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## The role of physical activity in instilling healthy lifestyle habits in children

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# The role of physical activity in instilling healthy lifestyle habits in children

## Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Data Interpretation
- E Manuscript Preparation
- F Literature Search
- G Funds Collection

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## abstract

**Background** Habitual physical activity adapted to a child's individual needs, ability, health, gender and age has positive implications for cognitive and physical growth and maturation. Childhood physical activity is a predictor of better health and general well-being in adulthood.

**Material/Methods** A questionnaire study was conducted on a population of 371 randomly selected primary school students in Lublin county. Correlations were determined between the student's levels of physical activity and leisure time activities vs. age, gender, BMI score and the parents' levels of physical activity.

**Results** The students' attitudes towards PE differentiated subjects as to gender and the BMI score, whereas the frequency of exercise was correlated only with gender. Girls accounted for 72% of the students who did not enjoy PE classes. The duration of exercise was significantly correlated with age. Research results indicate that parents who are physically active instill healthy habits in their children.

**Conclusions** Physical activity plays a very important role in instilling healthy lifestyle habits. Parents or caretakers are the best role models for children. In an era when children and adolescents are increasingly likely to spend most of their free time playing computer games or watching television, parents should encourage their children to participate in extracurricular physical activities that promote healthy growth and development.

**Key words** health promotion, physical education, obesity

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## INTRODUCTION

Physical activity is one of the key prerequisites for a healthy life style, in particular in children and adolescents. It is vital to the holistic development of young people, fostering their physical, cognitive and social health.

Habitual physical activity adapted to a child's individual needs, ability, health, gender and age has positive implications for cognitive and physical growth and maturation. Childhood physical activity is also a predictor of better health and general well-being in adulthood. Low levels of physical activity in highly developed nations contribute to health risks [1, 2], including coronary heart disease, hypertension, stroke, type 2 diabetes and osteoporosis. A sedentary lifestyle increases the risk of cardiovascular diseases, obesity as well as postural defects in children [3, 4].

According to the International Obesity Task Force (IOTF) [5], 155 million school-age children around the world are overweight or obese. This group includes 30-45 million of obese children and adolescents aged 5 to 17 years and 22 million of obese children younger than 5 years.

According to a research study carried out by the National Food and Nutrition Institute in Warsaw as part of the National Program for the Prevention and Treatment of Obesity, 12-14% of Polish children are overweight or obese, with differences between regions. A recent study of primary school graduates revealed that 9.7% of 13-year-old boys and 3.9% of 13-year-old girls are overweight [6].

Excessive weight and obesity in children and adolescents results from poor eating habits, low levels of physical activity and the growing popularity of sedentary pastimes, such as playing computer games and watching television [7]. The Polish society is characterized by low levels of physical activity in comparison to the European and Asian average, in particular in the category of organized sports. The number of people who opt for sedentary leisure time behavior increases with age.

The main objective of this study was to survey physical activity levels among primary school students and to identify sociodemographic correlations between the respondents' lifestyle preferences vs. age, gender, BMI score, physical activity of parents and health awareness.

The main research problem was formulated: Do anthropometric factors and family factors influence the type and frequency of physical activities undertaken by children? The study also attempted to answer the following question: Which factors have the greatest influence on the attitudes displayed by 9- to 13-year-olds towards physical education classes and other types of physical activity?

## MATERIAL AND METHODS

The study was carried out in the first quarter of 2014 on a population of 471 randomly selected primary school students in Lublin county. The factor determining the selection of students was the headmaster's consent for the research and the correct completion of the questionnaires by the children.

A total of 371 children, including 170 boys and 201 girls aged 10–13 years, were qualified for the study. The study was anonymous, and the polled subjects were not asked to reveal their personal data. The questionnaire was filled out by the students during homeroom class under the supervision of a teacher and a surveyor, none of whom influenced the children's answers.

Physical activity levels among children were determined in a questionnaire survey. The survey was modeled on the part addressing physical activity in the questionnaire developed by the Chief Sanitary Inspectorate, the Institute of Mother and Child, and the Higher School of Vocational Education (PWSZ) in Kalisz [8]. The subjects were asked to fill out a questionnaire that was designed by the authors and contained closed-ended and open-ended questions about their lifestyle preferences, leisure time preferences, sports skills, parents' levels of physical activity and perceived impact of physical activity on health. The students were also asked to indicate their gender, age, height and body weight, and the above data were used to calculate their BMI scores.

The nutritional status of the analyzed population was determined based on the results of height and weight measurements. The children's BMI scores were used to divide the surveyed population into three groups: underweight and thin students, normal-weight students, overweight students and students threatened by obesity. The degree of obesity was determined based on BMI scores adjusted for age and gender with the use of the Cole index [9].

The questionnaire contained questions about the respondents' preferred sports activities, frequency of exercise and training, leisure time preferences, time spent in front of the computer, attitude towards physical education classes in school and physical activity in general. The frequency of physical activity was evaluated on a 3-point or a 4-point grading scale.

The results were processed in the Statistica 10 application. The effect of qualitative variables, such as gender, age, BMI score and the parents' physical activity, on the respondents' answers relating to the preferred types of sports, frequency (number of hours) of exercise and training and time spent in front of the computer was determined by correspondence analysis. The collected data was arranged in cross tables, and the tables were analyzed by the chi-squared test.

The chi-squared test was performed for 10 questions, and critical values of  $\chi^2_{\alpha}$  were read from the chi-squared distribution table at the significance level of  $\alpha = 0.05$  and  $(r-1)(k-1)$  degrees of freedom.

## RESULTS

The study covered primary school students in grades 4 to 6. The choice of the analyzed population was dictated by the fact that physical education classes begin in grade 4, and most children are eager to participate. Middle school students are more reluctant to play sports, and the percentage of students, in particular females, who regularly attend PE classes in middle school is much lower, which would influence the results of the study.

Overweight students and students threatened by obesity accounted for 4.5% of the studied population, and no significant differences were observed between gender or age groups. The majority of boys had normal weight, whereas the majority of girls were underweight or thin (Table 1).

Table 1. Number of boys and girls in groups with different BMI scores

	Underweight n (%)	Normal-weight n (%)	Overweight n (%)	Students threatened by obesity n (%)
Girls	119 (59.2)	73 (36.3)	8 (4)	1 (0.5)
Boys	62 (36.5)	100 (59)	7 (4)	1 (0.5)
Total	181 (49)	173 (46.5)	15 (4)	2 (0.5)

In the analyzed population, only 50 students (13.5% respondents) did not enjoy PE classes, and of those, 18 children were dismissed from PE (36% in the group averse to PE), whereas the remaining 32 students attended PE classes sporadically, maximum 1-2 times per week. A total of 35 children were dismissed from PE in the entire population (9.4%), of which more than half (18 students) did not enjoy PE classes.

The correlations between body weight vs. PE class attendance were analyzed, and more than a third of overweight girls and boys were dismissed from PE, and the percentage of students not attending PE classes in the remaining groups was below 10%. The number of students dismissed from PE was somewhat higher in the group of normal-weight boys.

On the basis of the obtained results, it was found that both the gender, age and BMI may have an impact on physical activity (Table 2).

Table 2. The effect of the respondents' age, gender and BMI score and the parents' attitudes on leisure time preferences and physical activity levels

Question	Gender			Age			BMI score			The parents' attitudes		
	test value	critical value	result	test value	critical value	result	test value	critical value	result	test value	critical value	result
1. Do you enjoy PE classes?	4.97286	3.8415	$\chi^2 > \chi^2_{\alpha}$	0.581381	7.8147	$\chi^2 < \chi^2_{\alpha}$	9.28541	7.8147	$\chi^2 > \chi^2_{\alpha}$	3.30078	3.8415	$\chi^2 < \chi^2_{\alpha}$
2. Are you dismissed from PE classes?	0.277311	3.8415	$\chi^2 < \chi^2_{\alpha}$	5.18846	7.8147	$\chi^2 < \chi^2_{\alpha}$	2.37582	7.8147	$\chi^2 < \chi^2_{\alpha}$	6.46183	5.9915	$\chi^2 > \chi^2_{\alpha}$
3. How often do you exercise in PE classes?	1.24584	5.9915	$\chi^2 < \chi^2_{\alpha}$	7.32554	12.5916	$\chi^2 < \chi^2_{\alpha}$	7.00516	12.5916	$\chi^2 < \chi^2_{\alpha}$	3.20463	7.8147	$\chi^2 < \chi^2_{\alpha}$
4. How much time do you spend in front of the computer?	6.88603	7.8147	$\chi^2 < \chi^2_{\alpha}$	18.9886	16.9190	$\chi^2 < \chi^2_{\alpha}$	15.7097	16.9190	$\chi^2 < \chi^2_{\alpha}$	15.7620	3.8415	$\chi^2 > \chi^2_{\alpha}$
5. Are you physically active outside of school?	3.29445	3.8415	$\chi^2 < \chi^2_{\alpha}$	3.20206	7.8147	$\chi^2 < \chi^2_{\alpha}$	7.17357	7.8147	$\chi^2 < \chi^2_{\alpha}$	20.4161	7.8147	$\chi^2 > \chi^2_{\alpha}$
6. How often do you exercise?	10.2814	7.8147	$\chi^2 > \chi^2_{\alpha}$	14.2578	16.9190	$\chi^2 < \chi^2_{\alpha}$	7.93188	16.9190	$\chi^2 < \chi^2_{\alpha}$	30.5945	9.4877	$\chi^2 > \chi^2_{\alpha}$
7. How long do you exercise?	8.51031	9.4877	$\chi^2 < \chi^2_{\alpha}$	30.0483	21.0261	$\chi^2 > \chi^2_{\alpha}$	16.7218	21.0261	$\chi^2 < \chi^2_{\alpha}$	4.67559	3.8415	$\chi^2 > \chi^2_{\alpha}$

The students' attitudes towards PE differentiated subjects as to gender and the BMI score, whereas the frequency of exercise was correlated only with gender. Girls accounted for 72% of the students who did not enjoy PE classes. Children with excessive body weight less frequently declared that they like PE classes

than children of normal weight, regardless of gender. Girls with a deficiency in body weight significantly more often did not like PE than underweight boys. The duration of exercise was significantly correlated with age. The older the student, the longer the duration of exercise. The average duration of training in the analyzed population was  $78 \pm 21$  minutes. The training frequency was dependent on gender. Boys of all ages trained statistically more often than girls, an average of  $3 \pm 0.25$  times a week (in the case of girls training frequency was  $2.45 \pm 0.3$  times/week). Gender also differentiated the types of physical activities undertaken outside of school (Fig. 1).

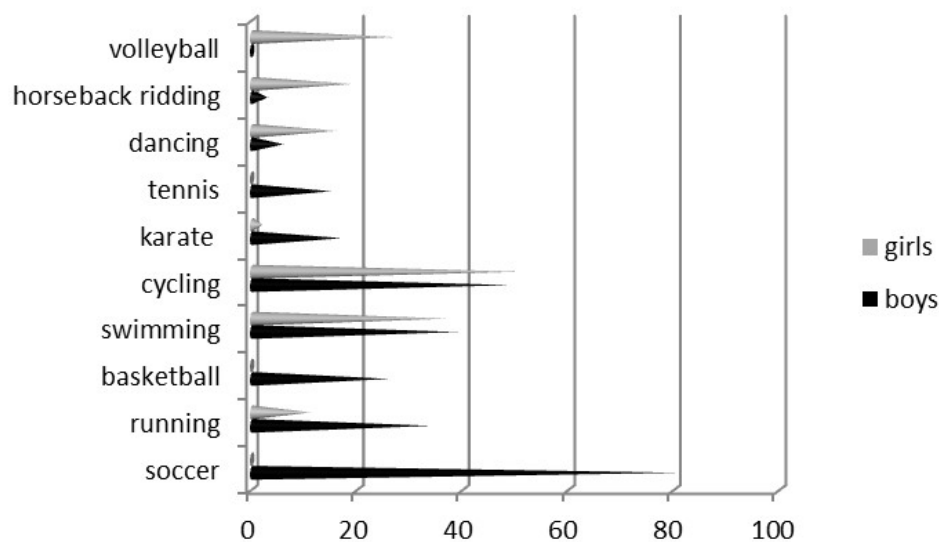


Fig. 1. Physical activities undertaken by girls and boys outside of school [%] (the respondents could choose more than one answer)

The parents' attitudes towards physical activity was a very important differentiating factor in the surveyed population (Tab. 2). 55.2% of parents exercised at least once a week, whereas work and household chores were the only forms of physical activity for the remaining parents. The collected data was analyzed to reveal that the parents' attitudes towards exercise and their awareness of the role played by physical activity in health promotion had a decisive impact on the students' physical activity behaviors.

The parents' physical activity levels also influenced the children's leisure time activity behavior (Fig. 2).

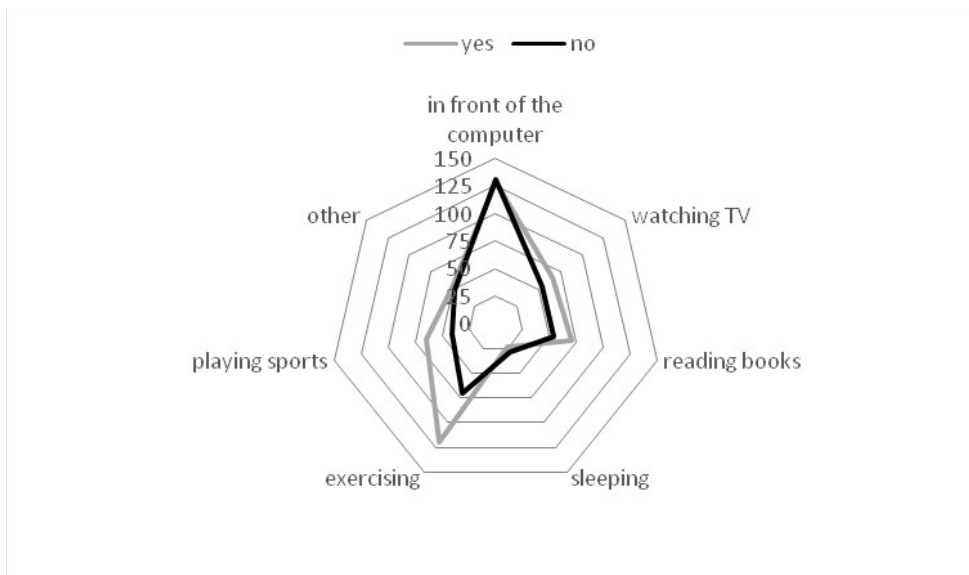


Fig. 2. Correlations between the respondents' leisure time activities and the parents' attitudes towards sports

Children from families with a positive attitude towards sports were more likely to opt for active forms of leisure time behavior. They not only exercised and participated in sports more often, but also chose a higher number sports disciplines, had a preference for more diverse forms of physical activity and were more likely to read books. No differences in the amount of time spent in front of the computer or the TV were observed between this group and the remaining groups (which was determined at  $2.98 \pm 1.23$  hours on average, regardless of gender, age or the BMI score).

## DISCUSSION

In line with the WHO guidelines, children should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity each day. Most of those activities should be aerobics. Vigorous-intensity activities, in particular those that strengthen muscles and bones, should be incorporated at least 3 times per week [10]. The above guidelines were not met in the group of children who participated in various types of physical activity outside of school. In that group, 15.9% of students exercised daily, 32.1% - 3 to 4 times per week, and 52% - only once or twice per week.

The correlations between physical activity and body weight have been well documented [11, 12]. In this study, overweight and obese children were significantly less likely to enjoy physical education and were more likely to be dismissed from PE classes. Overweight children are often ridiculed by their peers, and they are discouraged from participating in sports. A vicious circle thus develops, and it leads to obesity and emotional problems that have to be addressed by a professional therapist [13]. Poor eating habits and low levels of physical activity were associated with the risk of obesity. An obesogenic environment could be eliminated if teachers and parents worked together to instill healthy eating and physical activity habits [14].

According to the Supreme Audit Office, nearly 18% of grade 5 and 6 students do not attend PE classes, and in this study, the percentage of students dismissed from PE was determined at 12.24%. The number of middle and high school students avoiding physical education and exercise is growing steadily.

A balanced diet and habitual physical activity deliver health promoting effects and facilitate healthy weight maintenance [15]. Tedre et al. observed that awareness-rising programs for parents contribute to a reduction in their children's body weight. Lifestyle changes, including higher levels of physical activity, in the family motivate children to exercise and participate in sports [16].

The parents' attitudes influence children's and adolescents' physical activity profiles. The results of this study indicate that physically active parents were more likely to motivate their children to participate in sports that had not been played in school. The children of physically active parents were more often involved in sports disciplines requiring specialist equipment or paid lessons, such as swimming, horse riding, skating or skiing. Similar results were reported in a study carried out by the Institute of Mother and Child which demonstrated that children of physically active parents are significantly more likely to undertake moderate and intense physical activity. The results were not influenced by the parent's or the child's gender [17].

Research results indicate that parents who are physically active instill healthy habits in their children [18]. Physical activity delivers optimal health promoting effects only when combined with a balanced diet [19].

## CONCLUSIONS

Physical activity plays a very important role in instilling healthy lifestyle habits.

1. Anthropometric factors and family factors can significantly influence the type and frequency of physical activities undertaken by primary school students.
2. Parents and caretakers who are physically active are the best role models for children. Children raised in a physically active environment were more likely to participate in sports requiring specialized equipment or in extracurricular activities.
3. Gender and excessive weight were factors that significantly differentiated the surveyed children's' attitudes towards Physical Education classes.
4. Students are aware that regular physical activity is important for health; however, this knowledge is not put into practice in their daily routines or leisure time activities.

The results of this study indicate that teachers need to be educated and that Physical Education curricula should be modified to encourage all children to be more physically active.

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