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Physical health, lifestyle beliefs and behaviors, and mental health of entering graduate health professional students: Evidence to support screening and early intervention

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Abstract

Background and purpose: Little is known about the physical health, lifestyle beliefs and behaviors, and mental health among first-year health professional graduate students. Therefore, the purpose of this study was to describe these attributes as well as to explore the relationships among them.

Methods: A descriptive correlational study was conducted on the baseline data from a wellness onboarding intervention study with 93 health sciences students from seven different colleges within a large public land grant university in the Midwest United States.

Findings: Nearly 40% of the sample was overweight/obese, and 19% of students had elevated total cholesterol levels. Only 44% met the recommended 30 min of exercise 5 days per week. Forty-one percent reported elevated depressive symptoms and 28% had elevated anxiety. Four students reported suicidal ideation. Inverse relationships existed among depression/anxiety and healthy lifestyle beliefs/behaviors.

Conclusions: Students entering health professional schools are at high risk for depression, anxiety, and unhealthy behaviors, which could be averted through screening and early evidence-based interventions.

Implications for practice: Assessing the physical health, lifestyle behaviors, and mental health of first-year health sciences professional students is important to identify health problems and modifiable at-risk behaviors so that early interventions can be implemented to improve outcomes.

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Keywords

Body mass index (BMI); college students; mental health; physical activity; nutrition; stress and coping

Introduction

College is a stressful time in the lives of many students. Findings from recent studies indicate that the prevalence of mental health problems, including depression and anxiety, among college students is increasing (Eisenberg, Hunt, & Speer, 2013). Further, visits to college counseling centers have increased substantially in universities across the United States (Beiter et al., 2015). Most of the research that has been conducted on the health of college students has primarily focused on their mental health, including substance use, and has largely been conducted on students aged 18–22 in their bachelor's degree programs (Eisenberg, Speer, & Hunt, 2012; Mahmoud, Staten, Hall, & Lennie, 2012; Taylor, Bramoweth, Grieser, Tatum, & Roane, 2013). Some studies document the burnout, stress, and depression of specific health sciences professional students such as those in medical and dental school (Dyrbye et al., 2014; Elani et al., 2014). Yet, there is a paucity of studies that take a more comprehensive approach to describing the mental health, healthy lifestyle beliefs and behaviors, and physical health of graduate health sciences students from multiple disciplines. Understanding the relationships among these variables also is important in order to develop effective interventions to improve the health and lifestyle behaviors of professionals. These students will be delivering care to people throughout their career and serving as role models and coaches to help enhance their patients' healthy lifestyle behaviors.

Health and wellness are linked to capacity for success, as mental and emotional health problems interfere with learning and often result in poor academic performance (Richardson, Abraham, & Bond, 2012). Emotional distress also has been found to interfere with a health professional's ability to deliver high-quality care (Shanafelt, Bradley, Wipf, & Back, 2002). In a recent study, findings with medical students indicated that higher levels of physical activity were associated with high personal achievement and low emotional exhaustion (Cecil, McHale, Hart, & Laidlaw, 2014).

As a result of growing concern for the wellbeing of medical students and recognition that their level of wellbeing impacts the care they deliver, the Association of American Medical Colleges (AAMC) and the Institute of Medicine (IOM) have emphasized the need to address physician wellbeing in medical education (AAMC, 2004; IOM, 2004). Other professions such as dentistry, nursing, and veterinary medicine are recognizing the need to promote wellbeing in their students (Elani et al., 2014; Melnyk, Hrabe, & Szalacha, 2013; Siqueira, Hafen, & Rush, 2014).

Research supports that the transition from high school to college for students is stressful (Cleary, Walter, & Jackson, 2011) and students often gain weight in the first year of their college experience (Gropper, Simmons, Connell, & Ulrich, 2012a, 2012b). However, there is a paucity of studies that describe the physical health, lifestyle behaviors, and mental health

status of entering graduate health sciences students from a variety of health professional programs. Therefore, this study was conducted using the baseline data from an intervention study evaluating the effects of a wellness onboarding program for graduate health professional students with the primary aim of describing their physical health, lifestyle beliefs and behaviors, and mental health. Knowing the status of physical health, lifestyle behaviors and mental health of health professional students can identify students at high risk for health problems and unhealthy behaviors so that interventions can then be provided to assist students in succeeding during their graduate programs and helping them to establish a foundation for healthy behaviors now and into the future. The secondary aim of this study was to determine relationships among the study variables.

Methods

Study design

This study employed a descriptive correlational design using the baseline data from an intervention study being conducted with first-year health science graduate students designed to evaluate the effects of a wellness onboarding program on physical health, lifestyle beliefs and behaviors, and mental health outcomes. The seven health science colleges included Dentistry, Health and Rehabilitation Sciences, Medicine, Nursing, Optometry, Pharmacy, and Veterinary Medicine. The Ohio State University's Institutional Review Board approved this study, which was conducted from August 2014 to May 2015.

Sample and setting

Eligible first-year health science graduate students were recruited from health science colleges and schools within a large, land-grant university in the Midwest. Recruitment consisted of informing students of the study following a seminar on interprofessional education and practice along with emails to students and flyers. Students needed to be aged above 18 and provide consent. A total of 93 students consented to the study.

Measures and instruments

Wellness assessments were collected through Checkbox® survey software and consisted of demographics, the Healthy Lifestyle Beliefs Scale, Healthy Lifestyle Behaviors Scale, Patient Health Questionnaire 9 (PHQ-9), General Anxiety Disorder Scale (GAD-7), Brief Inventory of Perceived Stress (BIPS), and single items regarding healthy lifestyle behaviors (e.g., physical activity and smoking). Biometric screens were also conducted.

The Healthy Lifestyle Beliefs Scale

This 16-item scale assesses beliefs about various facets of maintaining a healthy lifestyle (e.g., "I believe that I can be more active" and "I am sure that I will do what is best to lead a healthy life"). Participants respond to each item on a Likert scale that ranges from 1 (*strongly disagree*) to 5 (*strongly agree*). Items are summed for a total score. The scale has face, content, and construct validity; Cronbach's alpha has been consistently above .80 and was .84 with this sample (Melnyk, 2003).

The Healthy Lifestyle Behaviors Scale

This 15-item scale assesses healthy lifestyle behaviors (e.g., ”I eat at least 5 servings of fruit and vegetables daily”; ”I engage in muscle-strengthening activities on 2 or more days of the week”; ”I do healthy things to cope and deal with my worries and stress”; Melnyk & Small, 2003). Study participants respond to each item on the scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Items are summed for a total score, which can range from 15 to 75. Cronbach’s alpha has been consistently above .80 in prior studies and was .78 with this sample (Melnyk et al., 2009; Melnyk, Kelly, Jacobson, Arcoleo, & Shaibi, 2014).

The Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a nine-item instrument that uses a summative rating scale to assess depressive symptoms and is based on the DSM-IV criteria for a major depressive episode (Kroenke & Spitzer, 2002). Study participants rate depressive symptoms for the previous 2 weeks on a scale of 0 (*not at all*) to 3 (*nearly every day*). The PHQ-9 has been validated as being highly correlated with clinician diagnosis and other assessment tools for depression in multiple populations, including young adults (Martin, Rief, Klaiberg, & Braehler, 2006). The questionnaire has demonstrated good sensitivity (.88) and specificity (.88) for detecting major depressive disorders (Kroenke, Spitzer, & Williams, 2001). Cronbach’s alpha with this sample was .87.

General Anxiety Disorders (GAD-7)

The GAD-7 is a seven-item instrument that uses a summative response scale to assess individual anxiety levels with previous studies demonstrating reliability and validity of the GAD-7 as a measure of anxiety in the overall population (Lowe et al., 2008). Study participants rank their anxiety levels for the previous 2 weeks on a scale of 0 (*not at all*) to 3 (*nearly every day*). This questionnaire has demonstrated sensitivity and specificity for generalized anxiety disorder (.89 and .82), panic disorder (.74 and .81), social anxiety (.72 and .80), and posttraumatic stress disorder (.66 and .81; Spitzer, Kroenke, Williams, & Lowe, 2006). Cronbach’s alpha with this sample was .88.

Brief Inventory of Perceived Stress Scale (BIPS)

The BIPS is a nine-item instrument that assesses level and category of stress with a 5-point Likert scale that ranges from 0 (*never*) to 4 (*very often*). This scale categorizes stress into groups (Lack of Control, Pushed, and Conflict and Imposition). Scores range from 0 to 36 with a higher score indicating greater stress. BIPS has demonstrated validity in assessing an individual’s perceived stress levels with Cronbach’s alphas above .85 (Lehman, Burns, Gagen, & Mohr, 2012). Cronbach’s alpha with this sample was .798.

Biometric screens

Biometric screening data included height, weight, body mass index (BMI) calculation, total cholesterol, high-density lipoproteins, non-high density lipoproteins, hemoglobin A1c, and blood pressure. Biometric screenings were completed by family nurse practitioner students and study staff using Alere Afinion™ AS100 (hemoglobin A1c) to Alere Cholestech LDX®

(cholesterol) point-of-care systems. BMIs were calculated based on criteria from the Centers for Disease Control and Prevention (2015).

Demographic and other variables

Demographic variables, such as age, race or ethnicity, and college or school were gathered along with single-item questions about certain healthy lifestyle behaviors about sleep, fruit and vegetable intake, tobacco use, and physical activity. Alcohol consumption was classified into “general” versus “binge” drinking. Binge drinking was defined as five or more drinks in 2 h for males and four or more drinks in 2 h for females (National Institute on Alcohol Abuse and Alcoholism, 2004). Students also were asked to rate their perceived health as fair, good, very good, or excellent.

Procedure

Once students consented to study participation, they were provided a link to the baseline wellness assessment and were asked to schedule an appointment for their biometric screen. Anthropometric data were not obtained for 12 participants who were “too busy” or forgot their appointment. The remaining 81 participants were screened for BMI, cholesterol, hemoglobin A1c, and blood pressure.

Results

Ninety-three participants consented to participating in the study. Baseline descriptive data are presented to provide a snapshot of population health. Variations in sample size on certain responses and measures existed as some students did not answer all questions or participate in all aspects of biometric screening as well as some chose to only complete certain aspects of the wellness plan. The majority of participants were White (n = 77, 83%) and over half of the sample was female (n = 60, 64.5%). The mean age of the sample was 25.43 years, but ranged from 21 to 51 years in age. Of the seven health science colleges, participation was highest among Medicine (n = 35, 38%), Nursing (n = 19, 20%), and Pharmacy (n = 16, 17%). Slightly more than half of the sample (n = 53, 57%) reported having a consistent healthcare provider. Table 1 highlights self-reported behaviors from this cohort.

Data collected from biometric screening is presented in Table 2. Of the students who opted to participate in the screening (n = 81, 87%), nearly 40% met criteria for a diagnosis of overweight with a BMI of 25–29.9 (n = 21, 25%) or obesity (n = 10, 12%) with a BMI 30.0 and above. Total cholesterol results indicated that 19.3% of students (n = 19) were above the 200 mg/dL desirable level. Further analysis showed that females (n = 56) had higher total cholesterol levels (M = 173.1, SD = 34.9) than their male (n = 26) counterparts (M = 161.6, SD = 35.2). However, females also had HDL, “the good cholesterol,” levels above the recommended 60 (M = 60.9, SD = 14.2). The mean HDL cholesterol of males was 50.0 (SD = 7.6). Blood pressure means were within normal limits. The mean systolic pressure was 114 mmHg and mean diastolic pressure was 70 mmHg. However, roughly 27% (n = 25,27.2%) of the students had systolic readings greater than 120 mmHg, indicating a risk factor for cardiovascular disease. All hemoglobin A1c results were under 6%, ranging from 4.6% to 5.7%.

Students reported strong healthy lifestyle beliefs ($M = 63.25$, $SD = 7.32$), but were lower on their healthy lifestyle behaviors ($M = 54.53$, $SD = 7.20$). There was no significant difference between White and minority students on study measures. Over 50% ($n = 48$, 51.5%) of students considered themselves to be in “very good” or “excellent” health. Seventy-three percent of the students reported sleeping at least 7 h per night. Collectively, however, only 32% reported eating at least five fruits and vegetables a day and only 44% exercised at least 30 min 5 days per week (see Table 3).

Regarding mental health, 41% ($n = 38$) of the students’ self-reported symptoms were indicative of elevated depression and 28% ($n = 25$, 27.8%) had elevated anxiety (see Table 4). Alarmingly, four of the students (4.4%) answered positively for suicidal ideation. Those students reporting suicidal ideation were immediately referred for further evaluation and services.

Baseline correlations were examined among the study variables for the entire sample. Both anxiety and depression significantly negatively correlated with healthy lifestyle beliefs and behaviors. Specifically, as depressive and anxiety symptoms increased, healthy lifestyle beliefs and behaviors decreased. Positive significant correlations existed among anxiety and stress, and depression and stress, indicating as stress increased so did the student’s anxiety and depressive symptomatology. Depression and anxiety significantly positively correlated with one another. Furthermore, healthy lifestyle beliefs and healthy lifestyle behaviors were also positively and strongly correlated, indicating as the student’s beliefs increased so did their healthy lifestyle behaviors (see Table 5).

Discussion

College attendance places students at risk for weight gain, substance abuse, stress, anxiety, and depression (Beiter et al., 2015; Reavley & Jorm, 2010). An alarming finding in this study was the large percentage of the subjects (41%) who reported elevated levels of depressive symptoms as they were beginning the first year of their health sciences graduate programs. This percentage is higher than reported in other recent research by Eisenberg et al. (2013). In their study of 14,175 students at 26 campuses at public and private universities nationwide, these investigators found that the prevalence of positive screens was 17.3% for depression, 7% for generalized anxiety, and 6.3% for suicidal ideation. In our study, 4% of students report suicidal ideation. Further, 28% of the participating students had elevations in anxiety, and correlational analyses indicated that anxiety and depression were highly associated. Poor mental health can interfere with functioning, including the ability to fully engage in everyday life and academic performance (Hardeman et al., 2015). Therefore, screening for depression and anxiety in graduate health sciences students could facilitate identification and early intervention for these problems. Early evidence-based management of mental health disorders in health sciences students is critical as these problems have been associated with substance abuse, decreased compassion, and overall poorer health in medical students (Ball & Bax, 2002; Hardeman et al., 2015; Newbury-Birch, Walshaw, & Kamali, 2001).

Despite awareness that engaging in regular physical activity, eating a healthy diet, maintaining a healthy weight, getting adequate sleep, and sustaining relationships are beneficial to one's health, individuals struggle with making healthy lifestyle behaviors a permanent part of their routine. This struggle is apparent in our sample of health sciences graduate students as only a third reported eating the recommended five fruits and vegetables per day and only 44% met the recommended physical activity guidelines for adults even though they reported strong healthy lifestyle beliefs. Further, 38% of the students admitted to binging on alcohol at least once a month. Only 52% of the students rated their health as very good or excellent, and only a little more than half reported that they had a consistent healthcare provider. On a positive note, reported tobacco use was very low with only two students reporting that they smoked.

A substantial percentage of the participating students were overweight or obese and nearly 20% had elevated total cholesterol levels. Overweight and obesity is a major public health problem today with numerous adverse health outcomes, and the Centers for Disease Control predicts that one in three individuals will have diabetes by 2050 (Centers for Disease Control and Prevention [CDC], 2010). Elevated cholesterol also is a risk factor for cardiovascular disease. Because these students will be counseling patients on healthy lifestyle behaviors in their clinical settings, it is critical that they themselves engage in and role model healthy behaviors. Evidence has demonstrated that providers are more likely to provide counseling on healthy behaviors if they practice these behaviors (Howe et al., 2010; Lobelo & Garcia De Quevedo, 2014).

Findings here demonstrate the inverse relationship between mental health, specifically depression and anxiety, and healthy lifestyle behaviors. This finding parallels prior research with other populations (Melnyk, Jacobson, et al., 2013). Therefore, targeting the treatment of depression and anxiety with cognitive behavioral therapy (CBT), which is the gold standard evidence-based treatment for mild-to-moderate depression, is key to enhancing students' lifestyle beliefs and healthy behaviors. Integrating cognitive behavioral skills and mindfulness training into academic programming has been shown to have positive effects on psychosocial outcomes (Conley, Durlak, & Dickson, 2013; Melnyk et al., 2009, 2014; Melnyk, Jacobson, et al., 2013). Therefore, it should be routinely threaded through health sciences curricula. The AAMC (2004) and IOM (2004) have promoted the need to address physician wellbeing in medical education. As a result, medical schools are beginning to implement wellness programming for their students; however, rigorous evaluation of these programs is limited (Ludwig et al., 2015).

Limitations and recommendations for future research

Caution must be used in generalizing these findings to other populations because of the study's small, largely White sample. In addition, because data from this study were cross-sectional, it does not substantiate causal relationships among the variables; it can only support their relationships.

Future research with larger samples is needed so that comparisons can be made among health sciences students on physical health, lifestyle beliefs and behaviors, and mental

health. There also is a need for longitudinal studies to determine changes in these variables over time. Intervention studies that evaluate wellness programming for this at-risk population are urgently needed.

Clinical implications

The U.S. Preventive Services Task Force (USPSTF) recommends that all adults 18 years and older should be screened for depression when systems are in place to assure accurate diagnosis, treatment, and follow-up (O'Connor, Whitlock, Beil, & Gaynes, 2009). Baseline data from this study support the significance of the USPSTF recommendations; Advanced Practice Registered Nurses (APRNs) should be aware that the health risks associated with college attendance may extend not only to undergraduate students, but also to graduate health professional students. Routine mental health screenings by APRNs who work in student health or with college-aged youth can lead to earlier intervention, effective treatment, and positive outcomes. Beginning health sciences students should be screened for depression and offered early intervention.

Implementation of evidence-based treatment approaches is vital for college-aged individuals experiencing depression and anxiety. Of those individuals who receive treatment, however, many do not receive CBT (Birmaher & Brent, 2007; Connolly & Bernstein, 2007). Although there is a shortage of mental health providers to deliver CBT, findings from studies have supported that manualized evidence-based CBT programs that can be delivered in brief 25–30 min sessions in primary care and academic settings, such as the Creating Opportunities for Personal Empowerment (COPE) Program, have been shown to be effective in reducing anxiety and depression in adolescents and college-aged youth (Melnyk et al., 2009, 2014; Melnyk, Jacobson, et al., 2013). Because depression is a predictor of suicide, a critical role for the APRN providing care for depressed college graduate students includes counseling on resources to assist them as needed. Students who report suicidal ideation should receive a comprehensive evaluation with prompt appropriate treatment.

Eliciting behavior change is a paramount, crucial challenge for APRNs who identify the need for healthy lifestyle behaviors in college students who are at risk for stress, anxiety, depression, substance abuse, poorer academic performance, and psychosocial concerns. The specific aim of health promotion within a college population is to support student success as college students face personal, campus, community, and institutional factors that contribute to health risks (American College Health Association [ACHA], 2012). Education alone typically does not result in behavior change, as individuals often do not change behavior unless crisis happens or their emotions are raised; therefore, strategies such as emotional story telling or motivational interviewing can be helpful in moving students from precontemplative to contemplative stages of change to action (Jensen et al., 2011). APRNs who are interested in addressing the specific risks that impact the health of college students can benefit from knowing what internal and external factors impact health, and what common motivations to change exist within this population (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008).

Findings highlight the need to assess perceived levels of stress, anxiety and depression, self-reported nutrition and physical activity routines, and goals for participating in wellness

behaviors in beginning health sciences students. Knowledge of these attributes will provide a foundation for establishing health promotion interventions that are client-centered and goal-directed. To be able to effectively address wellness behaviors, APRNs can use this foundational information as a basis for coaching college students to explore and resolve ambivalence related to wellness behaviors. Early intervention approaches are vital in order to sustain positive mental and physical wellness. Given that a large proportion of graduate health science students will eventually be healthcare providers, supporting the adoption of healthy lifestyle behaviors can impact not only their personal wellness, but the health of the populations that they will eventually serve.

Conclusion

Physical health, lifestyle beliefs and behaviors, and mental health should be assessed in all beginning graduate health sciences students in order to identify and implement early evidence-based interventions to improve student wellness, health outcomes, and capacity for success. Health professional students have the potential to provide better care for others when they engage in self-care to promote the highest level of their own wellbeing.

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References

American College Health Association [ACHA]. (2012). Standards of practice for health promotion in higher education (3rd ed.). Hanover, MD: Author.

Association of American Medical Colleges [AAMC]. (2004). Educating doctors to provide high quality medical care. A vision for medical education in the United States Report of the Ad Hoc Committee of Deans. Washington, DC.

Ball S, & Bax A (2002). Self-care in medical education: Effectiveness of health-habits interventions for first-year medical students. *Academic Medicine*: Journal of the Association of American Medical Colleges, 77(9), 911–917.

Beiter R, Nash R, McCrady M, Rhoades D, Linscomb M, Clarahan M, & Sammut S (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. Journal of Affective Disorders, 173, 90–96. doi:10.1016/j.jad.2014.10.054 [PubMed: 25462401]

Birmaher B, & Brent D (2007). Practice parameter for the assessment and treatment of children and adolescents with depressive disorders. Journal of the American Academy of Child and Adolescent Psychiatry, 46(11), 1503–1526. [PubMed: 18049300]

Cecil J, McHale C, Hart J, & Laidlaw A (2014). Behavior and burnout in medical students. Medical Education Online, 19, 1–9.

Centers for Disease Control and Prevention [CDC]. (2010). Number of Americans with diabetes projected to double or triple by 2050 (CDC Newsroom Press Release; October 22). Retrieved from http://www.cdc.gov/media/pressrel/2010/r101022.html

Cleary M, Walter G, & Jackson D (2011). “Not always smooth sailing”:Mental health issues associated with the transition from high school to college. Issues in Mental Health Nursing, 32(4), 250–254. [PubMed: 21355760]

Conley CS, Durlak JA, & Dickson DA (2013). An evaluative review of outcome research on universal mental health promotion and prevention programs for higher education students. American Journal of American College Health, 61(5), 286–301.

Connolly S, & Bernstein G (2007). Practice parameter for the assessment and treatment of children and adolescents with anxiety disorders. Journal of the American Academy of Child and Adolescent Psychiatry, 46(2), 267–283. [PubMed: 17242630]

Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, & Shanafelt TD (2014). Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. Academic Medicine: Journal of the Association of American Medical Colleges, 89(3), 443–451. [PubMed: 24448053]

Eisenberg D, Hunt JB, & Speer N (2013). Mental health in American colleges and universities. Journal of Nervous and Mental Disease, 201(1), 60–67. [PubMed: 23274298]

Eisenberg D, Speer N, & Hunt JB (2012). Attitudes and beliefs about treatment among college students with untreated mental health problems. Psychiatric Services, 63(7), 711–713. [PubMed: 22752036]

Elani HW, Allison PJ, Kumar RA, Mancini L, Lambrou A, & Bedos C (2014). A systematic review of stress in dental students. Journal of Dental Education, 78(2), 226–242. [PubMed: 24489030]

Gropper SS, Simmons KP, Connell LJ, & Ulrich PV (2012a). Changes in body weight, composition, and shape: A 4-year study of college students. Applied Physiology, Nutrition, and Metabolism, 37(6) 1118–1123.

Gropper SS, Simmons KP, Connell LJ, & Ulrich PV (2012b). Weight and body composition changes during the first three years of college. Journal of Obesity, 1–6. doi:10.1155/2012/634048

Hardeman RR, Przedworski JM, Burke SE, Burgess DJ, Phelan SM, Dovidio JF, & … Van Ryn M. (2015). Mental well-being in first year medical students: A comparison by race and gender: A report from the medical student CHANGE study. Journal of Racial and Ethnic Health Disparities, 2(3), 403–413. [PubMed: 26413458]

Howe M, Leidel A, Krishnan SM, Weber A, Rubenfire M, & Jackson EA (2010). Patient-related diet and exercise counseling: Do providers' own lifestyle habits matter? Preventive Cardiology, 13(4), 180–185. [PubMed: 20860642]

Institute of Medicine [IOM].(2004). Improving medical education: Enhancing the behavioral and social science content of medical school curricula. Washington, DC: National Academies Press.

Jensen CD, Cushing CC, Aylward BS, Craig JT, Sorell DM, & Steele RG (2011). Effectiveness of motivational interviewing for adolescent substance use: A meta-analytic review. Journal of Consulting and Clinical Psychology, 79(4), 433–440. [PubMed: 21728400]

Kroenke K, & Spitzer RL (2002). The PHQ-9: A new depression diagnostic and severity measure. Psychiatric Annals, 32(9), 509–515.

Kroenke K, Spitzer RL, & Williams JB (2001). The PHQ-9: Validity of a brief depression severity measure. Journal of General Internal Medicine, 16(9), 606–613. [PubMed: 11556941]

Lehman KA, Burns MN, Gagen EC, & Mohr DC (2012). Development of the brief inventory of perceived stress. Journal of Clinical Psychology, 68(6), 631–644. [PubMed: 22467381]

Lobelo F, & Garcia De Quevedo I (2014). The evidence in support of physicians and health care providers as physical activity role models. American Journal of Lifestyle Medicine, (10), 1–17.

Lowe B, Decker O, Muller S, Brahler E, Schelberg D, Herzoq W, & Herzberg P (2008). Validation and standardization of the General Anxiety Disorder Screener (GAD-7) in the general population. Medical Care, 46(3), 266–274. doi:10.1097/MLR0b01318160d093 [PubMed: 18388841]

Ludwig AL, Burton W, Weingarten J, Milan F, Myers DC, & Kligler B (2015). Depression and stress amongst undergraduate medical students. BMC Medical Education, 15, 141. doi:10.1186/s12909-015-0425-z [PubMed: 26311538]

Mahmoud JS, Staten R, Hall LA, & Lennie TA (2012). The relationship among young adult college students' depression, anxiety, stress, demographics, life satisfaction, and coping styles. Issues in Mental Health Nursing, 33(3), 149–156. [PubMed: 22364426]

Martin A, Rief W, Klaiberg A, & Braehler E (2006). Validity of the BriefPatient Health Questionnaire Mood Scale (PHQ-9) in the general population. General Hospital Psychiatry, 2, 71–77.

Melnyk BM (2003). Healthy Lifestyles Behavior Scale. Hammondsport NY: COPE for HOPE, Inc.

Melnyk BM, Hrabe DP, & Szalacha LA (2013). Relationships among work stress, job satisfaction, mental health, and healthy lifestyle behaviors in new graduate nurses attending the nurse athlete

program: A call to action for nursing leaders. Nursing Administration Quarterly, 37(4), 278–285. [PubMed: 24022281]

Melnyk BM, Jacobson D, Kelly S, Belyea M, Shaibi G, Small L, & Marsiglia F (2013). Promoting healthy lifestyles in high school adolescents: A randomized controlled trial. American Journal of Preventive Medicine, 45(4), 407–415. doi:10.1016/j.amepre.2013.05.013 [PubMed: 24050416]

Melnyk BM, Jacobson D, Kelly S, O'Haver J, Small L, & Mays MA (2009). Improving the mental health, healthy lifestyle choices, and physical health of Hispanic adolescents: A randomized controlled pilot study. Journal of School Health, 79(12), 575–584. [PubMed: 19909421]

Melnyk BM, Kelly S, Jacobson D, Arcoleo K, & Shaibi G (2014). Improving physical activity, mental health outcomes, and academic retention of college students with freshman 5 to thrive: COPE/healthy lifestyles. Journal of the American Academy of Nurse Practitioners, 26(6), 314–322.

Melnyk BM, & Small L (2003). Healthy living attitudes scale. Unpublished manuscript.

National Institution Alcohol Abuse and Alcoholism. (2004). NIAAA council approves definition of binge drinking (NIAAA Newsletter, Winter 2004). Retrieved from http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter˙Number3.pdf

Nelson M, Story M, Larson N, Neumark-Sztainer D, & Lytle L (2008). Emerging adulthood and college-aged youth: An overlooked age for weight-related behavior change. Obesity, 16(10), 2205–2211. [PubMed: 18719665]

Newbury-Birch D, Walshaw D, & Kamali F (2001). Drink and drugs: From medical students to doctors. Drug and Alcohol Dependence, 64(3), 265–270. [PubMed: 11672941]

O'Connor EA, Whitlock EP, Beil TL, & Gaynes BN (2009). Screening for depression in adult patients in primary care settings: A systematic evidence review. Annals of Internal Medicine, 151(11) 793–803. [PubMed: 19949145]

Reavley N, & Jorm AF (2010). Prevention and early intervention to improve mental health in higher education students: A review. Early Intervention in Psychiatry, 4(2), 132–142. doi:10.1111/j.1751-7893.2010.00167.x [doi] [PubMed: 20536969]

Richardson M, Abraham C, & Bond R (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. Psychological Bulletin, 138(2), 353–387. [PubMed: 22352812]

Shanafelt TD, Bradley KA, Wipf JE, & Back AL (2002). Burnout and self-reported patient care in an internal medicine residency program. Annals of Internal Medicine, 136(5), 358–367. [PubMed: 11874308]

Siqueira DA, Hafen M, & Rush BR (2014). Promoting well-being among veterinary medical students: Protocol and preliminary findings. Journal of Veterinary Medical Education, 41(3), 294–300. [PubMed: 25000881]

Spitzer RL, Kroenke K, Williams JB, & Lowe B (2006). A brief measures for assessing generalized anxiety disorder: The GAD-7. Archives of Internal Medicine, 166(10), 1092–1097. [PubMed: 16717171]

Taylor DJ, Bramoweth AD, Grieser EA, Tatum JI, & Roane BM (2013). Epidemiology of insomnia in college students: Relationship with mental health, quality of life, and substance abuse difficulties. Behavioral Therapy, 44(3), 339–348.

Table 1

Self-reported behaviors of first-year health science students

		Males		Females		Total	
Variable		***N***	**Within gender(%)**	***N***	**Within gender(%)**	***N***	**%**
Tobacco use	Yes	1	3.2	1	1.7	2	2.2
	No	30	96.8	59	98.3	89	97.8
Alcohol use							
Social	Never	4	12.9	7	11.7	11	12.1
	Once/year	2	6.5	3	5.0	5	5.5
	Once/month	4	12.9	8	13.3	12	13.2
	Every other week	3	9.7	17	28.3	20	22.0
	Once/week More than	7	22.6	16	26.7	23	25.3
	Once/week	11	35.5	9	15.0	20	22.0
Binge	Never	9	29.0	27	45.0	37	40.2
	Once/year	7	22.6	13	21.7	20	21.7
	Once/month	8	25.8	12	20.0	20	21.7
	Every other week	5	16.1	4	6.7	9	9.8
	Once/week	2	6.5	4	6.7	6	6.5
Perceived health	Fair	3	9.7	11	18.0	14	15.2
	Good	7	22.6	23	37.7	30	32.6
	Very good	11	35.5	20	32.8	31	33.7
	Excellent	10	32.3	7	11.5	17	18.5

Table 2

Physical attributes

	Males		Females		Total	
Attribute	***n***	***M* (SD)**	***n***	***M* (SD)**	***n***	***M* (SD)**
BMI	27	24.0 (3.5)	56	25.0 (5.8)	83	24.68 (5.2)
Cholesterol						
Total	26	163.0 (35.3)	56	172.9 (34.6)	82	170.5 (34.3)
HDL	25	49.3 (7.6)	56	60.7 (14.2)	82	57.0 (13.5)
Non HDL	26	116.1 (34.1)	56	112.4 (30.4)	82	113.6(31.5)
Blood pressure						
Systolic	26	121.1 (10.6)	56	113.5 (9.7)	82	115.9 (10.5)
Diastolic	25	71.7 (9.7)	56	69.3 (9.5)	81	70.1 (9.5)
Hemoglobin A1c	27	5.1 (0.2)	56	5.2 (0.18)	83	5.2 (0.2)

Table 3

Overall percent of students who meet sleep, nutrition, and physical activity guidelines

	Do you sleep at least 7 h per night? n (%)		Do you eat at least five servings of fruits and vegetable per day? n (%)		Do you exercise at least30 min days per week? n (%)	
	Males	Females	Males	Females	Males	Females
Yes	6 (27.3)	13 (26.5)	9 (40.9)	14 (28.6)	13 (61.9)	18 (36.7)
No	16 (72.7)	36 (73.5)	13 (59.1)	35 (71.4)	8 (38.1)	31 (63.3)

J Am Assoc Nurse Pract. Author manuscript; available in PMC 2020 April 17.

Table 4

Mental health attributes

Attribute	Males *n* (%)	Females *n* (%)	Total *n* (%)
Anxiety			91
None–minimal	24 (77.4)	40 (66.7)	64 (70.3)
Elevated	7 (22.6)	20 (33.3)	27 (29.7)
Depression			92
None–minimal	24 (77.4)	30 (49.2)	54 (58.7)
Elevated	7 (22.6)	31 (50.8)	28 (41.3)
Suicidal ideation	2 (2.2)	2 (2.2)	4 (4.4)

Table 5

Correlations among study variables at baseline ($n = 93$)

Variable	Healthy lifestyle beliefs	Healthy lifestyle behaviors	BIPS	GAD	PHQ-9
Healthy Lifestyle Belief Scale	1.00				
Healthy Lifestyle Behavior Scale	0.724**	1.00			
Brief Inventory of Perceived Stress	−0.181	−0.196	1.00		
GAD	−0.404**	−0.420**	0.546**	1.00	
PHQ-9	−0.534**	−0.524**	0.498**	0.740**	1.00

** Correlation is significant at the .01 level (two-tailed).

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