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Personal health-promoting attitudes and behaviors are of critical importance to the well-being of nursing students immersed in a stressful environment and preparing for their role as healthcare professionals. The American Nurses Association (ANA) has identified nurses' personal health attitudes and behaviors as a priority. The organization seeks to improve the health of this critical workforce through the *Healthy Nurse, Healthy Nation Challenge*. The ANA indicates that through supporting nurses' healthy lifestyles, the program encourages nurses and nursing students to provide better care to and set an example for their patients. (American Nurses Association, 2019).

According to Cushman (2016), risk behavior including smoking status, body mass index, physical activity, and nutrition are among the American Heart Association's (AHA) seven indicators of cardiovascular health, called *Life's Simple 7. Simple 7* scores indicating positive health behaviors are associated with decreased rates of cardiovascular and other frequently fatal health conditions. According to the Centers for Disease Control and Prevention (CDC), the majority of the top 10 causes of death in 2017 were preventable and associated with the risk behaviors identified by Cushman (2016). These include cardiovascular disease, cancers, chronic respiratory disease, diabetes mellitus, and kidney disease. (CDC, 2019)

In a 2019 article, Mills indicates that the quality of personal health attitudes and behaviors impact the effectiveness of nurses in their role as health promoters. However, nurses and nursing students have been shown to experience elevated levels of stress related to academic rigor, adjustment to long clinical hours, and the emotional toll of patient care. This strain is associated with poor health behaviors such as insufficient stress management, poor nutrition, and inadequate physical activity. Mills further argues that the future nursing workforce should be

supported by their educational institutions in developing a personal healthy lifestyle. (Mills, 2019)

Their future role in the nursing workforce is not the only reason to address the personal health behaviors of nursing students. According to Sogari and Mori (2019), the college years are a critical time for the development of personal health-promoting attitudes and behaviors related to nutrition and weight gain. Failure to establish positive attitudes and behaviors during these years may significantly, negatively impact future health. The authors conclude that educational institutions should consider the impact their organization has on the development of these behaviors.

According to evidence provided, it is apparent that understanding nursing students' health attitudes and behaviors is critical in evaluating their well-being and ability to take on the responsibilities of the profession. The purpose of this study was to assess the health-promoting attitudes and behaviors of baccalaureate nursing students at the University of Arkansas, Eleanor Mann School of Nursing.

Methods

This study used a cross-sectional survey design to answer two primary research questions: (1) Are Eleanor Mann School of Nursing students adequately prepared to face the unique demands of the nursing profession? (2) Does their education prepare them to model healthy lifestyle attitudes and behaviors, or do the stresses they experience predispose them to poorly managed stress and subsequent health behaviors?

Participants

A total of 166 students participated in the study, ranging in age from 19 to 29 years old with an average age of 21 years. Seven participants were male (4.2%) and 159 were female

(95.8%). The majority of students (84.3%) live off campus, while 15.7% of students live on campus in University or Greek Life housing. Approximately one half of students are employed.

Procedures

The survey was disseminated to 405 students enrolled in the Spring 2020 semester prelicensure Bachelor of Science in Nursing program at Eleanor Mann School of Nursing at the University of Arkansas. Participants in all four semesters of the program were solicited. Announcements about the survey were made through instructors and the local Student Nurses Association newsletter. Consent was obtained prior to the beginning of the survey. The survey was deployed using Qualtrics.

Responses to the survey were kept anonymous and data was stored on a password protected computer. Students were informed in the consent that participation in the survey was optional and would not impact their academic standing with the Eleanor Mann School of Nursing. Students had the option to enter a drawing for a gift card and four students were randomly selected to win; this was conducted with a separate survey to protect privacy.

Measures

The survey consisted of the following nine self-reported demographic components: age, sex, semester in nursing school, grade point average (GPA), residence (living on or off campus), employment (measured by weekly hours worked), height (in inches), weight (in pounds), and diagnosis of a chronic medical or mental health condition.

Participants' health behaviors and attitudes were measured using assessment questions from the Health Promoting Lifestyle Profile-II (HPLP-II) (Walker et al., 1995). The HPLP-II is a widely used instrument for evaluation of health behavior which has been validated in multiple studies (Walker et al., 1987; Sousa et al., 2015, Taniani et al., 2016). Based on Pender's Health

Promotion Model (1987), it conceptualizes an individual's health-promoting lifestyle in terms of the following dimensions: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Responses are measured by a four-point Likert-type scale (never, sometimes, often, routinely). Overall, the score for health-promoting lifestyle behaviors is calculated using the mean of responses for all 52 items and for each subscale (eight or nine items), with the lowest possible score of 52 and highest score of 208. In this study, the dimension of stress management and sleep was measured using 11 questions, physical activity using 8 questions, and nutrition using 9 questions. Questions were scored on a four-point Likert-type scale. Reponses to the Likert-type scale were represented by numerical scores from 1-4 with 1 representing "never", 2 "sometimes", 3 "often", and 4 "routinely". Scores from the HPLP-II questionnaire components were totaled for each response with a minimum of 28 points and a maximum of 112 points.

The final portion of the survey included five questions regarding degree of substance use including alcohol consumption, smoking habits, use of e-cigarettes or vaping, caffeine consumption, and recreational use of drugs. These questions were included due to the high degree of substance use and abuse seen in the 18-25 age category. (National Center for Health Statistics, 2019) Questions in this section were scored on the same four-point Likert-type scale. Scores for this section were totaled, with a minimum score of 5, indicating limited substance use, and a maximum score of 20, indicating high levels of substance use.

Data Analysis

Data analysis was performed using Microsoft Excel and JMP Pro 15 software. Students' body mass indices (BMI) were calculated from reported weight and height. Responses to the Likert-Type Scale were represented by numerical scores from 1-4 with 1 representing "never", 2

"sometimes", 3 "often", and 4 "routinely". The total scores of all 28 HPLP-II questions from

each respondent were used in statistical analysis. Separately, scores were totaled for the five

substance use questions to use in analysis. In addition, point totals for the subcategories, stress

management and sleep, physical activity, and nutrition, were totaled for further analysis. With

individual score totals from the HPLP-II survey components and the substance use questionnaire,

JMP Pro 15 software was used to calculate linear correlation, one-way analysis of variance

(ANOVA), and tests of means. A significance level of p-value = 0.05 was used for all tests of

significance.

Results

The survey responses represent 41% of the enrolled pre-licensure students at the Eleanor

Mann School of Nursing in the spring 2020 semester. Students responded from each semester

cohort represented by J1 (first semester), J2 (second semester), S1 (third semester), and S2

(fourth and final semester). J1, J2, and S2 each had between 44 and 50 responses, representing

approximately half of their cohorts. The S1 cohort totaled only 26 responses, approximately one

quarter of those enrolled. Descriptive data can be found in Table 1.

Table 1. Demographic Data					
n = 166	Mean	SD		Number	Proportion of n
Age	21.0	1.2	Females	159	95.8%
GPA	3.8	0.2	Males	7	4.2%
BMI	22.9	3.8	J1 students	50	30.1%
Work hours/week*	14.4	9.0	J2 students	44	26.5%
HPLP-II partial score	70.6	12.0	S1 students	26	15.7%
Substance use score	9	1.7	S2 students	46	27.7%
			Lives on campus	26	15.7%
			Lives off campus	140	84.3%
			Employed	82	49.4%
*of students who are employed (n=82)			Diagnosed with chronic illness	42	25.3%

Scores from the HPLP-II survey components were totaled for each response with a possible minimum of 28 points and a maximum of 112 points. The mean score of this section of the survey was 70.6, with a standard deviation of 12.0 points. Scores for the substance use section were scored in the same manner with a possible minimum score of 5, indicating limited substance use, and a maximum score of 20, indicating high levels of substance use. The mean substance use score was 9.0 with a standard deviation of 1.7.

Little variation existed between mean scores for each individual question in the HPLP-II portion of the survey and between the subcategories of stress management and sleep, physical activity, and nutrition. The mean question score across all responses was 2.52 (sd = 0.86). The mean score for questions in the stress management and sleep domain was 2.47, the mean for physical activity questions was 2.54, and the mean score for nutrition questions was 2.58.
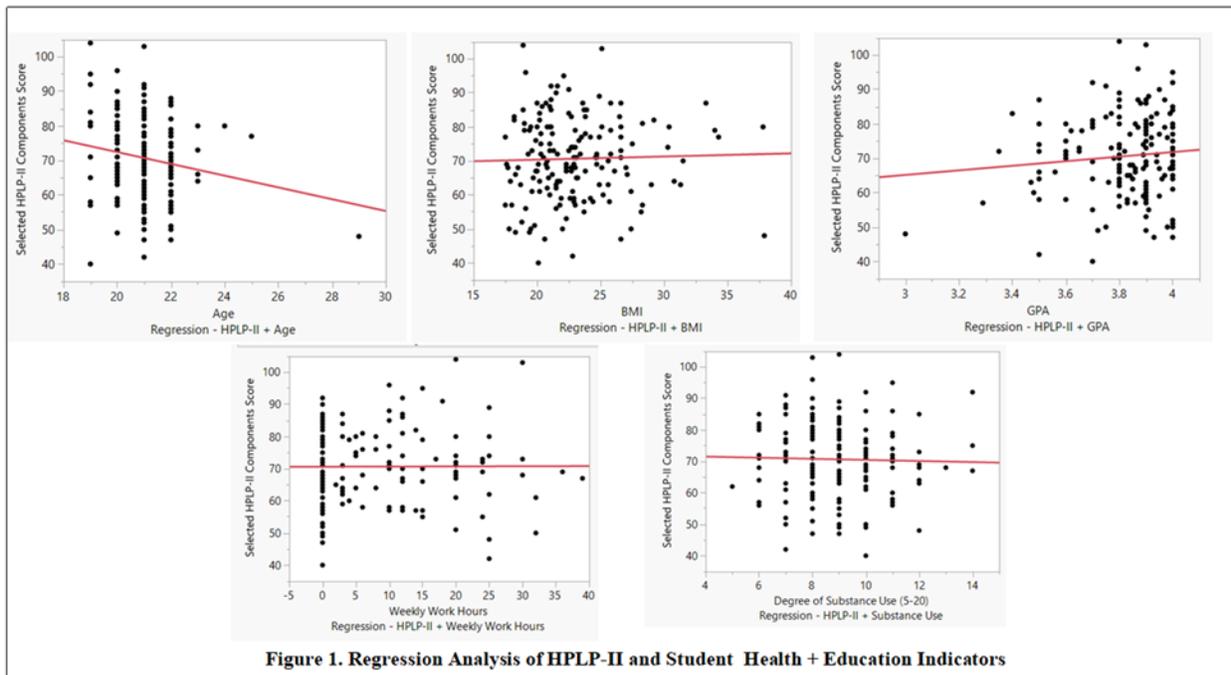
However, in the results from the substance use portion of the survey there was noted variation between the different components. The mean question score across the substance use questions is 1.8 (sd = 0.96). However, the mean response for consumption of alcohol is 2.44 and for consumption of caffeinated beverages is 3.18, indicating that these two substance use behaviors occurred more often than the mean for substance use behaviors. Mean scores for questions regarding smoking and vaping behaviors as well as recreational use of prescription drugs are 1.07 (smoking), 1.25 (vaping), and 1.05 (drug use); these scores are lower than the mean. A one-way analysis of variance (ANOVA) indicates that these differences are significant (p-value < 0.0001).

The correlation between the HPLP-II components score and participants' age indicated that there was a significant decrease in score with increased age (p-value = 0.0328). There was no significant correlation with the HPLP-II components scores and BMI (p-value = 0.7100),

GPA (p-value = 0.2380), substance use score (p-value = 0.7521), or work hours (p-value = 0.9572). See data Table 2 and Figure 1. A finding not directly related to the research question was a significant positive correlation between reported weekly work hours and participants' age (p-value = 0.0089, adj R-Sq = 0.0352)

Table 2. Regression analysis Partial HPLP-II score by health and education data			
	R-sq	Adj R-sq	P value
Age	0.0275	0.0216	0.0328*
BMI	0.0008	-0.0053	0.7100
GPA	0.0085	0.0024	0.2380
Substance use	0.0006	-0.0055	0.7521
Work hours	0.00002	-0.0061	0.9572
* p-value < α 0.05			

Figure 1. Regression Analysis of HPLP-II and Student Health + Education Indicators

The mean HPLP-II components score for students who reported a diagnosis of a chronic illness or mental illness ($\bar{x}$ = 66.7) was significantly less than the mean score for students without a diagnosis of a chronic illness ($\bar{x}$ = 72.0) (p-value = 0.0138). There was no significant difference

between students living on or off campus (p-value = 0.3699) and while the data indicated that

male participants had significantly lower partial HPLP-II scores than female participants (p-

value = 0.0148), the sample size of males was only 7. Further research with a more adequate

sample size would be needed to verify this result. See data Table 3.

A one-way ANOVA test found no significant difference in partial HPLP-II scores

between the four semesters (J1, J2, S1, S2) with a p-value of 0.2365. The second semester, J2,

had the highest mean score at 71.7 and the first semester, J1, had the lowest mean score at 69.7.

It was hypothesized that there would be a significant change over the four semesters but within

sample gathered, this was not found to be true. See data Table 3.

Table 3. Test of means. HPLP-II partial scores by health and education data		
	Test statistic	P value
T-test of means	**T-statistic**	
Diagnosis of Chronic illness	-2.49	0.0138*
On/off campus	0.90	0.3699
Sex[1]	-2.46	0.0148*
One-way ANOVA	**F-statistic**	
Semester (J1, J2, S1, S2)	1.4118	0.2365
* p-value < α 0.05		
[1] Sample size of 7 males, see Discussion		

Discussion

Using components of the Health Promoting Lifestyle Profile-II and questions on

substance use behavior, this study assessed BSN student's attitudes and behaviors related to their

personal health. Data indicated that nursing students' health promoting behaviors were

negatively correlated with increased age and were significantly lower in individuals with a

diagnosis of chronic illness. Little variation in mean scores from the three domains of the HPLP-

II screening tool (stress management & sleep, physical activity, and nutrition) was observed.

There was significant variation in mean scores between the substance use question responses. The mean scores for alcohol and caffeine consumption were much higher than the mean scores for smoking, vaping, and recreational use of prescription drugs. The distribution of age and GPA was primarily found in a very narrow range. This is expected based on the researcher's knowledge of the population; the majority of students are traditional full-time students seeking their first bachelor's degree and are required to achieve a high GPA to gain acceptance to the program.

Health Promotion Behaviors and Age, Chronic Illness, and Sex

There was a significant negative correlation between participants' partial HPLP-II scores and their reported ages. The researcher hypothesizes that with increased age, study participants have greater demands on their time, possibly a factor in their lower scores for personal health promotion. This is supported in the data analyzed by a significant positive correlation between reported weekly work hours and age. This finding may indicate that there is potential to improve the support structures available to non-traditional nursing students, such as those who are older than most undergraduate students, those with families, and those working significant hours outside the program.

The mean scores of HPLP-II components of individuals who reported a diagnosis of a chronic illness or mental illness were significantly lower than those who denied diagnosis of a chronic illness. This indicates that participants with a diagnosis of a chronic illness or mental illness report poorer nutrition, insufficient stress management and sleep, and lower physical activity than participants without a diagnosis of a chronic illness. Approximately 25.3% of participants in this study reported a diagnosis of a chronic condition. In their 2018 article, Barsell et al. identified that approximately 15% of new college students reported a chronic condition or

disability, and that the number was rising. Barsell et al. (2018) indicate that the connection between chronic conditions and subsequent health behaviors (both risk and protective behaviors) in college students has not been sufficiently studied. However, studies have investigated the link between diagnosis of chronic conditions and risky behavior in youth. (Suris and Parera, 2005) In addition, college students are at a higher risk for health risk behaviors related to sleep, nutrition, substance use, and sexual activity. (Lemly et al., 2014) While research on the topic is sparse, results from this study are congruent with the implied connection between diagnosis of a chronic condition and health-related behaviors in college students.

A difference in mean HPLP-II components scores was identified based on participants' sex, with males scoring on average lower than females. However, only 7 participants were male. The response rate by sex is consistent with the majority female population enrolled in the program, but further research is needed to collect significant results on this data point. Polat et al. (2016) conducted a study in which they surveyed nursing students' health-promoting behaviors, using the full HPLP-II questionnaire and a slightly larger sample of male students (n = 24). In their data, consistent with this study, there was a slight, non-significant difference between males and females, with males scoring lower on average.

COVID-19 Pandemic and Health Behavior

The online survey for this study was distributed in April and May of 2020. During this time, the University of Arkansas had adopted a completely remote teaching format due to safety concerns related to the COVID-19 disease pandemic. (University of Arkansas News, 2020) In person courses were suspended on March 12, 2020 and continued remotely throughout the spring semester.

Since the beginning of the pandemic there have been a multitude of studies on the impact of stay-at-home orders, lockdowns, social isolation, and other COVID-19 safety measures. These studies identified that such measures had a significant impact on self health-promoting behaviors including stress management, sleep quality, nutrition, physical activity, and substance use. (Ammar et al., 2021, Arora and Grey, 2020, Weaver et al., 2021) It is important to note that while research identified significant potential for the above health behaviors to worsen, some authors identified potential positive impacts on health behaviors due to school closings, stay-at-home orders, and other COVID-19 safety precautions. One such benefit is that adolescents receiving education at home may have more flexibility, allowing for a healthier sleep schedule (Arora and Grey, 2020). It should be taken into account that reported health behaviors during the early months of the COVID-19 disease pandemic may be skewed as a result.

Limitations

This study collected data through self-report in an online survey and is therefore based on personal perception of questions and Likert-type scale markers. Reflecting the population being studied, responses to demographic questions, particularly age and GPA, have little variation, allowing for limited statistical relevance.

<div align="center">

Conclusion

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There was no significant correlation between HPLP-II components (nutrition, stress management and sleep, and physical activity) and GPA, BMI, semester in nursing school, or degree of substance use. In this sample, there was not sufficient evidence to indicate that the nursing education environment significantly impacted health promotion behaviors. However, HPLP-II component scores were significantly lower with age and with diagnosis of chronic illness or mental illness. There were no significant links between degree of substance use and the

other measures investigated in this study. However, this study provides an insight into the personal health-promoting attitudes and behaviors of future health professionals in the early months of a global health crisis. Further investigation is needed to understand the impact of nursing education on students' self health-promoting attitudes and behaviors.

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