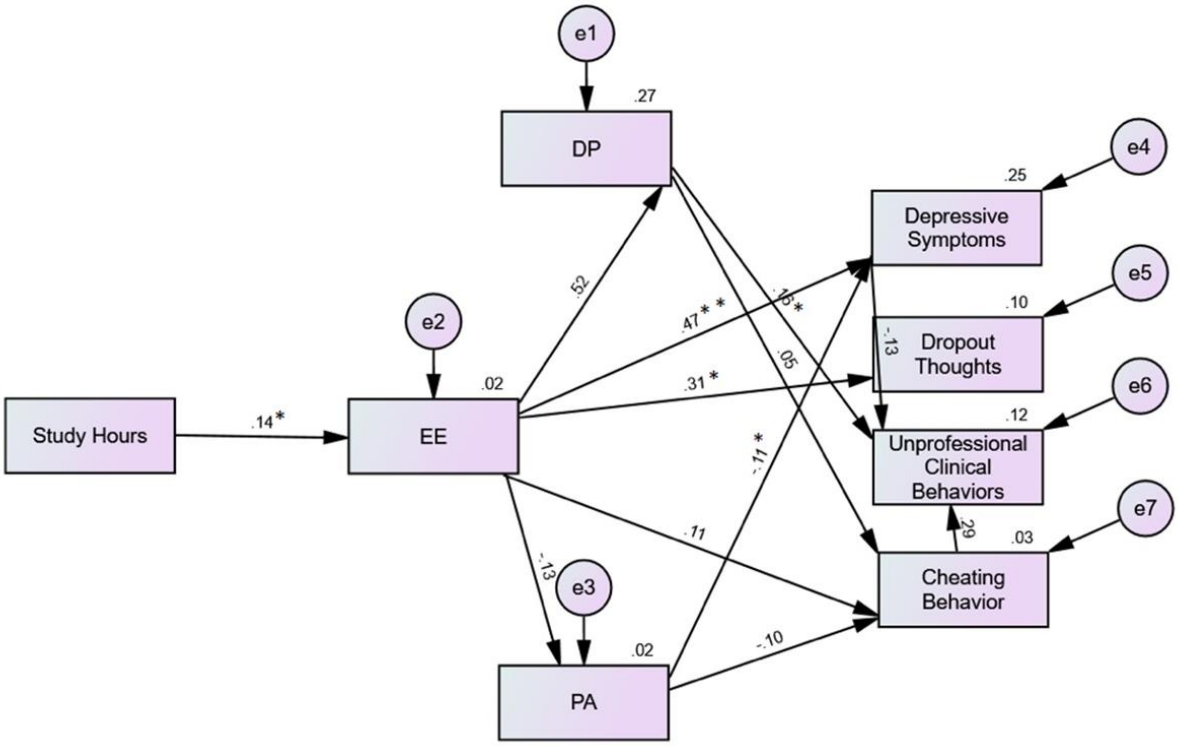

Figure 2. Final parsimonious model proposed by authors

DISCUSSION

The purpose of this study was to identify the prevalence of burnout in graduate athletic training students and determine if a theoretical model adapted from Atalayin et al predicted relationships between academic variables, burnout scores, and adverse outcomes in our sample of athletic training students.[15] High levels of burnout were reported by a percentage of athletic training students in our sample. However, our findings indicated that the overall percentage of athletic training students with high burnout levels was lower in our sample than in previous findings.[13] Outside of the Vineyard et al. study, only one other study has documented burnout scores utilizing the MBI-HSS in graduate athletic training students.[14] However, this study did not identify the percentage of students exhibiting high burnout scores.[14] Compared to our sample, increased burnout scores on the EE and DP scales were reported by Bryant and colleagues, indicating increased burnout in their sample.[14] The discrepancy in burnout scores between the studies mentioned above may be the academic and clinical changes related to the COVID-19 pandemic.[35] Athletic training education programs have also endured the same challenges as many other healthcare training programs, which may have impacted students' feelings of burnout due to disrupted schedules and a changing academic environment. For example, the graduate athletic training program at the university sponsoring this research encountered significant changes in student experiences during the onset of the COVID-19 pandemic. Students were unable to partake in normal clinical education experiences due to restrictions at various sites (i.e., hospitals and clinics limited environments to essential personnel only, university sports were temporarily shut down, limiting student involvement). However, further evaluation of the impact of COVID-19 on burnout in athletic training students was outside of the scope of this study.

Our proposed adapted theoretical model testing the relationships between academic variables, burnout symptoms, and outcomes of burnout was deemed successful based on the adequate measures of absolute and relative fit identified. Measures of absolute and relative fit met normative values, indicating that our model adequately fit the data and successfully described relationships between academic study time, burnout scores, and adverse outcomes in our sample of athletic training students.[36] These findings suggest that the theoretical model that we adapted from Atalayin et al. successfully described the hypothesized relationships between our variables of interest. Additionally, our adapted model identified that increased burnout scores (i.e., EE, DP, PA)

predicted at least one or more adverse outcomes (i.e., depressive symptoms, thoughts of drop out, and unprofessional clinical behaviors). Specifically, within our final model, EE scores were predictive of depressive symptoms in our sample of athletic training students.

Additionally, reduced PA predicted depressive symptoms in our sample of athletic training students. These findings support the relationship between burnout and depressive symptoms identified by Puranitee et al which revealed a significant positive relationship between depressive symptoms and burnout in medical students. Compared to previous reports of depressive symptoms in healthcare students, our sample had a higher percentage of depressive symptoms.[24] However, this may be due to our large percentage of female students. Females have been found to report depressive symptoms more often than their male counterparts.[37] Our findings also indicated that EE symptoms predicted the severity of dropout thoughts in our sample of athletic training students. These reports support findings within a sample of medical students that identified that burnout scores predicted thoughts of drop out.[16] Increased DP resulted in unprofessional clinical behaviors in athletic training students. This finding is similar to a study of medical students indicating that students with increased burnout scores were more likely to report engaging in one or more unprofessional behaviors than those with decreased burnout scores.[16] Our findings raise concerns for educators about the well-being and retention of athletic training students. Educators should be aware of the adverse outcomes identified in our sample of athletic training students and look out for warning signs of these behaviors and outcomes in their student populations. Furthermore, educators should help students identify potential resources that may help alleviate or prevent burnout onset to mitigate the risk of these adverse outcomes.

Limitations

Our study was not without limitations. First, this study represents a one-time cross-sectional sampling of burnout and outcomes of burnout in a sample of athletic training students. While SEM analysis helped identify predictive relationships between burnout and adverse outcomes, it did not allow for causal inferences between these relationships. Although the academic impacts of COVID-19 may have played a role in student responses, these findings were not assessed in respect of survey length. Furthermore, a response bias may have been present, resulting in students experiencing burnout not completing this survey.

Additionally, recall bias may have been present. Athletic training students may not have wanted to report that they performed cheating or dishonest clinical behaviors even though they were told the survey would remain anonymous. We utilized short-scale measures to avoid respondent fatigue due to the lengthy survey. Longer questionnaires may have been more beneficial in capturing aspects of the student's experience, such as the severity of depressive symptoms. The two-item screen utilized in this study is sensitive to detecting depressive symptoms but cannot quantify the severity of these symptoms. Additionally, because our sample was limited to athletic training students and included primarily female and Caucasian respondents, our ability to make inferences about athletic training students or other healthcare students is limited.

Recommendations for Future Research

Because the conflicting burnout prevalence findings between this study and previous studies on athletic training students, future research should consider longitudinal approaches to assess differences in burnout reports over time. Furthermore, researchers should consider testing the adapted model presented in other healthcare students to further understand the complex relationships between academic workload, burnout, and adverse outcomes in other healthcare students. Additionally, researchers should continue to study burnout in all healthcare students and identify methods to potentially alleviate or mitigate the risk of burnout in these students to diminish the risk of adverse outcomes in these student samples.

CONCLUSSIONS

Our findings indicated that academic workload predicted burnout. In turn, increased burnout scores predicted one or more adverse outcomes, including unprofessional clinical behaviors, thoughts of drop out, and depressive symptoms in our sample of athletic training students. These findings support relationships identified between workload, burnout, and adverse outcomes in other samples of healthcare students. Educators of healthcare students should be aware of the presence of burnout in these student samples and the potential impacts on academic honesty, retention, professionalism, and overall well-being. As a result of the adverse consequences of burnout in athletic training students identified in this study, researchers should continue to emphasize the study of burnout in all healthcare student populations. Methods to combat burnout and prevent its onset is imperative to set students up for success when entering their respective fields as full-time healthcare professionals.

REFERENCES

1. Maslach C. Burnout: the cost of caring. *New Jersey*. 1982;
2. Heinemann LV, Heinemann T. Burnout research: Emergence and scientific investigation of a contested diagnosis. *Sage Open*. 2017;7(1):2158244017697154.
3. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Annals of surgery*. 2010;251(6):995-1000.
4. Aiken LH, Clarke SP, Sloane DM, et al. Nurses' reports on hospital care in five countries. *Health affairs*. 2001;20(3):43-53.
5. Benson MA, Peterson T, Salazar L, et al. Burnout in rural physician assistants: An initial study. *The Journal of Physician Assistant Education*. 2016;27(2):81-83.
6. Oglesby LW, Gallucci AR, Wynveen CJ, Ylitalo KR, Benson NF. Burnout and substance use in collegiate athletic trainers. *Journal of Athletic Training*. 2020;55(7):744-751.
7. Ahola K, Hakanen J. Job strain, burnout, and depressive symptoms: A prospective study among dentists. *Journal of Affective Disorders*. 2007;104(1-3):103-110.
8. Campbell D, Miller M, Robinson W. The prevalence of burnout among athletic trainers *Athletic Training Journal National Athletic Trainers Association* 1985;20(2):110-113.
9. Gieck JH. Athletic training burnout: A case study. *Athl Train*. 1986;21(1):43.
10. Brazeau CMLR, Schroeder R, Rovi S, Boyd L. Relationships between medical student burnout, empathy, and professionalism climate. *Academic Medicine*. 2010;85(10):S33-S36.
11. Deeb GR, Braun S, Carrico C, Kinser P, Laskin D, Golob Deeb J. Burnout, depression and suicidal ideation in dental and dental hygiene students. *European journal of dental education*. 2018;22(1):e70-e74.
12. Johnson AK, Blackstone SR, Skelly A, Simmons W. The relationship between depression, anxiety, and burnout among physician assistant students: a multi-institutional study. *Health Professions Education*. 2020;6(3):420-427.
13. Vineyard AP, Gallucci A, Adair K, Oglesby L, White K, Wynveen C. Prevalence and Predictors of Burnout in Athletic Training Students: A Comparison of Undergraduate and Graduate Students. *Athletic Training Education Journal*. 2021;16(2):101-111.
14. Bryant K, Bradney DA, Favero D, Bowman TG. Burnout Levels and Mood States Among Athletic Training Students in Professional Master's Programs. *Athletic Training Education Journal*. 2019;14(3):151-155.
15. Atalayin C, Balkis M, Tezel H, Onal B, Kayrak G. The prevalence and consequences of burnout on a group of preclinical dental students. *European journal of dentistry*. 2015;9(03):356-363.
16. Dyrbye LN, Massie FS, Eacker A, et al. Relationship between burnout and professional conduct and attitudes among US medical students. *Jama*. 2010;304(11):1173-1180.
17. Freudenberger HJ. Staff burn-out. *Journal of social issues*. 1974;30(1):159-165.
18. Maslach C, Jackson S, Leiter M. MBI: Maslach burnout inventory: CPP, incorporated Sunnyvale (CA). 1996.
19. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. *Annals of surgery*. 2009;250(3):463-471.
20. Szigethy E. " Burnout": strategies to prevent and overcome a common--and dangerous—problem. *Psychiatric Times*. 2014;31(5):28-28.
21. Thun S, Fridner A, Minucci D, Løvseth LT. Sickness present with signs of burnout: The relationship between burnout and sickness presenteeism among university hospital physicians in four European countries. *Scandinavian Psychologist*. 2014;1
22. Tourigny L, Baba VV, Wang X. Burnout and depression among nurses in Japan and China: The moderating effects of job satisfaction and absence. *The International Journal of Human Resource Management*. 2010;21(15):2741-2761.
23. Johnson AK, Blackstone SR, Simmons W, Skelly A. Assessing burnout and interest in wellness programs in physician assistant students. *The Journal of Physician Assistant Education*. 2020;31(2):56-62.
24. Puranitee P, Saetang S, Sumrithe S, Busari JO, van Mook WNKA, Heeneman S. Exploring burnout and depression of Thai medical students: the psychometric properties of the Maslach Burnout Inventory. *International Journal of Medical Education*. 2019;10:223.
25. Dearie A, Van Langen D, Cavallario JM, Comins SA. Factors Influencing a Student's Choice of a Graduate Professional Athletic Training Program. *Athletic Training Education Journal*. 2020;15(3):177-185.
26. Ostrowski JL, Iadevaia CM. Characteristics and program decisions of master's-level professional athletic training students. *Athletic Training Education Journal*. 2014;9(1):36-42.
27. Carr WD, Volberding JL, Timson B. An exploratory study of athletic training student communication. *Athletic Training Education Journal*. 2016;11(4):219-226.

28. Gershenfeld S, Ward Hood D, Zhan M. The role of first-semester GPA in predicting graduation rates of underrepresented students. *Journal of College Student Retention: Research, Theory & Practice*. 2016;17(4):469-488.
29. Lee RT, Ashforth BE. A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of applied Psychology*. 1996;81(2):123.
30. Dyrbye LN, Thomas MR, Power DV, et al. Burnout and serious thoughts of dropping out of medical school: a multi-institutional study. *Academic Medicine*. 2010;85(1):94-102.
31. Spitzer RL, Williams JBW, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *Jama*. 1994;272(22):1749-1756.
32. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression: Two questions are as good as many. *Journal of general internal medicine*. 1997;12(7):439-445.
33. Atkinson L. The measurement-statistics controversy: Factor analysis and subinterval data. *Bulletin of the Psychonomic Society*. 1988;26(4):361-364.
34. Babakus E, Ferguson CE. C287. Ordinal data and lisrel: a note on significance level. *Journal of Statistical Computation and Simulation*. 1987;28(2):179-182.
35. Hall AK, Nousiainen MT, Campisi P, et al. Training disrupted: Practical tips for supporting competency-based medical education during the COVID-19 pandemic. *Medical teacher*. 2020;42(7):756-761.
36. Kline RB. *Principles and practice of structural equation modeling*. Guilford publications; 2015.
37. Salk RH, Hyde JS, Abramson LY. Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms. *Psychological bulletin*. 2017;143(8):783.