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DIFFERENCES IN THE LEVEL OF PHYSICAL ACTIVITY BETWEEN GIRLS AND BOYS OF YOUNGER SCHOOL AGE

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Abstract

This paper aims to determine the physical activity levels of younger school-age pupils concerning gender. The study involved 190 third-grade pupils (98 male and 92 female) from elementary schools in Čakovec. Physical activity was examined with the Fels physical activity questionnaire for children (Treuth et al., 2005), used to assess the physical activity level of children aged 7 to 19. Basic descriptive parameters were calculated, and the Mann-Whitney U-test was applied to examine differences in the TA level with respect to gender. The results showed that 66.3% of boys and only 34% of girls fall within the recommended daily physical activity. Furthermore, significant differences were obtained in the field of sports (p = 0.00), leisure time (p = 0.00), and total physical activity (p = 0.00). Boys are significantly more active in sports, leisure time, and total physical activity, while no significant difference between the genders was obtained in the field of physical activity in housework. The research showed that the total level of physical activity in this sample is very low in girls because only a third meet the recommended daily physical activities. Therefore, promoting and teaching physical activity is necessary at an early school age since entering puberty significantly reduces physical activity in both genders.

Keywords: *nine-year-old pupils, gender differences, physical activity*

INTRODUCTION

Physical activity is defined as any movement of the body performed by activating skeletal muscles, resulting in energy expenditure above the level of expenditure at rest (Caspersen, Powell, & Christenson, 1985). According to the World Health Organization (WHO), physical activity encompasses all movements, i.e., movement in daily life, including work, recreation, and sports activities.

According to the WHO's recommendation, children and young people should be physically active for at least 60 minutes a day in moderate-intensity physical activities that include activities related to that age: sports, planned exercise, physical education class, transport-related activities, recreational activities, and play during leisure time. Today's increasing problem for children and young people is an improper diet, physical inactivity, and a sedentary lifestyle. They increase the risk of becoming overweight and developing obesity, which is a significant risk for developing leading chronic non-communicable diseases. Children, especially adolescents, spend their free time indoors, most often in front of a screen, using various platforms (computer, PlayStation, Xbox), or on increasingly popular social networks (Facebook, Instagram, Tik Tok). Children and young people's physical inactivity has become an increasing problem in Croatia and worldwide.

The results of research within an international project (Inchley, Currie, Budisavljevic, et al., 2020a) involving 45 countries in Europe and North America on children and youth's health and behaviour show that only 19% of adolescents meet the recommended 60-minute physical activity of moderate to high intensity. Furthermore, 49% of boys and 35% of girls participate in high-intensity activities four or more times a week. In all age groups and almost all countries, boys are more active than girls, with the sex gap increasing with age for moderate to high-intensity activities and high-intensity activities. The results also show that social status is associated with physical activity, so adolescents from lower-income families show a lower level of physical activity of moderate and high intensity (Inchley, Currie, Budisavljevic, et al., 2020b).

Research on the health behaviour of Croatian students conducted in 2017/2018 (Pavić Šimetin et al., 2020), as part of an international survey (HBSC), shows that only 30.9% of boys and 25.1% of girls aged 11 meet the recommended daily moderate to intense physical activity. By comparing the same project results to 2013/2014, 39% of boys and 26% of girls meet the 60-minute daily moderate to intense physical activity. Following the pupils' results of the same age group, a decrease of 9.4% in boys and 0.9% in girls is visible. The proportion of male and female students engaged in moderate to intense physical activity declines with age, equally for both genders. However, the results of Croatian 11-year-olds who have increased high-intensity physical activity compared to the school year 2013/2014 are satisfactory – from 30% to 38% for girls and from 47% to 52% for boys (Pavić Šimetin et al., 2016).

Observational research that dealt with physical activity of children and youth in Croatia on a sample of fourth-grade pupils in urban elementary schools shows that 46.32% of male pupils and 33.33% of female students meet the recommended daily need for physical activity (Vidaković Samaržija and Mišigoj-Duraković, 2016). In the sample of second-and fourth-grade pupils, only 32.05% of male pupils and 25.64% of female pupils meet the daily need for movement and have an adequate level of physical activity, which is a very small share considering the age (Kamenjaš and Vidaković Samaržija, 2017). Petrić, Novak, and Matković (2016) state that only 33% of high school pupils meet the recommended daily physical activity.

The results of a vast number of research show gender differences in physical activity. Due to different research methodologies that measure the level of physical activity, the results of such research are difficult to compare, but the results show that boys are more active than girls (Hallal et al., 2012; Pearce et al., 2012; Telford et al., 2016; Ekelund et al., 2012). One reason given is that girls participate less in organised sports (Vella et al., 2014) and have weaker social support for participating in physical activities (Edwardson et al., 2012). Also, lower physical activity levels in girls are associated with maturation at an earlier chronological age, and gender differences are reduced with adjustment in biological age (Wickel, Eisenman, & Welk, 2009).

This research aims to determine the differences in the level of physical activity with regards to gender in a sample of third-grade pupils attending urban schools in Čakovec.

METHODS

An appropriate sample of respondents consisted of 190 third-grade elementary school students in Čakovec (98 male and 92 female), with an average age of 9 years (± six months). The research was conducted in two elementary schools with pupils of all third grades who usually attend Physical Education and do not have any motor, functional, or mental difficulties.

Children's physical activity was examined with the "*Fels physical activity questionnaire for children*" (Treuth et al., 2005), which is used to assess the level of physical activity of children aged 7 to 19 years. The questionnaire consists of three groups of questions that provide information on the respondents' level of physical activity, which is assessed based on three components: physical activity during leisure time, sports, and housework. Their summary provides the overall level of physical activity. The questionnaire contains eight questions, three of which are open-ended questions for the activities filled out by the respondents. Information on the frequency of participation in each of these activities is obtained. The Likert scale for assessing physical activity is applied for the remaining five questions. The intensity and frequency of performed physical activity are calculated. Intensities for individual physical activity were taken from the Physical Activity Compendium (Ainsworth et al., 2000). The authors assigned

a special intensity to each level of activity: low-intensity sports (≤ 4.5 MET) and low-intensity housework (≤ 3 MET) were given an intensity mark of 0.76. The maximum value of the total level of physical activity is 15 (5 for each category), i.e., five after the value is displayed on the Likert scale. According to Treuth et al. (2005), pupils with values of "4" and "5" meet the recommended level of physical activity, while those pupils with "2" and "3" belong to the group of physically inactive children. The metric characteristics of the questionnaire showed very good validity and reliability in Croatian pupils of younger school age (Kunješič, 2015).

Children's parents were acquainted with the research in accordance with the Code of Ethics for Research with Children (Ajduković and Kolesarić, 2003). With their written consent, they approved their participation in the research. They filled out the questionnaire together with their children. Data were collected in January 2020.

The research results were processed in the program IBM SPSS Statistics 23. Descriptive statistical methods were used to calculate the arithmetic mean (AS), minimum (Min) and maximum (Max) result, standard deviation (SD), asymmetry coefficient (Skew), and curvature coefficient (Kurt). The normality of the distribution was tested with the Kolmogorov-Smirnov test, and the differences between the genders at the significance level of 95% ($p < 0.05$) were tested with the nonparametric Mann-Whitney U-test.

RESULTS

Table 1. Descriptive indicators of the physical activity index for boys (N = 98) and girls (N = 92)

Variables		Min	Max	AS	SD	Skew	Kurt	KS-Z
Index sports	M	1.00	4.00	3.04	1.00	-0.71	-0.64	**0.00**
	F	1.00	5.00	2.21	.983	0.64	-0.22	**0.00**
Index leisure time	M	1.00	5.00	3.56	1.01	-0.64	-0.39	**0.00**
	F	1.00	5.00	3.08	1.07	0.01	-1.20	**0.00**
Index housework	M	1.00	4.00	2.61	0.88	0.48	-0.97	**0.00**
	F	1.00	5.00	2.60	.905	0.78	-0.74	**0.00**
Total physical activity	M	4.00	13.00	9.19	1.98	-0.40	-0.33	**0.00**
	F	4.00	12.00	7.81	1.86	0.27	-0.62	**0.00**

Average physical activity indices indicate that boys are most physically active during leisure time (3.56) and sports (3.04), and the lowest average index for boys is in housework (2.61).

In girls, the highest average index is observable in leisure time (3.08) and the lowest in sports (2.21). The smallest range of results is visible in boys in sports and housework and shows that no individuals stand out with an extremely high level of physical activity in this field. The variability is slightly higher in both genders in the total physical activity, which is confirmed by the values of the maximum result of physical activity.

The Kolmogorov-Smirnov test shows that the distributions of the results in all variables deviate statistically significantly from the normal distribution.

The values of the asymmetry coefficient (Skew) indicate a slightly negative asymmetric distribution in boys in sports, leisure time, and total physical activity, which indicates the grouping of respondents in the higher value zone with a few extremely low values. In contrast, the grouping is noticeable in all variables in the lower value zone in girls.

The curvature coefficients of the result curve peak (Kurt) indicate flattened distributions and heterogeneous distribution of results in all variables.

Table 2. Values of the total physical activity on the Likert scale

	TOTAL PHYSICAL ACTIVITY			
	2	3	4	5
BOYS N=98	1%	32.7%	64.3%	2%
	N=1	N=32	N=63	N=2
GIRLS N=92	2.2%	63.7%	34.1%	--
	N=2	N=59	N=31	--

Table 2 shows the levels of physical activity where the values “2” and “3” belong to the level of physical inactivity, while the values “4” and “5” belong to the level of recommended physical activity. It can be observed that 66.3% of boys and only 34% of girls fall within the recommended physical activity. It is also essential to underscore that only 2% of boys have the highest values of total physical activity. The percentage of girls who do not fall within the recommended physical activity framework is high at 65.9%.

Table 3. Gender differences in the physical activity index

Variables	M=98 F=92	AS-Median	Average rank sum	Mann-Whitney U	Z	p-value
Index sports	M	3.04 - 3.00	115.08	2491.00	-5.43	**0.00**
	F	2.20 - 2.00	73.37			
Index leisure time	M	3.56 - 4.00	106.39	3343.000	-3.16	**0.00**
	F	3.08 - 3.00	82.74			
Index housework	M	2.61- 2.00	95.90	4371.00	-0.26	0.79
	F	2.60 - 2.00	94.03			
Total physical activity	M	9.19 - 9.00	112.88	2707.00	-4.71	**0.00**
	F	7.81 - 8.00	75.75			

Table 3 shows the differences between the genders in physical activity. Statistically significant differences in favour of boys were obtained in the index of sports (p = 0.00), index of leisure time (p = 0.00) and consequently affected the difference in the total physical activity (p = 0.00). Both genders have equal average scores in the index of housework. Boys have, on average, a higher index of total physical activity than girls (9.19: 7.81, respectively); however, both average values are quite far from the maximum value of the total physical activity, which is 15.

DISCUSSION

The results of this research, which assessed the total physical activity, show that 66.3% of boys and only 34% of girls fall within the recommended daily physical activity. The results of this sample show a higher percentage of children who meet the daily recommendation of physical activity compared to the survey of Croatian 11-year-old pupils (boys 31%; girls 25%) conducted within the international project on health behaviour of Croatian pupils (HBSCO) (Inchley, Currie, Budisavljevic et al., 2020b). In comparison with the study (Roca, 2019) in which the same questionnaire was applied, the same percentage was obtained for girls (33.33%) and significantly higher for boys (47.92%) who meet the recommendation of physical activity. A higher percentage of girls (52.4) who meet the daily need for physical activity was recorded by Kunješić (2015), with a similar percentage of pupils being of the same age (64.5) as shown in the results of this research. In a sample of pupils from the Central Bosnia Canton, Karakaš et al. (2015) state that 57% of pupils meet their daily physical activity needs. On a sample of 206 ten-year-olds from Zadar, Vidaković Samaržija, and Mišigoj-Duraković (2015) found that 46.32% of male and 30.63% of female pupils meet the recommended daily needs for physi-

cal activity. Research on a sample of adolescent girls (Petrić, 2011), more precisely grammar school (39.53%) and vocational school girls (27.53%), also shows a low representation. Grammar school pupils comprise 41.3% of individuals who fall within the recommended values of the physical activity level, while vocational high school pupils have a slightly lower percentage, 37.37%.

From previous research that assessed pupils' physical activity, it can be seen that there are differences depending on the characteristics of the sample and the regions in which the research was conducted, but, in most cases, a much lower percentage of girls is noticeable. More precisely, only a third of girls meet the daily recommendation of moderate-intensity physical activity. Insight into the average values of the physical activity index shows that boys and girls are most active during their leisure time, followed by during sports, and the lowest activity is related to housework, which is in line with previous research (Kunješić, 2015; Roca, 2019, Petrić, 2011). In relation to the results of this research, a significantly higher index of housework (3.06) was found in the study of Đido et al. (2020) on a sample of pupils from the rural area of Busovača, while the least noticeable was recorded on a sample of adolescent boys (1.00) and adolescent girls (1.17) (Petrić, 2011).

On average, the total physical activity for boys is 9.00 and for girls 8.00, which means they are insufficiently physically active since both genders exceed half the maximum value. In this research, the index of total physical activity in boys is slightly higher and approximately the same in girls compared to the study conducted by Kunješić (2015) and Roca (2019).

The results show a significantly higher physical activity of boys in the field of sports and leisure time, which consequently affected the overall physical activity. Higher physical activity of boys was also confirmed in prior research (Vidaković Samaržija and Mišigoj-Duraković, 2015; Hallal et al., 2012; Pearce et al., 2012). A longitudinal study that addressed differences in physical activity between the sexes (Telford et al., 2016) shows that girls are less active because they receive less support in physical education classes, less family support, and participate less in organised sports activities. As these impacts may change, future intervention strategies to increase physical activity should simultaneously focus on each of these areas, and special attention should be paid to provide equal support and opportunities for both genders.

CONCLUSION

This research aimed to determine the level of physical activity of third-grade pupils from an urban environment and determine whether there are differences between the genders. The results showed that only 34% of girls and 66.3% of boys fall within the recommended daily physical activity and indicate that every third girl meets the criteria. Boys are thus significantly more physically active in sports, during leisure time, and overall physical activity. Average

participation in sports is low and indicates that girls should be significantly motivated to play sports both at school and in their leisure time. Schools are a significant factor in increasing physical activity through extracurricular activities and educating pupils about applying various physical activities in their leisure time. Younger school age is a crucial period for acquiring the habit of engaging in regular sports activities to become a permanent habit, since, with the onset of puberty, the total physical activity in both genders begins to decline.

In the last year, due to strict epidemiological measures caused by the Covid-19 pandemic, organised physical exercise for children and young people was stopped, which certainly drastically reduced overall physical activity. Spontaneous games with peers, which make up most of the time in physical leisure activities at younger school age, were banned due to epidemiological measures. It is assumed that, in the population of children and young people, there will be an increase in body weight, and in children who are active in sports clubs, the level of motor and functional abilities will decrease. Also, online teaching has extended the time of a sedentary lifestyle, reduced physical activity on the way to and from school, and denied physical education, which is the only organised form of physical exercise for some students. In these circumstances, only individuals who have a highly developed awareness of the need for physical exercise engage in such activities, which could only be practised in individual physical activities.

The consequences of these habit changes will be visible in the foreseeable future. Therefore, a great challenge for scientists will be to research the pupils' health and behaviour after a pandemic and for kinesiologists and physical education teachers who will need to motivate pupils to an active lifestyle.

In conclusion, the promotion of regular physical activity has been one of the leading public health priorities in the last ten years. In order to fast adaptation to the new situation and improvement of the health of children and youth, even stronger intervention measures will be needed to increase overall physical activity and improve the motor fitness of children.

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RAZLIKE U RAZINI TJELESNE AKTIVNOSTI IZMEĐU DJEVOJČICA I DJEČAKA MLAĐE ŠKOLSKE DOBI

Sažetak

Cilj ovog rada bio je utvrditi razine tjelesne aktivnosti učenika mlađe školske dobi s obzirom na spol. U istraživanju je ukupno sudjelovalo 190 učenika (98 učenika i 92 učenica) trećih razreda, polaznika osnovnih škola u Čakovcu. Tjelesna aktivnost ispitana je upitnikom Fels physical activity questionnaire for children (Treuth i sur., 2005) koji se koristi za procjenu razine tjelesne aktivnosti djece od 7 do 19 godina. Izračunati su osnovni deskriptivni parametri, a Mann a Man-Whitney U test primijenjen je za ispitivanje razlika u razini TA s obzirom na spol. Rezultati su pokazali da 66,3 % dječaka i samo 34 % djevojčica pripada u okvire preporučene dnevne tjelesne aktivnosti. Nadalje, značajne razlike dobivene su u području sporta (p=0,00), području slobodnog vremena (p=0,00) i ukupnoj tjelesnoj aktivnosti (p=0,00). Dječaci su značajno aktivniji u području sporta, slobodnog vremena i ukupnoj tjelesnoj aktivnosti, dok u području tjelesne aktivnosti u kućanskim poslovima nije dobivena značajna razlika između spola. Istraživanje je pokazalo kako je ukupna razina tjelesne aktivnosti na ovom uzorku vrlo niska kod djevojčica jer samo trećina zadovoljava preporučene dnevne tjelesne aktivnosti. Stoga su nužne mjere promicanja i edukacije tjelesne aktivnosti već u ranoj školskoj dobi budući da se ulaskom u pubertet znatno smanjuje tjelesna aktivnost kod oba spola.

Ključne riječi: *devetogodišnjaci, spolne razlike, tjelesna aktivnost*