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Mental Health Matters: Mental Health and Overall Well-Being Among First- and Second-Year Medical Students

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Abstract

Purpose: Recent studies have indicated a dramatic increase of depression and burnout levels among medical students. This study aimed to answer the question: how does medical students' mental health affect their stress, physical health, and academic success?
Method: A survey was distributed to first- and second-year medical students to gather information on various self-perceived parameters of health, well-being, and academic success. Participants rated their mental health, physical health, and stress on a five-point Likert scale. Grade point averages (GPAs) were used as a measure of academic success. Students were separated into "low" (1–3 of 5) and "high" (4–5 of 5) mental health categories based on self-reported mental health scores on the Likert scale. The two groups were compared on their self-reported physical health, stress, and GPAs. Linear regression analyses were also performed with GPA and mental health as the dependent variables.
Results: 121 surveys met inclusion criteria. The average physical health was 3.03 in the "low" mental health group ($n = 61$) and 3.88 in the "high" mental health group ($n = 60$) ($p < .001$). The average stress was 3.87 in the "low" mental health group and 3.35 in the "high" mental health group ($p < .001$). The average GPA was 3.22 in the "low" mental health group and 3.26 in the "high" mental health group ($p = .33$). Multiple linear regression analysis demonstrated that about 40% of the variation in mental health was explained by the combined effects of physical health and stress ($R^2 = .40$, $p < .001$). The cumulative effect of mental health, physical health, and stress on GPA was not significant ($R^2 = .017$, $p = .58$).
Discussion: It appears that better mental health is correlated with a decrease in stress and an increase in physical health but has no substantial impact on GPA. This may warrant future research into the influence of mental health on other aspects of academic and professional success.

Keywords: Burnout; Medical student; Mental health; Stress; Well-being

1. Introduction

Medical school is a well-documented source of psychological and emotional distress for students due

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to a wide variety of factors, including intense academic pressure, increased workload, financial concerns, sleep deprivation, student abuse and exposure to patients' suffering and death.[1–9] Medical students' mental health issues, including depression and burnout, are prevalent and significant factors influencing performance in medical training.[6,9–13] Previous studies have found that 38% of graduating medical students reported depressive symptoms, 34% reported low mental quality of life, 50% experienced burnout, and 10% experienced suicidal ideation.[10,14] Despite this general relationship between medical school and student mental health, little is known about specific associations between medical students' mental health and other aspects of their overall well-being and academic success. The purpose of this study was to investigate medical students' perceptions of their own mental health and how these perceptions are associated with other facets of their well-being, including stress, physical health, and academic success. We hypothesized that poor mental health predicts high stress, low physical health, poor academic performance, and poor overall well-being among first- and second-year medical students.

2. Method

2.1. Procedure

Study design and survey creation were performed from August to September of 2018. Institutional review board (IRB) approval was granted on October 30th, 2018. Medical students completed the survey in November 2019 and the data was subsequently compiled after the end of the Fall Semester on January 17th, 2019. Data analysis began on February 1st, 2019.

2.2. Participants

A sampling protocol was used to obtain first- and second-year medical student participants on campus at an urban medical school in the United States (USA). The survey was administered in November of the Fall 2018 term for both first-year and second-year medical students, ensuring that all participants had undergone medical school training for more than three months post-matriculation. Participants were informed, both verbally and with a cover letter, that participation was voluntary, and identities would remain anonymous. Student identification (ID) numbers were collected, but student researchers were not provided the names of the students; only the principal investigator, a full-time faculty member with completed research ethics and compliance training through the Collaborative Institutional Training Initiative (CITI) Program handled data analysis. This study was approved by the Institutional Review Board (HSIRB #_1798E_). 130 surveys were completed between both class years, yielding a response rate of 80.2%. Of the 130 surveys, 121 met the inclusion criteria as nine (9) surveys were only partially completed and were subsequently omitted from the data analysis.

2.3. Measures

A questionnaire developed specifically for this study was utilized to assess various aspects of first- and second-year medical students' self-perceptions of well-being, including mental health status, stress, physical health, and academic success. The questionnaire used a five-point Likert scale rating (1–5) to measure the overall well-being of medical students. Students were asked to rate their current mental health status, physical health, and stress level (Table 1). The rating scale used the following categories: 1) worst, 2) below average, 3) average, 4) above average, 5) best. Slight wording adjustments were made between the scales of different categories for clarity. We chose to use a self-reported measure of stress, rather than a more involved psychiatric stress scale to decrease the length of the survey and increase completion rate. The survey was provided on paper in English.

2.4. Data collection

The survey was administered at the start of preclinical lectures at the medical school campus. Scheduled lectures were postponed for 10 min to provide students an opportunity to complete the questions. The survey was administered once to the first-

Table 1
Student well-being survey used for self-assessment and self-reporting of physical health, mental health, and daily stress level.

Student Identification (ID) Number:_____
Please use the scale to answer the following questions.
1. How would you rate your physical health?
1 2 3 4 5
Worst Health Below Average Average Above Average Best Health
2. How would you rate your mental health?
1 2 3 4 5
Worst Health Below Average Average Above Average Best Health
3. How would you rate your daily stress level?
1 2 3 4 5
Least Stress Below Average Average Above Average Most Stress

year class and once to the second-year class. The full class of first- and second-year medical students that were present at the scheduled lecture were invited to participate (n = 162). Second-year students completed the survey on November 8th, 2018 (n = 59) and first-year students completed the survey the following day on November 9th, 2018 (n = 71). Some students were not included as they either chose to not participate or did not attend lecture on the day of survey administration. No financial compensation or other incentive was provided.

2.5. Data analysis

Survey data were manually entered into an electronic spreadsheet using a licensed version of Microsoft Excel, version 2016 (Microsoft Corporation, Redmond, WA, USA). Data grouping and statistical analysis were also performed on Microsoft Excel. The principal investigator, a full-time faculty member, added students' GPAs in an additional column of the spreadsheet next to their identification numbers. Students were separated into "low" (1–3 of 5) and "high" (4–5 of 5) mental health groups based on their reported mental health scores (1–5). Characteristics of physical health, stress, and GPA were compared between the "low" and "high" mental health groups using the T-test statistical function in Excel. In addition, linear regression analyses were performed with GPA and mental health as the dependent variables. Independent variables included physical health, stress, mental health and GPA. These statistical models were created with the regression analysis statistical function in Microsoft Excel.

3. Results

60 students self-scored into the "low" mental health group, indicated by a rating of "average" or below (1–3/5). 61 students self-scored into the "high" mental health group, indicated by a rating of "above average" or higher (4–5/5). Characteristics of physical health, stress, and GPA were then compared between the "low" and "high" mental health groups. Average self-perceived physical health was significantly higher in the high mental health group compared to the low mental health group (3.88 vs. 3.03 respectively, $p < .001$). However, average self-perceived stress level was significantly higher in the "low" mental health group compared to the "high" mental health group, (3.87 vs. 3.35 respectively, $p < .001$). Average student GPA was not significantly different between the high and low mental health groups (3.26 vs. 3.22 respectively, $p = .65$). See Table 2.

Multiple linear regression analysis demonstrated that about 40% of the variation in mental health was explained by the combined effects of physical health and stress ($R^2 = .40$, $p < .001$). The cumulative effect of mental health, physical health, and stress on GPA was not significant ($R^2 = .017$, $p = .58$). Physical health was not significantly related to GPA ($R^2 = .016$, $p = .16$). The relationship between mental health, and GPA was not statistically significant ($R^2 = .005$, $p = .45$) consistent with our finding of no significant difference in GPAs between the low and high mental health groups. Additionally, stress did not significantly contribute to GPA ($R^2 = .0002$, $p = .87$). Linear regression results are summarized in Table 3 below.

4. Discussion

Medical students face a unique set of stressors during their medical education training[1] that is associated with increased incidence and prevalence of mental health disorders, such as depression, anxiety, burnout, and suicidal ideation.[7,10–13,15–17] Unfortunately, little is known about protective factors for maintaining health and wellness during medical education.[18] It is paramount to understand both the causes of mental health issues among medical students and how to best alleviate them. Combating the burnout climate in medical school may aid in producing healthier, happier physicians who perform better as clinicians and act in a more humanistic manner toward patients.

This study found that students with higher self-reported mental health tended to have higher physical health. This finding is consistent with other research

Table 2
Comparison between low and high mental health groups.

	Low Mental Health Group (n = 60)	High Mental Health Group (n = 61)	p-value
Mean Physical Health ± Standard Deviation (SD)	3.03 ± .84	3.88 ± .69	<.001
Mean Stress Level ± SD	3.87 ± .72	3.35 ± .78	<.001
Mean GPA ± SD	3.22 ± .48	3.26 ± .45	.65

Table 3
Summary of linear regression analysis results.

Independent Variables	Dependent Variables	R^2	p-value
Physical Health, Stress, and GPA	Mental Health	.40	<.001
Physical Health and Stress	Mental Health	.40	<.001
Physical Health	Mental Health	.34	<.001
Stress	Mental Health	.14	<.001
Mental Health, Physical Health, and Stress	GPA	.02	.58
Physical Health	GPA	.02	.16
Mental Health	GPA	.005	.45
Stress	GPA	.0002	.87

where medical students who participated in aerobic exercise and/or strength training appear less likely to experience burnout, to have a higher quality of life, and to have a better mental health status.[19,20] Although it may be appropriate to recommend physical exercise during medical school, a high proportion of medical students do not adhere to physical activity recommendations due to a lack of time.[21,22] Therefore, a regular exercise routine may not be pragmatic for all medical students. Nonetheless, medical schools may better support their students by implementing optional lifestyle and exercise education curricula to help students achieve realistic exercise goals that fit into the schedule of their academic demands.[21]

This study also demonstrated that students who felt better in terms of their mental health experienced lower levels of subjective stress. This agrees with other findings that lower levels of perceived stress predicted better health-related outcomes in medical students.[18] In expanding the literature review to other types of health professional students, it was found that nursing students who cope well with educational stress do so by relying on the effective support networks surrounding them, adopting a positive, optimistic perspective towards course demands, and engaging in experiential learning and patient-care opportunities.[23] These results suggest that medical schools should place more emphasis on these learning modalities to create positive eustress. However, more research on distress versus eustress among medical students should be performed to understand how to best prepare them to successfully navigate the unique stressors of medical school. Although the amount of stress in medical school is unlikely to change considerably, further exploration should be performed to determine how students deal with stress.

This study found no association between perceived mental health level and academic performance as measured by current GPA. There is very little research on the effect of mental health on academic success in medical school[4] and thus much potential for investigation. There is limited data available regarding the causes of student distress and its impact on academic performance, dropout rates, and professional development.[4] Further research is required to identify training-related factors that influence depression, anxiety, and burnout among students and explore relationships between distress and the obtainment of competency.[4]

Some limitations exist in this study. The use of GPA as a marker of academic performance may not fully capture all entities associated with it. Perhaps future research could focus on the relationship between mental health and more significant academic outcomes, such as licensure examination scores, placement rates into graduate medical education residency programs, and specialty selection. Additionally, our study employed a broad interpretation of mental health. Further research could more specifically focus on the effects of specific mental health issues on academic success that are common amongst medical students, such as depression, anxiety, and suicidal ideation. Another study limitation is the subjective nature of the questionnaire. The investigators decided during the study design that a short, single page of direct and simple questions with a five-point Likert scale would result in the highest response rate. However, a more holistic and highly extensive Medical Student Well-Being Index (MSWBI) exists, which evaluates students based on burnout (emotional exhaustion and depersonalization), depression, mental quality of life (QOL), physical QOL, stress, and fatigue has been developed.[24] This metric obtains a more complete understanding of medical students' well-being and could be used in future studies to better compare different metrics against each other and the effect of overall well-being and academic outcomes. Finally, we chose to use a self-perceived measure of stress rather than a formal psychological stress scale.

This choice was made to shorten the length of the survey and increase the response rate.

5. Conclusion

The results of this study support the current understanding in the literature between good mental health and reduced stress and improved physical health. However, the results of this study demonstrated a lack of association between perceived mental health and GPA. There is much to be explored about the relationship between medical students' mental health and academic success. This study provides a source of information regarding mental health and academic success and encourages further research on medical student well-being.

Ethical Approval

Ethical approval has been granted by the Touro College Health Sciences Institutional Review Board for the Protection of Human Subjects (5 November 2018, HSIRB #_1798E_).

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Other disclosure

None.

Declaration of competing interest

None.

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