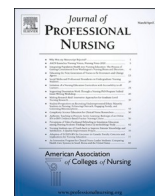


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The state of mental health and healthy lifestyle behaviors in nursing, medicine and health sciences faculty and students at Big 10 Universities with implications for action

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ABSTRACT

Background: High rates of mental health conditions and poor healthy lifestyle behaviors are reported in nurses, other clinicians, and health science students but have not been compared across different professions.

Purpose: The purpose of this study was threefold: (1) describe rates of mental health problems and healthy lifestyle behaviors across the Big 10 health professional faculty and students, (2) compare the health and healthy lifestyle behaviors of the Big 10 health sciences faculty and students across health sciences' professions, and (3) identify factors predictive of depression, stress, and anxiety.

Methods: Faculty and students from eight health science colleges at the Big 10 Universities responded to the study survey, which included: demographics, healthy lifestyle behavior questions, and three valid/reliable mental health scales. Descriptive statistics described the findings and multiple linear regression identified factors associated with mental health conditions.

Results: Eight-hundred and sixty-nine faculty and 1087 students responded. Approximately 50% of faculty and students reported 7 h of sleep/night, a third achieved 150 min of physical activity/week; 5.5%–9.9% screened positive for depression; and 11.5%–25.5% had anxiety. Age, sleep, and physical activity were associated with lower depression and anxiety.

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Conclusions: University leadership must build wellness cultures that make healthy lifestyle behaviors easy to engage in and enhance mental well-being.

Introduction

Burnout, stress, and depression are highly prevalent among health professionals with rates often reported as affecting 50% to 65% of clinicians (Kuhn & Flanagan, 2017; Maharaj, Lees, & Lal, 2018; Melnyk et al., 2018; Melnyk et al., 2021), which place them at risk for suicide (Davidson, Proudfoot, Lee, Terterian, & Zisook, 2020; Fink-Miller & Nestler, 2018). Burnout at the individual level can also impact system level problems like staff turnover, healthcare quality, and patient outcomes (Dewa, Loong, Bonato, & Trojanowski, 2017; Melnyk et al., 2018; Melnyk et al., 2021). Numerous national and global organizations have released public health declarations addressing the health professional burnout crisis, including the National Academy of Medicine's Action Collaborative on Clinician Well-being and Resilience's (2017) work towards reversing trends in burnout, the World Health Organization's (WHO, 2019) recognition of burnout as an "occupational phenomenon" that requires the improvement of mental wellbeing in the workplace, the American Association of Colleges of Nursing's (AACN, 2020) endorsement of a resolution calling for addressing nurse well-being in faculty and students, and the American Nurses Association Healthy Nurse Healthy Nation initiative (American Nurses Association, 2017). The Centers for Disease Control and Prevention (2018) considers well-being to be a wholistic approach to disease prevention. Well-being aims to change the healthcare paradigm from "sick care" to one that focuses on all aspects of health and well-being, including physical, mental, financial, intellectual, career, social, creative, environmental, and spiritual wellness. Issues with well-being, such as mental health conditions and poor healthy lifestyle behaviors have been reported in nurses, other clinicians, and health science students. However, there have been a paucity of studies that have compared health, well-being, and healthy lifestyle behaviors across different professions.

Review of the literature

Problems that have contributed to clinician burnout for professionals working within the healthcare system include long working hours, inadequate staffing ratios, and too much time spent on the electronic medical record (Shanafelt & Noseworthy, 2017). Not only does burnout negatively impact a clinician's ability to personally thrive, it also has serious consequences for healthcare quality, safety, and patient outcomes (Dewa et al., 2017; Melnyk et al., 2018; Melnyk, Hsieh, et al., 2021).

Burnout, stress, and depression also are highly prevalent among health sciences students and faculty. Forty-four percent of medical students deal with burnout (Frajerman, Morvan, Krebs, Gorwood, & Chaumette, 2019), and nursing students have significantly more stress, anxiety, stress related illness, and issues with sleep when compared to non-nursing students (Bartlett, Taylor, & Nelson, 2016). A more recent cross-sectional study of first-year health sciences students reported a 14% prevalence of moderate-to-severe anxiety, 17% prevalence of moderate-to-severe depression, and 6% prevalence of suicidal ideation (Hoying, Melnyk, Hutson, & Tan, 2020). Burnout in faculty has been commonly cited (Aquino, Lee, Spawn, & Bishop-Royse, 2018; Duke et al., 2020; El-Ibiary, Yam, & Lee, 2017; Sabagh, Hall, & Saroyan, 2018; Summers et al., 2019), however, prevalence studies for faculty anxiety and depression are less common. One cross-sectional study of 267 faculty from two universities reported an anxiety prevalence of 37.5% and a depression prevalence of 46.8% (Price, Salzer, O'Shea, & Kerschbaum, 2017).

Although healthcare professionals provide great care to others, they

often have challenges prioritizing their own self-care. Consequently, nurses, physicians, and other health professionals are at higher risk for mental health disorders when compared to the general adult population (Czeisler et al., 2020; Davidson, Accardi, Sanchez, Zisook, & Hoffman, 2020), and nurses have higher rates of obesity when compared to other healthcare workers (Kyle et al., 2017). Prior studies have identified the prevalence of such chronic health conditions and the behaviors leading to them within a single profession but have not compared rates of mental health issues and unhealthy lifestyle behaviors interprofessionally across health professional faculty and students. Therefore, the purpose of this study was threefold: (1) describe rates of mental health problems and healthy lifestyle behaviors across the Big 10 health professional faculty and students, (2) compare the health and healthy lifestyle behaviors of the Big 10 health sciences faculty and students across health sciences' professions, and (3) identify factors predictive of depression, stress, and anxiety.

Methods

Design

A cross-sectional descriptive correlational study design was used to collect data on the healthy lifestyle behaviors and mental health of health sciences faculty and students from dentistry, medicine, nursing, optometry, pharmacy, public health, social work, and veterinary medicine at the Big 10 Universities (University of Illinois at Chicago, Indiana University, University of Iowa, Michigan State University, Ohio State University, Pennsylvania State University [University Park and Health Milton S. Hershey Medical Center], Purdue University [West Lafayette], University of Maryland [Baltimore and College Park], and University of Wisconsin [Madison and Milwaukee]).

Ethics statement

This research was conducted according to the World Medical Association Declaration of Helsinki and deemed exempt from review by The Ohio State University Institutional Review Board (2019E0288). Prior to starting the study survey, participants were provided with a digital informed consent form that described: the study title; name of the researchers; the voluntary nature of the study; the purpose of the study; study procedures and duration; participant rights; and contact information for any questions. Participants were informed that by "clicking yes" at the end of the consent form, they were agreeing to participate in the research study.

Participants/setting

The Big 10 Universities' collaborating nursing faculty sent out study communication via an internal email list to their colleagues, asking them to complete the anonymous survey and to send survey communication to their students. The email contained a survey link and stated that participation was voluntary, anonymous, that there was no obligation to complete the survey. Faculty and students completed a Qualtrics survey from March 2019 through the end of May 2019.

Study measures

The survey sent to the participants was entitled as the *Big 10 Wellness Survey*. The wellness survey contained questions relating to the participants' demographics (e.g., gender, relationship status, number of

children in the home, ethnic background, educational attainment, academic program, attending university, professional discipline, and current faculty track) and general evidence-based health behaviors (e.g., amount of healthy eating, physical activity, and sleep). Additionally, three previously validated and reliable scales were used to assess perceived depression, anxiety, and stress.

Depression

The Patient Health Questionnaire 2 (PHQ-2; Kroenke, Spitzer, Williams, & Löwe, 2010) was used to measure depression. This 2-item questionnaire is used to screen for depressive symptoms and is valid in both patient and nonpatient populations (Löwe et al., 2010). Two items ask participants to rate their depressive symptoms (i.e., feeling down, depressed, hopeless, and experiencing an inability to feel pleasure over the past two weeks) using a four-point Likert-type scale (0 = not at all and 3 = nearly every day). Higher scores indicate increased symptoms of depression. Cronbach alphas in prior studies are reported as 0.76 to 0.83 (Melnyk, Hsieh, et al., 2021; Staples et al., 2019).

Anxiety

The Generalized Anxiety Disorder 2 scale (GAD-2; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007) was used to measure anxiety. Kroenke et al. (2007) validated the GAD-2 through use of a receiver-operating characteristic curve analysis (area under the curve 0.80–0.91). The GAD-2 is valid in both patient and nonpatient populations (Löwe et al., 2010). Two items ask participants to rate their anxiety symptoms (i.e., feeling nervous, anxious, or on edge; and not being able to stop or control worrying over the past two weeks) on a four-point Likert-type scale (0 = not at all and 3 = nearly every day). Higher scores indicate increased symptoms of anxiety. Cronbach alphas in prior studies range from 0.76 to 0.81 (Melnyk, Hsieh, et al., 2021; Staples et al., 2019).

Perceived stress

The Perceived Stress Scale 4 (PSS-4; Cohen, Kamarck, & Mermelstein, 1983; Andreou et al., 2011), a four-question instrument, was used to measure stress perception. The PSS-4 was validated in a non-patient population and coefficient alpha reliability ranged from 0.84 to 0.86 (Cohen et al., 1983). With a 5-point Likert scale (0 = never and 5 = very often), participants are asked to quantify how often over the past month they felt that they were not able to control the important things in their life, unable to handle their personal problems, if things were going their way, and if current difficulties were so immense that they could not overcome them. A perceived stress score was generated by calculating the sum of all four items with reverse scoring on two of the questions. Higher scores indicate higher perceived stress. Internal consistency reliabilities in prior studies range from 0.65 to 0.69 (Andreou et al., 2011; Melnyk, Hsieh, et al., 2021).

Statistical analysis

First, descriptive statistics were used to describe sample characteristics and to examine healthy behaviors and mental health of the various health sciences' faculty and students. Next, Chi-square tests were conducted to examine reported healthy behaviors among faculty and students. One-way analysis of variance (ANOVA) was conducted to examine reported depression, anxiety, and stress among faculty and students. Additionally, Chi-square tests were conducted to examine reported healthy behaviors between faculty and students, and independent-samples *t*-tests were conducted to examine reported depression, anxiety, and stress between faculty and students. Finally, multiple linear regression models were built to identify factors associated with depression, anxiety, and stress, respectively. All analyses were conducted using SAS software (version 9.4; SAS Institute Inc., Cary, NC, USA).

Table 1
Participant characteristics.

Characteristics	Faculty ^a (n = 869)	Student ^a (n = 1087)
Age, Mean ± SD	50.6 ± 12.0	27.6 ± 8.5
Gender, N (%)		
Female	645 (74.2%)	934 (85.9%)
Male	215 (24.7%)	145 (13.3%)
Ethnicity, N (%)		
White, not of Hispanic origin	772 (88.8%)	870 (80.0%)
Black, not of Hispanic origin	14 (1.6%)	42 (3.9%)
Hispanic	16 (1.8%)	49 (4.5%)
Education, N (%)		
Associate/Bachelor degree	16 (1.84%)	826 (76.0%)
Master's degree	165 (19.0%)	170 (15.6%)
PhD	651 (74.9%)	58 (5.3%)
University		
University of Illinois at Chicago	41 (4.7%)	78 (7.2%)
Indiana University	87 (10.0%)	151 (13.9%)
University of Iowa	26 (3.0%)	43 (4.0%)
Ohio State University	43 (4.9%)	69 (6.3%)
Pennsylvania State University	166 (19.1%)	368 (33.9%)
Pennsylvania State University – University Park	63 (7.2%)	16 (1.5%)
Penn State Health Milton S. Hershey Medical Center	26 (3.0%)	47 (4.3%)
Purdue University	161 (18.5%)	70 (6.4%)
University of Maryland – Baltimore	5 (0.6%)	21 (1.9%)
University of Maryland – College Park	37 (4.3%)	22 (2.0%)
University of Wisconsin – Madison	114 (13.1%)	64 (5.9%)
University of Wisconsin – Milwaukee	20 (2.3%)	51 (4.7%)
Other/Undisclosed	60 (6.9%)	79 (7.3%)
Professional discipline if Faculty / Academic program if Student, N (%)		
Dentistry	31 (3.6%)	20 (1.8%)
Medicine	216 (24.9%)	129 (11.9%)
Nursing	380 (43.7%)	721 (66.3%)
Optometry	18 (2.1%)	47 (4.3%)
Pharmacy	24 (2.8%)	18 (1.7%)
Public Health	38 (4.4%)	16 (1.5%)
Social Work	18 (2.1%)	3 (0.3%)
Veterinary Medicine	51 (5.9%)	45 (4.1%)
Other health sciences profession	82 (9.4%)	72 (6.6%)

^a 279 respondents did not provide their current role (faculty/student) information.

Results

A total of 869 faculty members and 1087 students completed the survey. Table 1 summarizes the participants demographics. For faculty, the average age was 50.6 years (standard deviation [SD] = 12.0). The majority of the faculty were female ($n = 645$, 74.2%), non-Hispanic White (772, 88.8%), and had a PhD degree ($n = 651$, 74.9%). Approximately 25% ($n = 216$) of the faculty were from the medical discipline and 44% ($n = 380$) were from the nursing discipline. For students, the average age was 27.6 years ($SD = 8.5$). Most students were female ($n = 934$, 85.9%) and non-Hispanic White ($n = 870$, 80.0%). Approximately 12% ($n = 129$) of the students were enrolled in a medical academic program and 66% ($n = 721$) were enrolled in a nursing academic program.

Figs. 1 and 2 show the reported healthy behaviors among faculty and students of nursing, medicine, and other health sciences. As shown in Fig. 1, the proportion of faculty who reported having at least 5 servings of fruits and vegetables per day (nursing [$n = 87$, 23%] vs. medicine [$n = 39$, 18%] vs. other [$n = 55$, 20%], $\chi^2 = 2.42$, $p = 0.30$) and having at least 7 h of sleep per night (nursing [$n = 404$, 56%] vs. medicine [$n = 68$, 53%] vs. other [$n = 156$, 57%], $\chi^2 = 0.67$, $p = 0.71$) did not differ by professional discipline. However, the proportion of faculty who reported getting at least 150 min moderate physical activity per week did differ by professional discipline (nursing [$n = 114$, 30%] vs. medicine [$n = 54$, 25%] vs. other [$n = 115$, 42%], $\chi^2 = 18.11$, $p = 0.0001$). Similarly, for students (Fig. 2), the proportion of students who reported getting at least

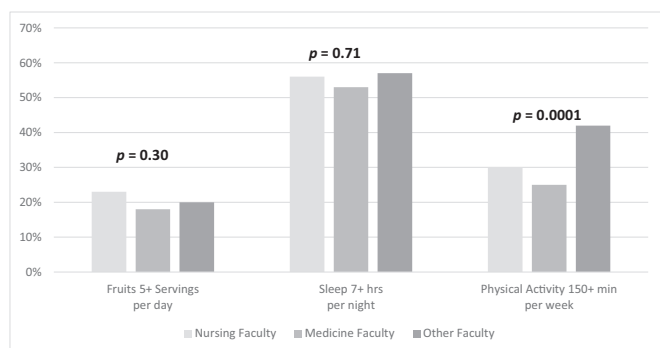


Fig. 1. Responses to healthy behavior questions by faculty professional discipline. Note. Other faculty includes dentistry, optometry, pharmacy, public health, social work, veterinary medicine, and other health sciences profession.

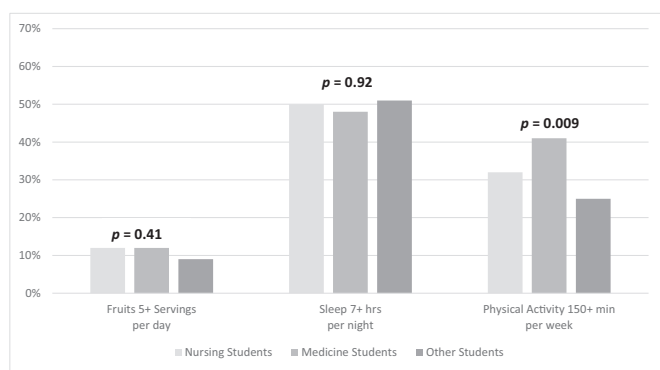


Fig. 2. Responses to healthy behavior questions by student academic program. Note. Other students include dentistry, optometry, pharmacy, public health, social work, veterinary medicine, and other health sciences profession.

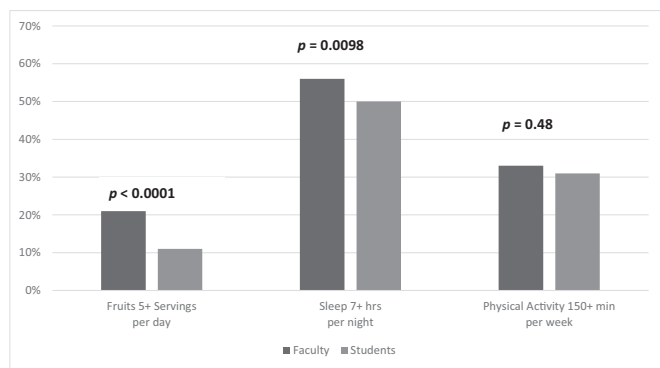


Fig. 3. Responses to healthy behavior questions faculty vs. students.

150 min moderate physical activity per week differed by professional discipline (nursing [$n = 231, 32\%$] vs. medicine [$n = 53, 41\%$] vs. other [$n = 59, 25\%$], $\chi^2 = 9.39, p = 0.009$).

Fig. 3 shows the self-reported healthy behaviors of faculty vs. students. Compared to faculty, a smaller proportion of students reported having at least 5 servings of fruits and vegetables on average per day (students [120, 11%] vs. faculty [182, 21%], $\chi^2 = 33.1, p < 0.0001$). Similarly, a smaller proportion of students reported getting at least 7 h of sleep per night compared to faculty (students [544, 50%] vs. faculty [487, 56%], $\chi^2 = 6.7, p = 0.001$). A similar proportion of students reported getting at least 150 min moderate physical activity per week compared to faculty (students [337, 31%] vs. faculty [287, 33%], $\chi^2 = 0.5, p = 0.48$).

Of the 869 faculty that responded to the PHQ-2, GAD-2, and PSS-4, $n = 45$ (5.5%) had increased symptoms of depression (PHQ-2 ≥ 3), $n = 100$ (11.5%) had increased symptoms of anxiety (GAD-2 ≥ 3), and $n = 203$ (23.4%) had a moderate to high level of stress (PSS-4 ≥ 8). Of the 1087 students who responded to the same screening tools, $n = 108$ (9.9%) had increased symptoms of depression (PHQ-2 ≥ 3), $n = 277$ (25.5%) had increased symptoms of anxiety (GAD-2 ≥ 3), and $n = 315$ (29.3%) had a moderate to high level of stress (PSS-4 ≥ 8). Figs. 4 and 5 show the reported depression, anxiety, and stress among faculty and students of nursing, medicine and other health sciences. As shown in Fig. 4, faculty-reported depression [$F(2, 853) = 1.72, p = 0.18$], anxiety [$F(2, 854) = 0.36, p = 0.70$], and stress [$F(2, 852) = 2.11, p = 0.12$] did not differ by professional discipline.

For students (Fig. 5), reported depression [$F(2, 1067) = 3.51, p = 0.03$] and stress [$F(2, 1067) = 4.14, p = 0.02$] differed by academic program (anxiety did not significantly differ). Students in the other category (i.e., dentistry, optometry, pharmacy, public health, social work, veterinary medicine, and other health sciences profession) reported significantly more depression and stress than nursing and medicine students.

Fig. 6 summarizes the self-reported depression, anxiety, and stress of faculty vs. students. On average, students reported higher levels of depressive symptoms (mean difference = 0.34, $p < 0.0001$), anxiety (mean difference = 0.73, $p < 0.0001$) and stress (mean difference = 0.70, $p < 0.0001$) compared to faculty.

Table 2 summarizes the results from the multiple linear regression model to examine the factors associated with depression. After adjusting for other variables in the model, age ($\beta = -0.01, p < 0.0001$), sleeping at least 7 h per night ($\beta = -0.27, p < 0.0001$), and engaging in physical activity at least 150 min per week ($\beta = -0.21, p = 0.0005$) were associated with lower depression scores. Specifically, faculty and students tended to report lower levels of depression as age increased (average depression score decreased by 0.01 point with one unit increase in age). Additionally, faculty and students who reported having at least 7 h of sleep per night were associated with a decrease of 0.27 points in average depression scores compared to those who reported sleeping less than 7 h per night. Finally, faculty and students who reported getting at least 150 min of physical activity per week were associated with a decrease of 0.21 points in average depression score compared to those who reported having less than 150 min of physical activity per week.

Table 3 summarizes the results from the multiple linear regression model to examine the factors associated with anxiety. After adjusting for other variables in the model, age ($\beta = -0.02, p < 0.0001$), gender ($\beta = -0.31, p = 0.0007$), sleeping at least 7 h per night ($\beta = -0.49, p < 0.0001$), and engaging in physical activity at least 150 min per week ($\beta = -0.27, p = 0.0005$) were associated with lower anxiety score. Specifically, faculty and students tend to report a lower level of anxiety as age increased (average anxiety score decreased by 0.02 point with one

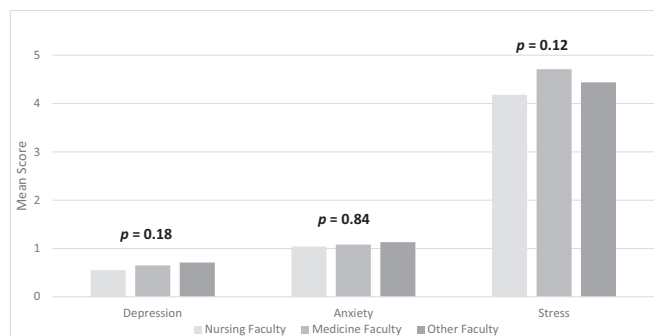


Fig. 4. Mean Score of Depression, Anxiety, and Stress by Faculty Professional Discipline.

Note. Other faculty includes dentistry, optometry, pharmacy, public health, social work, veterinary medicine, and other health sciences profession.

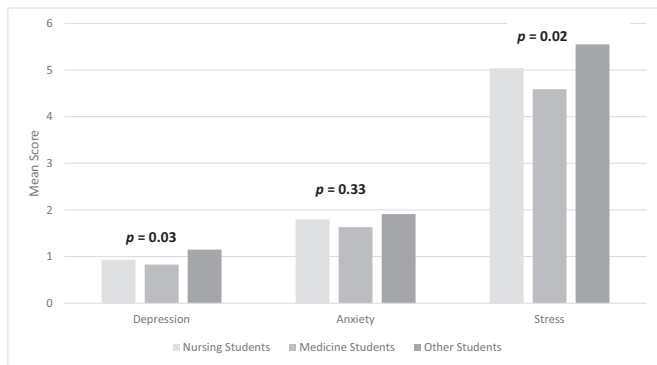


Fig. 5. Mean score of depression, anxiety, and stress by student academic program. Note. Other students include dentistry, optometry, pharmacy, public health, social work, veterinary medicine, and other health sciences profession.

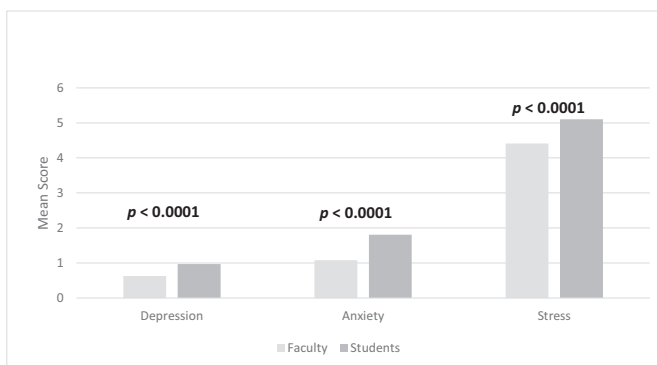


Fig. 6. Mean score of depression, anxiety, and stress faculty vs. students.

Table 2
Factors associated with depression in faculty and students.

Parameter	Coefficient estimate	P value
Age	-0.01	<0.0001
Gender: Male vs. Female	-0.07	0.34
Ethnicity ^a		
Black, not of Hispanic origin	-0.24	0.14
Hispanic	0.28	0.06
Other	0.14	0.13
White, not of Hispanic origin	Reference	
Education ^b		
Master	-0.12	0.18
PhD	0.07	0.53
Diploma/associate degree	Reference	
Status: Students vs. Faculty	0.003	0.98
Fruits 5+ servings per day: Yes vs. No	-0.14	0.06
Sleep 7+ hrs per night: Yes vs. No	-0.27	<0.0001
Physical activity 150+ min per week: Yes vs. No	-0.21	0.0005

^a The overall $p = 0.04$ for ethnicity.

^b The overall $p = 0.07$ for education.

unit increase in age), and the average anxiety score of males was 0.31 points lower compared to that of females. Additionally, faculty and students who reported having at least 7 h of sleep per night were associated with a decrease of 0.49 points in average anxiety score compared to people who reported sleeping less than 7 h per night. Finally, faculty and students who reported having at least 150 min of physical activity per week were associated with a decrease of 0.27 points in average anxiety score compared to people who reported having less than 150 min of physical activity per week.

Table 4 summarizes the results from the multiple linear regression model to examine the factors associated with stress. After adjusting for

Table 3
Factors associated with anxiety in faculty and students.

Parameter	Coefficient estimate	P value
Age	-0.02	<0.0001
Gender: Male vs. Female	-0.31	0.0007
Ethnicity ^a		
Black, not of Hispanic origin	-0.52	0.01
Hispanic	0.02	0.91
Other	-0.15	0.22
White, not of Hispanic origin	Reference	
Education ^b		
Master	-0.001	0.99
PhD	-0.05	0.69
Diploma/associate degree	Reference	
Status: Students vs. Faculty	0.09	0.50
Fruits 5+ servings per day: Yes vs. No	-0.14	0.16
Sleep 7+ hrs per night: Yes vs. No	-0.49	<0.0001
Physical activity 150+ min per week: Yes vs. No	-0.27	0.0005

^a The overall $p = 0.06$ for ethnicity.

^b The overall $p = 0.88$ for education.

Table 4
Factors associated with stress.

Parameter	Coefficient estimate	P value
Age	-0.04	<0.0001
Gender: Male vs. Female	-0.29	0.12
Ethnicity ^a		
Black, not of Hispanic origin	-0.68	0.10
Hispanic	0.08	0.84
Other	0.89	0.0003
White, not of Hispanic origin	Reference	
Education ^b		
Master	-0.15	0.51
PhD	-0.04	0.88
Diploma/associate degree	Reference	
Status: Students vs. Faculty	-0.39	0.14
Fruits 5+ servings per day: Yes vs. No	-0.29	0.15
Sleep 7+ hrs per night: Yes vs. No	-1.01	<0.0001
Physical activity 150+ min per week: Yes vs. No	-0.25	0.10
Engage in activities to reduce stress: Yes vs. No	-1.04	<0.0001

^a The overall $p = 0.0008$ for ethnicity.

^b The overall $p = 0.76$ for education.

other variables in the model, age ($\beta = -0.04, p < 0.0001$), sleeping at least 7 h per night ($\beta = -1.01, p < 0.0001$), and engaging in activities to reduce stress ($\beta = -1.04, p < 0.0001$) were associated with lower stress score. Specifically, faculty and students tended to report lower level of stress as age increases (average stress score decreased by 0.04 point with one unit increase in age). Additionally, faculty and students who reported having at least 7 h of sleep per night were associated with a decrease of 1.01 points in average stress score compared to people who reported sleeping less than 7 h per night. Finally, faculty and students who reported regularly engaging in activities to reduce stress were associated with a decrease of 1.04 points in average stress scores when compared to people who did not report engaging activities to reduce stress.

Discussion

Based on the data, it was apparent that a substantial percentage of faculty and students, regardless of their discipline, reported suboptimal levels of healthy behaviors (i.e., less than the recommended five fruits and vegetables a day, seven hours of sleep, and 150 min of exercise per week) and high levels of stress. No statistical differences between disciplines (for both students and faculty) were found regarding fruit and vegetable consumption or obtaining the recommended amount of sleep.

However, faculty in the “other” category (dentistry, optometry, pharmacy, public health, social work, and veterinary medicine) had a larger proportion of participants who reported obtaining the

recommended amount of exercise per week, followed by nursing and medicine faculty. The opposite was found in the health science students, with medical students reporting a significantly larger amount of physical activity (150+ min per week) than nursing and other students, respectively. While proportional differences between the disciplines existed, we believe the more important finding is that the majority of all faculty and students were not meeting the recommended amount of weekly exercise, though the reported levels of those who did meet the recommended amount were either about the same or much higher than the national average of 22.9% (healthypeople.gov, 2020). This highlights that, while nursing and health sciences faculty and students are outperforming national averages, there is still substantial room for improvement.

When comparing healthy behaviors between faculty and students, a smaller proportion of students reported getting the recommended amounts of sleep and exercise. This finding is somewhat similar to a cross-sectional study that analyzed the healthy behaviors of faculty and staff at a large Midwest University, which found that being faculty was a significant factor for engaging in positive healthy lifestyle behaviors (Melnyk, Amaya, Szalacha, & Hoying, 2016). Faculty may have greater flexibility for engaging in wellness programming when compared to students, which could possibly explain the differences found in our study.

Of most concern was that students reported higher levels of depression, anxiety, and stress when compared to faculty. One contributing factor for this increase in depression and anxiety could be that students reported less sleep than faculty. This study found that sleeping at least seven hours a night appears to be very important for its association with lower depression, anxiety, and stress for both faculty and students. Other studies have consistently found significant associations between poor quality sleep and depression. One meta-analysis reported a more than two-fold risk of depression development for participants with insomnia (Li, Wu, Gan, Qu, & Lu, 2016), while another study found a more than three-fold risk of anxiety for participants with insomnia (Hertenstein et al., 2019). There are disagreements within studies as to the directionality of the mental health disorder and insomnia association, with most asserting that the relationship is bidirectional.

While increased age also was an important factor for reductions in depression, anxiety, and stress, it is not something that a faculty member or student can control. Therefore, when establishing healthy behavior programming for universities, leadership should focus on evidence-based practices for improving sleep and encouraging faculty and students to engage in evidence-based programs, such as mindfulness and cognitive-behavioral skills building programs that reduce stress, anxiety, and depression (Asarnow & Manber, 2019; Melnyk et al., in press; Melnyk, Hoying, & Tan, 2020; Sampson, Melnyk, & Hoying, 2019; Sampson, Melnyk, & Hoying, 2020).

Cognitive behavioral therapy (CBT) is considered to not only be the gold standard treatment for mild to moderate depression and anxiety, but a systematic review reported that CBT also has large effect sizes (i.e., the strength of relationship between variables) on sleep duration, sleep onset latency, sleep efficiency, and wake after sleep onset (Friedrich & Schlarb, 2018). The same review also reported that interventions that teach sleep hygiene have a medium effect size. Thus, using programs that teach faculty and students the content and skills in CBT and sleep hygiene should be considered as a first line approach for improving sleep and decreasing depression, anxiety, and stress.

One such cognitive-behavioral skills building program is MIND-BODYSTRONG (Sampson et al., 2019; Sampson et al., 2020), which is based upon the COPE (Creating Opportunities for Personal Empowerment) program (Buffington, Melnyk, Morales, Lords, & Zupan, 2016; Hart Abney, Lusk, Hovermale, & Melnyk, 2019; Hoying, Melnyk, & Arcoleo, 2016; Melnyk, Kelly, & Lusk, 2014). This intervention includes seven weekly 45-min group sessions that focuses on catching negative thoughts and turning them around to feel emotionally better and behave

in healthier ways. Also included in one of the weekly sessions is education about sleep hygiene (i.e., barriers to adequate sleep and how to support healthy sleep). In a two-group randomized controlled study with 89 newly licensed registered nurses, the MINDBODYSTRONG intervention group (when compared to the control group) was found to have significant improvements in depressive symptoms and anxiety as well as higher healthy lifestyle behaviors at the 6-month postintervention survey (Sampson et al., 2019). Findings from several other studies using the COPE program, also called MINDSTRONG for college students, support that these programs reduce depression, anxiety, suicidal ideation, and enhance healthy lifestyle behaviors (Hart Abney et al., 2019; Melnyk et al., 2020; Melnyk et al., in press).

Another vital component necessary for improved healthy behaviors and reductions in symptoms of depression and anxiety is prioritizing cultures of wellness within the university setting. A national study of 1,790 clinical nurses, including those employed by a university hospital, found that the proportion of nurses with better emotional and physical health increased as perceived support of wellness within their workplace increased (Melnyk et al., 2018). This finding was recently replicated in a national study of critical care nurses (Melnyk, Hsieh, et al., 2021). A similar finding was reported in a cross-sectional study of 618 participants from four working sectors: banking, private university, public university, and wholesale supplier (Hoert, Herd, & Hambrick, 2018).

Establishing, promoting, and supporting evidence-based wellness programming is important for improving the healthy behaviors of faculty and students. However, feelings of depression and anxiety can become so severe that participating in health promotion activities within a university wellness program may seem completely out of reach. In these instances, professional therapy from a licensed clinician should always be available and encouraged.

Limitations

These study results are limited by the cross-sectional design. While the findings indicated that obtaining ≥ 7 h of sleep a night was associated with less depression, anxiety, and stress for both faculty and students, causality cannot be inferred. The strengths of the study include the large sample size and use of valid and reliable screening tools.

Recommendations for nursing education

Universities can assist faculty, staff, and students in seeking professional help through employee assistance programs, student health centers, and universal mental health screening programs. Employee assistance programs and student health centers typically depend on self-referral; therefore, a universal screening program is ideal for identifying and referring individuals who may be unaware that they have a problem (Forbes et al., 2021). Building on this observation, Forbes et al. (2021) screened 455 undergraduate students registered in a high enrollment gateway course with an online version of the “Counseling Center Assessment of Psychological Symptoms-62” (CCAPS-62) tool to screen for mental health disorders (Forbes et al., 2021). By using CCAPS-62, 158 at risk students were identified and followed up with to schedule a counseling appointment. A screening program for faculty could include something similar to CCAPS-62 or an alternative could be the HEAR (Healer Education Assessment and Referral) program, which uses anonymous on-line depression screening and treatment referrals for nurses and doctors (Davidson, Accardi, et al., 2020). Like the CCAPS-63 screening tool, The HEAR screening program was able to successfully identify a significant number of nurses who were high-risk for taking suicidal action and refer them to treatment.

Ideas for future research

Our study did not explicitly ask participants why they were unable to meet optimal levels of healthy behaviors or what they thought was

causing their issues with depression, anxiety, and stress. Future studies may want to use a qualitative study design and compare findings across the different professions.

Conclusion

While healthy lifestyle behavior differences were identified between disciplines in some instances (e.g., 150 min of exercise weekly), the overarching theme in this study was that both faculty and students from all participating health science colleges reported suboptimal healthy lifestyle behaviors and high levels of stress. Students reported higher levels of depression, anxiety, and stress than faculty as well as obtaining less sleep. In order to tackle burnout and mental health problems across all healthcare settings, we need to not only prioritize cultures of wellness within the healthcare industry, but also look further upstream to how university leadership can create positive caring learning environments for their health professional faculty and students. Utilizing evidence-based practices, such as CBT, sleep hygiene, and universal mental health screenings should be endorsed and provided.

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Declaration of competing interest

Bernadette Melnyk created the MINDSTRONG and MIND-BODYSTRONG programs discussed in this paper and has a company, COPE2Thrive, LLC that disseminates the COPE programs. At the time the study took place, each author was employed by a Big 10 University. Beyond these associations, the Authors declare no other conflicts of interest.

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