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PHYSICAL ACTIVITY OF STUDENTS OF THE UNIVERSITY OF NOVI SAD - REALITY AND PERSPECTIVES

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Abstract: Recognizing the importance of lifelong physical activity for all aspects of health, the aim of this study was to determine the current level of physical activity of student population of the University of Novi Sad (N = 300) measured using the standardized IPAQ questionnaire (International Physical Activity Questionnaire), which is intended for examining the frequency, duration and intensity of physical activity among adults. The basic hypothesis is that physical activity of students is at unacceptable and inadequate level. Differences in levels of physical activity of students with respect to gender and type of faculty were also examined. The results show that students are more likely to practice walking and intensive activities than moderate activities. Although characterized as an overall moderate physical activity, it is a result of physical activity and walking of significantly higher intensity, while the moderate activity of students itself is the lowest. A significant multivariate gender effect was obtained, with male students practicing more intense physical activities. The results also imply that the type of faculty also affects intense activity, while the effect on the other two activities (moderate physical activity and walking) is insignificant.

Keywords: *physical activity, students, physical education, education.*

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INTRODUCTION

The modern way of life has become the greatest enemy of human health. The epidemic of inactivity and obesity have become commonly used terms. Historically, the physical activity of an adult human has significantly decreased with the technological revolution, which makes most of the professional jobs more passive, with a declining amount of physical effort required to invest during working hours. Mass media, the Internet and the widespread social networks all have lead to a significant reduction in physical activity among adults during their leisure time. According to the report from the World Health Organization (2002), insufficient physical activity was declared the fourth independent risk factor of global mortality in the world and is the biggest health problem of a nation. In Serbia, every fifth adult is obese, every third adult consumes cigarettes, while almost half of the total population lives with hypertension (Strategy for the Development of Sport of the Republic of Serbia for the period 2014-2018, 2015). Based on the research conducted by the CESID (Strategy for the Development of Sport of the Republic of Serbia for the period 2014-2018, 2015), only 10% of the population in the Republic of Serbia is engaged in physical activity once a week, and even 56% of the population does not practice this type of activity at all. The availability of choice among various activities that lack physical activity and social interaction leads to spending of leisure time passively among adults and increasing levels of physical inactivity. Studies have shown that, although aware of the positive effects of physical activity, adults are less likely to exercise (World Health Organization, 2010).

The importance of practicing physical activities is reflected in their overall positive effects on the life of a person from a psychological, physiological and sociological point of view. Considering the physiological aspect of improving health through physical activities, these primarily represent an effective way of preventing and treating various diseases and help in maintaining and improving health. In adulthood, engaging in physical activities helps to preserve the acquired motor skills with the aim of preserving vital functions of the organism. Studies have shown that moderate physical activities stimulate the functioning of the human immune system (Nieman, 2000). The next segment of positive health effects of practicing physical activity is the psychological aspect. Sports and recreational activities positively affect both cognitive and affective domain of personality. Physical activities have also been shown to be an important factor of socialization of personality in adults, and pursuing them in leisure time positively affects the prevention of destructive behaviour.

Many global organizations have recognized the importance of physical activities in the context of modern life. The UNESCO emphasizes the importance of practicing physical activities for personal and social well-being. In 1978, the General Assembly of UNESCO adopted the International Charter of

Physical Education and Sport (1978), which proclaims the exercise of physical activities and sports the right and the need for people of all generations, essential for the full development of personality. The Charter highlights that everyone should be given the opportunity, in accordance with national sports tradition, for practicing physical activities and sport, developing physical fitness, and attaining the level of achievements in sport in accordance with his/her talents. In May 2004, the World Health Organization (WHO) adopted a final strategy, based on resolution 57/17, with an emphasis on promoting physical activity, proper nutrition and health, which in fact represents a recommendation for the adoption and construction of an adequate lifestyle. The following are some of the defined objectives within the global strategy (WHO, 2010): increasing the level of physical activity among adults from 15% to 20%; improving the education of children and adolescents in terms of physical culture by 2% by 2020; increasing walking and cycling (by 10%-20% among adults, 40%-60% among adolescents), and using a specially created questionnaire on monitoring physical activities – the Global Physical Activity Questionnaire. The primary stage in raising awareness of the importance of practicing physical activities is certainly getting insight in their current level.

Physical activity represents any movement of the body, produced by the human muscular structure, which implies higher energy consumption than that of the basal metabolism. It includes practicing professional and amateur sport, recreation, exercise, fitness, as well as activities that include physical involvement of the body while performing daily work in the house and moving from place to place. By definition, physical activity is any competitive or recreational activity which is based on moving and changing the position of the body, where the goal is to achieve a result in accordance with the abilities of the person who performs the activity (Bouchard, Blair, & Haskell, 2012). Measuring physical activity is an actual topic of several scientific disciplines, and the importance of it comes primarily from its relation to health. A number of techniques and instruments have been developed over the years that measure the level of physical activity in adults. They include criteria measurement methods (direct calorimetry, indirect calorimetry and direct observation), objective measurement methods (accelerometry, pedometry and monitoring of cardiac work), and subjective measurement methods (self-report technique). This study applies the subjective method, because a large number of studies have shown that self-reporting, as a subjective method of testing physical activity, showed a high level of reliability and validity (Hagstromer, Ainsworth, Oja, & Sjostrom, 2010).

In the last few decades, there are an increasing number of papers studying physical activity among adults. Reviewing the literature, a large number of studies can be encountered that focus on the level of physical activity of student population (Stynes & Peterson, 1978; Bourne, 2000; Ćurković, Bagarić, Straža & Šuker, 2009; Nikolić & Pahić, 2011; Nešić, Srdić, Fratrić, 2013), which shows a declining tendency. Research results also indicate a significant decline in physical activity in the transition of young people to early

adulthood, with the largest decline occurring during the course of studying (Kwan, Cairney, Faulkner, & Pullenayegum, 2012). Such data raises concern and represent the starting point for the problem of this research. Taking into account the increase in alcohol consumption and smoking in the period of studies, in addition to reduced physical activity, (Knaw et al. 2012), it can be concluded that student days are a critical period for a healthy lifestyle and a lifelong practicing of physical activities. Together with the above facts, the starting point of this research is the lack of classes of physical education at the faculties. Despite the fact that most developed countries introduce additional classes of physical education at all educational levels and in various ways encourage sport and recreational activities, in Serbia, physical education at faculties was a regular and obligatory class from 1963 to 1998, when, based on the new Law on the Universities it was completely abolished. The current National Strategy for the Development of Sport in the Republic of Serbia for the period 2014-2018 (2015) emphasizes the importance of promoting and strengthening the cooperation of sport recreation with university sport, but concrete activities were not determined.

Therefore, the main goal of this research is to gain an insight in the level of physical activity among students in order to stress the importance of practicing physical activity and educate young adults about healthy lifestyle and importance of lifelong physical activity as an imperative in the modern world. Research results should directly affect the improvement of pedagogical practice.

METHOD

In accordance with the research objective and problem, the following research tasks were set: 1) determine the level of physical activity of respondents; 2) examine whether gender affects the level of physical activity of respondents; 3) determine whether the type of faculty affects the level of physical activity of respondents.

The sample in this study consisted of 300 students: 175 (58.3%) females and 125 (41.7%) males. The sample consisted of students from five different faculties of the University of Novi Sad (Faculty of Philosophy, Faculty of Agriculture, Faculty of Sciences, Faculty of Sport and Physical Education and Faculty of Medicine) of the third and fourth year of study. The structure of the sample was chosen because these faculties include both natural and social sciences, and thus, strongly contribute to the research objective, noting that students of the Faculty of Sport and Physical Education were assumed to have higher preferences to physical activities than other respondents.

The research method consisted of a survey which was conducted using the International Physical Activity Questionnaire - IPAQ (http://www.ipaq.ki.se/), which is intended for testing the level of physical activity of young and middle-aged people (15-69 years of age). It was compiled

by scientists from 16 countries who adopted it at the World Health Organization conference in 1997 with the aim of standardizing the measurement of physical activity and comparing the results of various independent studies. The IPAQ questionnaire has been used so far in numerous studies to determine measurement characteristics (Craig et al. 2003) and is the most widely used questionnaire in the world when it comes to testing the level of physical activity (Van Poppel et al. 2010). Questions in the questionnaire refer to the amount of time spent on a certain type of physical activity over the past 7 days. Examples of the items are:

1. During the last 7 days, how many days did you do intensive physical activities like lifting heavy loads, digging, aerobics or fast bicycle riding?

   _____ day/s last week

   _____no intensive physical activity → proceed to question no. 3

2. How much time did you usually spend in intense physical activity on one of those days?

   _____hours and ___ minutes per day

   _____I don't know / I'm not sure

The results of previous studies show that measurement characteristics are satisfactory (Spearman's coefficient of correlation was 0.8, and the criterion validity had a median of about 0.30) and that the measuring instrument is applicable in studying the level of physical activity (Hallal, & Victoria, 2004; Hagströmer, Oja, Sjöström, 2006). IPAQ measures the frequency, duration and intensity of physical activity in four domains of our life (work, travel from place to place, housework and leisure time), and the results can be expressed as continuous variables in METs (value of metabolic equivalent, where 1 MET is the metabolic rate at resting) or categorical variables in three categories: low physical activity, moderate physical activity and high (intense) physical activity. In this paper, levels of physical activity were calculated based on the coefficients used in accordance with the IPAQ guidelines (Ainshwort et al. 2011), where intense physical activity is 8.0 MET, moderate physical activity 4 MET and walking 3.3 MET.

The results were analyzed based on Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (2005). After processing the collected data, descriptive indicators of the arithmetic mean were presented. In order to get an insight into the most prominent kind of activity among students, t-tests for independent samples were conducted. A multivariate analysis of variance was also applied, in which gender was the grouping variable in three dimensions of physical activities. In order to examine whether the type of faculty significantly affects the physical activity, a univariate analysis of variance has been applied.

RESULTS

The results show that the number female students in the sample was higher in the sample from the Faculty of Medicine (47), the Faculty of Agriculture (40), PMF (41) and the Faculty of Philosophy (33), while male students are more represented in the sample coming from the Faculty of Sport and Physical Education (46) - Table 1.

Table 1. *Gender distribution of students in relation to the type of faculty*

		Type of faculty					
		Philosophy	Agriculture	Sciences	Sport and Physical Education.	Medicine	Total
gender	female	33	40	41	14	47	175
	male	27	20	119	46	13	125
	Total	60	60	660	60	60	300

Using the chi-square test significant gender differences were obtained regarding the type of faculty ($\chi 2$ (4) = 44.57, p = .000). The age of students ranged from 19 to 26 years, with the average age being 21.14 (SD = 1.10). Gender differences in age are insignificant (t (298) = 0.43, p = .664). Differences in age with respect to the type of faculty are significant (F (4.295) = 21.35, p = .000). The post hoc LSD test showed that there are differences between students of the Faculty of Medicine and other students. Students at the Faculty of Medicine are significantly younger than students from other faculties.

Measures of physical activity (walking, moderate and intense activity) are calculated in MET units. As it can be seen in Table 2, kurtosis or skewness of distribution are above recommended value in case of moderate activity. Therefore, the data were not winsorized, i.e. the two outlier values (4800 and 3840) on this measure were replaced with the maximum achieved value (3600). In this way, all respondents were retained in the analysis. After winsorization, skewness for moderate activity is 1.06, and kurtosis 0.88, which is considered acceptable for normal distribution. Thus, no transformation of scores is required. Based on the height of arithmetic means, it can be seen that students practice more walking and intense activities than moderate activities. MET coefficients representing theoretical minimums (walking - 3.3 MET, moderate activity - 4 MET and intense physical activity – 8 MET) were also obtained empirically (Table 2). The empirical maximum reached for walking is 5544 MET, for moderate activity 4800 MET, and for intense physical activity 6720 MET (Table 2). When it comes to the total score for the level of physical activity according to Swartz (Swartz et al. 2000), the physical activity is low if it is $\leq$ 574 MET, moderate if $\leq$ 4945 MET and intense if $\leq$ 4945 MET. Therefore, the total physical activity of the sample of students of the University of Novi Sad can be characterized as moderate (AS = 3718.83) (Table 2). It should be kept in mind

that this result does not indicate moderate activity as really the highest, but was obtained as the average of significantly higher scoring intense physical activity and walking than the score of moderate physical activity.

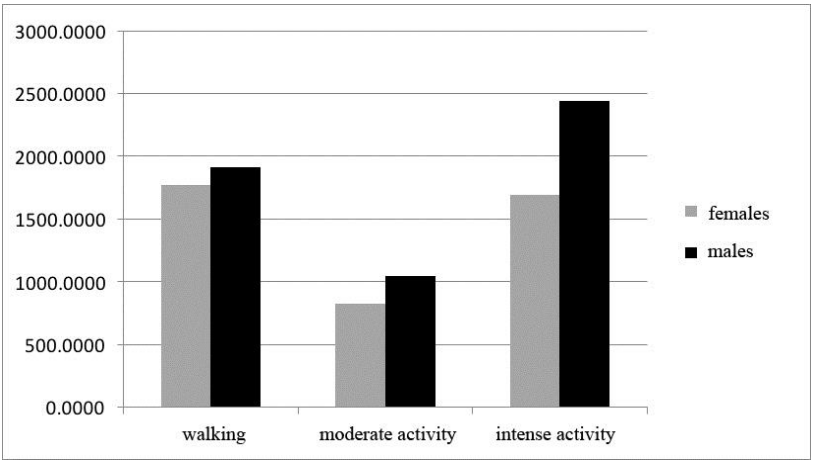
Table 2. *Descriptive data for the level of physical activity*

Physical activity (MET)	N	Min.	Maks.	AS	SD	Skewness		Kurtosis	
						Statistic	SE	Statistic	SE
šetnja	292	3,30	5544	1777,33	1459,90	0,78	0,14	-0,16	0,28
umerena aktivnost	210	4,00	4800	921,31	838,03	1,30	0,17	2,33	0,33
intenzivna aktivnost	201	8,00	6720	2001,15	1548,85	1,01	0,17	0,81	0,34
ukupni skor za aktivnost	300	0,00	12852	3718,83	2705,23	0,70	0,14	0,15	0,28

SE – standard error

For the purpose of deeper analysis in order to examine what kind of activity is the most prominent among students, t-tests for independent samples were conducted. These indicated that there are significant differences between moderate activity and walking ($t(206) = 8.73$, $p < .001$) and intense activities ($t(171) = -9.69$, $p < .001$), while there are no significant differences in the expressed scores on walking and the intense activity ($t(196) = -1.00$, $p > .05$) (Chart 1).

Chart 1. - *Intensity of physical activities as a function of gender*



The effect of gender on the level of physical activity was examined using

multivariate analysis of variance, in which gender was the grouping variable, and three dimensions of physical activity were the criteria. A significant multivariate effect of gender was obtained (F (3.165) = 3.57, p = .015) in favour of males. Gender differences regarding the level of physical activity were analyzed using a univariate analysis of variance. The results show that gender differences are significant only in the case of intense activity in favour of males, while there are no significant differences in walking and moderate activity (Table 3).

Table 3. *Gender differences in physical activities*

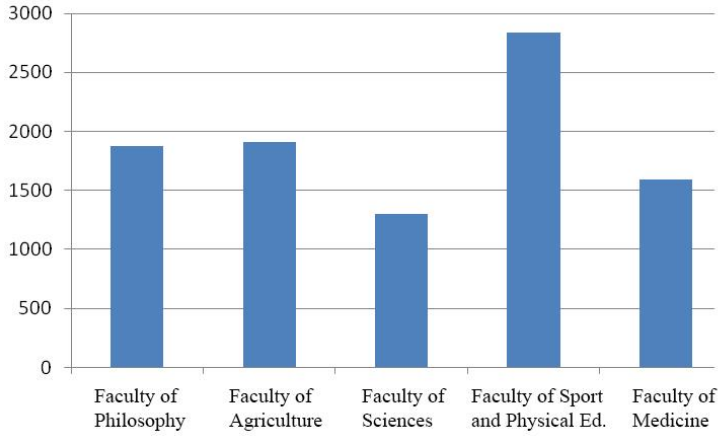
Criteria	F(1.167)	p
Walking	0.40	.528
Moderate activity	2.89	.091
Intense activity	9.79	**.002**

In order to examine whether the type of faculty affects the level of physical activity, a univariate analysis of variance has been applied. According to the results, the type of faculty significantly affects intense activity (p = .000; ηp2 = 143), while the effects on the remaining two activities – moderate activity (p = .089; ηp2 = .056) and walking (p = .994; ηp2 = .002) – are not significant (Table 4). Post hoc LSD tests have found that there are significant differences in intense activity between students of the Faculty of Sport and Physical Education and students of other faculties, i.e. Faculty of Sciences, Faculty of Philosophy and Faculty of Medicine on the other in favour of students of the Faculty of Sport and Physical Education. There are no significant differences in intense activity between students of the Faculty of Sport and Physical Education and students of the Faculty of Agriculture (Chart 2). In addition, a difference has also been obtained for intense activity between students of the Faculty of Agriculture and the Faculty of Sciences, in favour of students of the Faculty of Agriculture (Chart 2).

Table 4. *Univariate effect of the type of faculty on the level of physical activity*

Effect	Criterion	F(4,139)	p	η_p^2
Type of faculty	Walking	0,05	,994	,002
	Moderate activity	2,07	,089	,056
	Intense activity	5,81	**,000**	**,143**

Chart 2 – *Presence of intense physical activity (MET) in students of different faculties*



It can be concluded that students of the Faculty of Sport and Physical Education are the most engaged in intensive physical activity, which was expected, considering the activities that they are required to practice during the course of studies, and that this type of faculty does not have significant effect on the remaining two levels of physical activity – walking and moderate physical activity.

DISCUSSION

Although the results show that the level of overall physical activity of students is moderate, this result is obtained as the average of significantly higher actual intense physical activity and walking than of real moderate physical activity. Similar results were obtained with this instrument on the student population of Romania (Fagaras, Radu, & Vanvu, 2015). It can be concluded that real moderate physical activity, which is the most productive for a healthy lifestyle, is significantly less represented than walking and intense physical activity. Given that healthy adults between 18 and 65 years of age are recommended (Haskell et al. 2007) to practice moderate physical activity of at least 30 minutes for five days a week, this research therefore unambiguously shows that students fail to satisfy this minimum, that is, their engagement in moderate physical activity is insufficient. Similar results and tendencies in practicing physical activities were found worldwide. In the United States and Australia less than 50% of students practice some physical activity (Leslie et al. 1999; Pate et al. 1995). Previous studies have shown that the level of physical activity among young adults significantly decreases between the end of the

secondary school and the beginning of studies at faculty, and that the decline continues during the studies (Small, Bailey-Davis, Morgan, & Maggs, 2013). Given the great potential of faculties for positively affecting the health of a large number of students and directing them towards active lifestyles and physical activity (Miloroy, Orsini, D`Abundo, & Bridges, 2005), it can be assumed that the effect that could be achieved by involving these institutions adequately in a healthy lifestyle education, as well as by introducing, or more precisely, revitalizing physical education as a class at faculties in Serbia. This would enable continuity in practicing physical activities after finishing primary and secondary schools where organized physical activities are prescribed by the law. These structured activities, which take place regularly and according to the rules, represent an important element in the battle against deviant forms of behaviour and promote a healthy lifestyle (Zeijl, DuBois-Reymond, & Te Poel, 2001). Therefore, it is the introduction of physical education in faculty study programs which can be seen as one of the primary guidelines, implying a lifelong engagement in physical activities and an active lifestyle.

Furthermore, the results show a significant gender difference across the overall physical activity, and further analysis showed that the difference was significant in relation to intense physical activity, while in walking and practicing moderate activity it did not prove to be significant. The presented results are consistent with the findings of other similar studies (Miller et al. 2005). Thus, it can be concluded that female students should be more active regarding intense physical activity, although in this case the significant gender difference at the Faculty of Sport and Physical Education should also be accounted for, where the results show that they are significantly more engaged in intense physical activity. Some future studies should be focused on the topic of interests and needs of female student population, in order to examine the causes of deficient activity, as well as the possibilities of increasing it. In order to achieve this, it is first of all necessary to provide success and joy in practicing physical activities based on students´ affinities and needs, and then point out the need and purpose of being engaged in physical activities confirming support at all levels.

The results of the research show that there is a significant difference in terms of the type of faculty students are attending, where intense physical activity is mostly practiced by students of the Faculty of Sport and Physical Education, while students of the Faculty of Sciences are mostly lagging behind. These results speak in favour of necessity of education and teaching about the importance of active lifestyle, as well as of the necessity of introducing distinct measures in this age of life. This implies the need for educating the adults about physical culture and its significance, because only by developing the awareness and cognitive knowledge about the values of physical activities of the entire student population we can improve the overall level of their physical activity. In this sense, it is necessary to advance physical culture as a social phenomenon of imperishable value, while the level of its development is an indicator of the development of specific society. This need is particularly important when we

know that modern civilization is overwhelmed by a new way of working, with predominantly sedentary lifestyle, leading to changes also in the ways of resting and entertainment, where people spend their leisure time passively entertaining with monotonous contents of mass media, which occupy human attention beyond the limits of dependence. Bearing in mind the above, physical education should become an integral part of educational social institutions at various levels, which can strongly affect the student population and overall social environment.

CONCLUSION

The obtained results indicate lower levels of moderate physical activity among respondents in relation to intense physical activity and walking. Furthermore, the results suggest that there are significant gender differences regarding the level of intense physical activities, that is, male students are more engaged in intense physical activities than female students, and that there are differences in physical activities depending on the type of faculty they are studying. The statistical significance of obtained results is the same as of those obtained in previous studies worldwide. They can be interpreted primarily in the light of modern lifestyle, which involves less and less physical activity. Sedentary activities are on the rise, while the active way of life becomes determinative of its quality and privilege of a few. Although overall physical activity can be characterized as moderate on our sample of respondents, it is the result of higher intense physical activity and walking, instead of moderate activity itself, while moderate activity was proven to be significantly lower than intense activity and walking among students of the University of Novi Sad. The urge of providing socially desirable answers should also be taken into account, since the awareness of importance of physical activity was not examined, which in subsequent research could explain the reasons for the reduced participation of respondents in moderate physical activities.

Future research should explore the way in which young adults spend their leisure time, as well as their awareness of the importance of physical activity for health, as it is a key factor in increasing the participation of students in moderate physical activities. By creating positive attitudes toward physical activities, understanding their importance for psychological and physical health and influencing factors that can contribute to motivation is the key to activating young adults on the path towards lifelong physical activity.

The practical importance of the research and the results obtained points in several directions: developing a healthy lifestyle with lifelong engagement in physical activities; educating on the importance of physical activities in the young adult age, where the period of studying represent a milestone; influencing specifically female population and re-introducing classes of physical education at faculties.

This problem, though recognized in our country, requires more attention in terms of theoretical and empirical research, as well as a more professional and organized institutional approach and support at all levels of education, while respecting and encouraging changes in the overall educational policy.

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