

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND BODY MASS INDEX OF GRAMMAR SCHOOL STUDENTS

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ABSTRACT

The purpose of the paper is to find out the level of grammar school students movement activity in Vranov nad Topľou and analyse the relationship between movement activity and body mass index (BMI). The research group consisted of 160 girls and 148 boys aged between 15-19 years. For examining the level of movement activity was International Physical Activity Questionnaire (IPAQ). BMI was calculated on the basis of body height and body weight data of respondents. During the processing of data we focused on basic areas of intensive movement activity, average load movement activity, walking practiced during movements and free time, and sitting during working (school attendance days) and weekend days. We found out that difference between movement activity practicing of girls and boys on the behalf of boys. In term of movement activity and inactivity, movement inactivity had greater share during day. Students spend at average more than 8.7 hours by sitting during school-time and more than 7 hours during weekend. Movement activity data were related to body mass index. On the basis of correlation, there was not found any relation.

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Keywords: physical inactivity, International Physical Activity Questionnaire (IPAQ), vigorous movement activity, moderate load movement activity

INTRODUCTION

One of the negative features of present life is hypokineses, over-seating during watching electronic media, transporting (transport), bad regimen and stress (Bláha, Frömel, Válková, 2013). On the other side, the lack of movement is currently the fourth risk factor of various last sicknesses (Bouchard, 2007).

The lack of movement activity causes e.g. the prevalence of overweight, obesity and a variety of civilisation diseases in consequence of costs' increasing on health service from the point of individual as well as society. One of the solution is prevention through movement activity, especially in children when the process of maturing is not finished and biological needs, within which the movement belongs in, exhibit in greater extent than in grown individual (Radvanský – Kučera, 1999). Movement activity has besides health benefits also influence on psychic particularly on depressions' treating, decreasing of state anxiety, and improving psychic in fighting with stress. Therefore, it is logical that due to these reasons the question of healthy lifestyle has also become a part of The National Educational Programme within subject physical and sport education in Slovak republic.

Healthy lifestyle includes, besides balanced nutrition and drinking regimen, also disuse of addictive substances and enough movement activity. It means that the one of its characteristic feature is spending free time doing salubrious movement activity (Junger, 2006, Sigmund, E. & Sigmundová, D., 2011).

Currently exists various recommendations of specialists about optimal need for children and youth' movement activity within week regime e.g. New Canadian Physical Activity Guidelines Released, (2011), WHO (2009). Yiing-Mei Liou and Li-Chi Chiang (2004) state recommendations of authors like Sallis - Patrick (1994), Welk (2002), Cavill, Biddle & Sallis (2001), who are concerned with MVPA Moderate or vigorous intensity physical activity; VPA: Vigorous intensity physical activity is defined in MET's units and volume in minutes per week.

On the basis of the above mentioned knowledge and recommendations we tried to evaluate movement activity of grammar school' students in relation to Body Mass Index.

METHODS

Research was realized at Dr. Cyril Daxner's school in Vranov nad Topľou in March 2013 in the presence of qualified assistant. Research group consisted of 308 students (148 males, 160 females), age average was 17.06. For gaining data about the level of movement activity we used International Physical Activity Questionnaire (IPAQ) which students filled in within physical training lessons.

Research plan was reduced on vigorously performed movement activity, moderate physical activity, walking performed within transportation and in free time, sitting during weekdays (school attendance days) and during weekends. For each kind of activity was assigned the MET's value according to difficulty for gaining results in MET minutes.

Body Mass Index (BMI) was calculated from data that represent body height and body weight of respondents.

Using percentile norms of BMI specified for particular gender and age, we classified students into four categories and calculated percentile share of obesity occurrence in relation to the index (Department of Health and Human Services, 2000). Pearson's correlational coefficient was used for investigating the relation between two variables.

RESULTS AND DISCUSSION

The amount of fat mass changes within growing age and the amount of body fat reveals differences within both genders; therefore, we used different criteria for children as well as for adults within interpretation of BMI index. We found out within intersexual comparison that in our research group 13.1% of male students and 2.5% of female students have risk values of BMI in relation to obesity.

These results correspond with similar research realised in Slovakia only for males' research group. Gained data reveal higher prevalence of overweight in 12 % of children. Generally, the situation in Slovakia is considered to be unfavourable even though more favourable than in abroad where e.g. in Italy or Spain there is more than 30% occurrence of overweight (TASR, 2008). Similarly alarming data show researches in Czech republic where up-to 19% of children (between the ages of 6-14) live with overweight, 10% of it suffer from obesity. In years 2004-2007, in Czech Republic, increased the percentage of overweight and obesity up-to 8%, this value matches to other European countries (Bunc, 2008).

From the healthy aspect it is important to perform intensive movement activities which are typical for hard physical effort and breathlessness. The amount of subjectively realised movement activity, which was diagnosed using questionnaire, shows relatively high values of listed activities performed in intensive zone (4-6MET). In this type of ex post facto research subjectively listed data of performed movement activity tend to be frequently overestimated in comparison with directly monitored data (Bažantová, 2012).

Kosařová (2011) found out that during direct measuring of various intensity movement activities, students within physical and sport education lessons move within zone of high intensity only 3.2 minutes. We presupposed that this difference is caused by different

type of research and degree of subjectivity. Students perceive as intensive activity overall time of activity's realisation with breaks periods, pauses, dead times etc. The device strictly records these breaks and counts them as movement inactivity.

Tab. 1 Mean values of performed movement activity / inactivity and their representation in BMI categories.

		males	females
BMI	x	25.77	22.14
	underweight	3.5%	6.3%
	normal weight	83.4%	91.2%
	overweight	9%	2.5%
	obesity	4.1%	0%
Intensive movement activity [MET-minutes/week]	at school	271.68	250.08
	during housework/gardening	395.82	171.54
	in free time	1169.4	562.38
	sum	1836.9	984.06
[MET-minutes/week]	at school	210.04	270.08
	during housework/gardening	356.56	965.36
	in free time	363.68	182.08
	sum	930.28	1417.52
Walking [MET-minutes/week]	within travelling	1026.16	890.04
	in free time	663.07	565.88
	sum	1689.23	1455.92
Overall activity [MET-minutes/week]		4456.41	3857.5
Movement inactivity [hours]	during weekend	7.35	6.72
	during weekdays	8.13	9
	within travelling	2.86	3.26
	sum	18.34	18.98

Males and females of our research group indicate on an average 20-22 minutes during one physical training lesson as only one intensive movement activity that was performed within schooling. The most minutes in this intensity spend students according to subjective perception in their free time.

Our research confirmed results about higher activity of males (Tab.1) and we can state that it is more natural for males to perform activities with higher intensity than for females (Hrdličková, 2011, Frömel, K., Novosad, J., & Svozil, Z., 1999). Expressively higher outlay of energy was recorded in males within free time, in females it was during work around house, in flat and in the garden.

Alarming results were recorded during investigating of movement inactivity of students which is consisted of inactivity time's volume during weekdays, during weekends and period which students passively spend during travelling and transporting. Throughout weekdays (within school attendance) male in our research group spent passively 8.28 hours and females up-to 9.11 hours while during weekend it was on the contrary when the higher measure of passivity showed males 7.35 hours, females 6.72 hours.

Practising of movement activity in childhood brings many health benefits which are transferred by children and adolescents to the adulthood period. One of the positive influences of movement activity is undoubtedly maintaining of body weight and body composition.

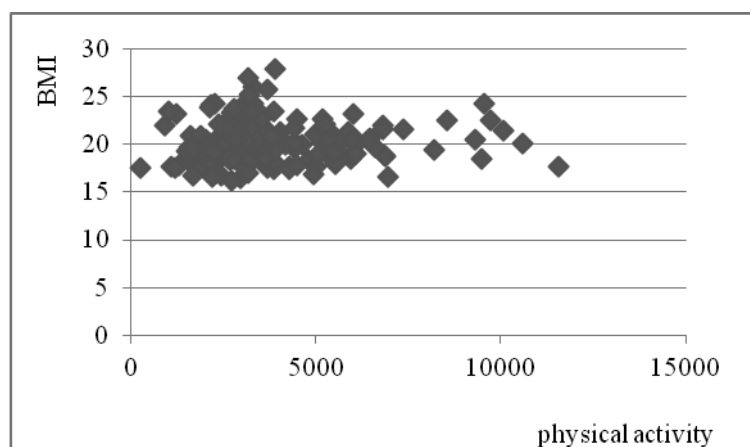


Fig. 1

The distribution of dependency between BMI and the sum of overall performed movement activity in MET- minutes of males.

On the basis of mentioned theoretical concepts we presupposed that higher portion of performed movement activity would be positively reflected on BMI. The distribution of dependency between BMI and the sum of overall performed movement activity in MET-minutes is presented in Fig. 1 and 2.

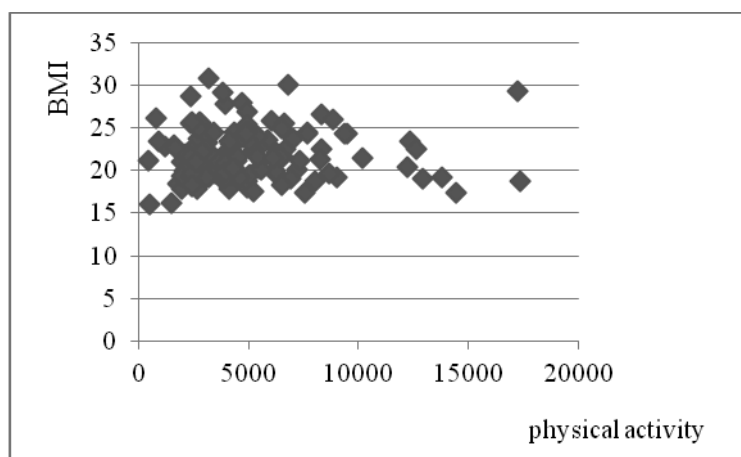


Fig. 2

The distribution of dependency between BMI and the sum of overall performed movement activity in MET- minutes of females.

Values of Pearson's correlation coefficient for males (0.0512) and females (0.0519) did not confirm linear dependency between the level of movement activity and body mass index; therefore, we can speak about no correlation.

CONCLUSION

The aim of our research was to find out the extent of performed movement activity of grammar school male and female students and its relation to BMI using questionnaire IPAQ.

On the basis of implemented research can be presented following results:

- 2.5% of females but up-to 13.1% of males suffer from overweight or obesity;
- females show the higher extent of inactivity during workweek, male during weekend;
- males indicate higher movement activity than females;
- for male it is more natural to perform activity of higher intensity than for females who on the contrary prefer activities of mean load;
- there has not been found any relation between body mass index and movement activity.

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