



Demographic factors and physical activity of female undergraduates

Authors' Contribution:

A - Study Design
B - Data Collection
C - Statistical Analysis
D - Manuscript Preparation
E - Funds Collection

Alena Buková^{1ABD}, Klaudia Zusková^{1ABE}, Lenka Szerdiiová^{2BC}, Zuzana Küchelová^{1ABE}

¹ University of P. J. Šafárik in Košice, Institute of Physical Education and Sport

² University of P. J. Šafárik in Košice, Faculty of Medicine

Abstract

Introduction: University years play an important role in building healthy lifestyle patterns and attitudes towards physical activity (PA) and sport. Regarding PA, female students are a riskier group than males. The environment can play an important role both as a barrier but also as support for PA. While researching PA in individual population groups, an ecological approach has to be taken into account. The aim of the research was to broaden knowledge about the underlying physical activity of female undergraduates in relation to selected demographic indicators, namely to urban and rural residence, its size in terms of population and the person's current place of residence during her studies. In monitoring PA, we focused on the frequency of sports activity, including exercise. **Methods:** The cohort of this cross-sectional study consisted of 1.630 female undergraduates from two universities in Eastern Slovakia. The research was carried out as part of the grant-aided VEGA Project No. 1/1343/12 "Selected risk factors of obesity and its prevention through physical activity" addressed by the Institute of Physical Education and Sport at P.J. Šafárik University (UPJŠ) in Košice. Data on frequency and regularity of doing sports, including exercise, during the previous half a year, the place of residence (city/country), population of residence, and the current place of residence during their studies were collected via a set of questions in a survey questionnaire designed for the purposes of the above research study. Data were processed using SPSS 23 software program. To find out the correlation between doing sport activities and selected demographic variables, the Spearman Chi square test and the Cramer coefficient of association were used. **Results:** Female students of both universities demonstrated low levels of engagement with sport activity and exercise in terms of the frequency and regularity of its performance in a week over the previous half year. We found significant correlation between the frequency of the sports activity by the undergraduates and the place of their permanent residence, with a result favouring city dwellers against the countryside. Paradoxically, there is no significant correlation regarding the number of inhabitants at the place of residence, although we can observe a certain positive tendency in favor of agglomerations with a population of over 50,000. The factor of the current place of residence during university studies proved to be insignificant.

Keywords: female undergraduates, demographic indicators, sport activity, exercise.

Address for correspondence:

Alena Bukova, University of P. J. Šafárik in Košice, Institute of Physical Education and Sport, Slovak Republic, e-mail: alena.bukova@upjs.sk

Received: 27.09.2017; Accepted: 30.10.2017; Published online: 20.12.2017

INTRODUCTION

Reducing the volume of physical activity (PA) causes civilization health problems [1]. Healthy behavior, including adequate PA, is one of the most important factors determining the individual's health. Its support in recent decades has become one of the public health priorities [2], national policy issues as well as EU and UN initiatives.

Healthy behavioral habits are shaped during the whole life. Particularly sensitive in this respect are the early ontogenetic stages of life. Individuals wishing to achieve higher education tend to do so during late adolescence and during early years of adulthood [3]. According to the standards for day-to-day PA, introduced by the World Health Organization, college students can be classified as a group of physically inactive persons with a strong tendency towards a sedentary lifestyle [4]. It is in sharp contrast to their openly declared attitude towards PA [5]. Among the significant changes in their lifestyle following their admission to college, in addition to smoking, higher alcohol intake and worsening eating habits, there is a significant reduction in PA [6]. University years play an important role in the formation of lifestyle patterns [7], and in forming one's attitude towards PA and sport [8,9]. University has the potential to involve large numbers of students in interventions aimed at favorable changes in behavior [10], thus being an important institution of health-promoting policy [11]. From the point of view of PA, female students are a riskier group than males [5,12].

In addition to certain subjective factors, PA is also influenced by environmental factors, such as the form of housing and the available infrastructure around the place of residence [13,14]. The surrounding environment may play an important role as a barrier but also as a support for PA [14,15]. While researching PA in individual population groups, an ecological approach has to be taken into account as well. Frank et al. [16] found that people are more willing to walk and use cycling as a means of transport if they live in cities, where shops and facilities are within accessible distance, compared to rather remote smaller communities. The authors also found correlation between increased PA in adults and related environmental characteristics such as the presence of walkways, public transport, safety, and the like. Research that analyzes PA in relation to the variables city and countryside, indicates certain inconsistency of the results. While some studies have shown the prevalence of higher PA in rural children [17,18,19,20], other works show the opposite trend, i.e. higher levels of PA in urban children and adolescents [21,22,23,24].

Based on the unequivocal knowledge of the relationship between PA and the environment as well as the specificities concerning the university population, and given the lasting possibilities of influencing their healthy lifestyle habits, we set the following goal: We particularly aim to broaden the knowledge about PA carried out by female undergraduates in its relation to selected demographic indicators, i.e. urban versus rural residence, its size in terms of population, and the place of their residence during university studies.

METHODS

Cohort description

The cohort (n=1630) comprised female undergraduates from 5 faculties of Pavol Jozef Šafárik University in Košice (hereinafter UPJŠ) (n=1049) and 8 faculties of the Technical University in Košice (hereinafter TUKE) (n=581) who underwent the diagnostics at the beginning of the winter terms of the academic years 2012/2013 and 2013/2014. The basic characteristics of the cohort are presented in Table 1. For most medical students of UPJŠ (1st year of study) and for all TUKE students, the lessons of Sport Activities during which the measurements took place were compulsory (n=832). Other female students of UPJŠ took up the subject Sport Activities as optional (n=798).

The representation of female students by the individual universities, divided according faculties, is shown in Table 2. For data collection we used a non-standard questionnaire that was part of a questionnaire set. The research was carried out as part of the grant-aided VEGA Project No. 1/1343/12 "Selected risk factors of obesity and its prevention through physical activity" addressed by the Institute of Physical Education and Sport at P.J. Šafárik University (UPJŠ) in Košice. From the original questionnaire, we selected questions related to demographic indicators: place of permanent residence (city/ countryside), size of population in the place of residence and the current place of residence during the university studies.

Pearson's Chi-square Test (χ^2) was used to evaluate the relationship between two variables, and Cramer's Association Coefficient (*Cramer's V*) and Spearman's Rank Correlation Coefficient were used to determine the strength of relationship between the variables. We determined statistical significance at $p < 0.05$. SPSS 23 statistics software was used as a means of mathematical statistical processing at the Institute of Medical Informatics of the Faculty of Medicine of UPJŠ in Košice.

Table 1 Cohort characteristics of female students according years of study.

	UPJŠ				TUKE			
	First year		Upper years		First year		Upper years	
	n	%	n	%	n	%	n	%
Number	731	69.7	318	30.3	328	56.5	253	43.5
	n	SD	n	SD	n	SD	n	SD
Age	19.22	2.17	21.71	3.7	19.55	1.16	21.12	1.31

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

Table 2 Cohort characteristics of female students by faculties.

Faculty	UPJŠ		Faculty	TUKE	
	n	%		n	%
Medical	301	28.7	BERG*	234	40.3
Natural Sciences	267	25.5	Economic	161	27.7
Philosophical	288	27.5	FEI*	50	8.6
Law	111	10.6	Metallurgy	58	10
Public Administ.	68	6.5	Aviation	10	1.7
Not stated	14	1.3	Mech. Engineer.	20	3.4
			Civil Engineer.	48	8.3
Total	1049	100%	Total	581	100%

*BERG - Faculty of Mining, Ecology, Process Control and Geotechnologies, *FEI - Faculty of Electrical Engineering and Information Technology

RESULTS

Physical activity of female undergraduates was measured via their weekly frequency of sports activity (SA) and exercise within the past half-year, evaluated by the respondents themselves (Table 3). When studying SA of female students at the two largest universities in Eastern Slovakia, we observed that about 65% of them engage in such activity irregularly, respectively not at all. Approximately 23% of them carry out SA two or more times a week, and 12.5% of the group do sports once a week. The difference between universities relative to the frequency of weekly sports activity is insignificant (Pearson $\chi^2=0.817$; $df\ 2$; $p>0.05$). The results proved that the branch of study is not a factor related to the lifestyle of female undergraduates in the terms of sports and exercise. Table 4 shows data regarding place of residence in terms of city versus countryside. Students with permanent city residence prevail at both universities.

Table 3. Weekly sports activity, including exercise, of female undergraduates over the last half year.

	irregularly or at all		regularly 1-times a week		regularly 1-times a week		Total n
	n	%	n	%	n	%	
UPJŠ	678	64.63	126	12.01	245	23.36	1049
TUKE	374	64.37	78	13.43	129	22.20	581
Total	1052	64.48	204	12.50	374	23.02	1630

Table 4. Place of permanent residence (city/ countryside).

	UPJŠ		TUKE		Joint cohort	
	n	%	n	%	n	%
City	626	60.25	320	55.07	946	57.98
Countryside	423	39.75	261	44.93	684	42.02

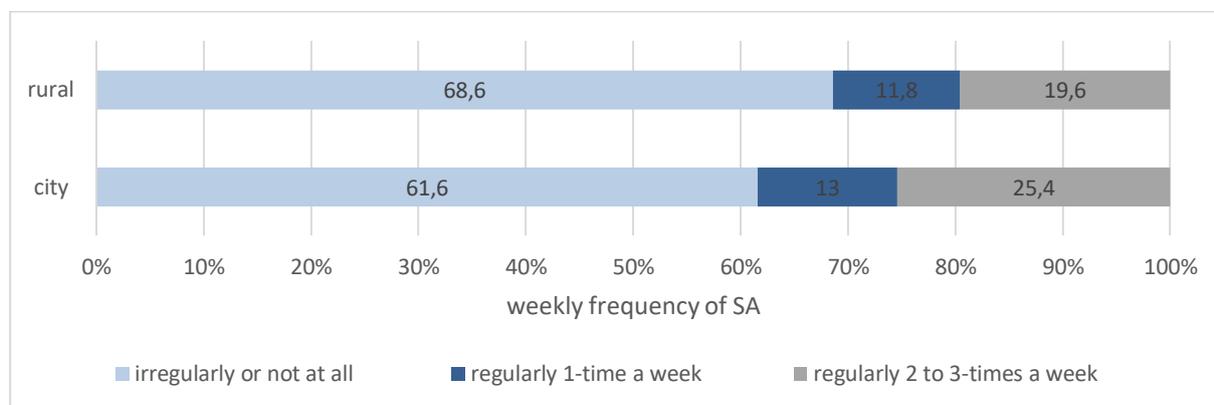


Figure 1. Sporting activity of TUKE and UPJŠ students in relation to the place of permanent residence (city / rural area).

Even though this number is higher at UPJŠ, it is not significant. When comparing the weekly frequency of SA (Figure 1) between urban and rural students, we observe a difference in favor of higher regularity and frequency of this activity in urban girls. There is a significant link between these variables. The results show that both regularity and frequency of SA are positively related to residence in urban agglomeration (Pearson $\chi^2=9.167$; df 2; $p\leq 0.01$).

Considering the fact that most girl undergraduates studying at both universities reside in towns, we examined the number of residents in their hometown and its association with SA and exercises. Most UPJŠ undergraduates come from a big city, i.e. with a population of over 100,000 (Table 5). Ranking second at this university are students from small municipalities up to 1,000 inhabitants. The smallest group comes from medium-sized towns of 50,000 to 100,000 inhabitants. A completely different situation is at TUKE, where most girls are from medium-sized towns and small villages and only a small proportion from a city with over 100,000 inhabitants, where they are currently studying, i.e. directly from Kosice.

Our results prove that girls residing in small villages of up to 1,000 inhabitants are least involved in SA or do sports only irregularly (Fig. 2). They further reported the lowest rate of PA at 3-times a week, which is a recommended health indicator for exercise and sports. The results did not prove any significant correlation between the weekly frequency of SA and the number of inhabitants in the place of permanent residence in the joint cohort of both universities (Spearman $R=0.060$).

Table 5. Stratification of the cohort according the number of residents in the place of permanent residence.

Number of residents	UPJŠ		TUKE		Joint cohort	
	n	%	n	%	N	%
0-1000	233	22.2	151	26.0	384	23.6
1 001-5 000	212	20.2	116	19.9	328	20.1
5 001-10 000	95	9.0	62	10.7	157	9.6
10 001-50 000	205	19.6	67	11.5	272	16.7
50 001-100 000	59	5.5	155	26.7	214	13.1
over 100 000	245	23.5	30	5.2	275	16.9
Total	1049	100	581	100	1630	100

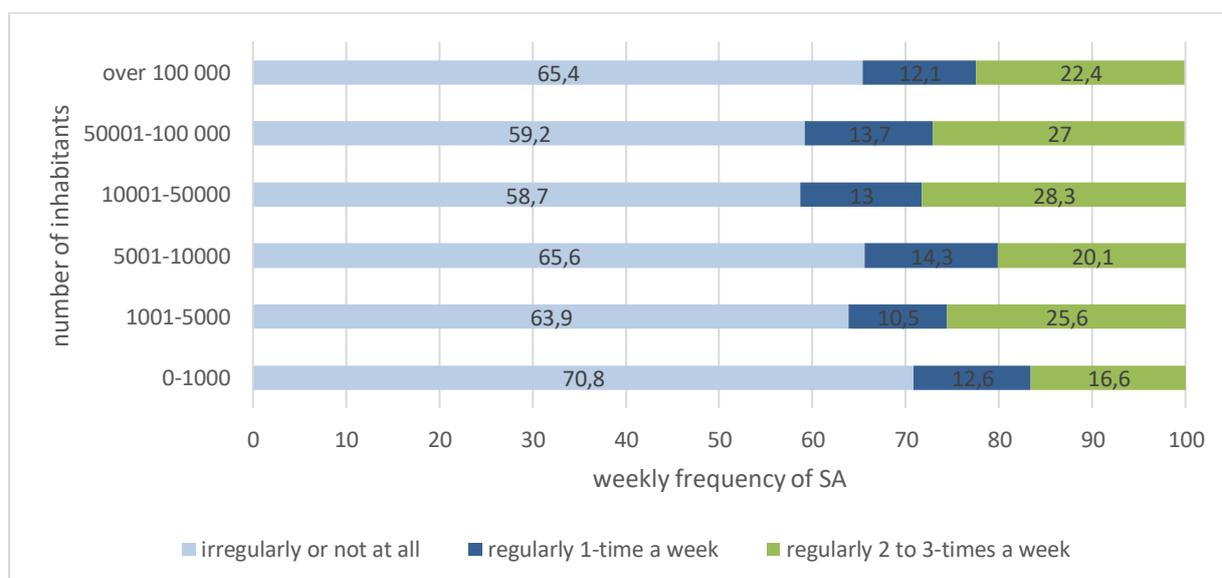


Figure. 2 Sporting activity of female students in relation to the number of inhabitants at the place of their permanent residence.

As shown in Table 6, a comparable percentage of female undergraduates at the two largest universities in Eastern Slovakia reside at home during their study (joint cohort 47.4%) versus stay at hostels (joint cohort 43.2%). A much lower proportion of girls rent a flat (a joint cohort 9.5%), which was an expected result due to low financial sufficiency of this social group, the cost-effective provision of dormitories in the city of Kosice, their availability and a convenient distance from the university. No correlation has been found between the variables place of residence during the study and the realization of SA. The difference in SA relative to the place of residence is minimal (Pearson $\chi^2=5.961$; $p>0.05$) (Figure 3).

Table 6. Place of current residence during study.

	UPJŠ		TUKE		Joint cohort	
	n	%	n	%	n	%
Home	462	44.04	310	53.4	772	47.36
Dormitory	465	44.33	239	41.1	704	43.19
Rent a flat	122	11.63	32	5.5	154	9.45
Total	1049	100	581	100	1630	100

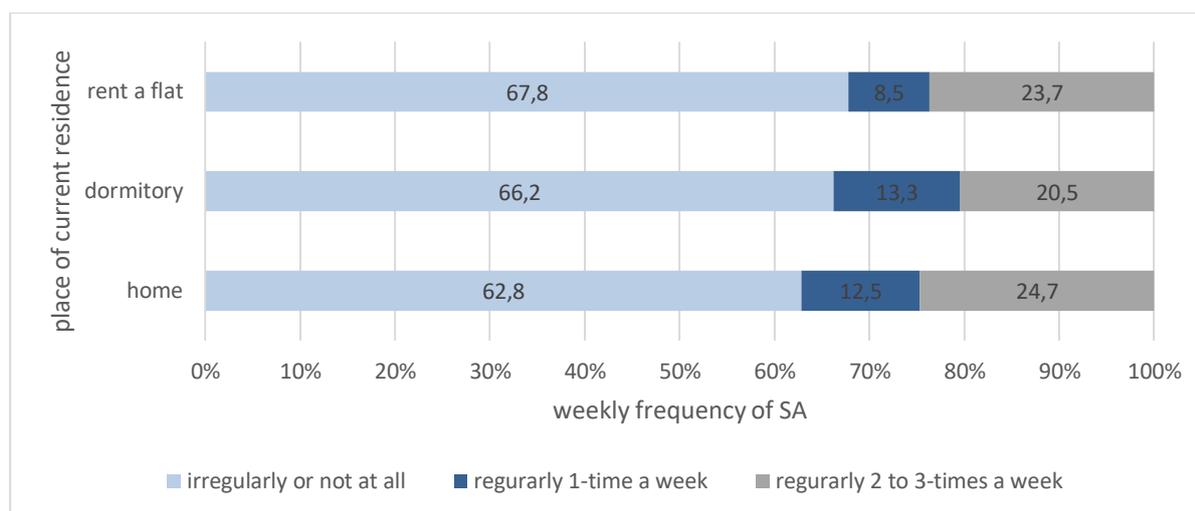


Figure 3. Sporting activity of female students in relation to their place of residence during studies.

DISCUSSION

The academic environment ought to support the physical activity of university students as they represent an important segment of the educated adult population. At this stage of their life, students are no longer dependent on their parents regarding own lifestyle compared to their previous years, so they should bear greater responsibility for their own health behavior. Our results related to doing sports and exercise, in terms of its regularity and frequency, are not favorable for female undergraduates. Only one quarter of the study group meet the health-related criteria for practising SA with a frequency of 3-times a week. This number also includes those students who exercise twice a week. Much more positive results were observed by Helmer et al. [25]. The authors studied college students in Germany and found passivity in only 27.1% of students. However, PA less than once a week was reported by more than 40% of them. Similarly, Nykodým et al. [26], applying an IPAQ questionnaire, found that 32.7% of Czech female undergraduates did not perform any intensive PA at the time of the research, and 9.3% of them did not even perform any medium-load PA. Similarly, Radu et al. [27] who studied PA and the active lifestyle of Romanian students reported a sedentary lifestyle in 34.7% of them. The lowest percentage (4.6%) of undergraduates who do not do any sport was reported by Gajdošík & Balas [9] at Charles University Medical School in Prague. Given that the female students from our research at UPJŠ are studying mainly humanities and natural sciences, more favorable results regarding SA were expected by them particularly. A certain parallel can be observed in the research by Kimáková et al. [28], which did not demonstrate differences in health risk behavior among students of medical versus non-medical fields of study. University students in general report lower levels of physical activity, which influences the body weight and body composition, and leads to a consequent acceptance of such condition [29]. Sparling & Snow [30] observed that as many as 81.3% of undergraduates who were physically inactive during their study tend to lead a sedentary lifestyle even after graduating. Despite the considerable awareness of undergraduates about the significant impact of sports activities on the body, the constantly changing regime of the day and study duties place increased demand on the amount and utilization of leisure time. Among others, those are the reasons why sporting activity is often ranking last in the hierarchy of students' interests [31].

Significant relationship between the place of permanent residence and the regularity and weekly frequency of SA was found to the benefit of urban girl students. This can be explained by the fact that in Slovakia there are still better conditions for sports in terms of available facilities, infrastructure designed for its implementation and programs on offer within

organized forms of SA. Sports, unlike general PA, require more specific conditions. Implicitly, our results have an affinity with the findings of Duncan et al. and Salis et al. on the importance of supportive environment in the implementation of PA. To reinforce the aforementioned, lower volumes of PA by rural population in the studies by Martin et al. [32] and Parks et al. [23], are attributed to a different lifestyle and the previously poorly examined impact of the socio-economic status. Given that our results are not supplemented by data in the wider context of conditions for SA, such substantive interpretation is rather deductive. However, according to our results, the number of inhabitants in their place of permanent residence is not related to the frequency and regularity of SA. On the other hand, we found certain tendency upwards in the same variables of SA in girl students from bigger cities of over 50,000 inhabitants. Paradoxically, Mitáš & Frömel [33], examining a sample of 8,256 adults in the Czech Republic, found a higher weekly volume of physical activity among respondents from smaller agglomerations. Frömel et al. [34] pointed out relationship between the place of residence, the form of housing and PA of the adult population in a selected region of Bohemia. According their results, physically most active appeared the inhabitants of agglomerations with a population of 1,000 to 29,900 inhabitants, while the least active were the inhabitants of the city of Olomouc, which counts about 100,000 inhabitants. Similar results in the adult population of a region in the Czech Republic were reported by Řepka et al. [35], stating that the inhabitants of smaller towns and municipalities have a greater chance of meeting the recommended volume of weekly PA. However, the above studies did not concern the specific social group of undergraduates. It also makes a difference whether we take into account the assessment and factors of performing PA as such or its particular forms, namely sport and exercise.

One of the external factors that could affect SA by female undergraduates is the place of their current stay during university studies. According to LaCaille et al. [36], numerous studies present changes in behavior after admission to college, typically associated with staying at student halls of residence. In most cases, it lies in a negative impact of the study, especially in the early years. This further results in an increase in body weight at the beginning of university study [37]. On the other hand, with an increase in PA sedentary behaviour is suppressed, whereas determinants of sedentary behavior in university students may well be the place of residence, lifestyle, exams, and pressure caused by academic duties [38]. In the research by Bernasovská et al. [39], medical faculty undergraduates residing at home reported healthier dietary habits than those accommodated at dormitories, although they smoked more. Our results regarding the location of stay during university studies indicate a favorable weekly frequency of SA by those staying home, but this relationship is not significant. This finding corresponds with the work of Wallmann-Sperlich et al. [40] on low socio-demographic correlates. As the authors assert, it is generally necessary to address studies focused on further definition of the true causal relationship between PA and the environment. In solving the problem of insufficient implementation of PA as well as SA, the ecological model of research, taking into account both the human and the environment, has its justification as well.

CONCLUSION

The results of our research, carried out on a sample of female undergraduates at the two largest universities in Eastern Slovakia, draw our attention to a markedly low rate of doing sports and exercise. We observed a significant correlation between the frequency of sporting activity by the students and the place of their permanent residence, which is more favorable for city dwellers against rural areas. Paradoxically, in terms of SA there is no significant link between the number of inhabitants at the places of residence, although we can see certain positive tendency in favour of agglomerations with a population of over 50,000. The factor of residence during university studies has proven to be insignificant in relation to the frequency and regularity of sports and exercise. Based on the results obtained, we would like to point to

the legitimacy of ecological approach to tackling the problem of physical activity, namely doing sports and exercise. We firmly recommend paying more attention to objective factors related to the realization of physical activity by university students, addressing the issue of barriers in relation to sport activities, but first and foremost to seeking tools of remedies or their elimination. Especially, that regular physical activity helps improve overall health and fitness, and reduces your risk for many chronic diseases because affects the immune system [41,42]. We further confirm, similar to [11], the need to reintroduce the subject of Sports Activities into the syllabus of study programs at universities, at least in the first level university degrees. This period is the last time we can institutionally influence the attitudes of college and university students in relation to a healthy lifestyle. This issue needs to be addressed clearly within the health promotion policy of the responsible ministries, the management of the universities, and consequently reflected in their mutual coordination.

REFERENCES

1. Wilmore JH, Costill DL. Physiology of sport and exercise. Human Kinetics, 2004.
2. Kohl HW, Craig CL, Lambert EV, et al. The pandemic of physical inactivity: global action for public health. *The Lancet*, 2012, 380 (9838): 294-305.
3. Compas BE, Wagner BM, Slavín LA, Vannatta K. A prospective study of life events, social support, and psychological symptomatology during the transition from high school to college. *Am J. Commun Psychol* 1986, 14: 241-57.
4. World Health Organization. Global recommendations on physical activity for health. 2010. <http://www.who.int/dietphysicalactivity/publications/9789241599979/en/>
5. Zusková K, Buková A, Bakalár P, Brtková M, Küchelová Z, Hančová M. Nadhmotnosť a obezita u vysokoškolákov. Univerzita Pavla Jozefa Šafárika v Košiciach, 2015. ISBN 9788081523892.
6. Loyd-Richardson EE, Bailey S, Fava JL, Wing R. A prospective study of weight gain during the college freshman and sophomore years. *Preventive Medicine*, 2009, 48 (3): 256 - 261.
7. Leslie E, Sparling PB, Owen N. University campus settings and the promotion of physical activity in young adults: lesson from research in Australia and the USA. In: *Health Education* 2001, 101(3): 116-125.
8. Bray SR, Born HA. Transition to university and vigorous physical activity: Implications for health and psychological well-being. In: *Journal of Am.College Health*, 2004, 52(4): 181-188.
9. Gajdošík J, Baláš J. Zájem o pohybové aktivity u studentů medicíny Univerzity Karlovy. In: *Studia Sportiva* 2012, 6(2): 62-69. ISSN 1802-7679.
10. Plotnikoff RC, Costigan SA, Williams RL. Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* 2015, 12:45. DOI 10.1186/s12966-015-0203-7.
11. Korn L, Gonen E, Shaked Y, Golan M. Health perception, self and body image, physical activity and nutrition among undergraduate students in Israel. In: *PLoS One*, 2013, 8(3). <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0058543>.
12. Steptoe A, Wardle J. Health behaviour, risk awareness and emotional wellbeing in students from Eastern Europe and Western Europe. *Soc. Sci. Med.*, 2001, 53, 1621-1630.
13. Bauman AE, Reis RS, Sallis JF. Correlates of physical activity: Why are some people physically active and others not? *Lancet* 2012, 380, 258-271.
14. Sallis JF, Bowles HR, Bauman A. Neighborhood environments and physical activity among adults in 11 countries. *Amer. J. Prev. Med.* 2009, 36, 484-490.
15. Duncan MJ, Spence JC, Mummery WK. Perceived environment and physical activity: A meta-analysis of selected environmental characteristics. *Int J. Behav Nutr Phys. Act.* 2005, 2. DOI 10.1186/1479-5868-2-11.
16. Frank LD, Engelke PO. The built environment and human activity patterns: exploring the impacts of urban form on public health. *J. Planning Literature* 2001,16:202-218.

17. Bebčáková V, Lenková R, Boržiková I, Durkáč P, Frömel K, Chmelík F. Pohybová aktivita 15 ročných žiakov základných škôl. Sborník príspevků z mezinárodní vědecké konference pohyb člověka, Ostrava, 2010: 17-23
18. Hiana TCh, Mahmud ZF, Choong TY. Physical Fitness Level between Urban and Rural Students-Case Study. *Procedia - Social and Behavioral Sciences*, 2013, 90: 847 – 852.
19. Regis MF, DeOlivera LMF et al. Urban versus rural lifestyle in adolescents: associations between environment, physical activity levels and sedentary behavior. *Einstein*, 2016, 14(4): 461-467.
20. Vitáriušová E, Babinská K, Rosinský J. et al. Fyzická aktivita a skladba voľného času v populácii detí na Slovensku. *Pediatr. prax*, 2009, 10(2): 94-97.
21. VanDyck D, Cardon G, Deforche B, DeBourdeaudhuij. Urban-rural differences in physical activity in Belgian adults and the importance of psychosocial factors. *Journal of Urban Health*, 2011 88 (1): 154-167.
22. Hoffmann K, Bryl W, Marcinkowski, JT, et al. Estimation of physical activity and prevalence of excessive body mass in rural and urban Polish adolescents. *Annals of Agricultural and Environmental Medicine*, 2011, 18(2): 398-403.
23. Parks SE, Housemann RA, Brownson RC. Differential correlates of physical activity in urban and rural adults of various socioeconomic backgrounds in the United States. *Journal of Epidemiology and Community Health*, 2003, 57(1): 29-35.
24. Wilcox S, Castro C, King AC, et al. Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. *J.Epidemiol. Community Health*, 2000, 54: 667-672.
25. Helmer, SM, Krämer A, Mikolajczyk RT. Health-related locus of control and health behaviour among university students in North Rhine Westphalia, Germany. In: *BMC Research Notes* 2012, 5:703. Dostupné na: <http://www.biomedcentral.com/1756-0500/5/703>.
26. Nykodým J, Zvonař M, Sebera M. Pohybová aktivita studentů Masarykovy univerzity. *Studia Sportiva* 2011, 5(1): 57-64.
27. Radu LE, Făgăraș PS, Vanvu G. Physical Activity Index of Female University Students. *Procedia - Social and Behavioral Sciences*, 2015, 191, 1763-1766.
28. Kimáková T, Čarnogurská D, Korchňáková, M, Schuster, J. Porovnávacie štúdiá vybraných fyziologických a antropometrických parametrov ovplyvňujúcich životný štýl vysokoškolákov medicínskych a nemedicínskych. *Studia Kinanthropologica* 2013, 14 (3): 205-207.
29. Telleria-Aramburu et al. Influence of Sport Practice and Physical Exercise on Anthropometric Indicators and Weight Satisfaction in Men University Students: A Pilot Study. *Nutricion Hospitalaria*, 2015, 31(3): 1225 – 1231.
30. Sparling PB, Snow TK, Physical activity patterns in recent college alumni. In: *Res. Quarterly for Exercise and Sport* 2002, 73(2): 200-205.
31. Buková A, Gajdošová B, Staško I. Športové a telovýchovné aktivity študentov UPJŠ. In: *Optimalizácia zaťaženia v telesnej a športovej: výchove*. Zborník z medzinárodnej vedeckej konferencie. Bratislava: Strojnícka fakulta STU 2008, 1-5. ISBN 9788022728522.
32. Mitáš J, Frömel K. Pohybová aktivita dospelé populácie českej republiky: prehľad základných ukazateľů za obdobie 2005 – 2009. *Tělesná kultura* 2011, 34(1): 9-21.
33. Frömel K, Mitáš J, Kerr J. The associations between active lifestyle, the size of a community and SES of the adult population in the Czech Republic. *Health & Place* 2009, 15(2): 447-454.
34. Řepka E, Šebrle Z, Fromel K, Chmelík F, Vašíčková Z. Plnění doporučení k týdenní pohybové aktivitě dospelou populací jihočeského regionu. *Tělesná kultura* 2011, 34(1): 65-75.
35. Martin SL, Kirkner GJ, Mayo K, Matthews CE, Durstine JL, Hebert JR. Urban, rural, and regional variations in physical activity. *The Journal of Rural Health*, 2005, 21(3): 239-244.
36. LaCaille LJ, Dauner KN, Krambeer RJ, Pedersen J. Psychosocial and Environmental Determinants of Eating Behaviors, Physical Activity, and Weight Change Among College Students: A Qualitative Analysis. *J. of Am. College Health* 2011, 59(6).
37. Mihalopoulos NL, Auinger P, Klein JD. The freshman 15: Is it real? *Journal of American College Health* 2008, 56: 531-53.
38. Deliens T, Deforche D, De Bourdeaudhuij I, Clarys P. Determinants of physical activity and sedentary behaviour in university students: a qualitative study using focus group discussions. *BioMed Central Public Health* 2015, 15:201: 1-9 [<http://www.biomedcentral.com/1471-2458/15/201>]

39. Bernasovská K, Rimárová K, Kovářová M. Posúdenie životného štýlu poslucháčov Lekárskej fakulty UPJŠ v Košiciach In: Životné podmienky a zdravie: zborník vedeckých prác. Bratislava, 2003: 273-279. ISBN 80-7159-138-6.
40. Wallmann-Sperlich B, Froboese I, Schantz P. Physical Activity and the Perceived Neighbourhood Environment – Looking at the Association the Other Way Around. *Int. J. Environ. Res. Public Health* 2014, 11: 8093-8111. DOI 10.3390/ijerph110808093.
41. Szerla M, Ortenburger D, Kluszczyński M, Wyszomierska J. Exercise and psychological factors in low back pain. *Physical Activity Review* 2017, 5:6-9. DOI: dx.doi.org/10.16926/par.2017.05.02
42. Ortenburger D, Rodziewicz-Gruhn J, Wąsik J, Marfina O, Polina N. Selected problems of the relation between pain-immunity and depression, *Physical Activity Review* 2017, 5:74-77. DOI: dx.doi.org/10.16926/par.2017.05.10

Cite this article as:

Buková A, Zusková K, Szerdiová L, Küchelová Z. Demographic factors and physical activity of female undergraduates, *Phys Activ Rev* 2017; 5: 202-211