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Health-promoting lifestyle profile and associated factors among medical students in a Saudi university

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Abstract

Objectives: Health promotion is the main strategy for encouraging people to adopt a healthy lifestyle and for preventing non-communicable diseases. Medical students, in particular, are expected to have an important role in health promotion in their near future as physicians. The aim of this study was to determine and evaluate all six components of the Health-Promoting Lifestyle Profile and its sociodemographic determinants among medical students.

Methods: A cross-sectional descriptive study was conducted in January 2018 in Jeddah, Saudi Arabia. The questionnaire used in this study consisted of two parts: the first part included sociodemographic questions and body mass index measurement and the second part consisted of questions from the Health-Promoting Lifestyle Profile II.

Results: The study enrolled 243 medical students, of which 55.1% were male, 39.5% were in their fifth year, and more than half had a monthly family income above 20,000 Saudi Riyal. The mean body mass index of the respondents was 25.1 ± 5.2 (range = 13.7–43.8). The total mean score of the Health-Promoting Lifestyle Profile II was 123.8 ± 19.8 (range = 72–191). Study findings showed that health-promoting profiles differed by gender, particularly with respect to physical activity and interpersonal relationships. Factors were found to be associated with the Health-Promoting Lifestyle Profile II subscales, including income and year of study.

Conclusions: University students, and in particular health science students, represent an appropriate area for health promotion interventions to be established.

Keywords

Medical students, health behaviors, health promotion, psychological status

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Introduction

Non-communicable diseases are the leading cause of morbidity and mortality worldwide, especially in developing countries, accounting for around 60% of all deaths globally. The World Health Organization (WHO) has pointed out that 60% of the morbidity and mortality of non-communicable diseases are dependent on behavioral and lifestyle factors.[1] Many studies have shown that practicing negative health behaviors increases an individual's vulnerability and susceptibility to bad health outcomes. Conversely, practicing positive health behaviors decreases morbidity and mortality rates and increases or maintains an individual's well-being and self-actualization.[2] Health-promoting behaviors include six components: health responsibility, physical activity, nutrition, stress management, self-actualization, and interpersonal relationships.[3] The adolescent and youth period is very important for adopting any

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health-related behaviors because they will continue throughout adulthood.[4] Many health problems and disabilities in adulthood can be avoided if their related health risk behaviors are identified and changed at an early stage of life.[5] Because it is also very challenging for adults to change unhealthy behaviors, it is vital to study lifestyle behaviors and their associated factors and then promote healthy lifestyle behaviors at younger ages.[3] University students represent a large proportion of the youth population.[6] Many university students have more choices in health-related behaviors and are more prone to unhealthy lifestyles, shifting toward smoking, unhealthy nutrition, increased stress, and a sedentary lifestyle.[3] Health promotion is the main strategy for encouraging people in general,[7] and students in particular,[8] to adopt a healthy lifestyle and behaviors that help prevent non-communicable diseases. Considering a relationship between personal health of health providers and embracing of healthier behaviors by patients,[9] medical students are specifically expected to play a key role in health promotion in their near future as physicians. The adoption and practice of a healthy lifestyle by medical students is critical for them to be role models and have the ability to influence their patients and the general population.[10] Interestingly, while medical students, who are expected to deal with rigorous study schedules, are taught about health, there are no health-promoting proceedings directed to them.[11]

Regardless of the literature documenting the benefits of a healthy lifestyle as well as the potential negatives related to not adopting it, students have been found to typically follow unhealthy lifestyles, particularly in ignoring physical activity and responsibility for health.[12–14] For these reasons, it is necessary to investigate this topic and educate medical students about health-promoting behaviors and practices during their educational years.[10] The Health-Promoting Lifestyle Profile II (HPLP II) questionnaire established by Walker et al.[3] is one of the most commonly used tools for investigation in such settings. This tool has also been used to further explore the impact of students' gender[12,15,16] and years of study.[16–18] Despite the importance of this issue, few studies have explored the Health-Promoting Lifestyle Profile (HPLP) among medical students, and literature from the Arab region for this particular group is even more scarce. Therefore, the aim of this study was to determine and evaluate all six components of the HPLP among medical students as well as examine any sociodemographic determinants. The results of this study will help university administrators and medical curriculum planners in designing, targeting, and implementing health-promoting programs to increase awareness in this population.

Methodology

A descriptive cross-sectional study was conducted in January 2018 among medical students of the faculty of medicine at King Abdulaziz University (KAU), Jeddah, Saudi Arabia. All undergraduate medical students in their fourth, fifth, and sixth years were considered eligible to participate. Students with any chronic medical diagnosis were excluded because of the possible effects of such diagnoses on lifestyle and behavior. Also, students who were in an exam period were excluded to avoid the confounding effect of stress. Using a stratified sampling and proportional allocation, the calculated sample was 243 out of 1100 students in the clinical phase of the curriculum. This was calculated using Raosoft[19] software (Raosoft, Seattle, WA, USA) and the single proportion method. After obtaining ethical approval from the KAU research and ethics committee, written informed consent was obtained from each student who participated. They were informed about the purpose of the study and the confidentiality of their responses. The study questionnaire consisted of two parts. The first part included sociodemographic questions (age, gender, nationality, smoking status, marital status, residence type, living arrangement, district, parents' marital status, deceased parents, monthly family income, number of brothers and sisters, academic level, and academic grade point average (GPA)). Weight and height were also acquired to assess each student's body mass index (BMI) using the equation of body weight divided by the square of the student's height (kg/m^2). Based on the BMI, students were classified as underweight (<18.5), normal (18.5–24.9), or overweight (>25).[20] The second part of the questionnaire consisted of the HPLP II questionnaire developed by Walker et al.[3] The HPLP II tool consists of 52 health-promoting behavior items that are categorized into six subscales: health responsibility (nine items), spiritual growth (nine items), physical activity (eight items), interpersonal relationships (nine items), nutrition (nine items), and stress management (eight items). A Likert-type scale was used to measure each behavior, with ranges of never (1), sometimes (2), frequently (3), and regularly (4). The total score of the HPLP II ranges from 52 to 208 and is measured by the mean score of the responses to all 52 HPLP items. The total HPLP II score is further classified into four levels: poor for the range 52–90, moderate for the range 91–129, good for the range 130–168, and excellent for the range 169–208. High scores in every subscale mean more frequent health-promoting behaviors. The overall scale of the original version of the HPLP II reported a Cronbach's alpha of 0.94, and for the six subscales, it ranged from 0.79 to 0.87.[3] The questionnaires were distributed to students after academic classes during the month of January 2018 by a trained research assistant and were returned at the end of the day to a specified office where a researcher was available to clarify any questions. Statistical Package for the Social Sciences (SPSS) version 23.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. The sociodemographic characteristics, total HPLP II scores, and subscales were described using percentages, means, standard deviations, minimums, and maximums. Cronbach's alpha was used to assess the reliability of the HPLP and its subscales. Independent samples and analysis of variance (ANOVA) tests were applied where appropriate to compare the mean scores of the HPLP and its subscales among salient factors such as gender, year of study, monthly income, and smoking status.

Table 1. Distribution of students' age, BMI, number of rooms, and siblings (N = 243).

Characteristics	Mean	SD	Min	Max
Age	21.6	1.0	20	25
BMI	25.1	5.2	13.7	43.8
Number of rooms	7	3	2	16
Number of brothers	3	2	0	9
Number of sisters	2	1	0	7

BMI: body mass index; SD: standard deviation.

Table 2. Distribution of students' socio-demographic characteristics (N = 243).

Characteristics	Students (N)	Students (%)
Year of university study		
Sixth year	53	21.8
Fifth year	96	39.5
Fourth year	94	38.7
Gender		
Male	134	55.1
Female	109	44.9
Nationality		
Saudi	230	94.7
Non-Saudi	13	5.3
Marital status		
Married	12	4.9
Unmarried	231	95.1
Parents' marital status		
Married	203	83.5
Divorced	40	16.5
Deceased parents		
No	216	88.9
Father	16	6.5
Mother	6	2.5
Both	5	2.1
Residences		
Alone	16	6.6
With family	227	93.4
Living arrangement		
Owner	176	72.4
Renter	67	27.6
Monthly income		
Less than 10,000	20	8.2
10,000–20,000	85	35.0
20,000–30,000	65	26.8
More than 30,000	73	30.0
Smoking		
Smoker	23	9.5
Non-smoker	213	87.6
Ex-smoker	7	2.9

Results

A total of 243 medical students enrolled in the study. Major sociodemographic factors are illustrated in Tables 1 and 2, while Table 3 shows students' HPLP II scores for the six subscales. The age range was 20–25 years, with a mean of 21.6 ± 1.0 years. Just over half (55.1%) were males. More than one-third (39.5%) were recruited from their fifth year, 38.7% were selected from the fourth academic year, and the rest were from the sixth year. With regard to marital status and residency, the majority of the students were unmarried (95.1%) and living with family (93.4%). As for living arrangements, 72.4% reported that their families owned the house they lived in. More than half had a monthly family income above 20,000 Saudi Riyal. In regard to smoking, 87.7% were non-smokers. As for BMI, the mean score of the respondents was 25.1 ± 5.2 (a range of 13.7–43.8), where 49% were in the normal BMI range, 5.8% were underweight, 29.2% were overweight, and 16% were obese. There was a significant difference between male and female students for BMI, with the male students having a higher mean BMI than the female students (male: 26.9 ± 5.2 vs. female: 22.8 ± 4.1; $p < 0.0001$). In addition, the results showed a significant difference in mean BMI score dependent on academic year, where the fourth-year students' mean BMI was higher than the fifth-year and sixth-year students (fourth year 25.7 ± 5.3 vs. fifth year 25.6 ± 5.4 vs. sixth year 23.9 ± 4.6; $p = 0.03$). The HPLP II total mean score was 123.8 ± 19.8 (range = 72–191), and the highest mean in the subscales was 25.5 ± 4.9 for spiritual growth and the lowest was 16.7 ± 5.3 for physical activity.

Table 3. Students' HPLP II scores (N = 243).

HPLP II and subscales	Mean	SD	Min	Max	Highest and lowest obtainable score
Health responsibility	17.9	4.5	9	31	9–36
Physical activity	16.7	5.3	8	32	8–32
Nutrition	21.3	3.9	12	32	9–36
Spiritual growth	25.5	4.9	10	36	9–36
Interpersonal relationships	23.4	4.4	13	35	9–36
Stress management	18.9	3.7	9	30	8–32
Total HPLP II	123.8	19.8	72	191	52–208

HPLP II: Health-Promoting Lifestyle Profile II; SD: standard deviation.

It is evident from the data shown in Table 4 that males had significantly higher scores than females in the areas of stress management ($t = 5.1$; p\0.03) and physical activity ($t = 9.5$; p\0.002). On the contrary, the average score for male students was better than that for female students in the areas of health responsibility, nutrition, spiritual growth, stress management subscales, and overall HPLP II, but with no significant differences. In addition, the average score of female students was better than male students in interpersonal relationships, but also with no significant difference.

The results among the different monthly income groups showed that the participants from the group whose families earn more than 30,000 Saudi Riyal had better mean scores than other groups with regard to health responsibility, physical activity, spiritual growth, interpersonal relationships subscales, and overall HPLP scores, but with no significant

Table 4. Distribution of Health-Promoting Lifestyle Profile (HPLP) scores according to year of study, gender, monthly income, and smoking (N = 243).

Descriptive feature	Health responsibility	Physical activity	Nutrition	Spiritual growth	Interpersonal relationships	Stress management	HPLP II total
Year of university study							
Fourth	17.43 ± 3.8	17.50 ± 5.3	21.30 ± 3.7	25.07 ± 5.3	22.92 ± 3.9	17.81 ± 3.8	122.06 ± 18.4
Fifth	18.08 ± 4.8	16.00 ± 5.2	20.88 ± 3.9	25.38 ± 4.6	23.15 ± 4.0	18.93 ± 3.6	122.55 ± 19.3
Sixth	18.19 ± 4.6	17.15 ± 5.3	21.55 ± 4.2	25.85 ± 5.1	23.95 ± 5.1	19.55 ± 3.7	126.26 ± 20.8
F	0.51	1.8	0.50	0.45	1.2	3.7	1.1
p	0.60	0.17	0.62	0.64	0.31	0.03*	0.33
Gender							
Male	18.35 ± 4.6	17.67 ± 5.5	21.48 ± 4.0	25.76 ± 4.9	23.23 ± 4.2	19.41 ± 3.5	125.94 ± 19.8
Female	17.47 ± 4.4	15.59 ± 4.8	20.99 ± 3.8	25.10 ± 4.9	23.59 ± 4.7	18.33 ± 3.9	121.08 ± 19.4
t	1.52	3.08	0.95	1.05	0.63	2.26	1.92
p	0.12	0.002*	0.33	0.29	0.53	0.03*	0.06
Monthly income							
<10,000	17.70 ± 4.3	15.35 ± 4.3	21.30 ± 3.6	24.30 ± 3.9	21.65 ± 3.7	18.35 ± 3.1	118.65 ± 17.5
10,000–20,000	18.00 ± 4.3	16.58 ± 5.4	21.63 ± 4.2	25.65 ± 5.2	23.27 ± 4.5	18.71 ± 3.9	123.85 ± 20.1
20,000–30,000	17.31 ± 4.2	16.63 ± 5.1	20.50 ± 3.9	25.14 ± 5.1	23.22 ± 4.4	18.07 ± 3.6	121.88 ± 19.9
>30,000	18.56 ± 5.1	17.41 ± 5.7	21.49 ± 3.7	25.88 ± 4.9	24.19 ± 4.5	18.21 ± 3.8	126.74 ± 19.7
F	1.5	1.1	1.2	0.7	2.9	0.7	1.7
p	0.20	0.35	0.31	0.5	0.03*	0.66	0.17
Smoking							
Smoker	17.39 ± 4.3	14.47 ± 5.4	20.65 ± 2.6	23.17 ± 5.5	22.47 ± 3.9	18.65 ± 4.5	116.74 ± 20.1
Non-smoker	18.03 ± 4.6	16.75 ± 5.1	21.38 ± 4.1	25.74 ± 4.9	23.53 ± 4.5	18.96 ± 3.7	124.67 ± 19.8
Ex-smoker	17.71 ± 3.5	15.71 ± 5.3	19.85 ± 3.9	24.57 ± 2.3	22.42 ± 2.7	18.85 ± 2.5	119.14 ± 13.4
F	0.9	0.9	1.1	0.6	1.9	0.4	1.2
p	0.44	0.46	0.33	0.57	0.13	0.73	0.31

*Correlation is significant at the 0.05 level.

differences (Table 4). In addition, the results showed that non-smokers had significantly better mean scores than smokers and ex-smokers in the area of spiritual growth (t = 2.9; p\0.04), while there were no significant differences in the overall HPLP II scale and the other six subscales.

It is evident from Table 4 that no significant difference was found in total HPLP II scores and the mean scores of the subscales related to marital status, nationality, parents' marital status, residency, living arrangements, number of rooms, or number of brothers and sisters. In Table 5, we can observe that the Pearson's correlation results showed negative correlations between the students' age and the overall HPLP II scale and all six subscales, with no significant differences, while the Pearson's correlation results showed a statistically significant negative correlation between students' BMI and interpersonal relationships only.

Overall reliability was found to be excellent, with Cronbach's alpha at 0.91. Mean scores for spiritual growth and the interpersonal relationships subscales were found to be relatively higher, while the physical activity subscale mean scores were relatively low in comparison to other subscales. There was a significant association between year of university study and stress management; fourth-year students had the highest scores. Regarding gender, male students had significantly higher scores than female students in physical activity and stress management. Higher income was significantly associated with a higher score on interpersonal relationships; BMI was negatively associated with interpersonal relationships. No significant correlations were observed between HPLP score and BMI or age.

Discussion

Several studies have assessed healthy lifestyle behaviors among students. In a metacentric study conducted among medical students in Turkey,[13] the results of the assessment of health-promoting lifestyle behaviors were similar to those in this study; in particular, the total average score of the HPLP II was 127.9 ± 18.2, and the highest scores were recorded in spiritual development and interpersonal relationships. These two subscales also received the highest scores among dental students in a Turkish study.[15] These students had learned about the health impacts of these behaviors, and the similar scores could be explained by the particular environment of attending a university, which is characterized by a relatively stressful schedule that prevents students from practicing sports and eating a healthy diet. Physical activity was also the subscale with the lowest score among nurses at a university hospital in Turkey.[21]

These results suggest that theoretical learning may not always be reflected in behavior. The findings of the different studies on this topic are controversial. A comparison between nursing and non-nursing students showed that the

Table 5. Distribution of Health-Promoting Lifestyle Profile (HPLP) scores according to age and BMI (N = 243).

Descriptive feature	Health responsibility	Physical activity	Nutrition	Spiritual growth	Interpersonal relationships	Stress management	HPLP II total
Age							
r	−0.083	0.051	−0.025	−0.019	−0.096	−0.080	−0.036
p	0.196	0.427	0.704	0.766	0.134	0.215	0.544
BMI							
r	−0.104	−0.080	0.018	−0.040	−0.150*	−0.076	−0.069
p	0.107	0.212	0.783	0.531	0.020	0.238	0.246

BMI: body mass index.
*Correlation is significant at the 0.05 level.

former had higher HPLP II scores than the latter,[22] but a Pakistani survey comparing the scores of medical and non-medical students concluded that, independent of the field of study, university students do not have healthy lifestyles in terms of diet and physical activity and have a tendency to be overweight or even obese. In the latter study, 15% of the students had a BMI in the overweight category; in this study's sample, the mean BMI of the respondents was 25.1 ± 5.2, with a mean score in the nutrition subscale that was relatively low. Another Saudi study conducted among medical students in Dammam[23] revealed that the majority of the respondents had bad dietary habits. This finding was confirmed by a cross-sectional study among Saudi college students where 15.7% were obese, and the majority had bad eating habits, including frequent consumption of fried foods. In this study, BMI was not without effects on the other aspects of health-promoting lifestyle behaviors; in fact, there was a significant negative association between BMI and interpersonal relationships. BMI as a determinant of a healthy lifestyle has been analyzed by other studies; for instance, a study performed among nurses in Kuwait highlighted the correlation between BMI and an overall health-promoting lifestyle and nutrition.[24] The association of a bad diet and lack of exercise as common habits among university students was confirmed by a literature review about healthy lifestyles among university populations.[25] Gender was cited by many authors as another determinant of health-promoting lifestyle behaviors.[18,26,27] Indeed, in this work, gender was significantly associated with two of the HPLP II subscales. Likewise, in a study conducted in Kuwait that enrolled 224 nursing students,[28] a significant difference was observed between the male and female students regarding physical activity and stress management, which was also observed in this study. These disparities between genders have been observed in other studies.[6,29,30] Indeed, many social practices are gender-typed in society, and sports are no exception to this gender marking; in general, it is considered to be a rather masculine domain.[31] Male students have a tendency to spend their free time in sports facilities, while female students would rather spend this time with family.[32] Some studies have found that gender was also significantly associated with another HPLP II subscale, that of interpersonal relationships,[16,28] but in this study's sample, while the female students had a slightly higher score on this subscale, there was no significant difference in comparison with the male students, although this may be explained by differences in the sizes and composition of samples in the studies. The interpersonal relationships subscale was also associated with income; individuals whose family income was higher had a better score on this subscale. Some studies have established that socioeconomic level is associated with healthy practices,[33] but within university life, this factor could be a double-edged sword; higher income may encourage the student to embrace the active social life of this particular environment, but it may also represent an easy way to gain access to the negative aspects of university life.[34] Education level represents another factor in health-promoting behaviors; in this study, the year of study was significantly related to stress management. In fact, studies have shown that managing stress improves with age and experience.[35,36] Education and training showed efficacy in improving the level of awareness about healthy practices among community members, and especially among students.[37,38] Furthermore, studies undertaken among medical students have shown that the more good health practices students had, the more engaged they were in patient education about health-promoting behaviors.[39]

This study has some limitations. Students were enrolled from one university only; thus, the results cannot be generalized to the total population of medical students in the country. Furthermore, the study concerned only medical students; therefore, its findings cannot be generalized to students in other fields. For data collection, a self-reported questionnaire was used; thus, participants' responses may not reflect reality.

Conclusion

This study showed excellent reliability of HPLP II scores among medical students. Health-promoting behaviors differed by gender, particularly with respect to physical activity and interpersonal relationships. Study findings suggest the importance of planning and prioritizing health-promoting activities for medical students to not only improve their lifestyles and health but also to possibly support population health-promoting programs. Further studies should be conducted in both

similar and diverse settings at regular intervals to identify needs, use feasible interventions, and evaluate proceedings.

Author contribution

All authors have read and approved the manuscript. SHA carried the study design and statistical analyses and shared in discussion writing. AAM contributed to the statistical analyses, and shared in writing introduction, discussion, and gathered references. JB contributed to the logistics, interpretation, and writing of results and discussion; review; and final approval of manuscript. SAS contributed to data entry, validation, and coding, and shared in writing introduction, discussion, and gathered references. MMS contributed to data collection, data entry, validation, and coding, and shared in writing introduction and gathered references. AAA contributed to data collection, data entry, validation, and coding, and shared in writing introduction and gathered references. MAM contributed to data entry, validation, and coding, and shared in writing introduction, discussion, and gathered references. YSA contributed to data collection, data entry, validation, and coding, and shared in writing introduction and gathered references. HKA contributed to data collection, data entry, validation, and coding, and shared in writing introduction and gathered references.

Data statement

All original data are available in the Department of Family Medicine, King Abdulaziz University, Jeddah, Saudi Arabia. Data used to support the findings of this study are available from the corresponding author upon request.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Disclosure

No part of this article has been presented in any conference proceedings. The manuscript has not been previously published and is not under consideration for publication in any other journal.

Ethical approval

The protocol of this study was approved by the Research Ethics Committee (REC) of King Abdulaziz University, Jeddah, Saudi Arabia (Reference No. 11210).

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Informed consent

Written informed consent was obtained and documented from all participants, who were informed about the nature of the study and the confidentiality of their responses.

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