SELECTED LIFESTYLE FACTORS OF FEMALE UNIVERSITY STUDENTS AS RELATED TO SPORTS ACTIVITIES

WYBRANE CZYNNIKI STYLU ŻYCIA STUDENTEK W ŚWIETLE AKTYWNOŚCI SPORTOWEJ

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Summary

Background. The transition from high school to college is an important milestone in the life of adolescents. In this stage of life, they are already aware of their responsibility for their health, which allows them to develop their health habits. The aim of this study was to increase the knowledge about selected aspects of female university students' lifestyle, including sports, sleep, stress, alcohol and smoking.

Material and methods. This cross-sectional research was carried out with 1,055 female university students in their first year of study at two universities in Slovakia as part of the VEGA grant project no. 1/0825/17 "Recommendations for physical activities in prevention and control of non-communicable diseases and their implementation in the Eastern part of Slovakia" implemented at P.J. Šafárik University in Košice. Data was collected on lifestyle factors, including frequency and regularity of participating in sports during the preceding half year, by means of a questionnaire.

Results. Students of both universities reported low levels of engagement in sport activity in the preceding six months, in terms of frequency and regularity of its weekly performance. There appeared to be a statistically significant relationship between the frequency of sport activity and fatigue after waking. Other relationships were not found to be statistically significant.

Conclusions. The scope of educational work by university education experts should include appropriate ways of influencing the lifestyle of first-year university students towards maintaining their good health. This can be carried out within the context of health education during compulsory and optional physical education classes.

Keywords: sleep, alcohol, stress, smoking, sporting activity

Streszczenie

Wprowadzenie. Przejście ze szkoły średniej na studia jest ważnym krokiem w życiu nastolatków. Na tym etapie życia są już świadomi swojej odpowiedzialności za własne zdrowie, co pozwala im rozwijać nawyki zdrowotne. Celem badań było poszerzenie wiedzy na temat wybranych aspektów stylu życia, takich jak sport, sen, stres, alkohol i palenie papierosów.

Materiał i metody. Badania przekrojowe przeprowadzono w grupie 1055 studentek na pierwszym roku studiów na dwóch uniwersytetach na Słowacji w ramach projektu grantowego VEGA nr 1/0825/17 „Wskazania do aktywności fizycznej w celu zapobiegania i kontroli chorób niezakaźnych oraz ich wdrożenie we wschodniej części Słowacji" przeprowadzonego na Universytecie P. J. Šafarika w Košiciach. Dane dotyczące częstotliwości i regularności uprawiania sportu, wybranych czynników stylu życia w przebiegu ostatniego półrocza zebrano za pomocą kwestionariusza.

Wyniki. U studentek obu uczelni odnotowaliśmy niski poziom zaangażowania w aktywność sportową w poprzednich sześciu miesiącach pod względem tygodniowej częstotliwości i regularności jej realizowania. Stwierdziliśmy istotną korelację pomiędzy częstotliwością aktywności sportowej a zmęczeniem po przebudzeniu. Inne zależności nie zostały uznane za statystycznie istotne.

Wnioski. Zakres prac edukacyjnych prowadzonych przez nauczycieli akademickich powinien uwzględniać odpowiednie sposoby wpływania na styl życia studentów pierwszego roku w celu utrzymania ich dobrego stanu zdrowia. Można to zrobić w kontekście edukacji zdrowotnej podczas obowiązkowych i nieobowiązkowych zajęć wychowania fizycznego.

Słowa kluczowe: sen, alkohol, stres, palenie papierosów, aktywność sportowa

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Introduction

University students are an important target group of the adult population in terms of healthy lifestyle. At this stage of life, they are no longer dependent on parents and family in day-to-day activities, and they have to take responsibility for their behavior and their own health [1]. Risk behavior in adolescence, including but not limited to lack of exercise, smoking, alcohol consumption and stress all determine lifestyle in later periods of life. A lifestyle that supports good health includes sufficient time spent relaxing and regenerating mental power and physical strength and so sleep duration and quality plays a significant role. Adolescence is a critical developmental period in life that commonly involves sleep deprivation [2]. It has been proved that health behaviors such as sleep and physical activity (PA) are associated with increased cognitive performance and better study results in students [3, 4]. In addition to academic performance, sleep deprivation can also affect health and mood. According to Harrison and Horn [5], insufficient sleep reduces creative thinking by up to 60% and flexibility of decision-making by almost 40%.

The next serious risk factor that increasingly affects university students is stress. Commencing post-secondary studies, becoming more independent from parents, changing living conditions (including housing), and a change in personal habits are stressors that most students have to cope with. It has been proven that regular PA can be associated with increased levels of life satisfaction in all age groups: in children and adolescents, in young adults, in adults generally and in the elderly [6]. Exercise and sports influence the human psyche both in the short and the long term [7]. According to Biddle & Mutrie [7], physical exercise can be as effective in alleviating the symptoms of anxiety as any other treatment or medication. However, it is has not been determined how PA is involved in reducing stress and suppressing the symptoms of depression.

Consumption of addictive substances, especially tobacco and alcohol, together with inadequate diet and low PA levels, significantly affect deaths and diseases that occur in the European region [8, 9]. According to Toumborou et al. [10] the consumption of various addictive substances is the cause of one third of deaths among young people worldwide. Gore et al. [11] further reported consumption of these substances as the fifth most common risky behavior in the lives of 10 to 24-year-olds.

Entering college is an important milestone when new lifestyle habits are formed or existing ones get modified. If changes for the worse become common routine, it will obviously decrease the students' potential for a healthy life.

The aim of this study is to analyze the following aspects of lifestyle in relation to sporting activity: hours of sleep, fatigue after awakening, stress levels in everyday life, alcohol consumption and smoking.

Material and methods

The set for this cross-sectional research consisted of intentionally selected female university students in their first year of study (n=1,055) from 5 faculties of the University of Pavol Jozef Šafárik in Košice (hereinafter UPJŠ, n=727) and from 8 faculties of the Technical University in Košice (hereinafter TUKE, n=328), undertaking initial measurements at the beginning of the winter semesters of academic years 2012/2013 and 2013/2014. The basic characteristics of the set are presented in Table 1. For most female students of the Medical Faculty of UPJŠ and for all TUKE students, the physical education classes during which they underwent the diagnostics were compulsory (n=554). For the rest of the female students at UPJŠ, the class was optional (n=501).

Table 1. Characteristics of the sample of female students

UPJŠ				TUKE			
Number of students		age		Number of students		age	
n	%	n	SD	n	%	M	SD
731	69.7	19.22	2.17	328	56.5	19.55	1.16

Legend: n - absolute frequency % - relative frequency, SD - standard deviation, M - Mean

In order to collect data relevant for this work, the following questions from the questionnaire battery were used:
- Have you done physical exercise or sports regularly within the past six months?
- How much sleep do you get on average?
- Do you often feel tired after waking up in the morning?
- Use the provided scale to rate the stress in your life over the past six months.
- How often do you consume alcohol?
- Do you smoke? If yes, how many cigarettes a day?

The research was carried out within the framework of VEGA grant project no. 1/0825/17 "Recommendations for physical activities in prevention and control of non-communicable diseases and their implementation in the Eastern part of Slovakia" implemented at UPJŠ. All variables were determined in relation to the amount of weekly sporting activity.

All statistical data was processed using IBM's SPSS v24 software application. The Chi-square test of independence was applied to determine the independence of the examined attributes. In case the null hypothesis on independence of the variables was rejected (i.e. p <0.05), z-scores were calculated for mean signed deviation (the sign represents the direction of the deviation, i.e. "+", the increase in empirical against expected, "-" the decrease of empirical against expected) that shall specify dependencies in the columns (one sign for 95% significance, two signs at 99%, and three at 99.9% significance). The mean signed deviation diagram further shows the simultaneously verified significance of the correlation coefficients (at the significance level of 0.05 and 0.01). The Kendall rank correlation coefficient was used to determine the tightness of the relationship between the observed variables. Testing the frequency distribution ratio between the categories of the variable "frequency of sporting activity over the past six months" for each row independently was done by the means of the *z*-test. Statistical hypotheses were tested at a significance level of α≤0.05.

The anonymous questionnaire used for data collection included a consent form so that the respondents could give consent for the use and processing of their data for scientific purposes.

Results

PA of female university students was determined by the reported frequency of sporting activity (SA) per week in the period of the prior six months (Figure 1). For the purposes of this study, we combined the categories of frequency of sporting activity into three groups in order to compare individual lifestyle variables: 1) students who performed SA irregularly or not at all, 2) students who did SA regularly once a week and 3) students who carried out SA regularly two, three or even more times a week.
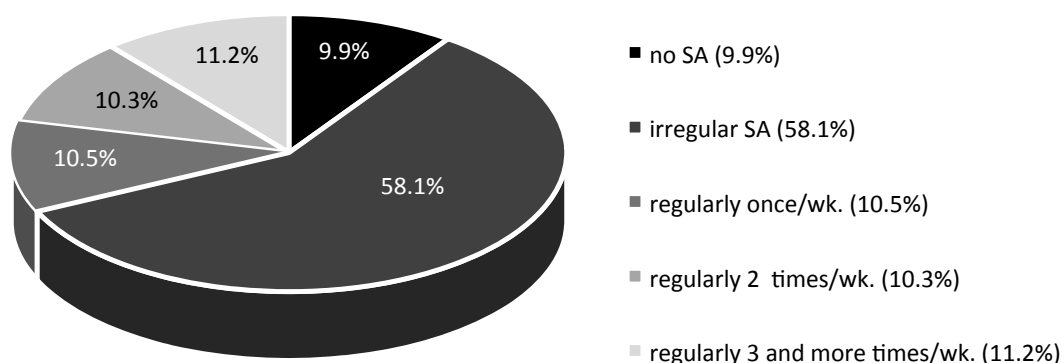

Figure 1. Frequency of weekly SA by female students during the past half a year

From the descriptive statistical data of SA by students of the two largest universities in Eastern Slovakia, it was apparent that approximately 68% of the female students were engaged in such activity irregularly or not at all. The most active group, i.e. those doing sports 2 or more times a week, comprised 21.5% of the students, which is 46.4% less than the students who performed SA irregularly or not at all. The difference was statistically significant (χ^2=254.343; p<0.05). The ratio of the percentual frequency of the number of students which performed SA once a week versus the group which performed SA most frequently (57.5%; χ^2 = 443.552, p<0.05) and group of students which performed SA irregularly or not at all (110; χ^2 = 39.811, p<0.05) was statistically significant.

Length of sleep

Sleep is an important lifestyle factor that helps regenerate the central nervous system. Students were asked to indicate the exact number of hours of sleep per day. The average length of sleep reported was 7.3 ± 1.15 (SD; Table 2). The average length of sleep of the students in groups by the frequency of SA was within the range of 7.27-7.31 (SD=1.10-1.19), indicating a uniform distribution of the examined parameter in each group. Approximately 44% of students reported more than 7 hours of sleep (9.8% of whom slept more than 8 hours, 10.6 vs. 9.0 vs. 7.5%,

ranked in ascending order according to the frequency of SA). Although in all groups by their frequency of SA (Table 3) the students also reported average sleep durations of 5 hours and less (4.2% vs. 4.5% vs. 3.5%, ranked in ascending order by the frequency of SA), which is considered insufficient for regeneration and relaxation; the positive finding is that this group represented only 4.1% of the total number of female students. For the proper use of chi-squared independence test, the values were categorized as follows: less than 6 hours of sleep, 6 hours, 6 to 7 hours, 7 to 8 hours, and more than 8 hours of sleep per day.

Table 2. Statistical values of average length of sleep in relation to the frequency of SA in female university students

Weekly frequency of SA	M	min.	max	SD
irregularly or not at all	7.30	4	14	1.17
regularly once a week	7.31	5	12	1.19
regular 2-3 times a week	7.27	4	10	1.1

Legend: M-mean, min.-minimum length of sleep, max.-maximum length of sleep, SD – standard deviation

Table 3. Statistical values of length of sleep in relation to the frequency of SA in female university students

Length of sleep	Weekly frequency of SA							
	irregular or none		regularly once a week		regularly 2-3-times a week		Total	
	n	%	n	%	n	%	n	%
< 6 hrs	32	4,5	6	5.4	9	4.0	47	4.5
6 hrs	134	18.7	19	17.1	47	20.7	200	19.0
> 6 ≤ 7 hrs	246	34.3	38	34.2	62	27.3	346	32.8
> 7 ≤ 8 hrs	229	31.9	38	34.2	9	40.5	359	34.0
> 8 hrs	7	10.6	10	9.0	17	7.5	103	9.8
Total	717	100%	111	100%	227	100%	1,055	100%

Legend: n - absolute frequency, % - relative frequency

At p>0.05 (χ^2=8.385, df=6) we found that there is no statistically significant relationship between the length of sleep and the weekly frequency of SA. The difference in frequency between groups of SA categorized by the average length of sleep is minimal. A statistically significant difference was only observed in the category of >7≤8 hours' sleep, i.e. 31.9% vs. 40.5% (p<0.05) between the group doing sports most frequently and the group of female students who performed SA irregularly or not at all. Similar results, showing minimal dependence of the length of sleep on the frequency of performing SA in males, were found in the study by Uher et al. [2013].

Morning fatigue after waking reported by the respondents

Sleep duration and sleep quality are equally important. The best indicator of sleep quality may be the feeling of tiredness after waking. The students indicated their subjective feeling of fatigue after waking on a scale which included: no, mostly no, mostly yes and yes. Almost 5% of female students involved in the study did not feel fatigue after waking up (Table 4), regardless of the frequency of SA per week. The lowest percentage of those feeling fatigue after waking was observed among students with the highest frequency of SA. Female students with more frequent SA reported the lowest fatigue after waking. The answers mostly not and not at all were provided by 60% of them. However, as many as 12% of students felt fatigue after waking in the subgroups of those who performed SA irregularly or not at all. When comparing the number of students among groups with varying frequencies of SA, statistically significant differences in fatigue were observed in the "yes" category between the students who performed SA irregularly or not at all vs. those who did sports once a week (12.1% vs. 5.5%) and those who performed sports most frequently (12.1% vs. 6.6%). Statistically significant differences in fatigue were found between students who did sports irregularly or not at all, and those who did sports one time per week in the "mostly not" (41.8% vs 54.6%) and "mostly yes" (42.4% vs. 31.3%) fatigue categories. However, in the "mostly yes" category, a statistically significant difference was further found between students doing SA once a week and those performing SA two or more times a week.

Table 4. Subjective evaluation of fatigue after waking in relation to the weekly frequency of SA in female university students

Fatigue after waking	Weekly frequency of SA							
	irregular or none		regularly once a week		regularly 2-3 times a week		Total	
	n	%	n	%	n	%	n	%
no	26	3.6	5	4.6	1	7.5	48	4.6
mostly no	300	41.8	52	47.7	124	54.6	476	45.2
mostly yes	304	42.4	46	42.2	71	31.3	421	40.0
Yes	87	12.1	6	5.5	15	6.6	108	10.3
Total	717	100%	109	100%	227	100%	1053	100%

Legend: n - absolute frequency, % - relative frequency

There was a significant association between the variables fatigue after waking and frequency of SA (χ^2= 25.340, p≤0.05 and τ_b= -.134, p≤0.05). In terms of rank correlation, we may talk about a negative, low level of correlation.

Stress

University study, in terms of its demand on students during the semester and the change elicited by transition to university, is closely linked to increased psychological tension and stress. Female students were asked to subjectively assess their level of stress in the past six months of their lives on a numerical, seven-degree scale. The scale was anchored by 1 (*no stress*) and 7 (*extreme stress*).

Even at the beginning of the semester, approximately 5% of female students experienced extreme stress and about 16% of them substantial stress (Table 5). On the contrary, only a minimal number of respondents (0.5% in total) felt no stress at all. Among the female students who performed SA irregularly or not at all and those doing sports once a week, there was only one student, while in the group performing sports 2 and more times a week there were 3 students out of a total of 1,055 students. For the correct use of the chi-squared independence test, we merged extreme stress levels 1 and 2 into one category and levels 6 and 7 into another joint category. Our finding shows that subjectively evaluated stress rated for the past six months was not mutually interrelated with the frequency of SA (χ^2=9.558, df=8, p>0.05).

Table 5. Stress levels in relation to the weekly frequency of SA in female university students

Stress level	Weekly frequency of SA							
	irregular or none		regularly once a week		regularly 2-3 times a week		Total	
	n	%	n	%	n	%	n	%
None	4	6.3	5	5.0	22	11.1	67	7.2
3	68	10.8	16	15.8	26	13.1	110	11.8
medium	205	32.4	29	28.7	59	29.8	293	31.5
5	183	29.0	31	30.7	50	25.3	264	28.4
extreme	136	21.5	20	19.8	41	20.7	197	21.2
Total	632	100%	101	100%	198	100%	931	100%

Legend: n - absolute frequency, % - relative frequency

Risk factors - alcohol consumption and smoking

Alcohol is the most commonly used legal addictive psychoactive substance in Slovakia. We analyzed the relationship between alcohol consumption and weekly frequency of SA. Since we did not include the question about smoking until the second year of the study, the multiplicity of the set relative to this question was lower (n=404).

The options for answers to the question regarding the frequency of alcohol consumption are presented in Table 6. In our research, female students consumed alcohol mostly on an occasional basis (59.5%; Table 6). In terms of SA frequency, it was below 60% for students who did not participate in sports and those who performed SA irregularly, and above 60% for those who performed SA regularly. A high percentage of female students reported that they had never consumed alcohol (12% of the group which participated in SA irregularly or not at all and 7.2% of those who did sports one time a week). Approximately 15% of students with the higher weekly frequency of SA did not ever drink alcohol. Given the fact that the research focused on female students in their first two weeks of the semester, it would be useful to follow further developments during their post-secondary

education. Although a low percentage of students admitted daily or almost daily intake of alcohol, this may be evidence of habits previously developed at secondary school. However, this percentage is very low (from 0.7% in the group which participated in SA irregularly or not at all, up to 1.8% of female students who performed SA 2 to 3 times a week). No statistically significant correlation between alcohol consumption and the frequency of SA was observed (χ^2 = 16.064, df 14, p>0.05).

Table 6. Frequency of alcohol consumption in relation to weekly frequency of SA in female university students

Frequency of alcohol consumption	Weekly frequency of SA							
	irregular or none		regularly once a week		regularly 2-3 times a week		Total	
	n	%	n	%	n	%	n	%
Never	83	11.6	8	7.2	3	15.2	125	11.9
occasionally	412	57.7	75	67.6	137	61.2	624	59.5
1-2 times a month	84	11.8	10	9.0	14	6.3	108	10.3
3-4 times a month	5	7.8	7	6.3	15	67	78	7.4
1-2 times a week	60	8.4	9	8.1	18	8.0	87	8.3
3-4 times a week	10	1.4	1	0.9	2	0.9	13	1.2
5-6 times a week	4	0.6	0	0.0	0	0.0	4	0.4
daily, almost daily	5	0.7	1	0.9	4	1.8	10	10
Total	714	100%	111	100%	224	100%	1049	100%

Legend: n - absolute frequency, % - relative frequency

Smoking is one of the most common habits or addictions having a negative impact on human health. This is a health problem across all societies that causes serious cardiovascular, oncological and other diseases.

When asked about smoking, students that admitted smoking also reported how many cigarettes they smoked a day. The individual variables, grouped accordingly, are listed in Table 7. We found out that more than three quarters of female students did not smoke (Table 7). This includes not only the group which participated in SA irregularly or not at all (almost 80%), but also the group engaged in sports regularly (over 80%). On the other hand, we still observed a high number of those smoking regularly on a daily basis. In the group which participated in SA irregularly or not at all it was almost 21%, in those who did sports 1 x weekly it represented 12.5% and in students who participated in sports 2 and more times a week it was 17%. Only a minimal number of students admitted smoking more than 10 cigarettes a day. This group accounted for six students in the group which participated in SA irregularly or not at all compared to only one student from among those who did sports at least once a week. Not one in the most frequently exercising group reported such a large daily amount of cigarettes. When all groups were considered as one, almost 17% of the students involved in the study smoked on a daily basis. We can assert that the representation of female students in the different categories by the variable of smoking frequency, comparing the individual groups according to the frequency of sports activity over the past six months, was statistically not significant. The group who participated in sports once per week had the highest frequency of smoking as compared to the other groups, but this difference was not significant.

Table 7. Frequency of smoking in relation to weekly frequency of SA in female university students

	Weekly frequency of SA							
	irregular or none		regularly once a week		regularly 2-3 times a week		Total	
	n	%	n	%	n	%	n	%
non-smoker	219	79.3	35	87.5	73	83.0	327	80.9
1-5 cigarettes	37	13.4	4	10.0	13	14.8	54	13.4
6-10 cigarettes	14	5.1	0	0.0	2	2.3	16	4.0
11-15 cigarettes	5	1.8	0	0.0	0	0.0	5	1.2
more than 15 cigarettes	1	0.4	1	2.5	0	0.0	2	0.5
Total	276	100%	40	100%	88	100%	404	100%

Legend: n - absolute frequency, % - relative frequency

Discussion

Sleep is a basic physiological need just as much as sufficient fluid intake and appropriate quantities of nutritious foods. Sleep is of particular importance for university students because of their increased mental activity. Students suffering from sleep deprivation experience increased levels of depression, anxiety, stress and various health problems [13]. In our study, the average length of sleep reported by first year female university students was approximately 7.3 hours, regardless of the frequency of SA per week. Differences between groups with respect to SA are negligible. With reference to the American Academy of Sleep Medicine and the Sleep Research Society [14], we can assert that the female students participating in our study have sufficient sleep duration. According to Buman [15], the average length of sleep gradually decreases from 8.4 hours at the age of 11-12 years down to 6.9 hours at the age of 18 to 19. For illustration, in a study by Kukačka & Lundáková [16], 8.8% out of a total of 1,151 university students (of which 744 were women) from the University of Bohemia, claimed that 6 hours or even less sleep were sufficient for them. The most frequently reported length of sleep in the research quoted above was 7-8 hours (77.8%). Only 3.1% of the set indicated sleeping for 10 hours or longer. As far as women are concerned in the same work, they demonstrably prefer a sleep time duration of 8 hours (approximately 40%), or 7 hours (approximately 35%), which corresponds with our results. Within all our research groups in relation to SA, the minimum sleep time duration observed in the students in our study is 4 to 5 hours, which is generally considered insufficient for regeneration. Sleep time duration of less than 6 hours is reported by only 4.5% of the set. Bartel et al. [17] studied adults in Australia, Canada, and the Netherlands examining several variables in relation to sleep. According to the results, high intensity of exercise was associated with longer sleep duration, but at a more frequent weekly SA. However, there was no difference in the length of sleep among young people who practiced mild physical exercise, regardless of the weekly frequency of SA. Our study does not compare the intensity of the SA performed in relation to its length, but only to its frequency. Thus the results only indicate a similar tendency regarding the latter.

Sleep quality is equally important as length of sleep. Praško [18] claims that the indicator of good quality sleep is arising from bed sufficiently rested and full of energy. Sleep deprivation may increase inattention among the youth, particularly in the morning. Female students participating in our research did not feel sleepy and tired after waking up in the morning, regardless of the frequency of weekly SA. Students with the most frequent SA reported the lowest fatigue after waking, but this difference was not significant. Morning fatigue among female students is not unusual, as evidenced by several studies. Such is the work of Kwan et al. [19] who studied risk behavior in university students from all over Canada (n = 8,182, of which 5,542 were women). In this study, low quality sleep was found in 75.6% of the respondents. In another study by Hussain et al. [20] who examined Australian students (n = 355, of which 244 women), more than half of the respondents experienced fatigue or lack of energy. In the study of Kukačka and Lundákova [16] only 18.6% of the students at a Czech university (n = 1,151, of which 744 women) were fully satisfied with their sleep.

Stress is a natural part of a person's life, including university students. What matters is its degree and the ability to adapt. University students face a number of stressors, such as academic overload, constant pressure to succeed, competition among colleagues, and future uncertainty [21]. The first year of college in particular is a critical period for the first occurrence of depressive symptoms. As many as 4.2% of female students in our study felt extreme stress at the beginning of the semester. Only a minimum number of respondents felt no stress at all. According to Tavolacci et al. [21], physical activity is beneficial for mental health and stress perception. Our results do not clearly support the above statement as we found no significant relationship between stress level and weekly frequency of SA. However, in the study by Zusková et al. [22], which examined the relationship between the level of stress and subjective evaluation of the amount of physical activity in the past year, a significant negative relationship of the two variables had been confirmed both in the set of male students and female students (females χ^2= 36.6133, df 12, p<0.01; males χ^2= 27.2819, df 12, p<0.01). The study by Doležalová and Pinkavová [23] found that 61.1% of the respondents indicated their course of study in college being their main source of stress, while 22% of them blamed their stress on time pressure. Similar results regarding the perception of stress were observed in female college students studying medicine in the Netherlands [24]. The authors cited above have concluded that female students are more sensitive to stress and find it harder to study under the pressure of having to meet expectations. Sokratous et al. [25] found a prevalence of mild depression symptoms (almost 19%), and clinically significant depression symptoms (25%) while examining university students on Cyprus. The authors found substantial differences in clinically significant symptoms of depression by gender, with a higher incidence in women (χ^2=8.53, df=1, p=0.003). Therefore, the prevention of health-related psychological problems in female students is important. Appropriate leisure-time activities can compensate for a perception of elevated stress levels.

Alcohol is one of the most widespread drugs in the world. The university environment tends to promote smoking and drinking of alcoholic beverages [26, 27]. Data on average alcohol consumption by students in their first year of study are concerning. In the study by Podstawski et al. [28], a relatively high percentage of female students (9%) admitted regular alcohol consumption every day; what is more, more than 12% of the respondents admitted at least one case of drinking until loss of consciousness in their first year. However, the preponderance of women in the same study (61%) reported drinking only occasionally during the first academic year. Such findings correspond with our results. Most female students in our research consume alcohol only occasionally (over 57%), regardless of the weekly volume of SA. Moreover, a relatively high percentage of them (from 7.2% to 15%) claim they have never consumed alcohol. This figure is highest in the group doing sports most frequently, but the difference between the groups is statistically not significant. Some authors [26, 27], observed substantially higher alcohol consumption by those doing more PA compared to students who did not engage in any PA. The results of our study do not correspond with such findings. Most certainly, the different results may be influenced by the factor of gender. Higher alcohol consumption is observed in men [3, 28]. Also, the fact that the participants of the research were first-year students, at the beginning of their studies, could have eliminated the impact of "student life". Many authors present behavioral changes over in the course of study at college [29, 30]. The study by Kwan [19] points out the decline in physical activity and the increase in drinking to impairment and smoking during the transition to early adulthood. As Kwan's study shows, young adults struggle with excessive drinking and smoking, while their participation in PA is reduced steadily.

As many as 20% of female students in our study admit smoking on a regular basis, which is a considerable number. Such finding is perceived negative considering the fact that university students smoke tobacco products substantially less, on average, than the rest of society [31]. On the other hand, the author claims that the cause of alcohol consumption and smoking can be an attempt to escape from school-related problems. A percentage of smokers comparable to our study was found among university students by Terebessy et al. [32], who reported a smoking prevalence of 18.6% in both male and female students at a Budapest university (n=629 students, of which 341 were women) during 3 consecutive years. A somewhat higher prevalence of smoking among female students (19.2%) was found in a study by Hussain et al. [20] involving Australian students.

The above variables do not represent a comprehensive and systematic compilation of all lifestyle factors; they represent only some of them. Many such factors are preventable, their early detection and modification go hand in hand with health education. Primary prevention can have a positive impact on many of them and save considerable resources exerted to prevent negative consequences.

To improve the lifestyle of first-year college students, it is necessary to create meaningful, holistic programs that encourage physical activity. These programs should therefore not only focus on a certain type of sporting activity, but should also take into account other aspects of lifestyle. In particular, based on our results, it is necessary to consider the regularity of doing sports which is further related to the quality of sleep. As female students have a tendency to assess their stress levels higher than average, they may benefit from adopting behavior that works in a compensatory way. Such compensation definitely includes sports activity and good quality sleep. Although the study results do not indicate increased risk of alcohol consumption and smoking, it is very important to prevent such risky behaviors. In particular, this prevention may include making sure that students have sufficient knowledge of the possible consequences of the above risky behaviors. In view of the sporting activity that is part of PA, female students represent a riskier group [33, 34], and therefore related programs need to be designed specifically for the female gender.

Study limitations

The present study was a cross-sectional research where no long-term data were available to assess the differences in the observed lifestyle factors. The questions used in the research were originally formulated for needs of a VEGA research grant project, which may distort explicit comparisons with other such studies. As a result, the data obtained may be considered to have a high level of subjectivity.

The strength of this study remains the high frequency of the studied cohort. Although the data are of high value for predicting the Eastern Slovak region, the results cannot be globalized within Slovakia due to socio-economic diversity.

The sample was comprised of first-year female university students at two Eastern Slovak universities, which is considered a further strength of this study, considering the possibility to partly control homogeneity of the cohort and the demographic factor. However, it also represents a constraint because the results may not be representative at the national level.

Conclusions

In this cross-sectional research, we analyzed the relationship between selected aspects of lifestyle and the frequency of SA, including exercise. We looked at sleep (both hours of sleep and fatigue after waking), subjective assessment of the level of stress in the past six months, alcohol consumption and smoking. There appears to be a statistically significant relationship between the frequency of SA and fatigue after waking. Other relationships have not been found to be statistically significant. Unfavorable results regarding the length of sleep in relation to the frequency of alcohol consumption and smoking draw attention to the need for appropriate interventions to modify the behavior of first year university students. Professionally-oriented young people at this age already have responsibility for their own health. The scope of educational and pedagogical work by university education experts should include appropriate ways of influencing the lifestyle of first-year university students towards maintaining their good health. This can be carried out within the context of health education during compulsory and optional classes of Physical Education.

Aknowledgments

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