

PHYSICAL ACTIVITY OF SILESIAN YOUTH

by

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The main aim of this study was to diagnose the physical activity of boys and girls in the Silesian region. Physical expenditure during physical education classes and during the whole week was evaluated as well as the dominant forms of physical activity were considered. The research methods included: Caltrac accelerometer, Omron pedometer, Polar heart rate monitors and standardized questionnaire were applied.

A tendency for lowered physical activity was observed for both sexes. Higher physical activity was registered among teenagers during workdays in comparison to weekends. There were significant differences in the level of physical activity among boys and girls and walking was the dominant form of physical exercise.

The energy expenditure during PE classes compensated the lack of physical activity in everyday's life.

Key words: physical activity, youth, Silesian region

Introduction

Health and lifestyle of the present generation have been the object of analysis and critique both abroad and in Poland. Growing occurrence of hypokinesia has become one of the "civilization diseases". Hypokinesia contradicts the documented in research values related with physical activity for human health, understood as the full state of physical, mental and social well-being. The meaning of physical activity in the dynamic development of man, that is perceived in the categories of present needs. According to Kozłowski [1981] „the disregardance of biological values in childhood and youth will find the reflection in physical efficiency and fitness during maturity and later stages of life". This is why children and youth physical activity is one of the most important problems of physical education (PE) theory and significant research object. Physical activity of children and youth during PE classes and leisure has

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been studied by American Academy of Pediatrics (2000), Borek et al. (1995), Corbin and Pangrazi (1996), Dale et al. (2000), Frömel et al. (2000), Frömel, Novosad, and Svozil (1999), Górna and Skalik (2001), Groffik (2001), Prior (1999), Sallis and Owen (1999), Skalik and Groffik (2001), McKenzie et al. (2000), Wright et al. (2000). Hypokinesia has been noticed among the researched groups which increases with age as well as inadequate control of intensity of exercises during PE classes.

The main objective of this research project was the evaluation of physical activity of children and youth from Silesian region. The following research questions were formulated:

- What are the main motives of physical activity in schoolchildren?
- How large is the input of physical activity among other forms of activities in children and youth? Is the physical activity sufficient for biological development? What are the dominant forms of physical activity?
- Do the PE classes stimulate the adaptive changes of human organism?
- Do sexual differences in physical activity exist?

Material and method

Research with the use of standardized questionnaire evaluating motives of physical activity was conducted on 1251 boys and girls from Silesian region and 3456 schoolchildren from Czech Republic.

The physical activity of 168 girls and 63 boys from elementary and high schools during weekly period was diagnosed with the use of Caltrac accelerometer and Omron pedometer. The special standardized sheets: „Physical Activity Record” and „Weekly Physical Activity” was used to register the activity of children. The following variables were measured: approximate time of participation in organized physical activity forms, type, volume and intensity of physical activity. The pedometer allowed to register quantity of steps (skips, changes of position), the distance in kilometers and energy expenditure during physical activity.

The physical activity during PE classes (45 min.) was evaluated among 250 pupils from elementary and 352 from high schools using Caltrac accelerometer

and Polar heart rate monitors in 15 second intervals. Among all these pupils the questionnaires for evaluation of physical education classes were also applied

The research methodology originated in the SPARK project at University in San Diego (Sallis and Owen 1999). It was also verified for Central European conditions in the Kinantropology Department of Palacky University in Olomouc and extended to Tri Trac-R3D accelerometer usage (Frömel, Novosad and Svozil 1991).

Results and discussion

a) Weekly physical activity of boys and girls

The obtained results showed that the variables which described the average energy expenditure of physical activity (kcal/day) were higher during workdays than weekends (tab.1). That tendency occurred both among boys and girls. The comparison of physical activity according to energy expenditure is higher for boys during workdays and weekends. The differences are statistically significant ($p < 0.01$).

Table 1. Weekly physical activity among Silesian boys and girls

Parameters	Girls		Boys		F
	M	SD	M	SD	
Active energy expenditure in workdays (kcal/day)	485.72	213.47	756.88	276.01	62.55**
Active energy expenditure in weekends (kcal/day)	376.80	230.72	530.84	307.74	16.86**
Intensity of physical activity in workdays (METs)	1.69	0.25	1.94	0.29	39.02**
Intensity of physical activity in weekends (METs)	1.68	0.33	1.73	0.30	0.83
Capacity of physical activity in workdays (the number of steps)	14323	5689	14119	5502	0.07
Capacity of physical activity in weekends (the number of steps)	9261	4834	9494	3545	0.12

** - the difference statistically significant ($p < 0.01$)

Considering that minimum volume for health maintenance equals 9000 steps for girls and 11000 for boys [Frömel et al. 1999] the obtained results seem satisfactory. Assuming that the average of received results should be acknowledged as satisfactory especially for girls, the considerable dispersion of individual results (SD) deserves attention. Taking this variability into account the volume of boys and girls' physical activity during weekends should be described as insufficient.

According to Pate's classification (Pate et al. 1995) the obtained results (METs) correspond with low intensity (< 3 METs) in the presence of slight dispersion of individual results (SD). No statistically significant differences in intensity of physical activity among boys and girls during workdays were found. However significantly greater intensity of physical activity was observed during weekends for boys.

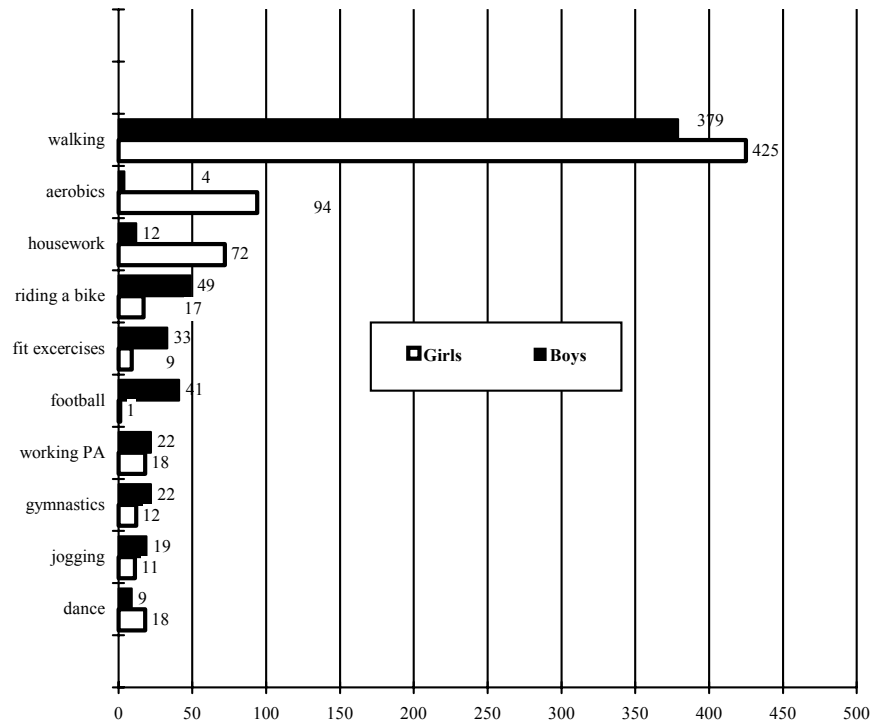


Fig. 1. The physical activity structure recorded weekly in boys and girls of elementary and high schools (in minutes)

The qualitative analysis of forms of physical activity used by the examined youth confirms the above presented data. The determined energy expenditure was mainly the result of walking (fig.1). Walking dominated in the volume of all physical activities performed during a day. It is characteristic that boys used sports-recreation forms of physical activity more often than girls. Aerobics were a very popular form of physical activity among girls what is to specific conditions made for that form of physical activity.

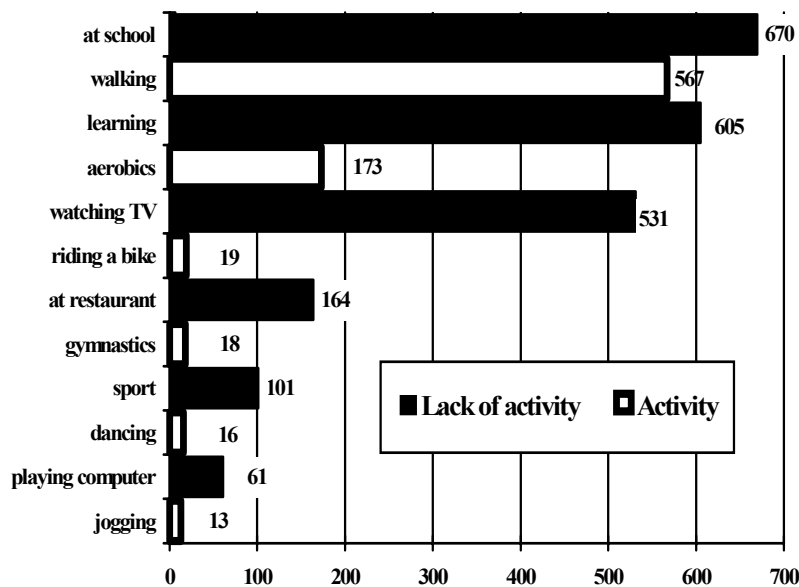


Fig. 2. Comparison of activity and the lack of physical activity of high school girls per week

Weekly physical activity was compared to the other activities performed during the week. The conclusion is that walking and sport-recreation did not balance the time that was spent on other activities (Fig. 2). The periods of inactivity are significantly greater in girls what suggests the dominance of a sedentary style of life among girls. Obtained results show commonly observed tendencies in lack of physical activity among today's youth. This tendencies are characteristic for highly developed countries. From the standpoint of biological needs of the organism they are viewed negatively. According to the results of

the questionnaire the main reason for decreased physical activity includes lack of time.

b) Physical activity during PE classes

Taking physical activity into consideration in successive days of the week it was observed that days that included PE classes were distinguished because of the increased energy expenditure (Fig. 3). The highest energy

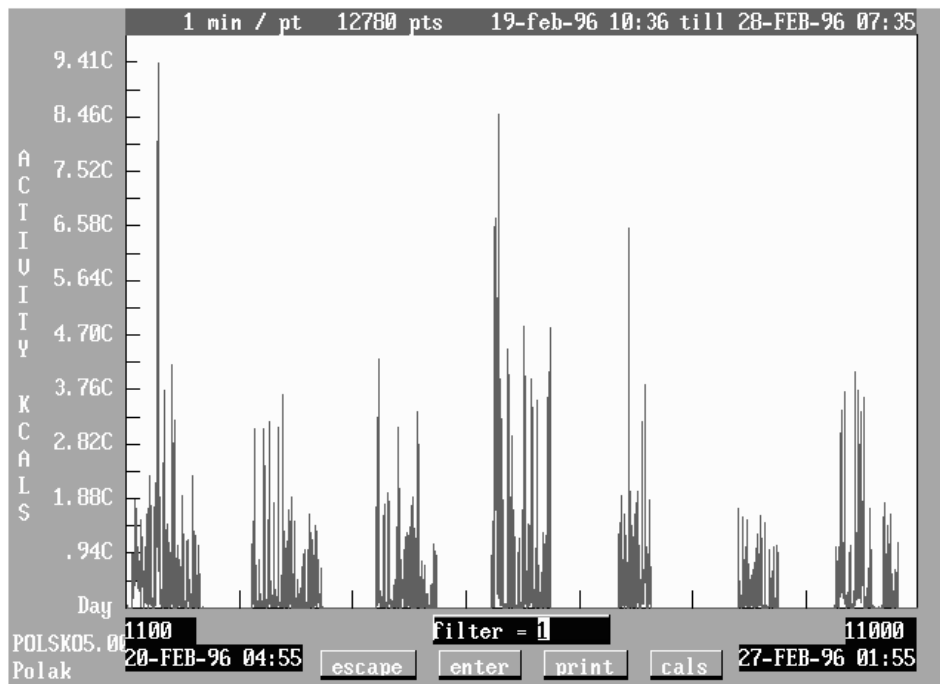


Fig. 3. Active energy expenditure (kcal/kg/min). The recording of weekly TriTrac-R3D physical activity for individuals

expenditure was registered during PE classes (Fig. 4). Elementary and high school teachers reached good results in applying proper workloads for boys during PE classes (Fig. 5,6). The volume index of physical activity during PE classes in elementary schools was twice and in high schools three times higher than the acceptable minimum (Fig. 5). The average intensity expenditure (METs) met the norms describing medium intensity (from 3,0 METs to 6,0 METs) (Fig. 5). High intensity of PE classes are confirmed by evaluations

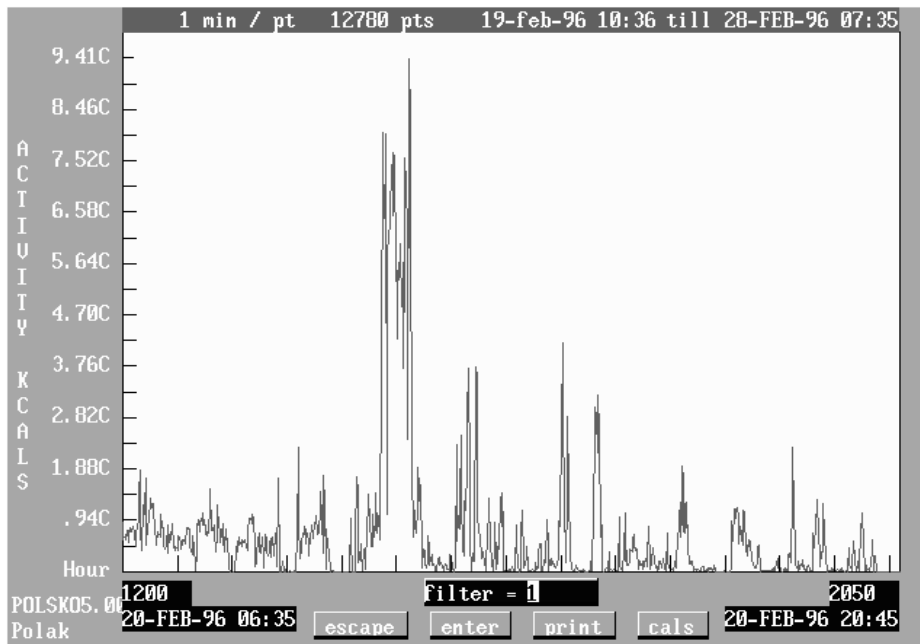


Fig. 4. Active energy expenditure (kcal/kg/min). The recording of daily TriTrac-R3D physical activity for individuals

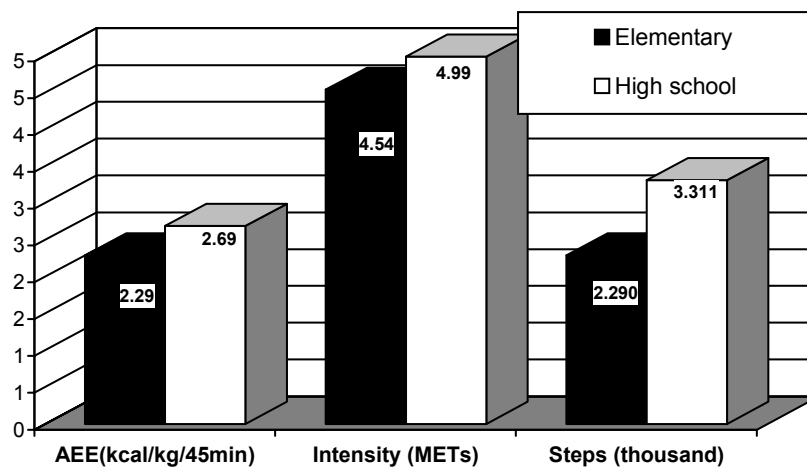


Fig. 5. The elementary and high school pupils' physical activity during PE classes

of heart rate (fig. 6). The average heart rate during PE classes in elementary and high schools were intensive enough to create significant adaptive changes. Average and high intensity, evaluated by heart rate was maintained for over 30 min. during PE classes.

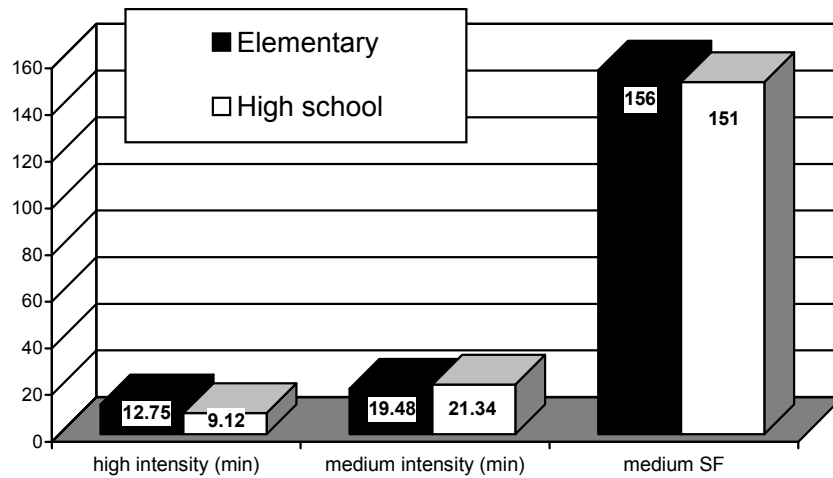


Fig. 6. The intensity of physical activity of elementary and high school pupils during PE classes (Heart rate monitor Polar)

Stated energy expenditure (Fig. 7) was in approximate percentage as an effect of body translocations in three directions: forward - backward, up - down, right - left (X, Y, Z) that might show the comprehensive character of performed movements. Generalizing the obtained results one can acknowledge that PE teachers fulfilled the task of stimulating the adaptive changes in children and youth organisms. The essential fact is that it was done without omitting other, how important aims. The results of standardized questionnaire about the classes confirm that. All the aspects of PE classes were estimated positively by considerable percentage of examined students (Fig. 8) and boys from Silesia viewed the their classes as more efficient in comparison to Czech colleagues. The analyzed PE classes workload indicates that the distribution of intensity was in most cases incorrect (Fig. 7) - the highest at the beginning and end of the class and relatively low in the rest of the time.

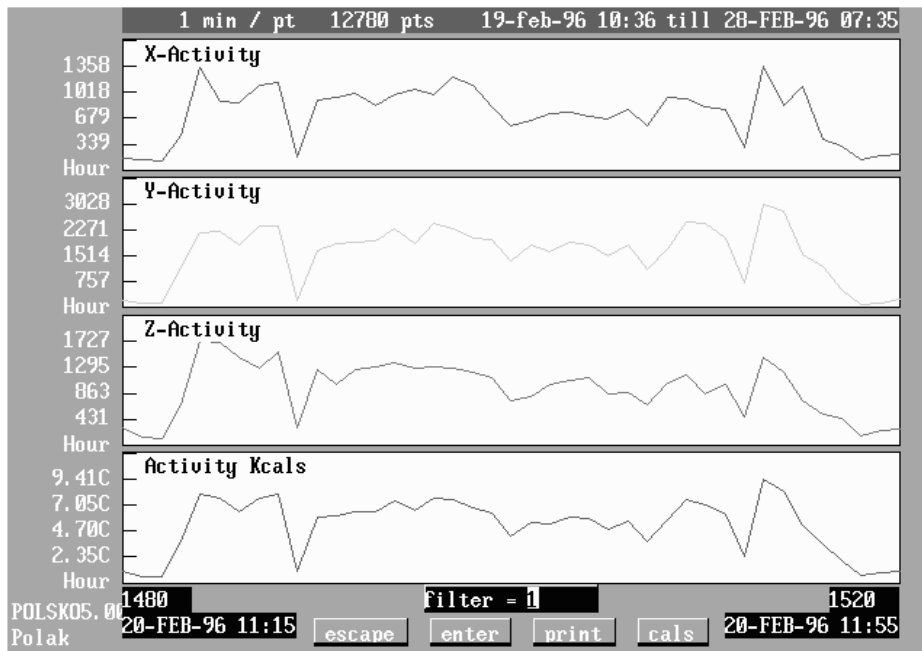


Fig. 7. Physical activity during PE classes for individuals (TriTrac-R3D). Active energy expenditure (kcal/kg/min)

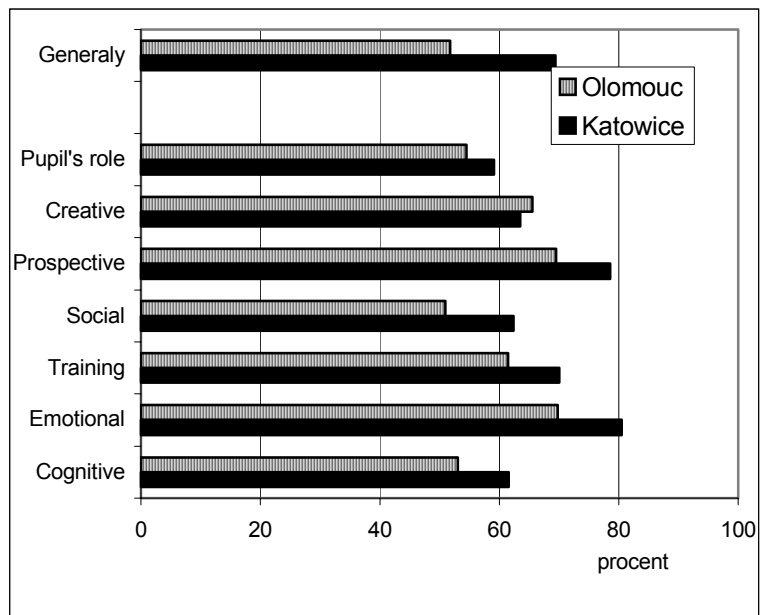


Fig. 8. Boys' positive attitudes towards the components of PE classes

The detailed information for each student was an essential element of our research. The informative sheet includes data which allows for each student to evaluate his physical activity on the background of the minimal and maximal results of the entire group. It also allows them to recognize the time of physical activity in relation to lack of the activity and familiarize with the forms of exercises most frequently used by themselves. The educative element is to understand the rules of reading the workloads and evaluation of its parameters. The essential observation that has been made from the research is the considerable increase of youth interest related to obtained effects and the qualitative comparison of individual weekly physical activity.

c) Boys and girls attitude towards the goals of physical activity

Among Silesian youth all the specified in questionnaire motives of physical activity have occurred (Fig. 9). The hierarchical order (1 – the highest and 6 – the lowest position) of motives differed among boys and girls. As far as girls are

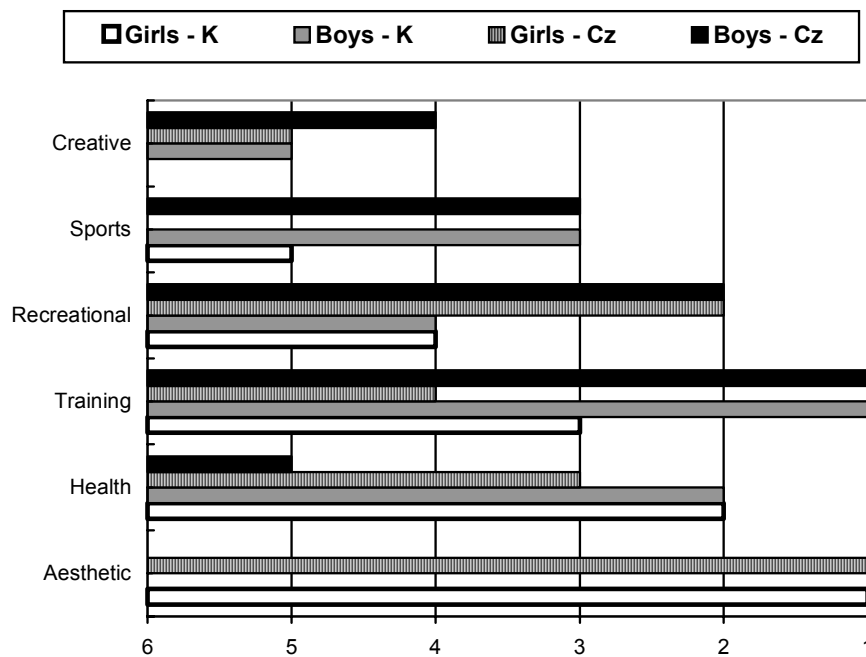


Fig. 9. The aims of physical activity in girls and boys from Silesian (K) and Czech (Cz) high schools

concerned the aesthetic goals were followed by health goals and by sports training and recreational goals. As far as boys are concerned the sports training motive was the most common factor followed by health and recreational . The creative goals did not find any acceptance. Variety of physical activity factors that reflect individual pupils' needs and the sexual differences between the goals are confirmed by works of other authors (Frömel et al. 1999, Koszyczyc et al. 1996, Krawczyk 1989). Comparing Czech and Silesian youth the health goals of physical activities were preferred among Silesian boys and girls (Fig.9).

Conclusions

The obtained results allow for determination of the following tendencies:

- A sedentary lifestyle is characteristic for researched youth. The sports-recreational forms of physical activity have less meaning than walking, which takes the highest position in human's life.
- Boys and girls use inadequate dispersion of physical activity during a week. The highest intensity occurs during PE lessons and the lowest over weekends.
- Girls are characterized with lower level of physical activity than boys.
- The obligatory PE lessons compensate for the lack of everyday physical activity among children and youth.
- Boys and girls have different goals of physical activity.

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