

DIFFERENCES IN HEALTH-PROMOTING LIFESTYLE PROFILE AMONG CROATIAN MEDICAL STUDENTS ACCORDING TO GENDER AND YEAR OF STUDY

Tonći Mašina¹, Tomislav Madžar², Vera Musil³ and Milan Milošević⁴

¹University of Zagreb, School of Medicine, Department of Physical Education, ²Center for Sports Medicine and Occupational Health Promotion, ³Andrija Štampar School of Public Health, Department of Social Medicine and Healthcare Organization, ⁴Department of Environmental and Occupational Health, Zagreb, Croatia

SUMMARY – Increasing awareness of healthy lifestyle is important during the period of adolescence because habits are difficult to modify in adulthood. The aim of the study was to examine gender differences in health-promoting lifestyle among medical students and to analyze changes between the first and second year of the study. This cross sectional study was conducted on a sample of 1186 students (36% male). Data were collected by self-administered anonymous questionnaire, the Health-Promoting Lifestyle Profile [HPLP II] (Adult Version), and analyzed by descriptive statistics and nonparametric tests. The 941 HPLP II questionnaires were collected and analyzed (79% response rate). Both genders showed a medium level HPLP II total score (male $M=2.68$; $IQR=2.42-2.92$ vs. female $M=2.65$; $IQR=2.46-2.90$), without significant gender difference. A significantly higher score was observed in the subscales on health responsibility ($p=0.027$) and interpersonal relations ($p<0.001$) among female compared to male students, and a significantly higher score in the subscales on physical activity ($p<0.001$) and stress management ($p=0.025$) among male compared to female students. Considering differences in the health-promoting lifestyle between study years, a significantly higher score was recorded among second-year students in the HPLP II total score ($p=0.004$) and the subscales on physical activity ($p=0.007$), stress management ($p=0.006$) and spiritual growth ($p=0.029$). In conclusion, study results implied the need of organized health care and physical activity programs for university students based on specific requirements and needs.

Key words: *Students, medical; Lifestyle; Health promotion; Croatia*

Introduction

Health is determined by physical, social, cultural and economic environment where people live and work^{1,2}. Healthy behaviors are activities and efforts that individuals undertake to stay healthy, to prevent potential diseases, and live happy and fulfilled life^{3,4}. In order to develop healthy lifestyle, individuals develop and adopt healthy eating habits, responsibility for health, regular and sufficient physical activity, satisfac-

tory relationships, effective stress management and appropriate sense of self-realization^{5,6}. Healthy lifestyle can improve health and prevent development of chronic non-communicable diseases, which are the leading cause of mortality and morbidity worldwide⁷⁻⁹. In Croatia, the increasing prevalence and incidence of non-communicable diseases pose considerable burden upon the society and health care system^{10,11}.

Adolescence as a developmental period of life is characterized by noteworthy physical and psychosocial changes¹². Healthy lifestyle adopted earlier in life often is carried out to adulthood^{13,14}.

Starting university education is for many students the beginning of life out of the parents' home. In this period, risky behaviors are often adopted due to ad-

Correspondence to: *Tonći Mašina*, Department of Physical Education, School of Medicine, University of Zagreb, Šalata 4, HR-10000 Zagreb, Croatia

E-mail: tonci.masina@mef.hr

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justment to the new environment and organization of one's own life¹⁵⁻¹⁸. The intensive period of learning while studying at the university and transferring specific knowledge can trigger students' inner motivation and increase concern about their own health, encouraging them to adopt healthy lifestyle habits. They could also encourage other students and members of community to do the same^{17,19,20}. Despite well documented benefits of health promoting behaviors, many studies have shown that university students exhibit behaviors of unhealthy lifestyle, especially inadequate physical activity and responsibility for health, which needs further research¹⁵⁻²⁹.

In gender research, the term gender is used to make distinction between biological sexes and the social, cultural and historical construction of femininities and masculinities. Gender influences the way how the individual is observed and evaluated by the others. An individual's gender affects the way the individual assesses the others³⁰. Recent studies have demonstrated gender impacts on the perception of healthy and unhealthy lifestyles and making health-related decisions. Gender differences in healthy behaviors could be affected by the interacting effects of important aspects of traditional gender roles and the modern milieu^{31,32}.

Increasing awareness of healthy lifestyle is essential considering the fact that lifestyle habits are difficult to modify, especially in adulthood³³.

Schools and universities have been recognized as appropriate settings for health-promoting lifestyle among young people and the period of studying as the 'last chance' for development and adoption of healthy lifestyle habits³⁴⁻³⁶.

The aim of this study was to examine gender differences in health-promoting lifestyle among medical students and to analyze changes between the first and second year of the study.

Materials and Methods

Study design and sampling

The study was conducted among students of the University of Zagreb School of Medicine in the academic years 2013/2014 and 2014/2015, from March to May. Target population included 1186 (36% male) first-year and second-year students in the academic years 2013/2014 and 2014/2015 that attended mandatory physical education course: 301 1st year students in

2013/2014 (group 2I, initial), 298 2nd year students in 2013/2014 (group 1), 299 1st year students in 2014/2015 (group 3) and 288 2nd year students in 2014/2015 (group 2F, final). Group 1 were examined in second study year 2013/2014, with 192 students (41% male) participating in the study. Group 2 (cohort generation) was examined in first-year of study 2013/2014 and in second-year of study 2014/2015. In group 2 – first-year (group 2I) in 2013/2014, 258 students (35% male) participated in the study, and in group 2 – second-year (group 2F) in 2014/2015, 237 students (35% male) took part in the study. In group 3 in first-year of study 2014/2015, 254 students (36% male) participated in the study. Participation in the study was voluntary. For the purpose of this report, we analyzed data on 941 (37% male) students of three different generations that agreed to participate in the study and completed the questionnaire.

Tools and data collection

Data were collected by self-administered anonymous questionnaire The Health-Promoting Lifestyle Profile II [HPLP II] (Adult Version), developed by Walker, Sechrist and Pender and validated for student population³⁷. HPLP II questionnaire is composed of 52 statements divided in six subscales. The HPLP II subscales are: health responsibility, physical activity (exercise), nutritional habits, spiritual growth, interpersonal relations, and stress management. Health responsibility is about the importance of improving individuals' health and the health of the others. Physical activity includes adhering to regular exercise patterns. Nutritional habits include establishing meal patterns and making food choices. Spiritual growth includes attaining self-actualization and fulfilment. Interpersonal relations deal with maintenance of relationships involving a sense of intimacy and closeness. Stress management includes both recognizing the sources of stress and taking action to control stress and achieve relaxation. The scale is of a 4-point Likert-type and there are 4 choices for each statement, scored from 1 to 4. "Very uncharacteristic of me" receives 1 point, "Somewhat uncharacteristic of me" 2 points, "Somewhat characteristic of me" 3 points and "Very characteristic of me" 4 points. For the English version of the HPLP II, Cronbach's alpha of 0.94 is reported for the overall scale and alpha ranging from 0.79-0.87 for the six subscales^{6,34}. For the purpose of this study, the orig-

inal English version of HPLP II was translated and introduced to students. Total score and individual subscale scores were obtained. Cronbach's alpha reliability coefficient was 0.896 for total HPLP II, and ranged from 0.65 to 0.79 for subscales.

Data analysis

The data collected were analyzed for male and female students separately. Distribution of data was tested for normality by Kolmogorov-Smirnov test. Data were analyzed by descriptive statistics and non-parametric tests. HPLP II total score was calculated as mean and median of all 52 questions. The score for each of the six subscales was calculated as mean and median of the responses to subscale items. Due to the perceived not-normal distribution of the results, median (M) was taken as a measure of mean value instead of arithmetic mean (m), and percentile as a measure of dispersion instead of standard deviation (SD). According to Peker and Bermek, interpretation of the results range in percentiles (25th-75th) was as follows: 1.60-2.25 low level; 2.26-2.71 medium level; and 2.72-3.27 high level²⁴. Differences between genders were tested with Mann-Whitney U test, between years of study with Kruskal-Wallis test, and between dependent variables in cohort group (group 2) with Wilcoxon test. The values of p less than 0.05 were considered statisti-

cally significant. Data were analyzed using STATISTICA version 10.0 (Stat Soft. Inc. Tulsa, US, 2010).

Ethical consideration

The study protocol was approved by the University of Zagreb School of Medicine board and written permission was obtained from the Ethics Committee (No. 380-59-10106-16-20/159). A written informed consent was obtained from all participants prior to data collection. Students were approached during mandatory course class and invited to participate in the study. They were informed on the purpose of the study and told that participation was voluntary. They had a right to withdraw from the study at any time. The study was conducted in accordance with the Declaration of Helsinki.

Results

A total of 1186 first- and second-year medical students were invited to participate in the study. Finally, 941 HPLP II questionnaires were collected and analyzed. Response rate at first study year in group 1 was 64% (male 75% and female 56%), 86% in group 2 (male 82% and female 88%) and 85% in group 3 (male 84% and female 85%). Response rate in cohort group (group 2) was 92% at second year of study (male 91%

Table 1. Gender differences in Health-Promoting Lifestyle Profile (HPLP II)

Subscale (HPLP-II) Gender		n	Percentile			P
			25 th	M (50 th)	75 th	
Interpersonal relations	Male	254	2.78	3.11	3.44	<0.001
	Female	429	3.00	3.33	3.56	
Nutritional habits	Male	254	2.44	2.78	3.11	0.588
	Female	429	2.56	2.78	3.00	
Health responsibility	Male	254	1.78	2.11	2.44	0.027
	Female	429	1.89	2.11	2.56	
Physical activity	Male	254	2.00	2.50	3.00	0.001
	Female	429	2.00	2.25	2.75	
Stress management	Male	254	2.13	2.50	2.75	0.025
	Female	429	2.00	2.38	2.63	
Spiritual growth	Male	254	2.67	3.00	3.44	0.455
	Female	429	2.67	3.00	3.33	
HPLP-II total	Male	254	2.42	2.68	2.92	0.948
	Female	429	2.46	2.65	2.90	

Table 2. Differences in Health-Promoting Lifestyle Profile (HPLP II) between first and second year of study

Subscale (HPLP-II)		n	Percentile			P _a	P _b	P _c	P _d	P _e	P _f
			25 th	M (50 th)	75 th						
HPLP II total	Group 2I	258	2.40	2.63	2.83	0.961	0.035	0.309	0.344	0.009	<0.001
	Group 1	192	2.42	2.63	2.94						
	Group 3	254	2.42	2.64	2.83						
	Group 2F	237	2.50	2.71	2.92						
Physical activity	Group 2I	258	1.88	2.25	2.75	0.392	0.099	0.193	0.594	0.005	0.001
	Group 1	192	2.00	2.38	2.88						
	Group 3	254	1.97	2.25	2.75						
	Group 2F	237	2.13	2.38	3.00						
Stress management	Group 2I	258	2.00	2.38	2.63	0.096	0.409	0.061	0.753	0.005	0.002
	Group 1	192	2.13	2.38	2.75						
	Group 3	254	2.00	2.38	2.63						
	Group 2F	237	2.13	2.50	2.75						
Spiritual growth	Group 2I	258	2.67	2.89	3.22	0.525	0.035	0.610	0.205	0.104	0.004
	Group 1	192	2.67	3.00	3.22						
	Group 3	254	2.67	3.00	3.33						
	Group 2F	237	2.78	3.11	3.33						

p_a = difference between group 1 and group 3: cross-sectional comparison (Mann-Whitney U test)

p_b = difference between group 1 and group 2F: cross-sectional comparison (Mann-Whitney U test)

p_c = difference between group 2I and group 1: cross-sectional comparison (Mann-Whitney U test)

p_d = difference between group 2I and group 3: cross-sectional comparison (Mann-Whitney U test)

p_e = difference between group 3 and group 2F: cross-sectional comparison (Mann-Whitney U test)

p_f = difference between group 2I and group 2F: longitudinal cohort comparison (Wilcoxon test)

and female 92%). Eight male and 13 female students were lost from follow up in cohort group on second year of study.

In HPLP II total score, both genders showed medium level. In the subscales of interpersonal relations, nutritional habits and spiritual growth, both genders showed high level. In the stress management subscale, both genders showed medium level. In the physical activity subscale, male students showed medium level and female students showed low level. In the health responsibility subscale, both genders showed low level. Significant gender differences were found in the following subscales: interpersonal relations ($p < 0.001$), health responsibility ($p = 0.027$), physical activity ($p < 0.001$) and stress management ($p = 0.025$) (Table 1).

Analysis of differences between years of study included data on 941 (345 male and 596 female) students (group 1, group 2I, group 2F and group 3). Difference in the HPLP II total score between first-

and second-year of study was statistically significant ($p = 0.004$). In subscales, significant differences were observed in physical activity ($p = 0.007$), stress management ($p = 0.006$) and spiritual growth ($p = 0.029$) (Table 2).

Differences between independent groups of participants were tested with Mann-Whitney U test and showed no significant differences when comparing group 1 and group 3; group 2I and group 1; and group 2I and group 3. In order to determine groups of participants with significant differences, Scheffe's *post-hoc* analysis was performed. Significant difference was observed when comparing group 1 and group 2F, and group 3 and group 2F. Group 1 and group 2F significantly differed in HPLP II total score ($M = 2.63$ vs. 2.71 ; $p = 0.035$) and spiritual growth subscale ($M = 3.00$ vs. 3.11 ; $p = 0.035$). Group 3 and group 2F differed significantly in HPLP II total score ($M = 2.64$ vs. 2.71 ; $p = 0.009$) and the subscales of physical activity (2.25 vs.

2.38; $p=0.005$) and stress management (2.38 *vs.* 2.50; $p=0.005$). Analysis of dependent samples of students (group 2I and group 2F) using Wilcoxon test showed significant differences in HPLP II total score ($M=2.63$ *vs.* 2.71; $p<0.001$) and the subscales of physical activity ($M=2.25$ *vs.* 2.38; $p<0.001$), stress management ($M=2.38$ *vs.* 2.50; $p=0.002$) and spiritual growth ($M=2.89$ *vs.* 3.11; $p=0.004$) (Table 2).

Discussion

Both genders showed medium level of health-promoting lifestyle in HPLP II, without significant gender difference. In the subscales of interpersonal relations, nutritional habits and spiritual growth, both genders showed high level. In the stress management subscale, both genders showed medium level. In the physical activity subscale, male students showed medium level, while female students showed low level. Low level in both genders was found in the health responsibility subscale. Significant gender differences were observed in the following HPLP II subscales: health responsibility, interpersonal relations, physical activity and stress management. Female students paid more attention to interpersonal relations and were more responsible for health than their male colleagues, although both genders showed low score in these HPLP subscales. Male students showed a significantly higher level of physical activity and better stress management skills than female students.

Similar to our results, no significant gender difference in HPLP II total score was found in other studies conducted among university students^{22,24-26}. Considering the scores in subscales, results of the studies conducted in Hong Kong by Lee and Loke and in Jordan by Al-Khawaldeh showed that male and female students did not differ significantly in health responsibility, nutritional habits, spiritual growth, interpersonal relations and stress management^{21,29}, but in many studies male students scored better than female students in the physical activity subscale^{15,21,24-26,28,29}. According to results of the studies conducted by Wei *et al.* among Japanese students, Senjam and Singh among Indian students, Peker and Bermek among Turkish students, and Shaheen *et al.* among Jordanian students, female students showed more sense for health responsibility compared to their male counterparts^{15,24-26,28}. Senjam and Singh report that Indian female students visited

physicians, washed hands before meal and performed personal hygiene measures more regularly than their male counterparts^{25,26}. Nassar and Shaheen report higher score averages in the subscales of health responsibility and stress management in Jordanian male students as compared to female students. The authors offer a possible explanation that female students have more duties in preparing themselves for the future role as wife and mother. They might be overloaded with study and duties, and do not have enough time to care about their health and empowerment of abilities for stress management²².

In our study, female students were significantly more involved in care of interpersonal relations than their male colleagues. Similar results were observed among Jordanian female students in the study conducted by Shaheen *et al.*²⁸. In the study by Wei *et al.*, Japanese female students practiced better interpersonal relations, nutritional habits and health responsibility as compared to their male colleagues¹⁵.

Results of the cohort group (group 2) follow up revealed a higher level of healthy lifestyle in second year of study (group 2F). Significant differences were observed in HPLP II total score and the subscales of physical activity, stress management and spiritual growth. Yet, group 2F had a higher HPLP II total score compared to all other groups observed. The possible explanation could be motivation of university students to make some changes in lifestyle habits through acquiring better knowledge about health while studying medicine. Similar results were observed among university students in Thailand in the study conducted by Hong *et al.* Higher scores in the subscales of spiritual growth, stress management, nutrition and health responsibility have been reported at higher years of study as compared to first year¹⁹. In contrast, numerous studies showed a higher healthy lifestyle score at lower years of study^{15,20,23,28}. In the study conducted by Nualnetr and Thanavat in Thailand among physical therapy students, students at higher years of study showed lower scores in the subscales of stress management and physical activity, whereas first-year students showed higher score in the subscale of nutritional habits²³. Similarly, higher total HPLP II score was recorded in Turkish first-year students as compared to sixth-year students²⁰. A significant negative correlation of student age with HPLP II total score and interpersonal relations subscale was observed

among Jordanian students, although the subscales of spiritual growth and stress management showed positive correlation²⁸. Japanese students tended to practice more health-promoting lifestyles during first-year of enrolment in general university courses as compared to students at higher years of study¹⁵.

Limitations of our study included cross-sectional approach, using a self-reporting questionnaire, enrolling students from a single school on first and second year of study, and follow up of one cohort group for only one year.

Conclusion

Croatian medical students showed medium level of health-promoting lifestyle in total HPLP II score. In the subscales of interpersonal relations, nutritional habits and spiritual growth, they showed high level and in stress management medium level. In the physical activity subscale, male students showed medium level and female students low level. Low level was found in the health responsibility subscale. Significant gender differences were observed in the HPLP II subscales of health responsibility, interpersonal relations, physical activity and stress management. Female students scored better on interpersonal relations and responsibility for health than male students. Male students scored better in the subscales of physical activity and stress management than female students. Comparing the health-promoting lifestyle habits between first and second year of study, a significantly higher score was observed in HPLP II total score and in the subscales of physical activity, stress management and spiritual growth among second-year students.

The results of the study implied the need of organized health care and physical activity programs for university students based on specific requirements and needs. In order to get better insight in healthy lifestyle behaviors, further research should include a representative sample of university students from different schools and all years of study, with follow up of generations throughout the study, and using a combination of self-reported and observational research methodology.

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Sažetak

RAZLIKE U NAČINU ŽIVOTA KOJI PROMIĆE ZDRAVLJE
S OBZIROM NA SPOL I GODINU STUDIRANJA MEĐU STUDENTIMA MEDICINE U HRVATSKOJ*T. Mašina, T. Madžar, V. Musil i M. Milošević*

Svijest o važnosti zdravog načina života među adolescentima veća je s obzirom na to da je teško mijenjati navike u odrasloj dobi. Glavni cilj ovoga rada bio je istražiti postoje li spolne razlike u načinu života koji promiče zdravlje među studentima medicine te analizirati promjene između prve i druge godine studija. Presječna studija je provedena na uzorku od 1186 studenata, od kojih je bilo 36% mladića. Podaci su prikupljeni pomoću anonimnog upitnika *Health-Promoting Lifestyle Profile* (HPLP II, *Adult Version*) i analizirani deskriptivnim statističkim postupcima te neparametrijskim statističkim postupcima. Ukupno je prikupljen i analiziran 941 upitnik HPLP II (stopa odgovora 79%). Oba spola su pokazala umjerenu razinu u ukupnom rezultatu HPLP II, pri čemu nije zabilježena statistički značajna razlika. Značajno više vrijednosti zabilježene su u domenama odgovornost prema zdravlju ($p=0,027$) i međuljudski odnosi ($p<0,001$) u korist studentica, dok su značajno više vrijednosti u domenama tjelesna aktivnost ($p<0,001$) i nošenje sa stresom ($p=0,025$) ostvarili muški studenti. Studenti druge godine ostvarili su značajno više vrijednosti u ukupnom rezultatu HPLP ($p=0,004$) te u domenama tjelesna aktivnost ($p=0,007$), nošenje sa stresom ($p=0,006$) i samoodređenje ($p=0,029$). Zaključno, rezultati istraživanja upućuju na potrebu organizirane zdravstvene skrbi i programa tjelesne aktivnosti za studente medicine utemeljene na specifičnim zahtjevima i potrebama.

Ključne riječi: *Studenti medicine; Način života; Promicanje zdravlja; Hrvatska*