

SCHOOL CLASSES AND ITS COMPENSATION THROUGH PHYSICAL ACTIVITY

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Keywords:

- physical activity,
- diagnose,
- School classes.

Abstract:

The aim of research was to define differences in a level of physical activity during whole day of counting as well as physical activity during time not connected with school classes with taking into account groups' division on higher and lower level of school physical activity. Research, that aim was to diagnose week physical activity, were conducted youths from schools in Śląskie Province.

INTRODUCTION

Suitable level of physical activity being an effect of working skeletal muscles aiming at energetic expense over passive condition [2], is one of fundamental elements of healthy life style. A young man taking up various forms of physical activity counteracts civilization diseases connected with bone, respiratory, and circulatory system. It determines harmonious development of organism in somatic, intellectual, psychical as well as social spheres [21]. According to EU, physical activity defined from a week perspective should maintain a level of three differentiated groups with regard to capacity and intensity of the following physical activities: five times a week/30 minutes of low intensity effort, five times a week/30 minutes of medium intensity effort, three times a week/20 minutes of high intensity effort [22]. These criteria seem to be difficult to realize because student spends on educational classes in a sitting position the most of day. However, time devoted to physical education classes means only three hours at school (after gymnasium) and four hours in primary school and in gymnasium [19]. Moreover, continuous civilization progress strengthening urban and communications development leads to unconscious decreasing of physical activity importance [1].

AIM OF WORK

The aim of research was to define differences in a level of physical activity during whole day of counting as well as physical activity during time not connected with school classes with taking into account groups' division on higher and lower level of school physical activity. In connection with that authors formulated the following research:

1. Do more physically active girls during school classes are also more physically active during the whole day in comparison to less active girls during school classes?
2. Do more physically active boys during school classes are also more physically active during the whole day in comparison to less active boys during school classes?
3. Do more physically active girls during school classes are also more physically active in their free time in comparison to less active girls during school classes?
4. Do more physically active boys during school classes are also more physically active in their free time in comparison to less active boys during school classes?

MATERIAL AND RESEARCH METHODS

Research, that aim was to diagnose week physical activity, were conducted among 16-years youths from schools in Śląskie Province (tab. 1).

Table 1. Characteristics of the respondents

	n	Age (years)	Weight (kg)	Height (cm)	BMI	RHR
		M SD	M SD	M SD	M SD	M SD
Boys	63	16,20 (0,74)	67,77 (11,46)	176,26 (7,27)	21,73 (2,99)	63,69 (7,84)
Girls	107	16,49 (0,81)	57,76 (8,04)	166,11 (5,90)	20,89 (2,38)	62,61 (7,99)

Source: authors' elaboration

Legend: n – number of respondents, M – arithmetic mean, SD – standard deviation, RHR – resting heartbeat

Physical activity measurement was made with help of two multisensory diagnostics devices, based on suitable body parts. The first of them was ActiTrainer located at front upper hip height, the second was signals' transmitter in form of fillet situated below bigger pectoral muscle on xiphoid appendix height of the respondents. Thanks to possibility of body movement registration on the base of piezoelectrical phenomenon in a vertical, horizontal, and fibular axle, one could define intensity of physical activity with taking into account an average value of caloric consumption, number of steps as well as frequency of systole per hour. In the aim of improving reliability of research results, youths made notes concerning separate components such as: time before school classes, time devoted to school classes as well as time after educational classes. The data collected in this way let researchers analyze results dividing respondents into two groups: more and less active persons at school with taking into account their sex. Calculations were made with help of Statistica 10 Programme.

RESEARCH RESULTS

When analyzing groups with regard to values of made steps, caloric consumption, frequency of systole at 30-60% and 60-80% HRmax level after school classes, one can claim that there are no statistically significant differences between more and less active groups of girls and boys at school (tab. 2).

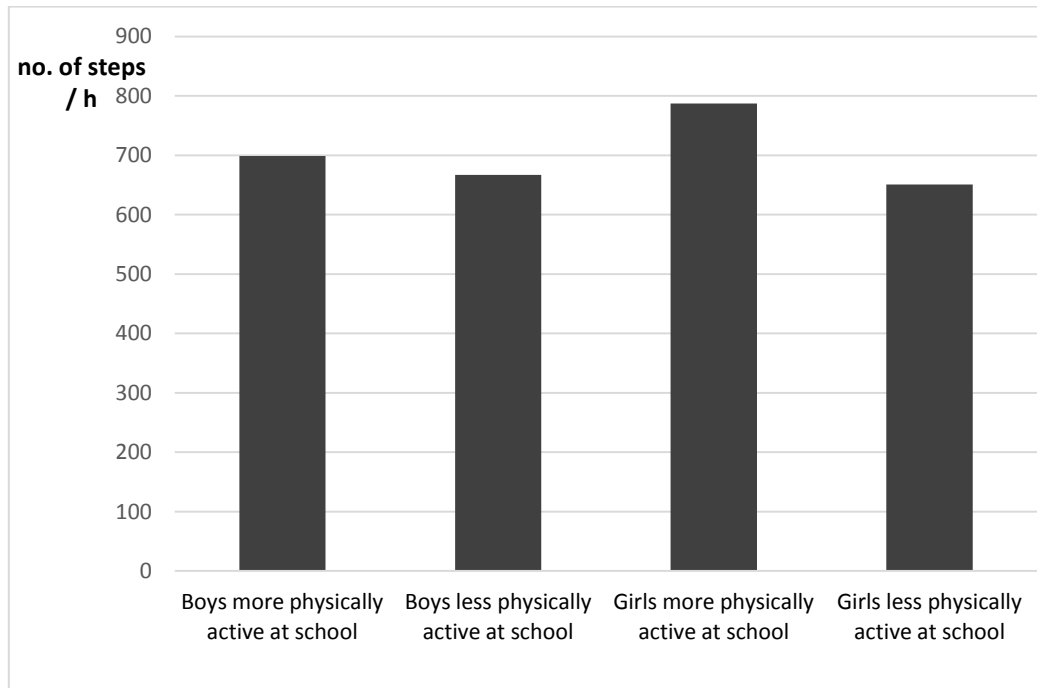
Table 2. Characteristics of the respondents

The Respondents	Average component values of physical activity per hour in a free time after school			
	Number of steps	Caloric consumption (kcal)	Frequency of systole at 30-60% HRmax level	Frequency of systole at 60-80%HRmax level
Boys more active during school classes	626	0,49	3,81	7,07
Boys less active during school classes	745	0,54	4,43	7,11
Girls more active during school classes	858	0,57	4,58	6,11
Girls less active	827	0,54	4,30	5,58

during school classes				
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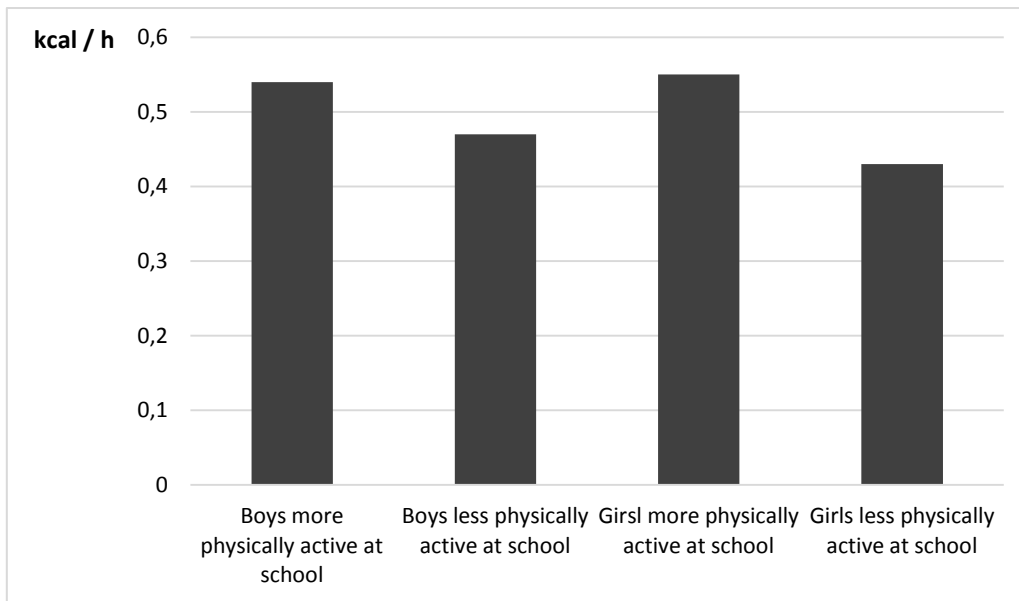
Source: authors' elaboration

Despite more steps made during whole day by more physically active groups during educational classes in relation to the respondents with less physical school activity one can claim that, from a statistical point of view, there are no significant differences between them (graph 1).



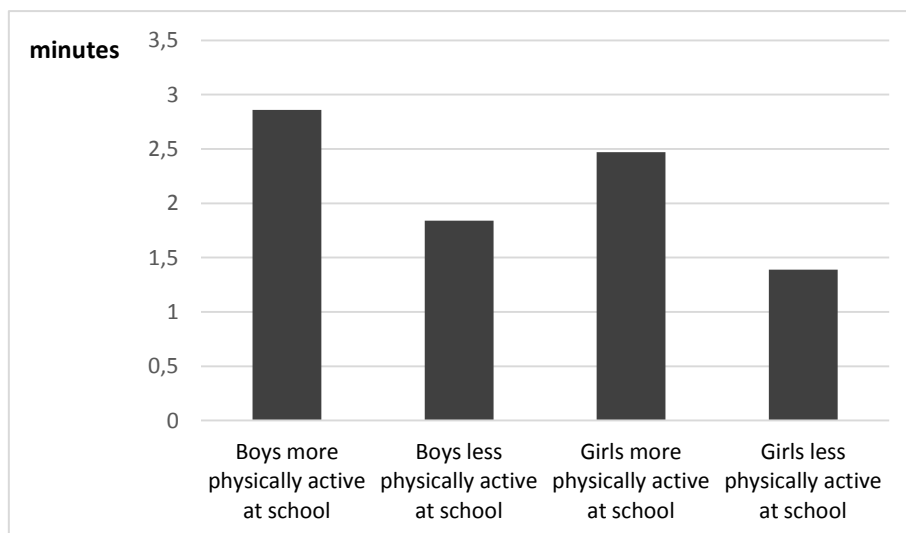
Graph 1. Number of steps per hour during whole day
Source: authors' elaboration

In case of an average caloric consumption per hour during day (graph 2) one can claim that there are significant statistical differences among girls ($p=0,013$). Girls who are more active at school, they are more physically active during whole day in comparison to less active girls at school.



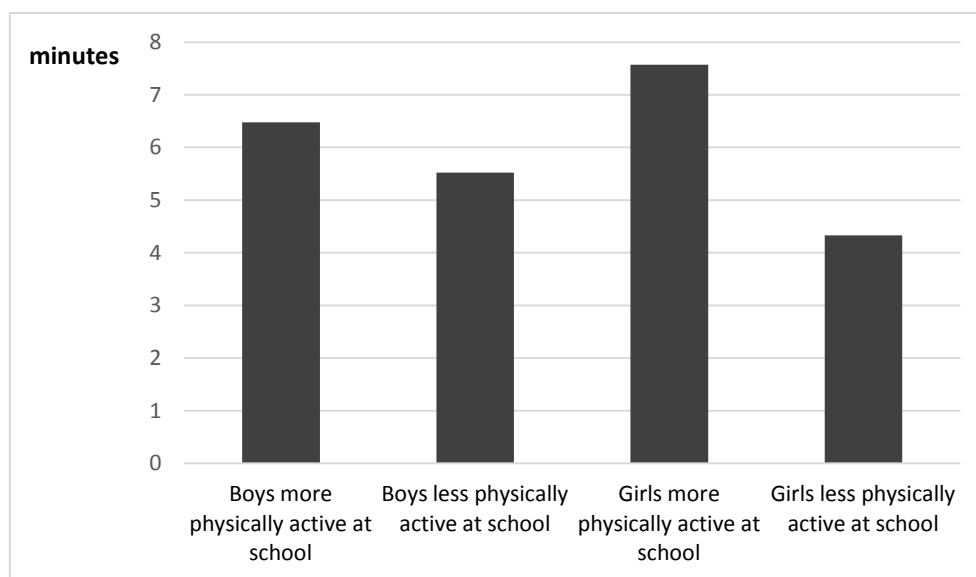
Graph 2. Active caloric consumption per hour during whole day
Source: authors' elaboration

When analysing duration of systole at 30-60% HRmax (graph 4) level, one can claim that there are significant statistical differences between two groups of boys ($p=0.014$) as well as groups of girls ($p=0,000$). Youths who are more active at school from a physical perspective, present higher level of activity during whole day in comparison to less active youths at school. Additionally, duration of systole at 30-60%HRmax level among more active boys differs with the activity of less active girls ($p=0,000$) considerably.



Graph 3. Average duration of effort with a frequency of systole at 30-60% HR max level per hour during whole day
Source: authors' elaboration

Statistically significant differences ($p=0,038$) were also confirmed in relation to duration of effort with an average value of systole at 60-80% HRmax level among more and less active girls (graph 3). More active girls at school participate longer (i.e. 3,2 minutes longer) in efforts at 60-80% HRmax of intensity during whole day in comparison to less active girls at school.



Graph 4. Average duration of effort with a frequency of systole at 60-80% HR max level per hour during whole day
Source: authors' elaboration

SUMMARY

On the base of analysis of separate components of physical activity such as: number of steps, value of caloric consumption, duration of effort with a frequency of systole at 30-60% and 60-80% HR max level after school classes as well as number of steps made during whole day with taking into account separate research groups, one can claim that there are no significant statistical differences. Similar results concerning comparison of steps made by both boys and girls during whole day, were achieved by Groffik, Fromel, Pelclova during few weeks analysis of physical activity [7, 8]. In comparison to other European countries, one has to claim that boys are more active when comparing them with girls, so they make more steps during whole day [3, 4, 12, 14, 15].

Analyzing data presented above from a whole day perspective, one can observe significant statistical differences within chosen groups of the respondents. More active girls got considerably higher average values per hour in comparison to less active girls, both in case of duration of effort with a frequency of systole at 60-80% HR max level, being an effect of an average intensity [16] as well as caloric consumption. When comparing duration of effort with a frequency of systole at 30-60% HR max level, statistically significant differences appear among both boys and girls. Achieving higher values among the respondents during whole day measurement (boys and girls with higher level of school physical activity) as well as not connected with educational classes (boys and girls with higher school physical activity) in relation to other groups of respondents, may give evidence of appearing some compensation of educational classes. Similar reliance was noticed by Long, Sobol, Cradock and others as well as by Matthews-Ewald, Kelley, Gurka and others. They all claim that from a whole day perspective higher level of physical activity get people who are more active at school, whereas higher values after school get people with less school physical activity [10, 11]. The reason may be a character of activities taken up by the respondents in their free time which aim is to meet their needs consciously as well as realization of daily duties [6, 13]. Explanation of the phenomenon can be hypothesis stating that in a central nervous system of each body, it exists a biological regulator of physical activity, called „activity center” or „activity stat”, that causes many biological responses for changes that take place in our organism during physical activity to maintain stable daily caloric consumption [21]. Level of

physical activity may be maintained in a narrow range of tolerance so as maintain not only energetic balance but also internal body temperature, pH and blood pressure [14].

In this situation, school classes become factors influencing whole day physical activity of young man. Therefore, one has to underline role of educators, physical education teachers as well, who thanks to suitable didactic methods, contribute to taking up physical activity at school and after school by young people [5]. Lack of possibility to analyze whole day physical activity in a complete way, do not let unambiguously confirm the observed compensation, and at the same time one can not state if the respondents made recommended, minimal number of steps during whole day. Additionally, one can not state if the intensity of physical activities was due to norms/standards given [9, 18, 19, 23].

CONCLUSIONS

1. More physically active girls during school classes are also more active during whole day in comparison to less physically active girls at school.
2. More physically active boys during school classes are also more active during whole day in comparison to less physically active boys at school.
3. No statistically significant differences in physical activity after school between groups of analyzed girls were claimed.
4. No statistically significant differences in physical activity after school between groups of analyzed boys were claimed.

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