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ORIGINAL ARTICLE

STUDY AND EVALUATION OF PHYSICAL ACTIVITY OF YOUTH FROM THE VISEGRAD COUNTRIES IN RELATION TO THE WHO RECOMMENDATIONS

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ABSTRACT

Background. In recent years, the subject literature has provided concrete recommendations concerning health with regard to specific parameters. Therefore, it is necessary to indicate appropriate physical activity standards for proper development at various stages of human ontogenesis.

Objective. The aim of the work was knowledge of the level of physical activity of high school youth in the Visegrad countries, including gender indications, to demonstrate whether the WHO recommendations are fulfilled.

Material and methods. The research was conducted in students from four Visegrad countries: the Czech Republic, Poland, Slovakia and Hungary. As the research method, the International Physical Activity Questionnaire − IPAQ in the extended version was used.

Results. Boys seem to do much better and have largely fulfilled the WHO recommendation for high-intensity efforts performed 3 times for 20 minutes, and medium and high efforts − 7 times for 60 minutes, which is particularly crucial for the effectiveness of the level of physical activity.

Conclusions. It is indispensable to continue monitoring the physical activity of young people using modern research techniques. It seems intentional to intensify promotion and educational activities, which should be aimed at motivating young people to undertake physical activity in accordance with world-wide recommendations.

Key words: *physical activity, IPAQ, youth, Visegrad countries*

STRESZCZENIE

Wprowadzenie. Literatura zagadnienia dostarcza na przestrzeni ostatnich lat konkretne rekomendacje z uwzględnieniem wskazanych parametrów. Potrzebne jest zatem wskazanie odpowiednich norm aktywności fizycznej dla prawidłowego rozwoju na różnych etapach ontogenezy człowieka.

Cel. Celem pracy było poznanie poziomu aktywności fizycznej młodzieży szkolnej z państw wyszehradzkich, z uwzględnieniem płci i wykazanie wypełnienia rekomendacji WHO.

Materiał i metody. Badania przeprowadzono wśród uczniów z czterech państw wyszehradzkich: Czechy, Polska, Słowacja, Węgry. Jako metodę badań wykorzystano Międzynarodowy Kwestionariusz Aktywności Fizycznej - IPAQ w wersji długiej.

Wyniki. Obraz aktywności fizycznej jawi się korzystniej u chłopców, którzy w dużym stopniu wypełnili rekomendację WHO dla wysiłków o intensywności wysokiej 3 razy po 20 min. oraz średniej i wysokiej 7 razy po 60 min., co ma szczególne znaczenie dla efektywności poziomu aktywności fizycznej.

Wnioski. Nieodzownym jest dalsze monitorowanie aktywności fizycznej młodzieży z wykorzystaniem nowoczesnych technik badawczych. Za celowe wydaje się zintensyfikowanie działań promujących i edukacyjnych, których zadaniem powinno być motywowanie młodzieży do podejmowania aktywności fizycznej zgodnie ze światowymi rekomendacjami.

Słowa kluczowe: *aktywność fizyczna, IPAQ, młodzież, państwa wyszehradzkie*

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INTRODUCTION

The effects of civilizational change increasingly lead to a sedentary lifestyle in which people do not see the necessity of maintaining health through physical activity. It should be remembered though that physical activity is measured by such parameters as duration (volume) and its type, frequency and intensity. Physical effort will be effective only if it is taken as often and with as much intensity as possible and for a sufficiently long time.

It is assumed that a serious change concerning the role of physical activity took place when it started to be regarded as a crucial element of a healthy lifestyle [20, 26]. In the last years, the subject literature has provided numerous requirements and recommendations with regard to concrete parameters. It has, therefore, become necessary to indicate appropriate physical activity standards for proper development at various stages of human ontogenesis. And so, *Strong* et al. [22] indicate, the US youth should spend no longer than 60 minutes for medium and high intensity daily. There is also a regular recommendation on an amount of exercise by an American College of Sport Medicine [1], which proposes moderate intensity effort at least 30 minutes daily, not less than 5 times a week, or high-intensity effort at least 20 minutes daily three times a week. In turn, the European Union [8] forwards the following three standards of physical activity to comply with: a) 20 minutes of high intensity effort 3 times a week, b) 30 minutes of medium intensity five times a week, c) 30 minutes of low intensity (walking) five times a week. In addition, the Healthy People 2020 program [24], beside the requirements for appropriate physical activity, points to the need of reducing the amount of the time spent on watching TV to two hours a day.

Furthermore, the recommendations of reducing work have been supplemented with a variant of getting involved in medium and high intensity-effort 7 times a week for 60 minutes. As a criterion of a healthy lifestyle, the number of steps performed daily is also given, which is 11,000 for adolescents [23], with 9,000 steps for girls and 11,000 for boys [9]. On the other hand, among the undesirable changes in the lifestyle of school youth, an increase in the time spent sitting has been indicated [6, 14, 21]. An all-too-common sedentary lifestyle leads to overweight and obesity. Therefore, the aim of the study was knowledge of the level of physical activity of high school youth in the Visegrad countries, including gender considerations, to demonstrate whether the young people comply with the WHO recommendations.

MATERIAL AND METHODS

The research on lower and upper secondary school students aged 15 to 17 four Visegrad countries: the Czech Republic, Poland, Slovakia and Hungary was conducted in April 2015. Overall, were examined 2425, out of which 499 (20.6%) were eliminated, due to their incompleteness. As the research method, the International Physical Activity Questionnaire − IPAQ in the extended version was used in on-line INDARES system. The number of respondents considering gender and age is presented in Table 1.

Table 1. Characteristics of the respondents by gender and age

Age (in years)	Boys (%)	Girls (%)
15	191 (23.7)	280 (25.0)
16	249 (31.0)	341 (30.4)
17	365 (45.3)	500 (44.6)
Total	**805 (41.8)**	**1121 (58.2)**

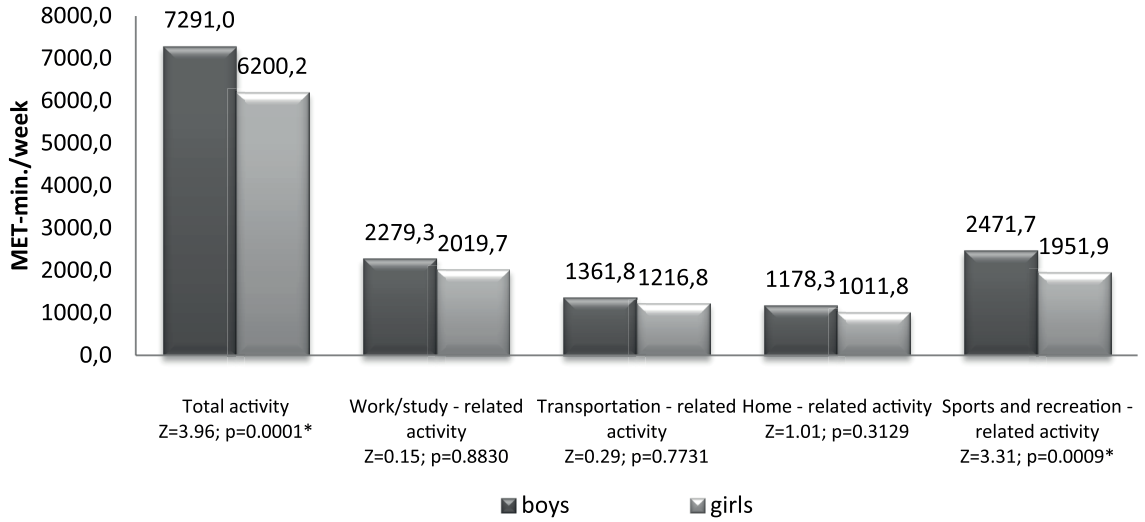
The extended version of IPAQ consists of five parts containing 27 questions in such domains as work/study, transportation, housework, recreation and sport, and time spent sitting. Each type of physical activity was expressed in three energy dimensions: vigorous, moderate, walking. The total physical activity was calculated by estimating the data in MET-min./times in particular domains, multiplying the duration in minutes by the number of days and the corresponding intensity factor: walking - 3.3, moderate - 4.0, vigorous - 8.0. At the same time, 1 MET corresponds to the consumption of oxygen at rest and amounts to 3.5 ml 02 / kg of body weight per minute.

The statistical analysis was performed in the STATISTICA programme v. 10. The level of physical activity was presented in the form of arithmetic means and standard deviations. To detect statistically significant differences between boys and girls, the *Mann-Whitney* U test was applied. If they belonged to a given recommendation groups, the data were presented in percentages and the *Pearson Chi-square* test was used. In all analyzed cases, the significance level was assumed at $p = 0.05$.

RESULTS

The level of physical activity of students by gender

The level of weekly total physical activity in boys was 7.291 MET and was substantially higher than in girls 6,200 MET. Significantly higher physical activity in boys was also demonstrated in the sports activity domain, i.e. 2,471 MET, with 1.951 MET in girls. No significant variation was detected in other domains: school-, transportation- and home-related activity (Figure 1).



* - significant variation at p <0.05; Z-value of the *Mann-Whitney* U test

Figure 1. The level of total physical activity and its areas (domains) by gender

A detailed analysis of the time data of physical activity (in minutes) within particular domains and the intensity of efforts showed a large variation between in girls and boys. The boys devote significantly more time to vigorous efforts in the domain of home-related activity, i.e. 44.7 minutes vs. - 29.4 minutes in girls (p = 0.0000) and sports and recreation-related activity, with 51.5 minutes and 40.2 minutes (P = 0.0000) respectively. However, there was no significant difference in the domain of school activity. The boys are also significantly more active in the domain of transportation, doing cycling − 33.9 minutes and 22.4 minutes respectively (p = 0.0000), while girls in walking, 48.1 minutes and 41.2 minutes respectively, i.e. an effort of relatively low intensity (Table 2).

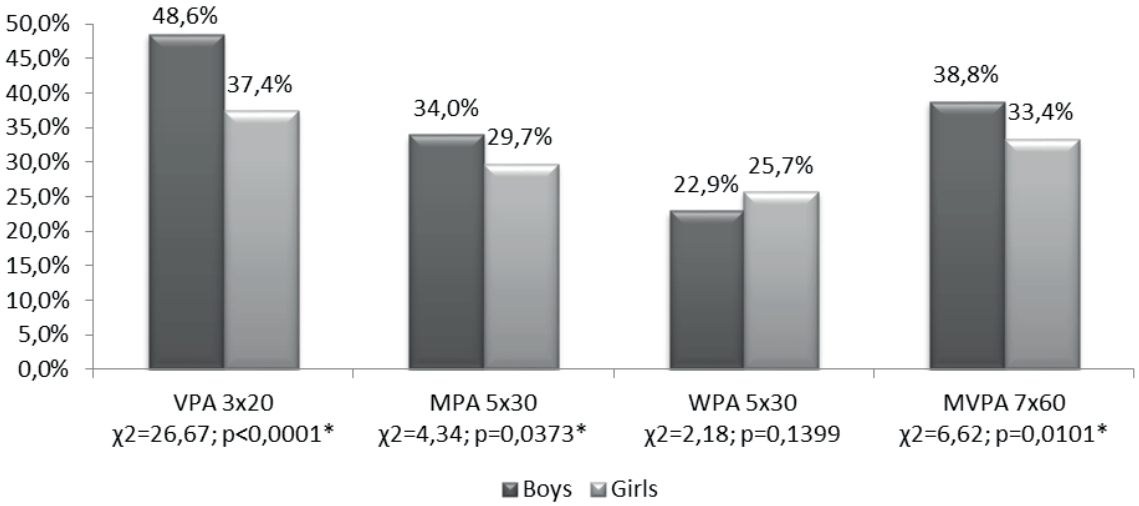
An unfavourable phenomenon visible in girls, less so in boys, is a significantly low amount of free time spent sitting in the means of transport, 70.9 minutes and 63.6 minutes respectively (p = 0.0004) and in other places on working days, 432.1 minutes and 392.7 minutes respectively (p = 0.0000) (Table 2).

Table 2. Weekly quantitative dimension of physical activity in particular domains by gender (in minutes)

No.	Domain	Girls		Boys		Test	
		mean	SD	mean	SD	z	p
1.	*School-related activity*						
	Vigorous	38.6	56.1	43.6	61.2	-1.16	0.2453
	Moderate	34.5	51.8	40.3	55.6	-1.70	0.0892
	Walking	**46.0**	59.4	**41.7**	58.1	2.08	0.0375*
2.	*Transportation-related activity*						
	Cycling	**22.4**	44.5	**33.9**	53.8	-6.06	0.0000*
	Walking	**48.1**	56.4	**41.2**	55.9	49.3	0.0000*
3.	*Home-related activity*						
	Vigorous around home	**29.4**	51.5	**44.7**	61.2	-6.83	0.0000*
	Moderate around home	39.8	51.3	41.7	54.3	0.10	0.9226
	Moderate at home	**47.7**	50.6	**35.1**	47.7	7.68	0.0000*
4.	*Sport and recreation-related activity*						
	Vigorous	**40.2**	50.7	**51.5**	56.8	-4.63	0.0000*
	Moderate	**28.8**	45.7	**37.0**	51.4	-4.03	0.0001*
	Walking	**52.8**	55.3	**49.1**	55.5	2.57	0.0102*
5.	*Sitting*						
	a) In means of transport	**70.9**	57.7	**63.6**	55.7	3.51	0.0004*
	b) In public places on working days	**432.1**	200.9	**392.7**	237.3	4.89	0.0000*
	During the weekend	296.6	198.5	312.9	231.6	-0.57	0.5707

* - significant variation at p <0.05; Z-value of the *Mann-Whitney* U test

The majority of boys undertake efforts of high intensity and perform them 3 times a week for 20 minutes (48.6%) and of medium and high intensity 7 times for 60 minutes (38.8%). In contrast, girls do that mainly with regard to high intensity efforts three times a week for 20 minutes (37.4%) and to high and medium efforts 7 times a week for 60 minutes (33.4%). Significant differences in the percentage of persons representing groups with recommended levels of physical activity were shown in relation to all groups except for WPA 5x30 (Figure 2).



VPA 3x20 – High-intensity AP performed 3 x 20 minutes a week
MPA 5x30 - Medium-intensity AP performed 5 x 30 minutes per week
LPA 5x30 – Low-intensity AP performed 5 x 30 minutes a week
MVPA 7x60 – Moderate and vigorous intensity AP completed 7 x 60 minutes a week

* -a significant differentiation at p <0.05; χ2-value of *Pearson's Chi*-square test

Figure 2. WHO recommendations of physical activity with gender mainstreaming

Recommendations of physical activity with regard to gender

The level of weekly physical activity shows statistically significant differences with varying intensity of efforts in boys and girls. These differences concern high-intensity efforts undertaken 3 times a day for 20 minutes each week (VPA 3x20), with a moderate intensity − 5 times a week for 30 minutes (MPA 5x30) and moderate and high intensity − 7 times a week for 60 minutes (MVPA 7x60). On the other hand, there were no significant differences within the particular gender at low-intensity efforts undertaken 5 times a week for 30 minutes (LPA 5x30) (Figure 2).

DISCUSSION

It is almost universally believed that proper physical activity is crucial for health maintenance in contemporary generations. Research conducted in high school students from different countries shows their insufficient activity [5, 7, 10, 11, 18, 25].

The essence of the International Physical Activity Questionnaire − IPAQ [4] is the possibility of comparing the results among respondents from different states. The obtained values of the total weekly PA of the youth of the Visegrad countries (Czech Republic, Poland, Slovakia, Hungary) at the level of 7,291 MET in boys and 6,200 MET in girls is much higher than the ones found in the youth surveyed by the same questionnaire in Lithuania [2], Czech Republic [13] or Croatia [12]. Similar high values as the ones obtained in the respondents from the Visegrad countries were demonstrated only in young people from Spain [5], which allows for assessing the level of total weekly physical activity both in the boys and in girls as good.

The findings in the study on physical activity in high school youth obtained with the extended version of IPAQ show higher values in boys than in girls in Latvia [2], 4,895 MET and 4.404 MET respectively, and in the Czech Republic [13] - 5,220 MET and 2,372 MET. The same pattern is visible in the studies on the Spanish youth [5], though they were calculated on one day, not a week. The values in boys amounted to 855 MET, and 656 MET in girls.

Own research confirms that it has become almost a norm that boys demonstrate higher physical activity in each of four countries: the Czech Republic, Poland, Slovakia and Hungary and the values in individual countries range from 4.546 MET to 10,280 MET in boys, and from 4.079 MET to 7.287 MET in girls.

The research in other studies has also confirmed much regularity in the higher level of physical activity

demonstrated in boys [4, 5, 13, 15, 16, 17, 19], which is mainly explained by less interest in motor activities in girls at this age. There might be another reason that could explain the results − the offer of physical activities for girls and the way they are run is not very attractive.

Still, it is particularly essential to follow the WHO recommendations on physical activity for the youth of the Visegrad countries. As indicated, this image appears to be more beneficial for boys who have largely fulfilled the recommendations for high-intensity efforts 3 times 20 minutes and medium and high-intensity efforts − 7 times for 60 minutes, which is particularly crucial for the effectiveness of the overall level of physical activity.

CONCLUSION

It is indispensable to continue monitoring the physical activity of young people using modern research techniques. It seems intentional to intensify promotion and educational activities, which should be aimed at motivating young people to undertake physical activity in accordance with world-wide recommendations.

Conflict of interset

The authors declare no conflicts of interest.

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