

**KOMPARÁCIA POHYBOVÝCH AKTIVÍT ŽIAKOV STREDNÝCH ŠKÔL
VO VYBRANÝCH MESTÁCH NA SLOVENSKU**
**COMPARISON OF SECONDARY SCHOOL STUDENTS' PHYSICAL ACTIVITIES
IN THE SELECTED TOWNS IN SLOVAKIA**

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ABSTRACT

Regular physical activity is a key factor in maintaining health and healthy lifestyle. Up to 80 % of adolescents do not reach the recommended volume of physical activity. Therefore, it is very important to promote the regular physical activity among adolescents. The aim of our study was to analyse and compare the physical activity of secondary school students from the selected towns in Slovakia. As the main method we used a survey. We examined the physical activity of secondary school students in Žilina, Zvolen, and Banská Bystrica. Our survey was anonymous and carried out from February to May, 2019. The obtained data was evaluated by using the method of percentage. The difference of survey group was evaluated by the method of inductive statistics (Chi-square test) at the level of significance of $p < 0.01$ and $p < 0.05$. In terms of total volume of leisure time, we recorded the statistical significance at the level of significance of $p < 0.01$. Almost 60 % of the survey group was physically active and performed the physical activity at the recreational level. The survey group performed the physical activity inside. During the weekend, the total volume of leisure time was smaller than during the weekday. Our results indicate that the competitive level of physical activity was the dominant form of performing the physical activity. The survey group performed the physical activity at the sports grounds near their residence.

Key words: Physical activity. Secondary school. Students.

ABSTRAKT

Pravidelná pohybová aktivita je kľúčovým faktorom pre udržanie zdravia a zdravého životného štýlu. Až 80 % dospievajúcej mládeže nedosahuje odporúčané množstvo pohybovej aktivity. Z tohto dôvodu je veľmi dôležité viesť dospievajúcu mládež k pravidelnej pohybovej aktivite. Cieľom tejto štúdie bolo analyzovať a komparovať pohybové aktivity žiakov stredných škôl z vybraných miest stredného Slovenska. Skúmali sme pohybovú aktivitu žiakov stredných škôl v Žiline, Zvolene a Banskej Bystrici. Naša anketa bola anonymná a realizovaná od februára do marca 2019. Získané údaje boli vyhodnotené s pomocou percentuálnej metódy. Rozdiel v prieskumnej skupine bol vyhodnotený metódou induktívnej štatistiky (Chi-square test) na hladine významnosti $p < 0,01$ a $p < 0,05$. Z hľadiska celkového objemu voľného času sme štatistickú významnosť zaznamenali na hladine významnosti $p < 0,01$. Takmer 60 % z prieskumnej skupiny bolo pohybovo aktívnych a pohybovým aktivitám sa venovalo na rekreačnej úrovni. Prieskumná skupina vykonávala pohybovú aktivitu v interiéri. Cez víkend bol celkový objem voľného času menší ako cez pracovný deň. Naše výsledky na-

značujú, že výkonnosťná úroveň pohybovej aktivity bola dominantnou formou vykonávania pohybovej aktivity. Prieskumná skupina vykonávala pohybovú aktivitu na športoviskách v blízkosti ich bydliska.

Kľúčové slová: Pohybová aktivita. Stredné školy. Žiaci.

INTRODUCTION

The physical activity is a part of human being's lifestyle and is perceived as beneficial for health. The lack of physical activity may increase the risk of diseases, such as stroke, cancer and diabetes [1-3]. Being physically inactive may shorten the lifespan by 4 years. Therefore, the global target is to reduce the physical inactivity by 10 %. In many countries, there has been recorded decreasing level of physical activity, which has the major implications for the prevalence of noncommunicable diseases and general health of population worldwide [4]. Children aged 5 to 17 should do at least 60 minutes (1 hour) of moderate-to-vigorous intensity physical activity each day. The most of physical activity should be aerobic and incorporated, including such physical activity which strengthens muscle and bone, at least three times per week. The total volume of physical activity greater than 60 minutes per day, provides additional health benefits [5].

The total volume of physical activity has been decreasing with age and gender. Boys are more physically active than girls [6]. Sedentary lifestyle prevails during the period of pubescence [7]. The period of pubescence is very important for developing physical habits [8]. Sitting and lying down, while performing leisure activity, is considered as the sedentary lifestyle [9]. In contrast with the past, the leisure activity is more sedentary and screen-based. Therefore, the total volume of time spent being sedentary should be limited, in particular the recreational screen time [10]. When spending the

leisure time with family and performing leisure activity, the process becomes spontaneous and forms positive relationship [11]. The leisure time is changing from spending it with family to friends. When searching for indicators of leisure activity and socioeconomic status of a family, the searching revealed associations between the parents' education and child's membership in the sports organizations [12].

Performance of leisure activity has been associated with several factors, which have not supported the status of being physically active. The most common factor of being physically inactive has been the financial support which has been related to the town budget and system of sports financing. The lack of time has been the most common reason of being physically inactive [13]. Another reason for not performing leisure activity is the lack of sporting infrastructure near the residence [14].

The aim of our study was to analyse and compare the physical activity of secondary school students from the selected towns in Slovakia. The main reason for choosing the selected towns of former Central Slovak Region (December 18, 1990) was its area (35 % of Slovakia), which was the largest area in the entire Czechoslovakia. The area (km²) and population (total, density) of the selected towns was as follows: (a) Žilina – 80.03 km², 80 386, 1004.45 per km² (capital town of Žilina Region); (b) Zvolen – 98.74 km², 42 092, 426.33 per km²; (c) Banská Bystrica – 103.38 km², 77 791, 751.78 per km² (capital town of Banská Bystrica Region; the European City of Sport – 2017; the European Youth Olympics Festival – 2022). Other reasons for choosing the selected towns of former Central Slovak Region: (a) The selected towns are among the 5 most populous towns; (b) the selected towns are among the 3 largest towns (area); (c) the population of selected towns has decreased by less than 2.9 %; (d) the unemployment rate of selected towns has been relatively balanced (from 3.33 % – Banská Bystrica to 3.62 % – Žilina).

METHODS

Participants

In terms of the study aim, the survey group was chosen purposely, with the following criteria: (a) The same year of students; (b) not having health issues (one item of survey was detecting the health issues of the survey group (n = 1 112). Out of fifty – five secondary schools (n = 55; 100 %) of the selected towns of Central regions of Slovakia, fifteen

secondary schools (n = 15; 27.27 %) participated in our study. The incidence of involved secondary schools was as follows: (a) Žilina – five secondary schools (n = 5; 33.33 %); (b) Zvolen – five secondary schools (n = 5; 33.33 %); (c) Banská Bystrica – five secondary schools (n = 5; 33.33 %). In total of 1 112 secondary school students (460 male students – 40.99 %, age 18.43 years, body weight 74.13 kg, body height 179.30 cm, body mass index 23.05; 662 female students – 59.01 %, age 18.47 years, body weight 59.32 kg, body height 165.42 cm, body mass index 21.66) participated in our study. The incidence of involved secondary school students was as follows: (a) Žilina – 366 (32.91 %, 126 male students – 34.42 %; 240 female students – 65.58 %); (b) Zvolen – 346 (31.11 %, 152 male students – 43.93 %; 194 female students – 56.07 %); (c) Banská Bystrica – 400 (35.98 %, 182 male students – 45.50 %; 218 female students – 54.95 %).

Procedures

When collecting the data, we used the survey as the main method. The survey was created purposely (non-standardised survey) and comprised of eight items, concerned with the physical activity and students of secondary schools. Inspired by several authors, our survey was created and its content was related to secondary school students' attitudes about the leisure time and physical activity [15-17]. In case of underage participants, written consent was required from parents (guardians). The information about identity was not taken, so that the survey was answered objectively. Our survey was given to each secondary school student who inscribed the answers in the pre-printed forms. After inscribing the answers, the survey was given to the authors of the study. The survey was carried out from February to May, 2019.

Statistical analysis

The obtained data was evaluated by using the programme - Tap 3 Gamo, Banská Bystrica. We used the method of percentage (%), while the difference between the leisure time and physical activity of secondary school students was evaluated by the method of inductive statistics (Chi-square test) at the level of significance of $p < 0.01$ and $p < 0.05$.

RESULTS

In terms of study results, the first item of our survey was dealing with the average leisure time of secondary school students after performing every-

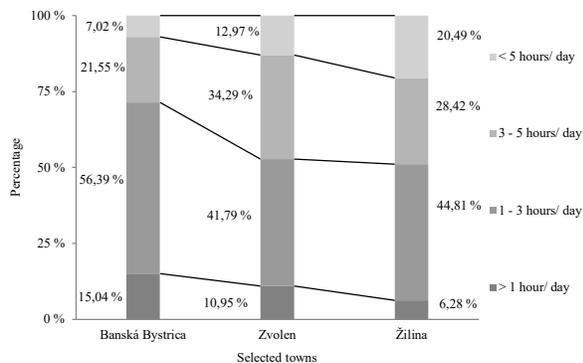


Figure 1 Average leisure time during the weekday

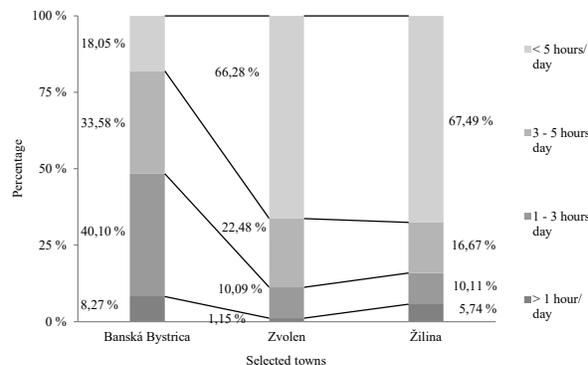


Figure 2 Average leisure time during the weekend

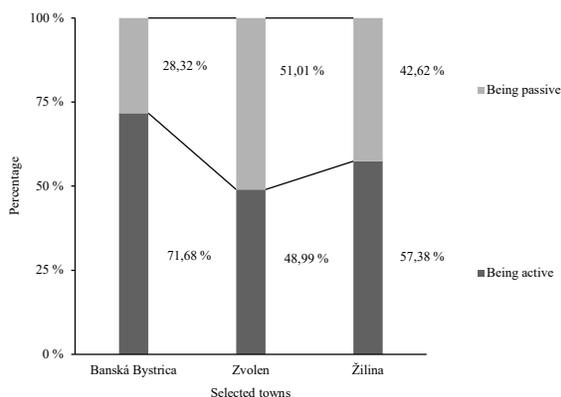


Figure 3 Dominant form of spending leisure time

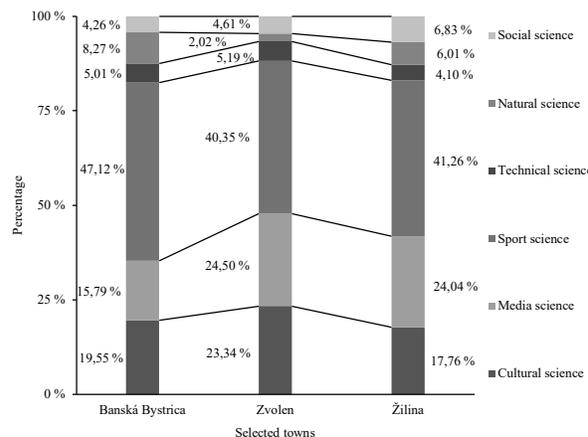


Figure 4 Dominant area of spending leisure time

day obligations (Fig. 1). When inscribing the answer about the leisure time, the survey group's highest percentage answer (average) was the answer from one to three hours per day (47.69 %). The incidence of the selected towns was as follows: (a) Žilina (n = 164; 44.81 %); Zvolen (n = 145; 41.89 %); (c) Banská Bystrica (n = 226; 56.39 %). The answer from three to five hours per day (28.08 %) was the second highest percentage answer of the survey group. The answer incidence of the survey group was from 21.55 % (Banská Bystrica) to 34.29 % (Zvolen). When comparing the selected towns almost 21 % of the survey group of Žilina (n = 75) inscribed the answer of having more than five hours per day of leisure time.

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Tab. 1).

When presenting the survey group's leisure time during the weekend, the answer of having more than five hours per day of leisure time was the highest percentage answer of survey group (66.88 % –

Žilina, Zvolen). The answer of having one to three hours per day of leisure time was the highest percentage answer in the survey group of Banská Bystrica (40.10 %, n = 160). The answer of having less than one hour per day of the leisure time was the lowest percentage answer of the survey group (5.05 %). The answer incidence of the selected towns was as follows: (a) Žilina (n = 21; 5.74 %); (b) Zvolen (n = 4; 1.15 %); (c) Banská Bystrica (n = 33; 8.27 %).

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Tab. 1).

When determining the dominant form of spending leisure time, almost 60 % of the survey group inscribed the answer of being physically active. The answer incidence of the survey group was from 48.99 % (n = 170; Zvolen) to 71.68 % (n = 286; Banská Bystrica) (Fig. 3). Despite having the answer rate of 59.35 %, being physically inactive was the dominant form of spending the leisure time in the survey group of Zvolen (n = 176; 51.01 %).

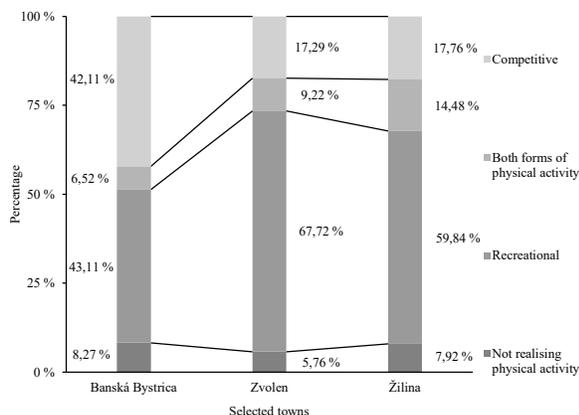


Figure 5 Dominant form of performing the physical activity

Providing different opportunities, in terms of sporting infrastructure caused the different answer rates of the survey group.

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Žilina, Zvolen/ Banská Bystrica) and $.05$ (Žilina/ Zvolen) (Tab. 1).

When evaluating the dominant area of spending leisure time, the answer rate of the survey group was quite different (Fig. 4). The answer of the sport science was the highest percentage answer of the survey group. The answer incidence of the selected towns was as follows: (a) Žilina ($n = 151$; 41.26 %); (b) Zvolen ($n = 140$; 40.35 %); (c) Banská Bystrica ($n = 188$; 47.12 %). Another dominant area of spending leisure time was media science (21.44 %). The answer incidence of the survey group was from 15.79 % (Banská Bystrica) to 24.50 % (Zvolen). The answer of the cultural science was the second highest percentage answer (Banská Bystrica, $n = 78$; 19.55 %). The least dominant area of spending leisure time was as follows: (a) Žilina (Technical science, $n = 15$; 4.10 %); (b) Zvolen (Natural science, $n = 7$; 2.02 %); (c) Banská Bystrica (Social science, $n = 17$; 4.26 %).

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Zvolen/ Banská Bystrica) and $.05$ (Žilina/ Zvolen and Žilina/ Banská Bystrica) (Tab. 1).

In terms of determining the dominant form of performing the physical activity, 56.89 % of the survey group was performing the recreational level of physical activity. The answer incidence of the

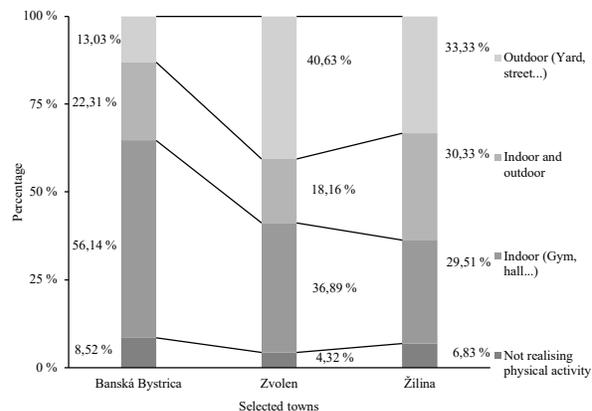


Figure 6 Dominant place of performing the physical activity

selected towns was as follows: (a) Žilina ($n = 219$; 59.84 %); (b) Zvolen ($n = 234$; 67.72 %); (c) Banská Bystrica ($n = 172$; 43.11 %). Another dominant form of performing the physical activity was competitive level of the physical activity (25.72 %) (Fig. 5). The answer incidence of the survey group was from 17.29 % (Zvolen) to 42.11 % (Banská Bystrica). About 7.32 % of the survey group was not performing the physical activity, which was the lowest percentage answer of the survey group. The answer incidence of selected towns was as follows: (a) Žilina ($n = 29$; 7.92 %); (b) Zvolen ($n = 20$; 5.76 %); (c) Banská Bystrica ($n = 33$; 8.27 %).

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Žilina, Zvolen/ Banská Bystrica) (Tab. 1).

In contrast to previous item of the survey, the answer rate of the survey group was quite different. When inscribing the answers about the dominant place of performing the physical activity, almost 41 % of the survey group was performing indoor physical activities (Gym, hall). The answer incidence of the selected towns was as follows: (a) Žilina ($n = 108$; 29.51 %); (b) Zvolen ($n = 128$; 36.89 %); (c) Banská Bystrica ($n = 225$; 56.14 %) (Fig. 6).

When comparing the percentage answer of the survey group, the most dominant place of performing the physical activity was outdoors in the survey group of Žilina ($n = 122$; 33.33 %) and Zvolen ($n = 141$; 40.63 %). About 6.55 % of the survey group was not performing the physical activity. The answer incidence of the selected towns was as follows: (a) Žilina ($n = 25$; 6.83 %); (b) Zvolen

Table 1. Statistical evaluation of survey group's answers

Figure	Žilina/ Zvolen		Žilina/ B. Bystrica		Zvolen/ B. Bystrica	
1	**	4.93E-03	**	2.01E-10	**	3.60E-06
2	**	3.18E-03	**	1.01E-43	**	1.36E-42
3	*	2.49E-02	**	7.87E-05	**	2.29E-10
4	*	3.87E-02	*	2.973-02	**	2.29E-04
5	n	6.87E-02	**	8.07E-13	**	2.96E-13
6	**	3.79E-04	**	2.37E-15	**	2.46E-16

Note: ** Statistical significance at level of 0.01; * Statistical significance at level of 0.05; ⁿ Statistical insignificance

(n = 15; 4.32 %); (c) Banská Bystrica (n = 34; 8.52 %).

In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ (Tab. 1).

DISCUSSION

In terms of our study aim and results, the average leisure time of the survey group was from one to three hours per day during the weekday (47.69 %). After carrying out the similar study, the average leisure time of the survey group (aged from 15 to 29; Czech Republic) was three hours and forty-five minutes per day [18]. The average leisure time of American adolescents was five hours per day during the weekday and seven hours per day during the weekend. In the summer, the American adolescents, aged 15 to 17 were devoting more of their time to the educational activities and less time to leisure activities [19]. The answer of having more than five hours per day of the leisure time (66.88 % – Žilina, Zvolen) correlated with the average leisure time of the American adolescents. In terms of secondary schools' locations, the difference of survey group and selected towns was significant at the level of significance of $p < 0.01$. It means that the diverse nature of secondary schools' locations and selected towns' options of the survey group caused the significant differences about spending the leisure time of the survey group. Up to 42.11 % (n = 168) of the survey group (Banská Bystrica) was performing the competitive level of physical activity.

The total volume of leisure time was lower during the weekend. In the period of adolescence, the total volume of leisure time was six hours and fifty-eight minutes per weekend [18]. Spending the leisure time actively was recorded in 59.35 % (n = 660) of the survey group, which was in the contrast to the survey group of Zvolen (n = 176; 51.01 %). Providing the different selected towns'

options, in terms of the sporting infrastructure, caused the different answer rates of the survey group, as well as the dominant form of spending leisure time. The adolescents who are more physically active are more physically active as adults. The use of excessive media was associated with the poorer mental and physical health. It is very important to analyse the leisure time and physical activity of adolescents, because many tendencies to maintain active lifestyle show the insignificant results [20, 21]. Human beings understand the urgency to move and perform physical activity, however, it is very difficult to convince them to do something beyond the scope of daily duties. In the period of adolescence, there has been decline of the physical activity [22]. Shin & You [23] revealed that 73.85 % of their survey group was spending leisure time passively. In this sense, it is related to moving from the structured activities to the unstructured activities [24].

In the period of adolescence, 81 % of school population was physically inactive and performed less than one hour per day of the physical activity (78 % of male and 84 % of female students). Positive physical activity is perceived as the basic biological requirement, while the failure of meeting the basic requirements may cause the increase of the noncommunicable diseases [25].

Because of not moving enough to maintain healthy growth and development, "Active Healthy Kids Global Alliance" developed the standardized global surveillance system of the physical activity and related indicators [26]. More than 30 % of school population performed the recommended volume of the physical activity, while strong correlation was recorded between the age and gender [26]. According to the systematic reviews [27-28], the performed physical activity has been decreasing, mainly in the male school population. About 7.32 % of the survey group was not performing the physical activity. It was not because of health issues. We be-

lieve that being physically inactive and not performing physical activity is associated with the selected towns' options. About 26.1 % of secondary school students performed the physical activity in the length of sixty minutes per weekday, while 51.1 % of secondary school students performed the physical activity more than three times per week [29]. At least for one hour per day, 14 % of school population was performing the physical activity, while the average length of performing physical activity has been decreasing [21, 30]. About 33 % of the school population was using the computer for something unrelated to the school. It was in the length of three hours per school day. As a result, 14.3 % of the school population was not performing the recommended volume of the physical activity [29]. Devoting leisure time towards the media science was recorded in 21.44 % of the survey group ($n = 238$). The sports science was the highest percentage answer of the survey group ($n = 160$; 42.91 %). In terms of secondary schools' locations, the difference of the survey group and selected towns was significant at the level of significance of $p < 0.01$ and 0.05 . The sedentary lifestyle and computer games have contributed to the epidemic of the physical inactivity. The innovative technologies have utilised to promote health and physical activity through mobile device applications and wearable devices [31-33].

The gender-based disparity of the physical activity among adolescents is the persistent finding in the literature. The difference of the total volume of physical activity performed between male and female students differs [34]. According to Pastucha [35], the survey group of female secondary school students showed almost 20 % lower involvement in the sports and physical activity than the survey group of male secondary school students. The sedentary lifestyle prevails and has been associated with the decrease of performing physical activity at the competitive level. Performing physical activity is associated with the music in the form of dance and aerobics. The survey group was performing physical activity at the recreational level (56.89 %; $n = 632$), while the competitive level of the physical activity was performing 25.72 % ($n = 286$) of the survey group. Available leisure time varies across the regions because of the difference of school enrolment, hours spent at school and sporting infrastructure. In the rural regions, the adolescents can participate in the structured extracurricular activities, such as organized sports and school clubs [36]. The

dominant form of performing physical activity was the competitive level of physical activity ($n = 168$; 42.11 %), which was only 1 % ($n = 172$; 43.11 %) less than the recreational level. One of the reasons for such preference of performing physical activity at the competitive level can be the fact that capital town of Banská Bystrica Region became the European City of Sport and organises the European Youth Olympics Festival.

In terms of dominant place of performing the physical activity, less active survey group preferred the outdoor environment (Yard, street), while more active survey group preferred performing indoor physical activities (Gym, hall) [14]. About 40 % of the physical activity was performed outdoors, while 36 % of the physical activity was performed indoors [37]. The survey group, which was performing the physical activity at the recreational level, was enjoying the outdoor environment. Performing the competitive level of the physical activity was more associated with the indoor environment. It was confirmed by the statistical evaluation of the survey group's answers. Having the sporting infrastructure near the residence and adequate system of sports financing allowed the survey group of Banská Bystrica to perform the physical activity at the competitive level ($n = 168$; 42.11%). In contrast with the past, the leisure time of adolescents has been spent in the public places (outdoor environment), such as parks and cafés, rather than in the indoor environment (Gym, hall) [38].

CONCLUSION

The aim of our study was to analyse and compare the physical activity of secondary school students from the selected towns in Slovakia. The diverse nature of secondary schools' locations caused the significant differences in the total volume of leisure time of the survey group. Almost 60 % of the survey group was physically active, in terms of leisure time, while the dominant form of performing the physical activity was the recreational level of the physical activity (56.89 %; $n = 632$). From the point of view of the dominant area of spending the leisure time of the survey group, the answer of sports science was the highest percentage answer of the survey group (42.91 %; $n = 477$). Our results indicate that the competitive level of physical activity was the dominant form of performing the physical activity. The survey group performed the physical activity at the sports grounds (Gyms and fields) near

the residence, while performing the physical activity at the competitive level was associated with the indoor environment (Gym, hall). During the weekend, the total volume of leisure time was smaller in the survey group. Promoting the physical activity is very important, in terms of maintaining good health. In addition to good health, regular physical activity has positive effect on the physical fitness, self-confidence and sense of satisfaction.

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