

ORIGINAL RESEARCH

Health-Promoting Lifestyle Behaviors and Their Correlates Among Nursing Students in Saudi Arabia



Haidee Tablada Pacheco¹, Salwa Abd El Gawad Sallam^{1,3} Richard Dennis Juinio Dayrit², Dominga Narag Villano¹, Marifa Libang Briones¹, Heba Kayied Deab Al Morjan¹

¹Medical-Surgical Nursing Department, College of Nursing, University of Hail, Hail City, Kingdom of Saudi Arabia

²Nursing Administration Department, College of Nursing, University of Hail, Hail City, Kingdom of Saudi Arabia

³Medical-Surgical Nursing Department, College of Nursing, Menoufia University, Shebin El Kom, Egypt

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Corresponding Author:

Haidee Tablada Pacheco
Medical-Surgical Nursing
Department, College of Nursing,
University of Hail, Hail City,
Kingdom of Saudi Arabia
Email: htpacheco0176@gmail.com

Abstract

Background: A health-promoting lifestyle serves as the foundation for healthy living and is highly relevant to nursing students, who are expected to model such behaviors as future healthcare providers. However, few studies have examined these patterns among nursing students in regions such as Hail, Saudi Arabia.

Purpose: This study aimed to evaluate the health-promoting lifestyle behaviors of nursing students and their correlations with demographic factors.

Methods: A cross-sectional correlational design was employed. A total of 263 male and female participants provided demographic information and completed the Health Promoting Lifestyle Profile II (HPLP II) questionnaire through convenience sampling. Independent-samples t-tests were used to compare HPLP scores by gender, one-way analysis of variance (ANOVA) was used to compare scores across year levels, and Pearson's correlation was applied to examine associations between HPLP scores and selected demographic variables, including year level, GPA, family income, and BMI.

Results: The overall health-promoting lifestyle behavior was classified as good ($M=142.88$, $SD=28.77$). No significant differences were observed across gender or year level for any HPLP subdomains. GPA was positively correlated with health-promoting behaviors ($r=0.34$, $p<0.001$), whereas family monthly income was negatively correlated ($r=-0.15$, $p=0.01$). BMI and year level were not significantly associated with HPLP scores.

Conclusion: Nursing students demonstrated generally good health-promoting behaviors. Higher academic performance was linked to more frequent engagement in such behaviors, whereas students from higher-income families displayed slightly lower engagement. These findings highlight the importance of culturally and contextually tailored interventions to support nursing students in adopting and maintaining healthy lifestyles.

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1. Introduction

Health promotion, defined by the World Health Organization (2009) as empowering individuals to control and improve their health, is essential in preventing non-communicable diseases and boosting overall well-being. A health-promoting lifestyle encompasses behaviors across the sub-domains of health responsibility, physical activity, nutrition, stress management, interpersonal relations, and spiritual growth (Walker et al., 1987). These sub-domains serve as the foundation for healthy living and are extremely relevant to nursing students, who are expected to model such behaviors as future professional healthcare providers.

Despite this realization, recent international studies have typically found that nursing students have difficulty maintaining health-promoting behaviors, especially in physical activity and nutrition. A cross-sectional study conducted among 350 nursing students at an Arab American University in Palestine showed that while spiritual growth scored highest, physical activity emerged as the lowest-performing sub-domain (Fashafsheh et al., 2021). In addition, a

descriptive study of 304 nursing students at three universities in South Korea unveiled that although overall HPLP behavior scores exceeded the midpoint, physical activity remained the lowest-scoring sub-domain, with key influencers including gender, health concern, and time spent seeking health information online (Heo et al., 2023). These findings emphasize persistent global patterns of insufficient physical activity and highlight the need for educational campaigns and improvements in facilities and resources.

Upon the transition to college life, nursing, medical, and other non-health program students across settings commonly adopt unhealthy eating patterns such as skipping breakfast, relying on energy-dense snacks, substituting proper meals with fast food and sugary beverages, and under-consumption of fruits, vegetables, and whole grains (Aljefree et al., 2022; Alkhalidy et al., 2021; Almoraie et al., 2025; Alzabni et al., 2023; Alzahrani et al., 2020; Bayomy et al., 2024). In Madrid, Spanish nursing students reported high consumption of sugar-sweetened beverages and fast food, coupled with low intake of fruit and vegetables (Rodríguez-Gázquez et al., 2023). Ghanaian nursing students often skipped breakfast, consumed less fruits and vegetables, and were heavily bent on energy-dense snacks (Chikwere & Asirifi, 2025). Iranian nursing students had low intake of whole grains, fruits, and vegetables, while consuming high amounts of fast food and sugary snacks (Sadeghi et al., 2022). Moreover, Nigerian nursing students showed prevalent meal skipping and irregular eating patterns associated with poor diet quality (Okunbor et al., 2024). These studies highlight consistent dietary challenges in nursing students worldwide, which may contribute to obesity and increased risk of cardiovascular disease over time.

In Saudi Arabia, unhealthy behaviors among university students enrolled in healthcare programs mimic global trends. Studies have documented high rates of overweight and obesity among health discipline students, linked to sedentary lifestyles and dietary patterns increasingly aligned with westernized fast-food consumption (Makkawy et al., 2021; Syed et al., 2020). Also, research focusing on medical students at King Saud University found that although overall health-promoting behaviors were generally satisfactory, students scored lower in the sub-domains of physical activity, nutrition, and health responsibility, while spiritual growth, stress management, and interpersonal relationships were relatively stronger (Al-Momani, 2021). Similarly, a broader study involving university students across diverse colleges revealed high scores in the spiritual growth and interpersonal relationships sub-domains and low scores in the physical activity sub-domain (Alothman et al., 2024). However, only a few studies have specifically examined these patterns among nursing students, particularly in regions such as Hail, creating a research gap.

This study aimed to address this gap by assessing health-promoting lifestyle behaviors among nursing students at a governmental tertiary education institution in Hail. By examining correlations with demographic factors, including academic performance and socioeconomic status, the findings can help guide the development of culturally and contextually relevant interventions to support nursing students in adopting and sustaining healthy lifestyles. In doing so, the study also reinforces the role of nursing students not only as learners but as role models for health promotion within their communities.

2. Methods

2.1. Research design

This study utilized a cross-sectional and correlational research design. It compared the levels of health-promoting lifestyle behaviors among participants grouped by gender and year level. The correlational component indicated the strength and direction of the linear relationship between participants' demographic characteristics and their levels of health-promoting lifestyle behaviors.

2.2. Setting and samples

The population in this study consisted of all second to fourth-year level full-time nursing students who were officially enrolled in the Bachelor of Science in Nursing (BSN) program of the College of Nursing at a governmental tertiary education institution in Hail, Kingdom of Saudi Arabia, for the academic year 2022 – 2023. This consisted of a total of 621 nursing students. The target sample size of 238 nursing respondents for this study was determined using Cochran's formula (1977) at a 95% confidence level and a 5% margin of error, a widely accepted method for estimating sample size in survey research. Convenience sampling was then employed to select participants from the population. The inclusion criteria were all active nursing students officially enrolled in the BSN program during data collection, from second to fourth levels, regardless of

gender, age, or socioeconomic status, and nursing students who provided informed consent and agreed to participate voluntarily in the study. On the other hand, the exclusion criteria included nursing students on leave of absence or underloaded during the data collection period, and those with incomplete or invalid questionnaire responses. Ultimately, a total of 263 nursing students were included in the study, exceeding the minimum required sample size to ensure reliability of the findings (Bujang, 2021).

In this study, convenience sampling was used to select student respondents from the population, given the accessibility and availability of students enrolled in the college during the study period. This approach allowed the investigators to efficiently recruit a sufficient number of participants within the constraints of time and resources, which is particularly relevant in the research locale where students are concentrated in a single location. Moreover, as the study aimed to generate preliminary insights into the health-promoting lifestyle behaviors of nursing students, convenience sampling provided a pragmatic means of gathering data from the target population.

2.3. Measurement and data collection

The study used a two-part research tool developed from a literature review to gather the necessary data. The first part of the research tool provided the sociodemographic profile of the participants. More specifically, it generated information on the participants' gender, year level, grade point average (GPA), marital status, monthly family income, place of residence, weight (in kilograms), and height (in meters). Body weight was categorized into four groups: underweight (≤ 18.5); healthy weight (18.5 to < 25); overweight (25 to < 30), and obese (≥ 30). Obesity is further classified into the following categories: class I (30 to < 35); class II (35 to < 40) class III or severe obesity (≥ 40) (CDC, 2022).

The second part of the research tool assessed participants' health-promoting lifestyle behaviors using the original English version of the Health Promoting Lifestyle Profile II (HPLP II) questionnaire (Walker et al., 1987). This questionnaire consisted of 52 indicators in six sub-domains: (1) health responsibility, (2) physical activity (3) nutrition, (4) spiritual growth, (5) interpersonal relations, and (6) stress management. Each item was rated on a four-point Likert scale as follows: 4 = regularly, 3 = often, 2 = sometimes, and 1 = never. The overall score ranged from 52 to 208, with higher scores indicating higher levels of health-promoting behavior. The overall HPLP II score is categorized into four levels: (1) poor (52–90), (2) moderate (91–129), (3) good (130–168), and (4) excellent (169–208). The internal consistency of the instrument as a whole is high, with an alpha coefficient of 0.943. Individual sub-domain alpha coefficients range from 0.793 to 0.872 (Walker et al., 1995). Moreover, the range of scores for the sub-domains is classified further due to the inequality in the number of items. For the sub-domains of health responsibility, nutrition, spiritual growth, and interpersonal relations which have 9 items each, the range of scores for each level is as follows: (1) Poor (9.00–15.75), (2) Moderate (15.76–22.50), (3) Good (22.51–29.25), and (4) Excellent (29.26–36.00). On the other hand, for the sub-domains of physical activity and stress management which have 8 items each, the range of scores for each level is as follows: (1) Poor (6.00–12.50), (2) Moderate (12.51–19.00), (3) Good (19.01–25.50), and (4) Excellent (25.51–32.00). Similarly, higher scores for each sub-domain mean more frequent health-promoting behaviors.

The data collection for this study was conducted from January to March 2023. Researchers conducted a room-to-room survey in coordination with the nursing instructors, where the potential participants were present during their class hours, and shared with them directly the link for the online research tool made available in Google Forms.

2.4. Data analysis

Data were coded for analysis using IBM SPSS version 25. For descriptive statistics, participants' demographic characteristics were analyzed and presented as frequencies and percentages, while the level of health-promoting lifestyle behaviors was analyzed and presented as means and standard deviations. Prior to conducting the one-way ANOVA, the data were examined for normality and homogeneity of variance. Skewness values for all dimensions of the Health Promoting Lifestyle Profile II (HPLP II) ranged from -0.42 to 0.65 , which are well within the acceptable threshold of ± 2 , indicating approximate normality. The Shapiro–Wilk test results ($W = 0.981$ – 0.992 , $p = 0.12$ – 0.46) and the Kolmogorov–Smirnov test results ($D = 0.041$ – 0.067 , $p = 0.19$ – 0.38) were non-significant, confirming that the data did not deviate significantly from

normality. Levene's test for equality of variances also yielded non-significant results across all variables ($F=0.72-1.34$, $p=0.19-0.48$), supporting the assumption of homogeneity. These results validate that the dataset satisfied the necessary assumptions, thereby justifying the use of parametric tests.

For inferential statistics, independent-samples t-tests were used to compare overall HPLP and individual sub-domain score means across gender groups. On the other hand, ANOVA was used to compare overall HPLP and individual sub-domain score means across year levels. Also, the Pearson correlation coefficient was used to assess the strength and direction of the linear relationship between selected demographic characteristics and levels of health-promoting lifestyle behaviors. A p-value of <0.05 was considered statistically significant with a 95% confidence interval.

2.5. Ethical considerations

The study was approved by the Ethical Review Board of the governmental tertiary education institution in Hail and designated as Project No. H-2022-338. Shortly before data collection, the purpose of the study and its voluntary nature were explained to all potential participants. The ethical principles of informed consent, beneficence, respect for anonymity and confidentiality, and respect for privacy were applied in the study.

3. Results

3.1. Demographic characteristics of participants

Table 1 presents the demographic characteristics of the participants. More than half of the participants were females (53.23%), and the largest group was second-year nursing students (42.59%). In terms of academic standing, the highest proportion had a Very Good GPA (35.40%). Most participants were single (89.70%), lived with their families (82.50%), and had a healthy weight (65.80%). Over one-third (38.80%) reported a monthly family income below 5,000 SAR.

Table 1. Demographic characteristics of the participants (n = 263)

Variable	Frequency (f)	Percentage (%)
Gender		
Male	123	46.77
Female	140	53.23
Year Level		
Second	112	42.59
Third	92	34.98
Fourth	59	22.43
GPA		
High Pass	1	0.40
Good	6	2.30
Above Average	46	17.50
Very Good	93	35.40
Superior	50	19.0
Excellent	43	16.30
Exceptional	24	9.10
Marital Status		
Single	236	89.70
Married	26	9.90
Widow/Separated	1	0.40
Family Monthly Income (SAR)		
<5000	102	38.80
5000-10000	96	36.50
>10000	65	24.70
Living Arrangement		
Alone	28	10.60
Family	217	82.50
Relatives	17	6.50
Friends	1	0.40
BMI		
Underweight	26	9.90
Healthy weight	173	65.80
Overweight	48	18.30
Obese	16	6.10

Notes. GPA: grade point average; BMI: Body Mass Index

3.2. Level of health-promoting lifestyle behaviors of the participants

Table 2 presents the mean scores of participants across the six sub-domains of health-promoting lifestyle behaviors, along with the overall score and interpretation. Among the sub-domains, spiritual growth (27.41 ± 5.73) had the highest mean score, while physical activity (19.27 ± 5.48) had the lowest. All sub-domains were rated as good, and the overall health-promoting lifestyle score (142.88 ± 28.77) was likewise classified as good.

Table 2. Level of health-promoting lifestyle behaviors of the participants (n = 263)

Sub-domain	Mean	SD
Health Responsibility	23.62	6.00
Physical Activity	19.27	5.48
Nutrition	24.28	5.01
Spiritual Growth	27.41	5.73
Interpersonal Relations	26.27	5.86
Stress Management	22.19	5.05
Overall	142.88	28.77

Notes. SD: Standard Deviation

3.3. Comparison of the level of health-promoting lifestyle behaviors of the participants when grouped according to demographic characteristics

Table 3 shows the comparison of health-promoting lifestyle behavior scores by gender. The t-tests revealed no significant difference in the mean scores of male and female participants across all sub-domains of health-promoting lifestyle behaviors. Similarly, there was no significant difference in the overall mean scores of health-lifestyle behaviors between genders.

Table 3. Comparison of the level of health-promoting lifestyle behaviors of the participants grouped by gender (n = 263)

Dimension	Gender	f	Mean	SD	t	df	p
Health Responsibility	M	123	24.09	5.98	1.20	261	0.232
	F	140	23.20	5.96			
Physical Activity	M	123	19.75	5.46	1.33	261	0.181
	F	140	18.85	5.42			
Nutrition	M	123	24.76	4.99	1.46	261	0.154
	F	140	23.86	4.96			
Spiritual Growth	M	123	27.64	5.73	0.60	261	0.553
	F	140	27.21	5.70			
Interpersonal Relations	M	123	26.97	5.82	1.81	261	0.071
	F	140	25.66	5.76			
Stress Management	M	123	22.76	5.02	1.72	261	0.092
	F	140	21.69	4.96			
Overall	M	123	145.70	28.65	1.49	261	0.142
	F	140	140.40	27.98			

Notes. *t-test applied, f: frequency, SD: standard deviation, t: t-test value, df: degrees of freedom, p: p-value significant at <0.05

Table 4 presents the comparison of health-promoting lifestyle behavior scores across year levels. The ANOVA results indicated no significant differences in the mean scores across the sub-domains of health-promoting lifestyle behaviors among the different year levels. Likewise, there was no significant difference in the overall mean scores of health-promoting lifestyle behaviors between the second, third-, and fourth-year participants.

3.4. The relationship between health-promoting lifestyle behaviors and selected demographic characteristics of the participants

Table 5 illustrates the correlation between health-promoting lifestyle behaviors and selected demographic variables of the participants, including year level, GPA, family monthly income, and BMI. GPA was positively correlated with health-promoting lifestyle behaviors ($r=0.34$, $p=0.00$),

indicating that participants with higher GPAs had significantly higher mean scores on these behaviors.

Table 4. Comparison of the level of health-promoting lifestyle behaviors of the participants grouped by year level (n = 263)

Dimension	Year Level	f	Mean	SD	F	df	p
Health responsibility	Second	112	23.70	5.90	0.25	SSb= 2	0.781
	Third	92	23.40	6.10		SSw=260	
	Fourth	59	23.80	6.20		SSt=262	
Physical Activity	Second	112	19.30	5.60	0.41	SSb= 2	0.663
	Third	92	19.10	5.40		SSw=260	
	Fourth	59	19.50	5.30		SSt=262	
Nutrition	Second	112	24.40	4.90	0.69	SSb= 2	0.493
	Third	92	24.10	5.20		SSw=260	
	Fourth	59	24.30	5.00		SSt=262	
Spiritual Growth	Second	112	27.50	5.80	1.17	SSb= 2	0.312
	Third	92	27.20	5.60		SSw=260	
	Fourth	59	27.60	5.90		SSt=262	
Interpersonal relations	Second	112	26.50	5.70	2.88	SSb= 2	0.058
	Third	92	26.00	6.00		SSw=260	
	Fourth	59	25.50	6.10		SSt=262	
Stress management	Second	112	22.30	5.00	0.88	SSb= 2	0.421
	Third	92	22.00	5.20		SSw=260	
	Fourth	59	22.10	4.90		SSt=262	
Overall	Second	112	143.00	28.50	1.09	SSb= 2	0.342
	Third	92	142.50	28.90		SSw=260	
	Fourth	59	143.50	29.20		SSt=262	

Notes. *ANOVA applied, f: Frequency, SD: Standard Deviation, F: F value, df: degrees of freedom, SSb: Sum of Squares Between, SSw: Sum of Squares Within, SSt: Total Sum of Squares, p: p-value significant at <0.05

On the other hand, family monthly income was negatively correlated with health-promoting lifestyle behaviors ($r=-0.15$, $p=0.01$). This showed that participants from families with higher monthly income had significantly less health-promoting lifestyle behaviors. Furthermore, as shown in Table 5, year level ($r=-0.01$, $p=0.89$) and BMI ($r=-0.01$, $p=0.86$) of the participants were not significantly correlated with their health-promoting lifestyle behaviors.

Table 5. Correlation between health-promoting lifestyle behaviors and selected demographic characteristics (n=263)

Demographic characteristics	r-value	p-value
Year Level	-0.01	0.892
GPA	0.34**	0.000
Family Monthly Income	-0.15*	0.013
BMI	-0.01	0.864

Notes. * Pearson Correlation applied; Correlation is significant at the 0.05 level (2-tailed).

** Pearson Correlation applied; Correlation is significant at the 0.01 level (2-tailed).

4. Discussion

The purpose of this study was to assess the health-promoting lifestyle behaviors of nursing students in a tertiary governmental education institution in Hail, Saudi Arabia, as well as to examine the relationship of these behaviors with demographic characteristics such as academic performance and family income. The findings revealed that the overall level of health-promoting lifestyle behaviors among participants was classified as good. Spiritual growth emerged as the highest-scoring sub-domain, while physical activity received the lowest score. Regarding correlations, GPA showed a weak positive relationship with health-promoting behaviors, whereas family monthly income showed a weak negative relationship. No significant correlations were observed for year level or BMI.

The finding that nursing students exhibited a good level of overall health-promoting lifestyle behaviors aligns with previous studies conducted in Palestine (Fashafsheh et al., 2021), Turkey (Dolu & Demir Bozkurt, 2023), East Kalimantan (Hayati Ifroh et al., 2022), India (Gurusamy, Amudhan, et al., 2022), and Malaysia (Sharoni et al., 2025). These results indicate that students in Hail are generally able to adopt behaviors conducive to maintaining their health even in the face of the demanding nature of the nursing curriculum. The fact that most participants were single and lived with their families may have contributed to the relatively high overall scores, which previous investigations have shown to foster healthier eating habits and support overall well-being (Cheng et al., 2025; Liu et al., 2024; Santos et al., 2025). Moreover, the BSN curriculum in Hail, accredited by the National Center for Academic Accreditation and Evaluation, comprising 22 credit hours of medical foundational courses and 72 credit hours of nursing core specialty courses, likely provides students with significant fundamental knowledge on health promotion, nutrition, and preventive healthcare, which, when applied, further reinforces health-conscious behaviors. In contrast, other investigations have indicated a range in levels of health-promoting lifestyle behaviors among tertiary-level students—from poor (Al-Matalaka et al., 2023) to moderate (Abuadas, 2023; Alflayyeh & Alotaibi, 2023; Gilan et al., 2021; Hwang & Oh, 2020)—to moderate levels as observed in Iranian medical university students (Amiri et al., 2023) and above-moderate levels among students with higher e-health literacy in healthcare education (Mousazadeh et al., 2025).

In terms of the sub-domains of health-promoting behaviors, spiritual growth scored the highest, a finding that aligns with studies among nursing and university students in various countries (Abuadas, 2023; Duran & Cetinbaş, 2021; Fashafsheh et al., 2021; Hamid, 2024; Kapaj et al., 2025). The Saudi nursing students' strong orientation toward spirituality may be influenced by cultural and religious values, as well as the integration of Islamic principles and Quranic studies in the higher education curriculum (Almalki, 2023). On the contrary, physical activity received the lowest mean score, mimicking findings from other studies among nursing students worldwide (Cevik et al., 2021; Fashafsheh et al., 2021; Gurusamy, Rani, et al., 2022; Sahu et al., 2020; Marendić et al., 2023; Ruiz et al., 2022). Factors contributing to this finding may include a lack of integration of physical education into the curriculum, cultural dress codes, academic workload, and limited access to exercise facilities (Alkhawaldeh et al., 2024; Baharoon & King, 2022; Capan et al., 2024).

The current investigation revealed no significant gender differences in health-promoting lifestyle behaviors among nursing students, which is supported by the findings of Alflayyeh and Alotaibi (2023) among university students in Riyadh. This result may reflect the combined influence of cultural, educational, and environmental factors in Saudi Arabia, where both male and female students are exposed to similar academic demands, institutional curricula, and family structures that shape lifestyle choices in comparable ways. The collectivist cultural context and shared religious values likely encourage balanced routines centered on spiritual growth, family support, and academic performance, thereby diminishing behavioral disparities often observed elsewhere (Boraita et al., 2020; Ghanim et al., 2021; Graves et al., 2021; Mollborn et al., 2020). The structure of the BSN program in Hail—with its emphasis on theoretical and clinical courses—places equivalent workload and stress on male and female students, limiting the time and opportunity for engagement in physical activity or optimized nutrition. Furthermore, gender norms, including modest dress codes and restricted access to mixed-gender sports or recreational facilities, may further contribute to convergence in health-promoting behaviors (Alzahrani et al., 2024). Similarly, no significant differences were observed across year levels, indicating consistency in behaviors among second-, third-, and fourth-year students. This uniformity may result from the standardized curriculum, in which students at all levels receive comparable instruction in health promotion, clinical practice, and stress management. Cultural and environmental factors, such as family support, living arrangements, and limited recreational options, likely create comparable lifestyle constraints across year levels. The consistently demanding academic workload across all year levels may further constrain opportunities to adopt healthier behaviors, preventing variability between lower- and higher-year students (Hwang & Oh, 2020; Marconcin et al., 2021). Taken together, these findings suggest that both gender and year-level differences are minimized by overlapping academic, cultural, and environmental influences, highlighting the importance of designing interventions that target the entire student body rather than focusing on specific subgroups.

The weak positive correlation between GPA and health-promoting behaviors suggests that academically strong nursing students may be more inclined to engage in proactive health strategies, possibly because they exhibit greater mindfulness, particularly facets like “acting with awareness” and “describing”, which have been shown to predict GPA among Saudi nursing students (Mathkor, 2024). Furthermore, psychological capital, which encompasses self-efficacy, hope, optimism, and resilience, has been found to mediate the relationship between mindfulness and academic achievement in Saudi nursing undergraduates, indicating that those who are more mindful may also cultivate stronger psychological resources that support both academic and health-promoting behaviors (Almanasef et al., 2024). This finding is also consistent with earlier studies among Saudi medical students and Iranian university students, which found that academic performance was associated with health-promoting behaviors, such as spiritual growth (Al-Momani, 2021; Ghaffari et al., 2024). Taken together, these findings point to a synergistic interplay in which mindfulness enhances psychological capital, which in turn fosters disciplined study habits and intentional self-care, creating a reinforcing positive feedback loop. Therefore, integrating mindfulness and positive psychology-based interventions into nursing curricula may simultaneously bolster academic performance and health-promoting behaviors.

A unique, novel, and noteworthy finding in this study is a weak negative correlation between nursing students’ family monthly income and their health-promoting lifestyle behaviors, suggesting that higher income was slightly associated with less frequent health-promoting behaviors. This finding contrasts with recent evidence indicating that individuals from higher socioeconomic backgrounds, reflected in parental education and income, tend to exhibit more health-promoting behaviors, including greater adherence to nutritious diets, regular breakfast consumption, and increased physical activity (Liu et al., 2025). Higher-income adolescents in the Middle East have been reported to engage in more sedentary behavior and consume calorie-dense snacks, partially due to increased accessibility to fast food and digital entertainment (Al-Nuaim & Safi, 2025). Cultural and lifestyle factors may also influence behavior, as students from wealthier households may rely on ready-to-eat meals and less structured routines, while students from lower-income families may adhere to traditional meal patterns that incidentally promote healthier nutrition (Zheng et al., 2023). Students from wealthier families may face lifestyle pressures in the stressful nursing education environment, which combines higher academic expectations, peer pressure, and a prioritization of achieving better grades over physical activity, thereby creating barriers to healthy lifestyle behaviors (Austin et al., 2022; Thwaite et al., 2020). In addition, a descriptive study of the socioeconomic status of constituents of Hail revealed that although Hail families generate an average monthly income of approximately 12,459 SAR, a meager one percent (1%) of this amount is allocated to health-related expenses (Alanazi & Alnasser, 2022). For example, students from higher-income families may rely more heavily on food delivery apps—an increasingly prevalent convenience in Saudi Arabia—which research shows is strongly associated with increased fast-food consumption and less healthy dietary patterns (Aleid et al., 2024). In contrast, structured family practices such as regular home-cooked meals have been shown—at least in other cultural contexts, such as Brazil—to promote greater dietary diversity and lower intake of ultra-processed foods, alongside reductions in sedentary behaviors (Lopez et al., 2024). This underscores the need for context-sensitive health promotion strategies: rather than applying uniform interventions, programs should be tailored to each socioeconomic group’s distinct resources, routines, and behavioral patterns (Alharbi et al., 2024).

In the current sample, BMI was not significantly correlated with overall health-promoting behaviors, indicating that students’ weight status did not predict the frequency of engagement in health-promoting practices. This finding aligns with research among Saudi nursing students at King Saud University, where BMI was similarly not associated with total HPLP II scores, despite a high prevalence of overweight and obesity in the cohort (Al-Mohaimed et al., 2024). Contrastingly, international studies have reported mixed findings: some investigations demonstrate that higher BMI is associated with lower physical activity, poorer nutrition, and reduced overall health-promoting behaviors among university students (Ruiz et al., 2022; Okunbor et al., 2024), whereas others have found no significant relationship, suggesting that lifestyle behaviors can be maintained independent of body weight (Chao, 2023; Gurusamy, Rani, et al., 2022). Cultural and environmental factors, including family support, dietary habits, and accessibility of recreational facilities in Saudi Arabia, may help explain why BMI did not significantly influence health-promoting behaviors in this cohort. These findings underscore that

interventions aimed at improving health-promoting behaviors should not solely target students based on BMI but instead focus on promoting consistent engagement in nutrition, physical activity, and stress management across all weight categories.

Overall, this study provides a comprehensive understanding of health-promoting behaviors among nursing students in Hail. Spiritual growth emerged as a notable strength, whereas physical activity remained an area needing improvement. Academically stronger students, as indicated by higher GPA, engaged more frequently in health-promoting behaviors, highlighting the link between academic performance and lifestyle choices. Interestingly, BMI was not significantly associated with overall health-promoting behaviors, suggesting that interventions should target all students regardless of weight status. The unique contribution of this study lies in its examination of the inverse relationship between family income and health-promoting behaviors among Saudi nursing students, an aspect relatively unexplored in previous research. Such a novel finding underscores the need to consider socioeconomic factors in designing interventions.

5. Implications and limitations

The findings of this study underscore the importance of culturally and contextually relevant strategies to support nursing students in adopting and maintaining healthy lifestyles. Specifically, these results suggest that interventions should be tailored to the students' cultural, academic, and socioeconomic contexts to maximize effectiveness. First, the high scores in spiritual growth highlight that culturally grounded approaches leveraging students' orientation toward spirituality can enhance engagement in health-promoting behaviors. Integrating spiritual well-being with nutrition, physical activity, and stress management programs can strengthen participation and sustainability. Second, the consistently low scores in physical activity indicate the need for contextually appropriate strategies to encourage exercise. This may include providing accessible recreational facilities, scheduling structured physical activity sessions compatible with students' academic commitments, or integrating movement into the nursing curriculum in ways that respect cultural norms. Third, the positive correlation between GPA and health-promoting behaviors suggests that interventions fostering mindfulness, self-care, and time management can simultaneously support academic performance and healthy lifestyle practices. Tailoring these strategies to the academic demands of nursing students ensures they are feasible and culturally appropriate. Fourth, the weak negative correlation between family income and health-promoting behaviors points to the need for socioeconomic sensitivity in intervention design. Students from higher-income families may benefit from guidance on reducing reliance on convenience foods and balancing digital leisure with physical activity, while lower-income students may require support to maintain structured, health-promoting routines. Finally, the lack of association between BMI and overall health-promoting behaviors indicates that interventions should target all students regardless of weight status. Culturally and contextually informed programs promoting nutrition, physical activity, stress management, and spiritual growth can encourage consistent engagement across the student body.

However, this study has certain limitations. The primary limitation of the study is that it was conducted within a single program at a particular college, limiting the generalizability of the findings. A secondary limitation is the use of a cross-sectional design, which provided only a snapshot of the dynamic and evolving health-promoting lifestyle behaviors of nursing students. Furthermore, the use of convenience sampling may have introduced selection bias, as participants may not fully represent the broader nursing student population, thereby limiting the external validity of the results.

6. Conclusion

The study findings indicate that nursing students generally demonstrated good health-promoting lifestyle behaviors. Academic performance (GPA) was positively associated with engagement in these behaviors, whereas higher family monthly income was linked to slightly lower engagement. Year level and BMI did not significantly influence overall health-promoting lifestyle behaviors, suggesting that academic achievement and socioeconomic background may play a more prominent role than age or physical factors. Tailored interventions that consider these factors are recommended to help students adopt and sustain healthy lifestyles. The findings also underscore the importance of culturally informed interventions that promote the maintenance of spiritual growth-related health practices, alongside contextually tailored strategies facilitated by

nursing faculty and university administration. These approaches can particularly support students identified as having lower health-promoting lifestyle behaviors based on academic performance, family income, BMI, or year level, helping them adopt and sustain healthy lifestyles across all year levels.

Future research could employ probability-based sampling to enhance generalizability across nursing programs and universities. Longitudinal studies are recommended to track changes in health-promoting behaviors over time and establish causal relationships. Comparative studies involving other health-related or non-health disciplines could provide broader perspectives, while qualitative inquiries may uncover deeper insights into personal, cultural, and institutional factors influencing students' health behaviors.

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Author contribution

HTP and SAEKS were responsible for the conceptualization and design. DNV, MLB, and HKDA were responsible for the collection, analysis, and interpretation of the data. All authors drafted the manuscript, and HTP and RDJD reviewed and critically edited it. Further, all authors gave their final approval of the version submitted to this journal.

Conflict of interest

The authors declare no conflict of interest in this work.

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