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# GENDER DIFFERENCES IN PHYSICAL ACTIVITY AMONG THE UNIVERSITY STUDENTS IN THE VISEGRAD (V4) COUNTRIES

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**ABSTRACT. Introduction.** Sedentary way of life has become a global phenomenon in the past decades. Therefore, the number of people with excess weight has doubled in the past 30 years. Besides this fact, it has been justified that more than half of the population is overweight. Even young adults are affected by the problem. It is an important issue because 60% of the overweight young people keep their excess body weight in later adulthood increasing the risk of different diseases.

**Material and method.** Our study aims at assessing the differences between the health status and the physical activity among young people (secondary school and university students) in the Visegrad (V4) countries. Our current research examines the differences in the physical activity among university students regarding their sexes (n=2237). SPSS 22.00 software was used for statistical analysis.

**Results.** According to the results, we found significant differences ($p<0.001$) both in the extent of physical activity values, except for moderate activities between sexes. Significant differences were observed between the countries concerning the examined parameters ($p<0.001$). Among Polish university students, we found significant differences in sexes in the total, vigorous, moderate and walking MET/week values ($p<0.05$).Almost identical results were found in the Czech Republic and the other V4 countries compared to Poland. There were no significant gender differences in the rate of walking activities regarding the Czech respondents ($p=0.426$).The results of the Hungarian respondents approximated

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those of the Slovak ones; no differences were found in the physical activity category of the vigorous and moderate activity values ($p>0.05$).In Slovakia, we found significant differences between sexes in total MET/week and walking activities (MET/week) ($p<0.001$), thus, female students were found to be more active than males caused by the higher rates of walking activities of women.

**Conclusion.** The V4 countries are not in an advantageous situation concerning physical activity in the European framework because only 21-35% of the population does sports once a week. According to our results, university students show a more positive picture on physical activity than the adult population. However, there are some specific risk groups. 43.8% of female and 57.3% male students can be considered as persons with high physical activity. Our findings may play a major role in the development of intervention programs targeting young people and in the concern of the differences between sexes. Furthermore, these results may call young people's attention to health maintenance to preserve their fitness for getting better activity figures.

**Keywords:** *physical activity, V4, gender differences, university students*

## Introduction

Changes in economic and social patterns of life have altered people's way of life significantly. A sedentary lifestyle has become a global phenomenon in the past decades and is associated with the development of various diseases, such as obesity, Type II diabetes, and cardiovascular disorders. Therefore, active physical life has a great significance nowadays (Biernat & Tomaszewski, 2015; Apor, 2012). According to statistics, the number of people with excess weight has doubled in the past 30 years. Besides this fact, it has been justified that more than half of the population is overweight. Even young adults are affected by the problem. It is an important issue because 60% of the overweight young people keep their excess body weight in later adulthood increasing the risk of different diseases (Herzig et al., 2012). Physical activity is an important factor in the prevention of diseases and health maintenance in which sports have a key role (Ács et al., 2011; Cselik et al., 2015; Jaromi et al., 2012; Babocsay et al., 2014). Doing mainstream sports should start in childhood as it determines health maintenance to a great extent. Moreover, athletes may feel to belong to a community (Bergier et al., 2014).

Unfortunately, most of the young people choose a sedentary lifestyle during their university studies. They spend a lot of time in front of the computer or television. For transportation, they take the public vehicle or cars opposite to

walking (Pavlik, 2015). Therefore, today's lifestyle does not require physical activity but everyone's conscious decision should be to do sports to preserve a good health status.

Inactivity has an adverse effect on people's health status, and also on their nervous, cardiovascular, musculoskeletal system (Apor, 2012).

Furthermore, nutrition and weight management also have an important role in health. With a healthy lifestyle three-quarter of cardiovascular illnesses could be preventable (Bergier et al., 2014).

Obesity is a serious problem worldwide, and a reason for several chronic diseases. According to the European Health and Life Expectancy study, more than half of the adult population is obese or overweight and this rate is also increasing among the young people in Europe (Martos et al., 2012; Központi Statisztikai Hivatal, 2010).

Besides the health risk of obesity, inactivity reduces the working capacity of the population. People are getting far away from physical activities, physical work or sports activities. In their leisure time, they choose sedentary activities different from active recreation (Pavlik, 2015).

Sports activities have some rules fixed in guidelines where the age groups can find the recommended weekly level of physical activities. For young people, 6-7 hours vigorous activities are recommended weekly (Pavlik, 2015). Furthermore, a research from Harvard University proved that 2000 kcal of physical activity/ week reduces the risk of heart attack by 64% (Shaper & Wannamethee, 1991). However, the personal guideline is essential, due to different personal health status, or age. The aim of sports activity is an important factor in physical and recreational activities (Pavlik, 2015). For people aged between 18-64 years, the WHO recommends 150 minutes of moderate physical activity/week equally distributed during individual days. It can be 75 minutes of intensive physical activity/ week or an equivalent volume of intensive and moderate physical activity/week including recreational activity, or exercise related to transport, relocation, occupational activity, household activities, and sports (Pavlik, 2015).

Bergier et al. showed that low physical activity was observed among 20.84% of students. According to the IPAQ, analysis of the physical activity level indicated that it was lower among females compared to males. The Median for weekly physical activity was 1,554.00 MET*min/week among women, and 2,611.00 MET*min/week among men ($p<0.000$) (Bergier et al., 2012).

In 2012, a national study called "ENERGY" was carried out with the participation of Sweden and seven other European countries. They examined the activity and leisure time habits of students aged between 10-12 years. The aim of the research was to compare the students' anthropometric data, nutrition habits, and physical activities with the participation of 546 students in Sweden

and the other countries. According to the results in Switzerland, there are fewer obese or overweight students than in other countries. Walking and cycling activities are higher represented in Switzerland. However, no significant differences were found in the consumption of sugary soft drinks among the eight European countries. Thus, these are age-related habits that we can change together but there are several other reasons for inactivity due to environmental differences. Obesity and inactivity of students can be considered as a combined problem which needs complex prevention to improve the proportion of healthy and active students in the European population (Michael et al., 2012).

Our research was conducted in the four Visegrad countries (V4): Poland, Hungary, Czech Republic, and Slovakia in 2015. The aim of the study was to examine the university students' physical activity, nutrition habits, and sports preferences to find the differences and similarities among the four countries and to finda better prevention strategy to improve the in-group's health status.

## Material and Method

### *Physical activity*

"*Physical activity is defined as any bodily movement, produced by skeletal muscles, that requires energy. It is associated with health and life quality. It involves sports and other activities undertaken while working, carrying out household chores or engaging in recreational pursuits*." American and European guidelines follow different ways (*http://www.eufic.org/article/hu/*). Americans suggest moderate intensity exercise with 150 min/week, while Europeans recommend 30 min. moderate exercise for 5 days a week at least. The importance of physical activity becomes a priority for the decision makers. It is affected by the inconvenient fact that only 41% of the European population does sports once a week at least (*http://ec.europa.eu/citizenship/*). Furthermore, Ács et al. (2011) justified that inactivity burdens the economy of a country (Ács et al., 2011).

Quantitative, cross-sectional survey research.

*Objective:* To assess the health status, physical activity, nutrition habits of young people (university students) in the V4 countries. The survey assesses the activities of young people, the basis of their nutrition, and their relation to sports. The study aims to learn if they do any sports or what sports they prefer.

*Participants:* Young population in the V4 countries (age: 19.5 (SD:2.95). Participant countries were the Czech Republic (Palacky University, Olomouc) Poland (*Pope John Paul II State School of Higher Education in Biala Podlaska*),

Slovakia (The *University of Presov in Presov, Faculty of Sport*) and Hungary (The *University of Pécs, Faculty of Health Sciences, Pécs*). The number of participants in each country accounted for 1200 persons from the secondary school and university population at the beginning of the research. The sample consisted of 600 secondary school and 600 university students on average in each country. The gender distribution was equal and the distribution per year was proportional. For statistical analysis, the research comprised of 2237 university students as a total. The university sample comprised of 1st-year and 3rd-year students at the Faculty of Humanities, the Faculty of Engineering, and the Faculty of Health Sciences.

*Survey:* Interviewing was carried out from April to June, 2015 at the same time in each country. IPAQ extended questionnaire and a self-administered questionnaire were used to assess nutritional and activity habits (*www.ipaq.ki.se*). In order to evaluate data, INDARES software and a paper-based questionnaire were used. Ethical principles of the Helsinki Declaration were taken into consideration. Participation was voluntary and anonymous for young people. Interviewing was carried out online and in a paper-based form with the help of research assistants.

### *Measuring physical activity*

Checking physical activity is possible only with reliable and valid methods. These methods include questionnaires, indirect calorimetric, direct observation, pulse telemetry, and sensors measuring different motions. Despite the limitations of these methods, there is no perfect standardized measurement for physical activity. Several measuring instruments are available, but access to these gadgets has financial limits. Therefore, it has become a crucial issue to elaborate a method to measure the extent and quality of physical activity entirely and be purchased quickly. Hence, the International Physical Activity Questionnaire was construed (IPAQ) in 1998. IPAQ gives an opportunity to assess the individual's physical activity, but at the same time, it seems to be a subjective tool to determine the extent of physical activity. Therefore, the most accurate data can be gained by the objective and subjective measurements of physical activity in a combined way. Evaluation of IPAQ separates three activity groups, namely low, medium, and high categories. The physical activity categories are as follows: low with 600/MET/week activity level; medium with 600-1500/MET/week; and high with above 1500/MET/week. IPAQ differentiates sedentary, moderate, and vigorous activities to which different MET values are associated, such as sports or household chores. The individual's physical activity per week equals with the MET value multiplied with the duration of the activity (MET/week) (Lachat et al., 2008; Lee et al., 2011).

### *Dependent and independent variables*

*Independent variables:* sex, age, domicile, body height, body mass (self-reported), education

*Dependent variables:* According to IPAQ extended data measuring physical activity, three physical activity categories were differentiated in agreement with international standards: low, moderate, and high physical activities.

*Statistical analysis:* Data analysis was carried out by SPSS 22.00 statistical software. Besides descriptive statistics, chi-square test, Mann-Whitney U test, and Kruskal-Wallis tests were used for analysis of the differences between countries. Data distribution was tested by Kolgomorov-Smirnov test. As data distribution was not considered as normal, we applied non-parametric tests. The significance level was determined by $p<0.05$.

## Results

### *Descriptive statistics*

**Table 1.** Descriptive statistics

| | **Hungary** | | **Poland** | | **Slovakia** | | **Chech Republic** | | **Total** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample size (n)** | 495 | | 727 | | 512 | | 503 | | 2237 | |
| **Gender** | *Male* | *Female* | *Male* | *Female* | *Male* | *Female* | *Male* | *Female* | *Male* | *Female* |
| | 231 (46.67%) | 264 (53.33%) | 356 (48.97%) | 371 (51.03%) | 262 (48.97%) | 250 (48.83%) | 219 (43.54%) | 284 (56.46%) | 1068 (47.74%) | 1169 (52.26%) |
| ***Mean (SD)*** | | | | | | | | | | |
| **Age** | 23.04 (2.05) | 22.75 (1.86) | 21.39 (1.64) | 21.15 (1.45) | 21.87 (1.46) | 21.19 (1.29) | 21.92 (1.89) | 21.35 (1.82) | 21.97 (1.85) | 21.57 (1.74) |
| **BMI** | 23.15 (3.69) | 21.74 (3.45) | 24.19 (3.33) | 21.60 (3.13) | 24.37 (3.13) | 21.31 (3.16) | 24.64 (3.43) | 21.51 (2.86) | 24.13 (3.40) | 21.55 (3.14) |
| **Body weight (kg)** | 73.77 (14.44) | 60.18 (10.60) | 79.16 (13.03) | 60.13 (9.95) | 79.56 (12.13) | 58.96 (9.70) | 81.32 (13.73) | 60.20 (9.41) | 78.53 (13.52) | 59.91 (9.92) |
| **Body height (cm)** | 177.17 (9.38) | 167.28 (6.09) | 180.72 (7.24) | 166.71 (6.21) | 180.49 (7.70) | 166.23 (6.01) | 181.46 (7.40) | 167.13 (6.29) | 180.15 (7.96) | 166.83 (6.16) |

The research was realized by the cooperation of four Visegrad countries (Poland, Slovakia, the Czech Republic and Hungary). The physical activity and the nutritional habits of 2237 university students were assessed with the help of an international research group.

**Table 2.** Gender differences in physical activity level among the V4 countries

| | Slovakia | | | | Poland | | | | Chech Republic | | | | Hungary | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Male | | Female | | Male | | Female | | Male | | Female | | Male | | Female | |
| PA | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| Low | 21 | 9.59 | 11 | 4.4 | 25 | 7.02 | 26 | 7.01 | 21 | 9.59 | 31 | 10.92 | 34 | 14.72 | 33 | 12.5 | 101 | 9.46 | 101 | 8.64 |
| Medium | 87 | 33.79 | 91 | 36.4 | 111 | 31.18 | 199 | 53.64 | 74 | 33.79 | 150 | 52.82 | 83 | 35.93 | 116 | 43.94 | 355 | 33.24 | 556 | 47.56 |
| High | 154 | 56.62 | 148 | 59.2 | 220 | 61.8 | 146 | 39.35 | 124 | 56.62 | 103 | 36.27 | 114 | 49.35 | 115 | 43.56 | 612 | 57.3 | 512 | 43.8 |
| *Gender difference:* | p=0.217 (0.077) | | | | p<0.001 (0.234) | | | | p<0.001 (0.207) | | | | p=0.191 (3.306) | | | | p<0.001 (0.148) | | | |
| Total MET/week | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* |
| | 5382.11 | 5366.7 | 7075.89 | 5815.33 | 7477.54 | 6479.81 | 5049.28 | 4848.03 | 7165.74 | 5951.12 | 5144.46 | 4700.67 | 3429.27 | 3058.71 | 3653.49 | 3543.79 | 6023.95 | 5727.01 | 5190.6 | 4913.07 |
| *Gender difference:* | p<0.001 (Z=-4.140) | | | | p<0,001 | | | | p<0,001 (Z=-3.972) | | | | p=0.967 (Z=-0.041) | | | | p=0.006 (Z=-2.750) | | | |
| Total vigorous activity MET/week | 1694.5 | 2215.81 | 1914.4 | 2367.36 | 2390.45 | 2841.63 | 1024.04 | 1893.91 | 2327.85 | 2507.92 | 1139.3 | 1954.05 | 1215.24 | 1725.23 | 1028.33 | 1576.36 | 1952.7 | 2457.87 | 1243.42 | 1985.06 |
| *Gender difference:* | p=0.334 (Z=-0.965) | | | | p<0,001 | | | | p<0,001 (Z=-6.475) | | | | p=0.404 (Z=-0.834) | | | | p<0,001 (Z=-7.942) | | | |
| *Total moderate activity MET/week* | 2327.11 | 2635.29 | 2393.85 | 2569.7 | 2938.43 | 3157.11 | 2273.17 | 2679.78 | 2806.43 | 2896.53 | 2208.47 | 2457.76 | 1434.09 | 1497.19 | 1713.91 | 2015.84 | 2436.02 | 2746.81 | 2156.96 | 2474.37 |
| *Gender difference:* | p=0.388 (Z=-0.864) | | | | p=0.010 (Z=-7.937) | | | | p=0.029 (Z=-2.177) | | | | p=0.533 (Z=-0.624) | | | | p=0.085 (Z=-1.725) | | | |
| *Total walking MET/week* | 1360.49 | 1663.48 | 2767.64 | 2527.23 | 2148.66 | 2288.48 | 1752.07 | 1976.33 | 2031.46 | 2134.03 | 1796.7 | 1867.88 | 779.94 | 1149.32 | 911.25 | 1148.69 | 1635.23 | 1982.82 | 1790.21 | 2030.01 |
| *Gender difference:* | p<0.001 (Z=-7.871) | | | | p=0.035 (Z=-2.108) | | | | p=0.426 (Z=-0.796) | | | | p=0.189 (Z=-1.314) | | | | p=0.009 (Z=-2.623) | | | |

The present study examines the responses of the 1st-year and the 3rd-year university students from four countries (495 Hungarian, 727 Polish, 512 Slovakian, and 503 Czech students) studying arts, engineering, health sciences, and medicine. The sex ratio follows a 50%-50% distribution. Their mean age was 21.76 (SD:1.80). Mean height: 173.15 cm's (SD: 9.71). Mean body weight: 68.81 kg's (SD: 15.01). BMI: 22.77 (SD: 3.51). Their BMI is in the center line of the average category, 22.92% of students was overweight or obese based on the self- reported measurements (Table 1).

### *Gender differences in physical activity among the Visegrad countries (V4)*

9.46% of male students and 8.64% of female students have low physical activity that equals with fewer than 600 MET physical activities at school, at home, or in free time activities. Differences were observed between the countries

in the MET/week values for total activities and the MET/week values for vigorous, moderate and walking activities.

The aim of our study was to assess the physical activity among university students in the V4 countries within the framework of gender differences. In our analysis, physical activity was compared to IPAQ questionnaire in three categories (low, moderate, vigorous) and to the MET/week values of the total activities concerning sex differences in four countries.

It was confirmed by the total MET/week (TMET) and the vigorous activity MET/week (VMET) values were higher in males (TMET: 6023.95 (SD: 5727.01), VMET: 1952.7 (SD: 2457.87)), than in females (TMET: 5190.6 (SD: 4913.07), 1243.42 (SD: 1985.06)). As a conclusion, there was a significant difference ($p<0.05$) concerning the four parameters in the V4 countries. In the four V4 countries, there were no significant differences in moderate (MET/week) activities, and we found inverse result in walking activities according to the gender differences, as in walking activities (WMET). Female students (WMET: 1790.21 (SD: 2030.01)) had significantly higher MET/week values than males (WMET: 1635.23 (SD:1982.82)).

A significant difference ($p<0.001$) was found between the physical activity categories in the light of sexes. We found a lower rate of low physical activity category (8.64%) in female students than in males (9.46%). However, male students were presented mostly in the high physical activity group. 57.3% of the male students took part in the high category opposite to females. Only 43.8% of the latter group was found in the high physical activity category.

Besides the gender differences of physical activity values in the V4 countries, we examined the differences among the four countries.

Similar results to those of the V4 countries resulted from Poland. 7% of both males (7.02%) and females (7.01%) belonged to the low physical activity category, thus, they did fewer than 600 MET/week physical activity. At the same time, the difference was significant between sexes in the high physical category. In this category, 61.8% of males and 39.35% of females did 1500 Met/week physical activity at least. This physical activity could be carried out at school, at home, or during leisure time. Similarly, there were significant differences in the sexes in total. The vigorous, moderate and walking MET/week values showed significant differences ($p<0.05$).

Almost identical results were found in the Czech Republic and other V4 countries compared to Poland. There was a significant difference in both sexes concerning the physical activity ($p<0.001$). We highlight the three activity categories in which 56.62% of males and 36.27% of females were the only respondents in the high physical activity category. In the Czech respondents, there were no significant gender differences between the rate of walking activities ($p=0.426$).

The results of the Hungarian respondents approximated those of the Slovak ones; no differences were found in the physical activity category, or in the vigorous and moderate activity values ($p>0.05$).

In Slovakia, we found significant differences between sexes in total MET/week and walking activities (MET/week) ($p<0.001$). We found that female students were more active than males caused by higher rates of walking activities of females.

The results of the Hungarian respondents were much lower in the total MET/week and vigorous MET/week values. It is worth mentioning, that the ratio of the respondents in the high activity category accounted for 49.35% of males and 43.56% of females. However, it was moderate but similar to the ratio of other countries. (Table 2). At the same time, the ratio of the respondents in the low category varied between14.72 % and 12.5% (Figure 1).

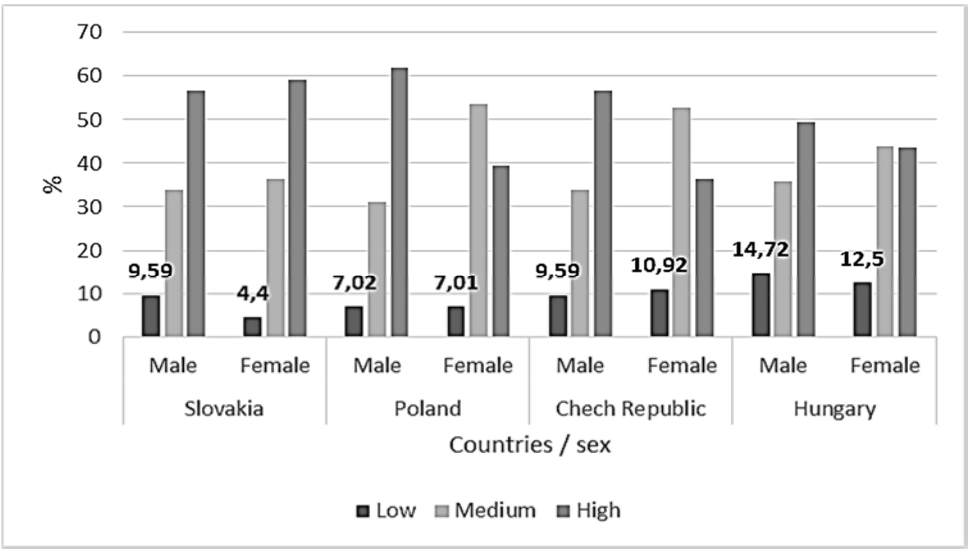


**Fig. 1.** Gender differences in the rates of low physical activity in the V4 countries

We also examined the differences between countries, and found significant differences among them ($p<0.001$). It was caused by the worse MET/week values of physical activity of Slovakia and especially Hungary. However, a higher proportion of low physical activity group was found for Hungary(Figure 2) where 12.5% of female students, and 14.72% of male students belonged to this category opposite to the other countries where this ratio was under 10% (except for Czech females).

## Discussion

Considering health status, the subjective evaluation is different between males and females. Females regard themselves as being less fit than males do (Tesch-Römer et al., 2008; Hosseinpoor et al., 2012; Vöörmann & Helemaee, 2013). Ansari (2014) et al. examined the five forms of physical activity related to sex distribution in a cross-sectional study. The five forms are as follows: moderate, increased, vigorous, intense, and workout physical activities. The representative sample comprised of 1300 university students. Issues in the self-administered questionnaire compiled by the American Heart Association concerned the duration and frequency of the physical activity per week. Regarding sex distribution, the activity level of female students was lower than that of their male counterparts (Ansari et al., 2014). Bergier et al. (2012) justified the activity in young people using IPAQ in their research. According to their results, 25.27% of the respondents had low physical activity. Regarding sex differences, there was a high ratio for those with vigorous physical activity (males:48.77% and females: 31.35%).Our results support these above findings that 12% of the university students have low physical activity that may increase the risk of getting into the inactive category. It may involve several health risks and the increase of the chance of diseases (Bergier et al., 2012).

At the same time, 43.8% of the female students, and 57.3% of males belong to the high physical activity category, that fact may serve as a guideline for the students to be an exemplar for other people. With the help of intervention, the physical activity of young people can be improved and incorporated into their everyday lives.

Teresa M Bianchini de Quadros et al. had similar results (2009) in their survey research in which they reported the socio-demographic factors of physical activity among university students in Brazil with the help of a logistic regression model. According to their results, females and part-time students had higher inactivity *(p<0,05)* (Bianchini de Quadros et al., 2009).

The above findings were confirmed by Galan et al. in which the sample with the total of 21188 persons justified boys' appropriate health status associated with higher life quality and satisfaction (Galán, 2013).

According to our results, differences in physical activity related to sexes were found among university students in the V4 countries except for moderate physical activities. Female university students have fewer appropriate physical activity indicators than male university students. However, female students had favorable results in walking activities than males. Regarding the country differences, Slovakia and Hungary need more effective changes in the improvement of physical activity among the university students. Furthermore, it should be noted

that there is no compulsory physical education at universities and colleges in Hungary. Students from the faculties examined take part in the physical education classes in an optional form. Therefore, willingness for participation is rather low despite that exercising should improve their health status. However, research proved that regularity in sports activities is crucial. It should be ideal for young people to do sports every day (Pavlik, 2015).

The research strengths are as follows: high sample size, international database supported by the partnership of the V4 countries. At the same time, it is worth mentioning that self-evaluation of physical activity results means subjective data for the researchers. An objective measurement technique would mean a useful option to confirm data and define new directions in research.

## Conclusions

Within a European framework, the V4 countries are not in an advantageous situation regarding physical activity. At the same time, our findings have justified that university students in these countries have more positive data on overweight and inactivity within the socio-demographic parameters than the adult population. Several differences regarding inactivity were found in our study. These results may play a crucial role in the development of intervention programs for different target groups. They may call young people's attention to further physical activities to maintain and sustain their health and fitness in all their life.

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