

## LEISURE-TIME PHYSICAL ACTIVITY AND PHYSICAL FITNESS AMONG CROATIAN CHILDREN: A CROSS-SECTIONAL STUDY

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### Abstract

The evidence linking both activity and fitness to health has been discussed, but the interesting question of whether physical activity is strongly related to physical fitness has controversies. The paper determined the association between leisure-time physical activities of elementary school children and their physical fitness. The sample consisted of 847 children, 413 girls and 434 boys. In this research, 15 measures of physical fitness, two measures of morphological characteristics were tested. The time spent in leisure-time physical activities was assessed by a questionnaire. It was found that 76% of boys and 60% of girls participated in leisure activities for at least 60 minutes a day. Based on the obtained and analyzed results, it can be concluded that there was a significant partial correlation between physical activity in leisure time and the level of physical fitness of upper-elementary school children and that it varied by the age of children. Significant correlation referred to the sixth to eighth grade boys and sixth-grade girls. A statistically significant correlation was not found in either gender in the fifth grade or in the girls in the seventh and eighth grades. It can be concluded that there exists a partial statistically significant correlation between the use of physical activities in leisure time and the level of physical fitness of children. Moreover, a decline in physical activity over the school-age years, was found in females which could suggest that they are at increased risk of obesity because of a sedentary lifestyle.

**Key words:** sport activity, fitness, leisure time, children

### Introduction

Physical inactivity is the central risk factor for many of the most common chronic diseases, especially heart disease, stroke, cancer, type 2 diabetes and mental health (Bull et al., 2004). Although the decline in physical activity is well documented (Sallis, 1993), some differences exist concerning the age-related changes depending on physical activity type and characteristics. High level of physical activity at ages 9 to 18, especially when continuous, can significantly predict a high level of adult physical activity (Telama et al., 2005). Moreover, regular participation in physical activity is significantly associated with both short- and long-term health benefits for children and adolescents in the physical, cognitive, emotional and social areas (Sallis, Prochaska, & Taylor, 2000; Yang, Telama, Viikari, & Raitakari, 2006). Assessing physical activity that can occur at home, or in the playground and that can be in the form of organized sports, non-organized sport, free play, walking or cycling, is really challenging (Telford, Salmon, Jolley, & Crawford, 2004). Children are engaged in regular physical activity during the school day, through physical education and playtime (Dale, Corbin, & Dale, 2000; Sarkin, McKenzie, & Sallis, 1997). The concept of leisure-time physical activity has recently appeared in the literature (Vuillemin et al., 2005). One consistent finding in children's studies is the strong relationship between cardiovascular fitness and fatness (Boreham, Twisk, Savage, Cran, & Strain, 1997; Gutin et al., 1994; Hager, Tucker, & Seljaas, 1995). However, research on the relationship

between spending leisure time and the development of physical fitness of children in the world is relatively poorly represented (Barnett, Van Beurden, Morgan, Brooks, & Beard, 2009; Casajús, Leiva, Villarroya, Legaz, & Moreno, 2007; Graf et al., 2004; Özdirenc, Özcan, Akin, & Gelecek, 2005; Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006), whereas in Croatia this kind of research has not been recorded. Mamalakis et al. (Mamalakis, Kafatos, Manios, Anagnostopoulou, & Apostolaki, 2000) concluded that the high scores of motor skills were associated with increased physical activity. Additionally, Okely et al. (Okely, Booth, & Patterson, 2001) using a multiple regression analysis, showed that the level of basic motor skills can predict, to a statistical significance, the time spent in organized physical activities. Furthermore, adolescent girls were more likely than adolescent boys to report not participating in any vigorous or moderate physical activity in the previous week (adolescent girls, 12%; compared to adolescent boys, 7%) (Gordon-Larsen, 2001). Sallis et al. (Sallis et al., 2000) conducted a comprehensive review of 108 studies on factors associated with physical activity in children and adolescents, and concluded that there is a need for further studies because there was considerable lack of consistency across studies. In addition, more studies from different cultural background with the emphasis on longitudinal design are needed to confirm or deny the discrepant findings regarding physical fitness and physical activity in children. Most of the aforementioned studies rely on self-reported data

of academic performance, without potential negotiations. The outcomes of studies may be a major concern for public health, and therefore appeal for further investigation in the relationship between physical fitness and physical activity during leisure time. In this context, this cross-sectional study was designed to determine the relationship between leisure-time physical activities of children with the level of their physical fitness.

## Methods

### *Participants*

In conducting this study, a sample of children from the fifth to eighth grade of elementary school was used. The age of children ranged from 11 to 15 years. The total number of children who participated in the study was 847, 413 girls and 434 boys. The sub-samples defined by age were divided into: 5th grade = 216 children, 6th grade = 221 children, 7th grade = 208, and 8th grade = 202 children. All children were completely healthy at the time of the study. Each children parent gave a written consent for their child's participation in the study. The principals of schools in which the research took place gave prior approval for the participation of their schools in the study.

The survey was conducted during the month of April in 2013. The sample was comprised of children who, territorially speaking, belonged to the urban area of the Sisak-Moslavina County and lived and study in the cities of Petrinja and Sisak. In each city two schools were selected that met the technical-material criteria, that is, each school had to have a sports hall in which tests to check the levels physical fitness could be carried out.

### *Procedure*

Set of variables in this study consisted of tests of physical fitness, measures of morphological characteristics and a questionnaire on how the children spend their leisure time and on the amount of time they spend doing certain activities.

### *Anthropometric assessment*

In the area of anthropometry, each child's body height and weight were measured. All measurements were performed using standard methods as described according to the instructions of the International Biological Program. Body height was measured to the nearest 0.1 cm by a metric measuring tape. Body weight was measured to the nearest 0.01 kg using a digital scale. Trained assessors took all measurements. Shoes and heavy clothing were removed prior to measurements. BMI was calculated from height and weight values, using the formula:  $\text{weight (kg)}/\text{height (m)}^2$ .

### *Physical fitness tests*

Subjects were instructed to avoid any strenuous physical activity during the duration of the experiment and to maintain their dietary habits for the whole duration of the study. The testing assessment procedures were conducted in the same indoor environment, at the same daily

schedule. The experiment consisted of a familiarization with the conducted tests. The testing sessions were conducted between 11 AM and 1 PM to minimize the effect of period of day on flexibility (Anderson, 2000). Each session was preceded by a standard 10-minute warming up and 10-minute stretching procedure. In order to facilitate testing procedures, subjects were tested in groups of 7 to 10. The same physical education teacher tested the same subjects following each warm-up treatment. After a detailed explanation and qualified demonstration of each test, all subjects performed 1-practice trial followed by 3 consecutive experimental trials.

The order of the individual tests within the testing sessions was partly randomized in a way that different muscle groups were targeted in consecutive test. The rest periods among consecutive trials and between 2 consecutive tests were 2 minutes, respectively. The pause between tests that included assessment of the same muscle group was approximately 20 minutes. Standardized protocols for fitness testing were followed according to methods previously described (COUNCIL, 1983; Faigenbaum, Bellucci, Bernieri, Bakker, & Hoorens, 2005; Katić & Bala, 2012; Marić, Katić, & Jeličić, 2013; Van Dusen, Kelder, Kohl, Ranjit, & Perry, 2011; Welk & Meredith, 2008). Physical fitness was assessed using a set of 15 composite physical fitness tests. To assess simple movement speed, 1) hand tapping, 2) foot tapping and 3) foot tapping against the wall were used. Tests used for assessing explosive power were: 1) horizontal jump; 2) throwing a medicine ball from supine position (MB throw) and 3) 20-meter sprint.

To assess muscular endurance, the following were used: 1) sit-ups, 2) back hyperextensions and 3) squats. Tests used to assess coordination were: 1) obstacle course covered backwards, 2) side steps and 3) slalom runs. To assess flexibility, the following were used: 1) V-sit, 2) seat and reach; 3) shoulder stretch. The measurement procedure for each test was repeated three times, except for the tests of muscular endurance, which were done only once.

### *A questionnaire on the level of leisure time physical activities*

To estimate the activity levels of children in their leisure time, a questionnaire that had been constructed for the purpose of this research was used. Metric characteristics showed that the questionnaire was reliable and that its application can provide reliable results on the way lower education students spend their free time (Badrić M, 2013). In the first part of the questionnaire, general data about the participants were collected: name, school, gender, age and the grade which the respondents attended. In the second part of the questionnaire, the use of physical activity was assessed. In the part of the questionnaire that assesses physical activities, 18 variables that address different physical activities were offered. In addition to the offered physical activities,

participants were given the option to write in their own activities that were not listed in the questionnaire. For each physical activity the subjects had to write whether they had or had not practiced it in the past seven days. If the answer given was confirmatory, they were supposed to write down the total amount of time spent practicing that particular physical activity in the last seven days. The time spent doing an activity was expressed in hours. Based on the overall results in this section of the questionnaire, the participants were categorized into two categories.

The categories of participants were:

- physically inactive in their leisure time (which means that they spent less than 60 minutes a day in a physical activity) and
- physically active participants (those who spent more than 60 minutes a day in one of the physical activities).

**Data Analysis**

All statistical analyses were performed with Statistica 7 for Windows (StatSoft 2004). Means and standard deviations of all variables were calculated. The normality of variable distribution was tested by the Kolmogorov-Smirnov test.

To determine the level of interconnection of the children's physical fitness as predictors and their levels of physical activity in leisure time as a criterion, regression analysis was applied. Frequency analysis determined the weekly amount of time spent in physical activities. Based on these data a daily amount of time that the children spent in physical activities was received, and based on these results the children were classified into two groups, according to the level of participation in a physical activity in leisure time.

**Results**

Table 1. Analysis of the frequency of physical activity levels in male and female children from grades 5-8

	Total	5th grade	6th grade	7th grade	8th grade	boys	girls
Physically inactive	32%	38%	30%	29%	31%	24%	40%
Physically active	68%	62%	70%	71%	69%	76%	60%

Table 1 shows the percentage of children classified by the level of physical activity participation. It is evident that of the total number of respondents, 68% were physically active, while 32% of participants were physically inactive. Observation by gender showed that male children (76%) were physically more active than female children (60%). As for the grades that the children attended, the largest difference between the physically active and inactive children was in the seventh grade, where the percentage ranged from 71% of active as opposed to 29% of inactive children. The following tables show the results of regression analysis that determined the relationship between physical activity levels of children of upper-elementary school age in leisure time and the level of physical fitness. Table 2 shows the results of regression analysis for the fifth-grade boys and girls. It is evident that the multiple correlation coefficient ( $R = .334$ ) between the system of motor tests and the levels of physical activity was not statistically significant ( $p > 0.05$ ) and explained only 11% of common variance. Regression beta coefficients indicated that there was no statistically significant correlation of any motor variable with the criterion variable.

Table 2. Results of regression analysis of the relationship between the levels of physical fitness and leisure-time physical activity in boys and girls, 5th grade

Model	R	R2	SE	F	p
Boys	.334	.112	.461	0.728	.7497
Girls	.373	.139	.463	4.285	.1309

	Boys			Girls		
	B	Std.	Beta	B	Std. Error	Beta
(Constant)	-1.23	1.54		-0.25	1.72	
Obstacle course covered	0.01	0.02	0.05	-0.02	0.01	-0.24
Side steps	0.00	0.06	0.01	0.04	0.06	0.11
Slalom run	-0.05	0.11	-0.07	-0.11	0.11	-0.16
Seat and reach	0.01	0.01	0.11	0.01	0.01	0.06
V-sit	0.00	0.01	0.03	0.01	0.01	0.18
Shoulder stretch	0.00	0.01	-0.02	0.00	0.01	-0.01
Hand tapping	0.01	0.02	0.05	-0.01	0.02	-0.06
Foot tapping	0.05	0.03	0.21	0.01	0.03	0.02
Foot tapping against a wall	0.00	0.02	0.02	0.01	0.01	0.10
Horizontal jump	0.00	0.00	0.16	0.01	0.00	0.20
20m sprint	0.10	0.18	0.09	0.17	0.18	0.14
MB throw	0.00	0.01	0.07	0.00	0.00	-0.06
Sit-ups	0.00	0.01	0.09	0.01	0.01	0.14
Squats	-0.01	0.01	-0.21	-0.01	0.01	-0.26
Back hyperextension	0.00	0.00	0.03	0.00	0.00	-0.11

\* $p < 0.05$ ; \*\* $p < 0.01$

Table 3. Results of regression analysis of the relationship between the levels of physical fitness and leisure-time physical activity in boys and girls, 6th grade

Model	R	R2	SE	F	p
Boys	.559	.312	.392	3.177	.0002
Girls	.662	.438	.390	4.371	.0000

	Boys			Girls		
	B	Std.	Beta	B	Std.	Beta
(Constant)	2.27	1.18		-1.93	1.32	
Obstacle course	-0.01	0.02	-0.06	-0.01	0.01	-0.09
Side steps	-0.01	0.04	-0.04	-0.03	0.05	-0.09
Slalom run	-0.04	0.09	-0.07	-0.06	0.10	-0.08
Seat and reach	0.00	0.01	0.02	0.00	0.01	-0.06
V-sit	0.00	0.00	0.01	0.00	0.01	0.09
Shoulder stretch	0.00	0.01	0.03	0.00	0.01	0.01
Hand tapping	-0.02	0.02	-0.12	0.00	0.02	-0.02
Foot tapping	-0.01	0.02	-0.03	0.01	0.02	0.04
Foot tapping against	0.01	0.01	0.11	0.03	0.01	0.20*
Horizontal jump	0.00	0.00	0.15	0.00	0.00	-0.01
20m sprint	-0.31	0.16	-0.24*	0.28	0.16	0.22
MB throw	0.00	0.00	-0.14	0.00	0.00	0.19
Sit-ups	0.01	0.01	0.18	0.01	0.01	0.17
Squats	0.00	0.00	-0.05	0.02	0.01	0.38**
Back hyperextension	0.00	0.00	-0.01	0.00	0.00	-0.01

\* $p < 0.05$ ; \*\* $p < 0.01$

The coefficient of multiple correlation between the set of variables of fitness tests and the levels of physical activity for the fifth-grade girls was  $R = .373$ . No statistically significant relations between the set of predictor variables and the criterion variable was identified ( $p > 0.05$ ). A statistically significant beta coefficient existed for the Squats, with the value of beta coefficient of  $-0.26$ . There was no statistically significant beta coefficient for any other predictor variable. Table 3 shows the results of regression analysis for the sixth-grade boys. The coefficient of multiple correlation between fitness tests and the levels of physical activity was  $R = .559$ . The statistically significant relationship between the set of predictor variables and the criterion variable explained 31% of common variance ( $p < 0.01$ ).

A statistically significant beta coefficient ( $-0.24$ ,  $p < 0.05$ ) exists for the variable 20-meter run. There were no statistically significant beta coefficient values for any other predictor variable. The coefficient of multiple correlation between the set of motor tests variables and the levels of physical activity for the sixth-grade girls was  $R = .662$  ( $p < 0.01$ ). The statistically significant association between the set of predictor variables with the criterion variable explained 44% of common variance. A statistically significant beta coefficient existed for the variable Squats, with the value of the beta coefficient of  $0.38$  ( $p < 0.01$ ), and for the variable foot tapping against a wall, with the value of the beta coefficient of  $0.20$ . There was no statistically significant beta coefficient for any other predictor variable.

Table 4. Results of regression analysis of the relationship between the levels of physical fitness and leisure-time physical activity in boys and girls, 7th grade

Model	R	R2	SE	F	p
Boys	.521	.271	.373	2.279	.0086
Girls	.461	.212	.470	1.510	.1201

	Boys			Girls		
	B	Std. Error	Beta	B	Std. Error	Beta
(Constant)	3.02	1.13		-1.00	1.53	
Obstacle course covered	-0.05	0.02	-0.39	0.00	0.02	-0.04
Side steps	-0.08	0.04	-0.28	0.07	0.05	0.21
Slalom run	0.01	0.10	0.01	-0.04	0.10	-0.07
Seat and reach	0.00	0.01	-0.07	0.02	0.01	0.20
V-sit	0.00	0.00	0.14	0.00	0.01	-0.07
Shoulder stretch	0.01	0.01	0.09	0.01	0.01	0.10
Hand tapping	0.01	0.01	0.12	0.00	0.02	-0.03
Foot tapping	-0.01	0.02	-0.05	0.03	0.03	0.12
Foot tapping against a wall	-0.01	0.01	-0.06	0.02	0.02	0.15
Horizontal jump	-0.01	0.00	-0.36*	0.00	0.00	0.16
20m sprint	-0.10	0.15	-0.10	-0.18	0.19	-0.14
MB throw	0.00	0.00	-0.01	0.00	0.00	-0.07
Sit-ups	0.00	0.01	0.06	0.01	0.01	0.22
Squats	0.00	0.00	0.09	-0.01	0.01	-0.16
Back hyperextension	0.00	0.00	-0.02	0.00	0.01	-0.02

\* $p < 0.05$ ; \*\* $p < 0.01$

Table 4 shows the results of regression analysis for the seventh-grade children. The coefficient of multiple correlation between the set of fitness tests variables and the levels of physical activity was  $R = .521$ . The statistically significant association between the set of predictor variables with the criterion variable explained 27% of common variance. A statistically significant beta coefficient existed for the variable Obstacle course covered backwards, with the value of the beta coefficient of  $-0.39$ , and the variable Horizontal jump, with the value of the beta coefficient of  $-0.36$ .

For all other predictor variables, there were no statistically significant beta coefficient values. As for the seventh-grade female children, the coefficient of multiple correlation between the set of fitness tests variables and the levels of leisure time physical activity was  $R = .461$ .

There was no statistically significant connection between the set of predictor variables with the criterion variable. Additionally, there was no statistically significant beta coefficient between the set of independent and dependent variables.

Table 5. Results of regression analysis of the relationship between the levels of physical fitness and leisure-time physical activity in boys and girls, 8th grade

Model	R	R2	SE	F	p
Boys	.527	.278	.387	2.210	.0116
Girls	.312	.097	.506	0.605	.8632

	B	Boys Std.	Beta	B	Girls Std.	Beta
(Constant)	3.74	1.31		-0.71	1.90	
Obstacle course	0.00	0.02	0.01	-0.02	0.02	-0.17
Side steps	-0.03	0.04	-0.08	-0.03	0.07	-0.08
Slalom run	-0.11	0.09	-0.18	0.07	0.14	0.12
Seat and reach	0.00	0.01	-0.05	0.01	0.01	0.07
V-sit	0.01	0.00	0.24*	0.00	0.01	-0.03
Shoulder stretch	0.00	0.01	-0.02	0.00	0.01	-0.01
Hand tapping	0.01	0.01	0.08	0.00	0.02	0.01
Foot tapping	-0.07	0.02	-0.37**	0.04	0.04	0.20
Foot tapping against a	0.00	0.01	-0.01	0.00	0.02	-0.02
Horizontal jump	0.00	0.00	0.06	0.00	0.00	0.11
20m sprint	-0.24	0.14	-0.25	0.05	0.15	0.04
MB throw	0.00	0.00	-0.10	0.00	0.00	-0.01
Sit-ups	0.00	0.01	0.05	0.00	0.01	0.01
Squats	0.00	0.00	-0.06	-0.01	0.01	-0.18
Back hyperextension	0.00	0.00	0.10	0.00	0.00	0.07

\* $p < 0.05$ ; \*\* $p < 0.01$

The results of regression analysis for the eighth-grade children are presented in Table 5. The coefficient of multiple correlation between the set of fitness tests variables and the levels of physical activity was  $R = .527$ . The statistically significant relations between the set of predictor variables and the criterion variable explained 28% of common variance.

The inspection of regression coefficients showed that a statistically significant beta coefficient existed for the variable V-sit, with the value of the beta coefficient of  $0.24$ , and the variable Foot tapping, with the value of beta coefficient of  $-0.37$ . There was no statistically significant beta coefficient for any other predictor variable.

The coefficient of multiple correlation between the set of motor tests variables and the levels of physical activity for the eighth-grade girls was  $R = .312$ , and there was no statistically significant correlation between the set of predictor variables and the criterion variable.

There was no statistically significant beta coefficient between the set of independent and dependent variables.

## Discussion

In accordance with the primary aim of this study, we analyzed the results of regression analysis that determined the relationship between the levels of physical activity of children in their leisure time and the level of their physical fitness. Findings partially support the hypothesis that the level of physical fitness would be related with leisure-time physical activity of elementary schoolchildren. Similarly, Raudsepp and Pall (Raudsepp & Pall, 2006) supported that developmental level of fundamental motor skills would be related with skill-specific outside-school physical activity but not with general level of physical activity of elementary school children. Our results show that the level of physical fitness of fifth-graders has no impact on their participation in a leisure-time physical activity. The reason could be attributed to the participants' age and the degree of development of their motor abilities. Children at this age have not reached a plateau of the development of capabilities and are either at the beginning or in the middle of the development of certain motor abilities. Also, the children in this research probably do not have a sufficiently created habit of daily physical exercise practice and they have also probably not formed a

positive attitude towards physical activities. Moreover, children are being taught by one teacher per class that teaches every subject till the fifth grade when PE teachers proceed to teach the children. This transition could affect the results in the fifth grade children. Looking at the results of boys, evident trend exist towards increased interest for participating in physical activity. A significant correlation was found between the set of variables of physical fitness and the variable that assessed the level of physical activity in boys from sixth to eighth grades. In the 6th grade, variable *20m run* that assesses the explosive leg power in boys, indicate that children who have developed explosive leg power certainly spend more time in physical exercise, and it could undoubtedly be one of the preconditions for practicing a physical activity during leisure time.

As for the boys who attended the seventh and eighth grades, the variables that significantly contributed to the explanation of the criteria were Obstacle course covered backwards and Horizontal jump (seventh grade), the variables assessing flexibility and the variable for estimating the frequency of leg movement (eight grade). Looking at the partial contributions of individual motor variables to explain the criteria, it is evident that motor dimensions, which are most developed under the influence of physical exercise, play a significant role. Girls from grades 5 to 8 show differences by age in the relationship between physical fitness and leisure-time physical activity. The results of regression analysis for girls who attended the sixth grade indicated the existence of a statistically significant correlation between the level of physical fitness and the levels of physical activity during leisure time.

Moreover, results show a statistically significant contribution of the variable that assessed muscular endurance of legs and the variable that estimated the frequency of leg movement. Girls who attended seventh and eighth grades showed no statistically significant correlation between physical fitness and the levels of physical activity during leisure time. Also, partial regression coefficients were also very low and showed no statistical significance in explaining the criteria. Similar to previous studies, it is evident that the level of motor abilities of girls decreases as age increases (Brettschneider & Naul, 2004; Mraković, Findak, Metikoš, & Neljak, 1996), but the interest for participating in physical activity decreases as well (Brodersen, Steptoe, Boniface, & Wardle, 2007; Ridloch et al., 2007; Sallis, Buono, Roby, Mical, & Nelson, 1993; Velde et al., 2007).

This is certainly one of the main reasons that for girls of this age a significant prediction between motor abilities and participation in physical activity during leisure time cannot be identified. Practicing physical activity in leisure time is important for the improvement of physical fitness, especially explosive power, coordination and running speed in youth (Wrotniak et al., 2006). It should also be noted that high levels of physical fitness in children

had a significant impact on participation in leisure-time physical activities. Similar results were obtained by other authors as well (Fisher et al., 2005; Graf et al., 2004; Okely et al., 2001; Strong et al., 2005). Children who develop their physical fitness to a high level are predicted to be physically active in adolescence as well (Barnett et al., 2009; Wrotniak et al., 2006). Participation in an additional physical activity certainly has a significant impact on the level of motor skills (Casajús et al., 2007). As the age of boys increases, their physical fitness develop more and thus they have a greater motivation to participate in leisure-time physical activities, whereas in girls, the increase in age decreases the interest in physical activities, regardless the level of physical fitness. This fact can be partially attributed to motivation because it is common knowledge that an increase of a girls' age reduces their interest in physical activities, and they show preferences for some other types of activities. The second fact could be partly contributed to traditionalism and the socialization of girls and boys for participating in physical activity (Okely et al., 2001). It is more socially acceptable for boys to participate in physical activity and the level of their physical fitness is not the determining factor for participation in physical activity, but the girls' participation in physical activity could be considered socially unacceptable (Okely et al., 2001). Increasing the participation of girls in everyday physical activity would certainly raise the level of their abilities and through continued participation in physical activity, the level of development of their motor abilities would increase and would thus come closer to boys (Vilhjalmsson & Kristjansdottir, 2003).

## Conclusion

The present study confirmed previous results from several studies that there exists a partial statistically significant correlation between the use of physical activities and the level of physical fitness in children. A significant association refers to boys attending primary school from sixth to eighth grade and sixth-grade girls. A statistically significant association by gender was found neither in the fifth grade nor in girls from seventh and eighth grades. A major strength of this study is the ability to determine trends of leisure-time physical activity at the population level. Thus, a reasonable number of participants compensate self-reported measure of leisure-time physical activity and possible errors of measurement. Although no conclusion can be drawn from this study about whether participation in physical sports activity during leisure time leads to improvements in physical fitness in children, these findings are of public health interest and extend earlier results that suggested the potential benefit of physical activity on numerous number of fitness parameters in youth. Implications for school health: The findings of this study have important implications for health and education policy. Our results have extended earlier findings that the level of motor skills is related with outside-school physical activity and

that most of the overall physical activity decline occurred between ages 12–15 for female subjects. The early teenage years may be the most critical period for interventions to stop the decline in physical activity. Increasing the participation of girls in everyday physical activity would certainly raise the level of their abilities. This study gives clear evidence supporting the need to provide children not only with good quality physical education but as well the outside-school physical activities. This could be very promising way to

promote health-related behavior among adolescents. Previous data can be a good basis for programming activities during school and leisure time, or for creating curricula that will offer children of this age access to school facilities throughout the year. At present, school facilities for physical exercise, are closed for students more than half a year. Naturally, this presents an opportunity for numerous volunteer activities which can involve parents and university students studying at teacher training institutions.

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## POVEZANOST IZMEĐU FIZIČKE AKTIVNOSTIU SLOBODNOM VREMENUSA MOTORIČKIM SPOSOBNOSTIMA KOD UČENIKA OSNOVNIH ŠKOLA

### Sažetak

Dokazi o povezanosti aktivnost i fitnesa sa zdravljem su prisutni, ali ima dosta kontradikcija sa pitanjem je li fizička aktivnost usko vezana sa fizičkim fitnessom. Cilj rada je utvrditi povezanost između fizičke aktivnosti u slobodnom vremenu kod učenika osnovnih škola sa njihovim motoričkim sposobnostima. Uzorak se sastojao od 847 djece, 413 djevojčica i 434 dječaka. U ovom istraživanju, utvrđene su 15 mjere fizičkog fitnesa, testirane su dvije mjere morfoloških karakteristika. Slobodno vrijeme korišteno za fizičke aktivnosti je procijenjeno putem upitnika. Utvrđeno je da je 76% dječaka i 60% djevojčica sudjelovalo u fizičkim aktivnostima u slobodno vrijeme u trajanju od najmanje 60 minuta na dan. Na temelju dobivenih i obrađenih rezultata može se zaključiti da postoji značajna parcijalna korelacija između tjelesne aktivnosti u slobodno vrijeme i razine fizičke spremnosti djece osnovne škole i da varira po dobi djece. Značajna korelacija je dobijena od šestog do osmog razreda za dječake i šestog razreda za djevojčice. Statistički značajna korelacija nije pronađena kod oba spola u petom razredu ili djevojaka sedmog i osmog razreda. Može se zaključiti da postoji djelomična statistički značajna povezanost između upotrebe fizičke aktivnosti u slobodno vrijeme i razine fizičke spremnosti djece. Osim toga, pad tjelesne aktivnosti tijekom školske dobi, pronađen je kod djevojaka, što bi moglo sugerirati na povećan rizik od pretilosti zbog sjedilačkog načina života.

**Ključne riječi:** sportske aktivnosti, fitness, slobodno vrijeme, djeca

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