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Gender Differences in the Physical Activity of Ten-Year-Old Pupils

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Abstract

Insufficient physical activity (PA) of children and youth has become a growing problem in contemporary society. It is one of the factors affecting the increase of overweight preschool and young school-age children. The World Health Organization issued recommendations for children and young people to accumulate at least 60 minutes of moderate physical activity daily, but in spite of encouragement to engage in PA, the level of PA starts to decline already in adolescence (Armstrong, Welsman, & Kirby, 2000; Wickel, Eisenmann, & Welk, 2009). The aim of this research was to determine the level of PA of fourth graders from several elementary schools in the city of Zadar, and differences in their PA with respect to gender. The sample consisted of 206 participants (111 female and 95 male students). The level of PA was estimated using the Physical Activity Questionnaire (PAQ-C) (Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997). Basic descriptive indicators were calculated, while the Mann-Whitney U test was applied to test differences in the level of PA with respect to gender. Male students have a significantly higher overall level of PA than female students do (Z=-2.15, p=0.03) and they differ significantly in variables estimating the level of PA in school during break time (Z=-3.05, p=0.00) and during lunch break (Z=-3.74, p=0.00). Also, in other variables which do not show a statistically significant difference but estimate PA in the evenings, on weekends and PA by days, male students show higher levels, which means that they are physically more active. The level of PA in the total sample is low and very few respondents meet the recommended daily requirement for PA, which points to the necessity of promoting PA among all age groups, particularly among adolescents.

Key words: *gender differences; physical activity; ten- year-olds.*

Introduction

Insufficient physical activity (PA) of children and youth has become a growing problem in contemporary society and is one of the factors affecting the increase of overweight and obese preschool and young school-age children. In 1997, the World Health Organization proclaimed obesity a global epidemic (WHO, 1997). The number of obese persons of all age groups is increasing every day and of particular concern is the growing number of obese children. The percentage of overweight children (including obesity) between 11 and 13 years of age ranges from 5% to as much as 25% in some countries (WHO, 2009). Despite the efforts of international organizations and national governments undertaken in order to increase the awareness of the obesity problem and to develop preventive measures, the prevalence continues in more than half of the countries.

Overweight and obesity in children have increased drastically during the last 20 years in Croatia, which means that it has reached epidemic proportions. The results of monitoring the nutritional status of schoolchildren aged 7-15 years show that on average 69.5% of children have normal body weight, 11% of children are overweight and 5.5% of children are obese, while only 1% are malnourished (Antonić-Degač, Kaić-Rak, Mesaroš-Kanjski, Petrović, & Capak, 2004).

The consequences of childhood obesity are numerous and many of them continue to prevail into adulthood. It is therefore necessary to take steps to prevent obesity or at least to reduce the number of obese children. One of these steps is to increase physical activity. The World Health Organization (WHO) recommends that children and young people should engage in at least 60 minutes per day of moderate-intensity physical activity. However, in spite of many warnings and encouragement to engage in physical activity, the number of physically active persons is declining. The level of PA starts to decline already in adolescence and this is confirmed by the results of longitudinal studies indicating that the decline in physical activity begins already at around 9 years of age (Armstrong, Welsman, & Kirby, 2000; Wickel, Eisenmann, & Welk, 2009).

The results of the study conducted in 2009/2010 as part of international HBSC project on the level of physical activity in Croatian school-age children have shown that only 25% of 11-year-old children meet the requirements for recommended daily physical activity (Currie, Zanotti, Morgan, Currie, de Looze, Roberts, Samdal, Smith, & Barnekow, 2012). If we compare these results with the results of the study conducted under the same project in 2005/2006 (Currie, Nic Gabhainn, Godeau, Roberts, Smith, Currie, Pickett, Richter, Morgan, & Barnekow, 2008), which showed that 31% of school-age children of the same age met the same requirements for recommended daily physical activity, we find that the number of physically active children declined by 6%. Similar results were shown in the study conducted by Petrić, Novak, and Matković in 2012, indicating that in the studied sample only 33% of adolescent girls and 31.2% of adolescent boys met the requirements for recommended daily physical activity. The study also established that physically more active female adolescents have normal body mass while overweight female adolescents are the ones who are less physically active.

There are numerous methods to estimate the level of physical activity and one of them is a questionnaire or a survey on physical activity where either the interviewer or respondent fills in the data. A large number of questionnaires exist which are used to assess the level of physical activity. They differ depending on the number of questions and degrees of detail, different techniques used in order to help respondents to answer the questions with respect to duration, intensity and type of activity it involves (Mišigoj Duraković et al., 1999). Questionnaires differ according to their validity and repeatability and for this reason many studies were conducted in order to evaluate and determine the reliability of questionnaires. One relevant study was conducted by Bates (2006), who among other things, analyzed eight most frequently used questionnaires to assess the level of physical activity of children and youth. Among them is also PAQ-C questionnaire (Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997) designed for young school-age children (aged 8-14 years). This questionnaire was tested on a sample of 215 children aged 8-16 years and it has demonstrated high reliability (test-retest; r=0.75 (M); r=0.82 (F)). A similar study was conducted by Biddle, Gorely, Pearson, and Bull (2011), which analyzed 20 most frequently used questionnaires for assessing the level of physical activity of children and youth. Among these 20 analyzed questionnaires, only three were ranked highly by experts and the PAQ-C questionnaire is one of them. Numerous other studies using different samples compared this questionnaire and accelerometer (Janz, Lutuchy, Wenthe, & Levy, 2008; Martínez-Gómez, Martínez-de-Haro, Pozo, Welk, Villagra, Calle, Marcos, & Veiga, 2009) and their findings have determined good validity and reliability of the PAQ-C questionnaire.

The PAQ-C questionnaire has been in use in different countries. It was translated into different languages and it has demonstrated good metric characteristics. The questionnaire was used twice in one week on a sample of 84 children from Canada (Crocker et al., 1997). By using the test-retest reliability method, the authors obtained a high reliability coefficient (α=0.75 for boys and α=0.82 for girls). Martinez – Gomez, Gómez-Martínez, Wärnberg, Welk, Marcos, and Veiga (2011) translated the questionnaire into Spanish and used it on the population in Spain. Their study also showed a high reliability coefficient (α=0.65 for boys and α=0.67 for girls). Faghihimani, Nourian, Nikkar, Farajzadegan, Khavariyan, Ghatrehsaman, Poursafa, and Kelishadi (2010) tested the reliability of the questionnaire on the population of children in Iran. Cronbach's reliability coefficient was α=0.89.

The PAQ-C questionnaire was translated into Croatian (Vidaković Samaržija & Mišigoj-Duraković, 2013) and it showed good metric characteristics: high reliability coefficient, Cronbach's alpha coefficient was 0.76, which indicates high reliability of the method in assessing the level of physical activity. The standardized alpha was 0.78 while the average correlation between items was r=0.17. The results of the study confirmed the validity of further usage of the questionnaire.

The results of numerous epidemiological studies point to the existence of gender differences in the level of physical activity. Research has shown higher level of physical activity among boys (Sherar, Esliger, Baxter-Jones, & Tremblay, 2007; Troiano, Berrigan, Dodd, Tilert, & McDowell, 2008). Boys have more interest in sports but they are also physically more active in their free time. The decline in physical activity starts earlier among girls and one of the reasons for this is the beginning of sexual maturation or the onset of puberty, which in comparison to boys, begins somewhat earlier in girls. The decline in physical activity in adolescence is somewhat more precipitous among girls than among boys (Armstrong et al., 2000). Between 6 and 17 years of age, a continual decline in physical activity has been noted: 2.7% per year among boys and as high as 7.4% per year among girls (Sallis, 1993).

Since there is an insufficiency of relevant data on the level of physical activity among 10-year-olds in Croatia and insufficient relevant data on gender differences in physical activity, the aim of this study is to research the existence of gender differences in physical activity on the population of 10-year-old urban children in the city of Zadar area.

Methods

The study was conducted on a sample of 206 participants (111 female students and 95 male students), fourth graders of elementary schools in Zadar, aged 10 years (± 6 months). Only healthy students, who were eligible to attend Physical Education classes in school, examined by school doctors and showing no morphological, motor function or mental aberrations, with valid consent forms for participating in the study, were included in the study. The study was conducted in four schools in the city of Zadar area and the selection of schools was made based on their availability. It is therefore appropriate to call this a convenient sample rather than a simple random sample.

The level of physical activity was measured using the PAQ-C questionnaire (Crocker et al., 1997). The questionnaire was designed for young school-age children (aged 8-14 years) to assess the overall level of physical activity. It consists of nine questions and the overall physical activity result is calculated based on the arithmetic mean of responses rated on a scale from 1-5, where 1 signifies low physical activity level and 5 signifies high physical activity level. The participants whose total result for overall physical activity is in a range between the values 4 and 5 meet the recommended daily level of physical activity, while the participants whose total result is in a range between the values 2 and 3 do not meet the requirements for recommended daily level of physical activity (Kowalski, Crocker, & Donen, 2004). The questionnaire has been translated into many languages and it has shown a high reliability coefficient in numerous studies (Crocker et al., 1997; Faghihimani et al., 2010; Martinez Gomez et al., 2011). It was translated into Croatian and a pilot study was conducted in order to determine the reliability of the Croatian version of the PAQ-C questionnaire but before the actual application of the questionnaire, it was necessary to obtain the translation approval

and the author's approval for further usage. The questionnaire has shown good metric characteristics (Cronbach's alpha coefficient=0.76; standardized alpha=0.78; the average correlation between items r=0.17) and the results confirmed the validity of further usage of the questionnaire (Vidaković Samaržija & Mišigoj-Duraković, 2013).

The questionnaire used to assess the level of physical activity was completed by students during class in their classrooms. Prior to that, they were given explanations about the measurement protocol, purpose and objectives. After the questionnaire sheets were handed out to the students, each question was explained to them in detail. While they were filling in the questionnaire, students could ask for clarifications. Since the research was anonymous, each questionnaire sheet given to a child had its own code.

The results were processed using computer statistical software Statistica 7.0. We calculated descriptive parameters for all quantitative variables: arithmetic mean (M), standard deviation (SD), median (Med), quartile range (QR), skewness (Skew) and kurtosis (Kurt). Distribution normality was tested using the Kolmogorov-Smirnov test. Since nearly all variables departed considerably from distribution normality, nonparametric methods were applied for further analysis. More precisely, in order to determine statistically significant differences in the level of physical activity with respect to gender, Mann-Whitney U test was applied and for this purpose the median, quartile range, z values and significance level (p) were calculated.

Results

Table 1 shows descriptive indicators of variables used to assess the level of physical activity as measured on the total sample and divided by gender.

The arithmetic mean of the summary result for the overall level of PA is 2.86 ± 0.58, which points to moderate level of physical activity of respondents. The arithmetic mean of the summary result with respect to gender shows that male students have somewhat higher overall level of PA than female students do (male students - 2.96 ± 0.58; female students - 2.78 ± 0.56). Among the items of the questionnaire, the highest arithmetic mean and consequently the highest physical activity level measured pertains to the variable evaluating PA in Physical Education class (4.40 ± 0.90). This was to be expected as it involved organized physical activity in which most of the students participate regularly.

The variability of results reaches maximum 1.21 of standard deviation (PA during break time), while measurements for asymmetrical distribution (skewness) and flatness of distribution (kurtosis) are the highest for the variable evaluating PA in free time (Skew=2.01; Kurt=6.78), which indicates that the distribution is moderately positively skewed and leptokurtic.

In most of the variables evaluating the level of physical activity, the average values are higher among male students, which indicates that male students are physically more active. The average values are higher among female students only for the variable evaluating PA after school. As a prerequisite before providing explanation of the

set hypotheses, the normality of distribution results of the variables evaluating the physical activity level was tested using the Kolmogorov-Smirnov test (Table 1).

For the total sample, the results show that the distribution significantly departs from

Table 1

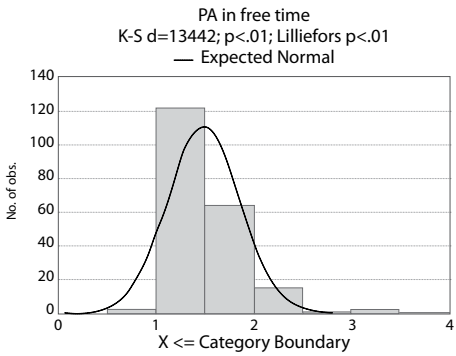
Descriptive indicators of variables used to assess the level of physical activity: arithmetic mean (M), standard deviation (SD), median (Med), quartile range (QR), skewness (Skew), kurtosis (Kurt)

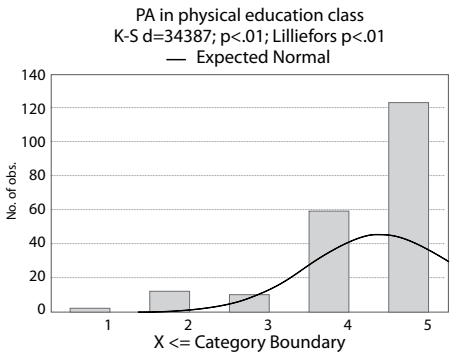
		M	*Med*	*QR*	*SD*	*Skew*	*Kurt*	*Max D*	*K-S*
PA in free time	T	1.48	1.42	0.48	0.37	2.01	6.78	0.13	*p < .01*
	M	1.49	1.43	0.45	0.42	2.38	8.22	0.16	*p < .05*
	F	1.48	1.41	0.43	0.33	1.22	1.92	0.13	p < .10
PA in Physical Education class	T	4.40	5.00	1.00	0.90	-1.70	2.53	0.34	*p < .01*
	M	4.46	5.00	1.00	0.91	-2.10	4.47	0.36	*p < .01*
	F	4.35	5.00	1.00	0.89	-0.39	1.18	0.33	*p < .01*
PA during break time	T	2.47	2.00	1.00	1.21	0.58	-0.53	0.23	*p < .01*
	M	2.76	3.00	2.00	1.27	0.21	-1.01	0.19	*p < .01*
	F	2.22	2.00	2.00	1.10	0.94	0.53	0.25	*p < .01*
PA during lunch break	T	3.18	3.00	2.00	1.15	0.10	-0.81	0.20	*p < .01*
	M	3.49	4.00	1.00	1.13	-0.39	-0.55	0.20	*p < .01*
	F	2.92	3.00	1.00	1.10	0.53	-0.31	0.25	*p < .01*
PA after school	T	3.02	3.00	2.00	1.17	0.10	-0.54	0.24	*p < .01*
	M	2.99	3.00	1.00	1.10	0.17	-0.23	0.25	*p < .01*
	F	3.05	3.00	2.00	1.24	0.04	-0.72	0.22	*p < .01*
PA in the evening	T	2.46	2.50	2.00	1.15	0.39	-0.51	0.18	*p < .01*
	M	2.58	3.00	2.00	1.26	0.29	-0.78	0.19	*p < .01*
	F	2.36	2.00	1.00	1.05	0.43	-0.27	0.18	*p < .01*
PA on weekends	T	2.88	3.00	1.00	1.05	0.19	-0.26	0.22	*p < .01*
	M	2.93	3.00	2.00	1.12	0.15	-0.52	0.20	*p < .01*
	F	2.84	3.00	1.00	0.98	0.21	0.04	0.24	*p < .01*
Self-evaluation of PA	T	2.75	3.00	1.00	0.99	0.27	-0.19	0.20	*p < .01*
	M	2.79	3.00	1.00	1.04	0.20	-0.31	0.20	*p < .01*
	F	2.72	3.00	1.00	0.96	0.33	-0.03	0.20	*p < .01*
PA by days	T	3.12	3.14	1.28	0.87	-0.25	-0.31	0.07	p > .20
	M	3.14	3.14	1.00	0.85	-0.27	0.11	0.10	p > .20
	F	3.10	3.29	1.28	0.90	-0.22	-0.57	0.11	p > .20
Overall level of PA	T	2.86	2.89	0.70	0.58	0.02	0.19	0.05	p > .20
	M	2.96	2.98	0.70	0.60	-0.05	0.40	0.06	p > .20
	F	2.78	2.82	0.70	0.56	0.03	0.07	0.07	p > .20

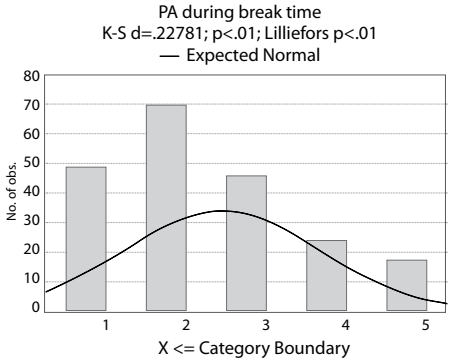
T-total sample (206); M-male students (95); F-female students (111)

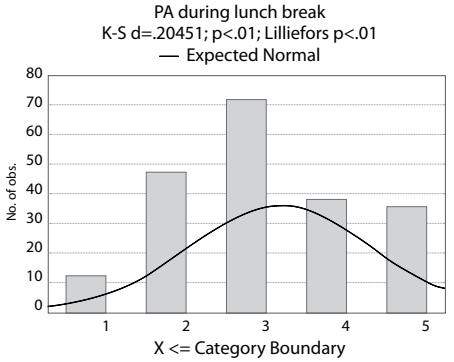
normality in most of the variables except for the variable evaluating PA by days and for the variable evaluating overall level of physical activity. The result distribution for the same variables departs significantly from normality also in gender subsamples. Although these departures from normality are not highly conspicuous, as can be seen from the histograms presented (Figure 1), nonparametric procedures were applied in further processing.

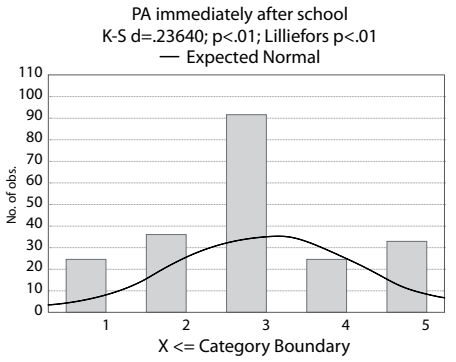
Before the actual assessment of gender differences in their physical activity, the participants were grouped into categories based on summary results of the questionnaire used to assess physical activity. All participants whose overall physical

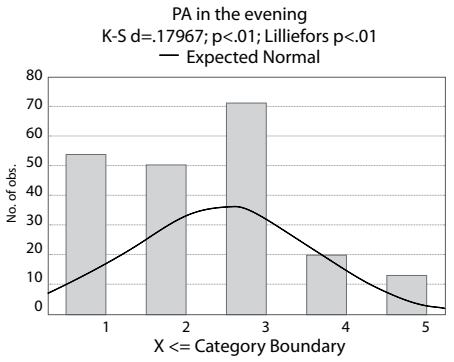

PA in free time
K-S d=13442; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary

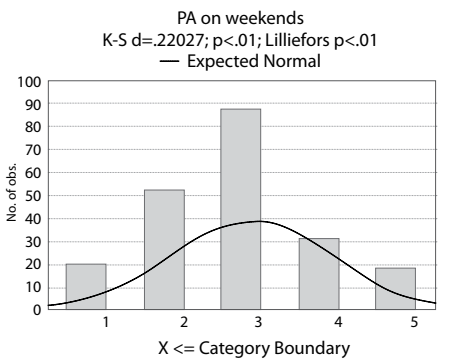

PA in physical education class
K-S d=34387; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary

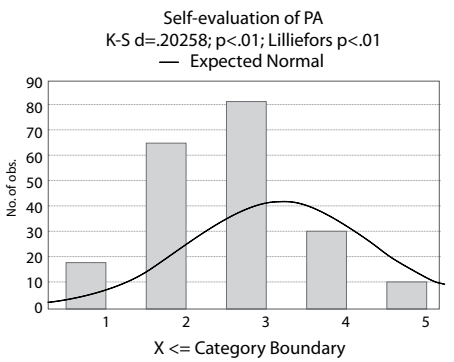

PA during break time
K-S d=.22781; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary


PA during lunch break
K-S d=.20451; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary


PA immediately after school
K-S d=.23640; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary


PA in the evening
K-S d=.17967; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary


PA on weekends
K-S d=.22027; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary


Self-evaluation of PA
K-S d=.20258; p<.01; Lilliefors p<.01
Expected Normal
No. of obs.
X <= Category Boundary

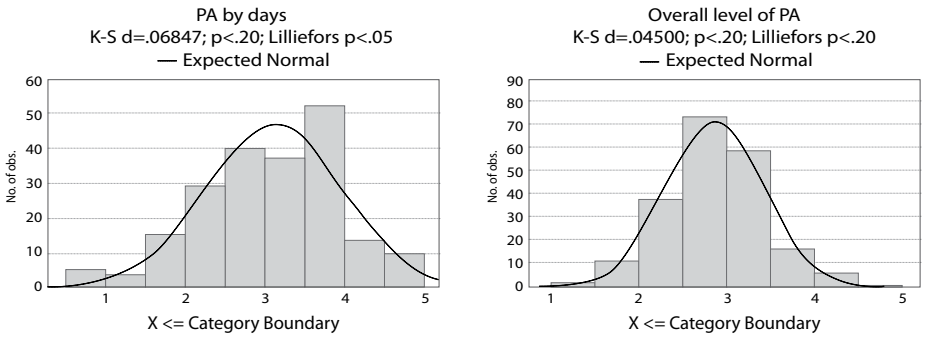


Figure 1. Distribution histograms of results for the variables evaluating overall physical activity level of the total sample

activity was ranked 4 or 5 meet the recommended daily level of physical activity (Kowalski et al., 2004). Figure 2 shows the overall physical activity of male and female students, measured on the Likert scale where value 2 marks the lowest and value 5 marks the highest level of physical activity.

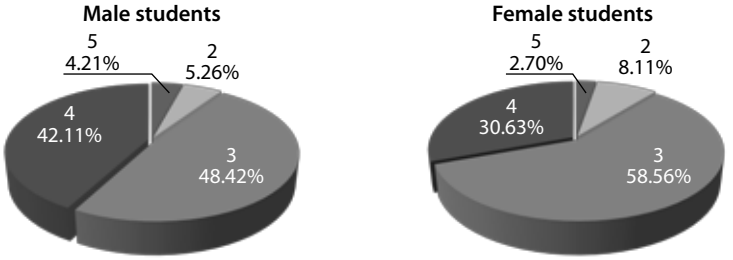


Figure 2. Percentage in the overall level of physical activity as measured on the Likert scale

According to percentages obtained, it is evident that male students are significantly more active than female students. As many as 42.11% of male students scored 4 while 4.21% of male students scored 5 on a scale measuring the level of physical activity, which falls within the range of recommended daily levels of physical activity (a total of 46.32% of male students meet the recommended daily levels of physical activity). Unlike male students, only 30.63% of female students scored 4 and 2.70% of female students scored 5 on a scale measuring the level of physical activity, which is a significantly poorer result (only 33.33% of female students meet the recommended daily levels of physical activity).

Using the Mann-Whitney U test, we tested the significance of gender differences in physical activity level. The analysis showed that the overall level of physical activity of male students is significantly higher than the overall level of physical activity of female students ($Z=-2.15$, $p=0.03$), which was expected. Male students are also significantly more active in school during break time ($Z=-3.05$, $p=0.00$) and during lunch break ($Z=-3.74$, $p=0.00$). Also, in other variables evaluating the level of physical activity in the evening, on weekends and by days, which do not show statistically significant differences, male students have higher scores, meaning that they are physically more active.

Table 2

Differences in physical activity between male and female students obtained using the Mann-Whitney U test:

	MED-QR Female	MED-QR Male	Z	p-level
PA in free time	1.41 (0.43)	1.43 (0.45)	0.62	0.54
PA in Physical Education class	5.00 (1.00)	5.00 (1.00)	-1.07	0.28
PA during break time	2.00 (2.00)	3.00 (2.00)	-3.05	0.00*
PA during lunch break	3.00 (1.00)	4.00 (1.00)	-3.74	0.00*
PA immediately after school	3.00 (2.00)	3.00 (1.00)	0.39	0.70
PA in the evening	2.00 (1.00)	3.00 (2.00)	-1.15	0.25
PA on weekends	3.00 (1.00)	3.00 (2.00)	-0.51	0.61
Self-evaluation of PA	3.00 (1.00)	3.00 (1.00)	-0.49	0.62
PA by days	3.29 (1.28)	3.14 (1.00)	-0.19	0.85
Overall level of PA	2.82 (0.70)	2.98 (0.70)	-2.15	0.03*

MED-QR - median-interquartile range; Z-z value; p - statistical significance

The chart (Figure 3) illustrates higher levels of physical activity among male students during break time and lunch break in comparison to female students and their higher overall level of physical activity. The biggest difference can be observed in physical activity during lunch break, which was to be expected owing to the fact that male students at this age are significantly more playful than female students and mostly spend their free time actively during lunch break. It can also be observed that higher portion of male students (25% - 75%) are also physically more active than female students in other variables (PA during break time and overall level of PA).

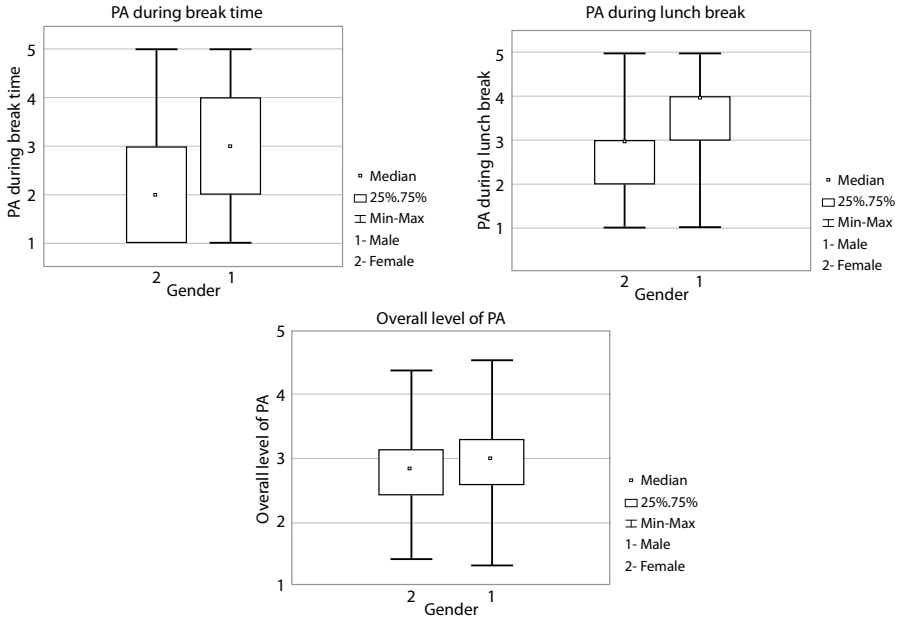


Figure 3. Differences between male and female students in PA during break and lunch break and in the overall level of physical activity

Discussion

The average summary result obtained using PAQ-C questionnaire to assess the overall level of physical activity is 2.86 ± 0.58, which points to moderate level of physical activity of respondents. By comparing the overall level of physical activity in the studied sample with the overall level of PA of their peers who also completed PAQ-C questionnaire (PAQ-C score= 3.21, Welk & Eklund, 2005; PAQ-C score= 3.06, Knowles, Niven, Fawkner, & Henretty, 2009), we can conclude that the overall level of physical activity in the studied sample is lower. Of the total sample, only 39.32 % of participants meet the daily requirements for physical activity (46.32% of male students and 33.33% of female students meet the recommended daily requirements for physical activity).

On a global scale, the level of physical activity is very low and it differs from one country to another. The results of the study conducted by Martinez-Gonzales, Varo, Santos, De Irala, Gibney, Kearney, and Martinez (2001) on the prevalence of physical activity, measured on a representative sample in the European Union, indicate that the population in northern European countries engages in more physical activity than the population in southern European countries. Of the countries included in this research, it is important to highlight Finland (91.9%) and Sweden (90.3%) which show the highest percentage of engagement in physical activity, while the lowest percentage of engagement in physical activity is reported in Portugal (40.7%). The level of physical activity among children and adolescents has become the object of research in a great number of scholarly articles as well as within different behavior surveillance systems monitoring national and international levels (Jurakić & Heimer, 2012). According to the results obtained by the system Health Behaviour in School-aged Children (HBSC), Croatia is slightly below the average in the number of physically inactive 11-year-olds (75%). However, when we compare the available data with those collected in the previous research in 2005/2006, it is evident that the prevalence of insufficient activity has increased by 6% (in 2005/2006 the prevalence of insufficiently active children was 69%), which is definitely disturbing and points to the necessity of creating a strategy for promoting physical activity in children. Intervention programs to increase levels of physical activity should be implemented for all age groups and should begin as early as preschool and encompass older age groups, with particular focus on preadolescent and adolescent age groups given the fact that numerous studies have reported a rapid decline in physical activity levels precisely for these two age groups (Dietz, 1994). Physical activity has a positive impact on body mass decrease. However, levels of physical activity in children and youth progressively decline significantly even before entering adolescence when there is generally a rapid increase in body mass (McMurray, Harrell, Creighton, Wang, & Bangdiwala, 2008).

When observing the levels of physical activity according to particular items it becomes evident that the highest level of physical activity is reached during Physical

Education classes (T= 4.40 ± 0.90; M= 0.46 ± 0.91; F= 4.35 ± 0.89), which was to be expected as it involved organized physical activity in which most of the students participate regularly. The arithmetic means show that there are no differences in the levels of physical activity during Physical Education classes, which is similar to the results of previous studies (Sarkin, McKenzie, & Sallis, 1998). The level of physical activity usually differs with respect to gender. Girls are generally less physically active, as was confirmed by this research. The results obtained using the Mann-Whitney U test showed that the overall level of physical activity of male students is higher than the overall level of physical activity of female students ($Z=-2.15$; $p<0.03$) and that male students are significantly more physically active during break time ($Z=-3.05$, $p=0.00$) and lunch break ($Z=-3.74$; $p=0.00$). Other research has shown higher levels of physical activity among boys (Sherar et al., 2007; Troiano et al., 2008).

Physical inactivity has been recognized as one of the biggest public health concerns in the 21st century (Blair, 2009). It is one of the factors contributing to the increase in body mass and obesity, which is inevitably linked to a greater risk for health issues. Since chronic illnesses have their origins in childhood and adolescence, the prevalence of physical inactivity in adolescence is of particular concern (Mišigoj-Duraković, Sorić, & Duraković, 2011). Overweight and obesity in childhood and in adolescence is linked to a greater risk for developing cardiovascular diseases (May & Kuklina, 2012), while frequent engagement in physical activity, especially in adolescence, decreases this risk (Hurtig-Wennlof, Ruiz, Harro, & Sjostrom, 2007). Low levels of physical activity increase the risk for high cholesterol (Brage, Wedderkopp, Ekelund, Franks, Wareham, Andersen, & Froberg, 2004) and high blood pressure. One study showed that the increase in levels of physical activity resulted in the decrease of systolic and diastolic blood pressure in a sample of preadolescent children (Hansen, Froberg, Hyldebrandt, & Nielson, 1991). Low level of physical activity is usually linked to overweight problems and obesity, which indirectly affects the development of type 2 diabetes, the incidence of which has dramatically increased in children and adolescents, especially in the United States (Centers for Disease Control and Prevention, 2011).

With respect to the available information about insufficient levels of physical activity among children and youth and the prevalence of risk factors for developing various health conditions due to inactivity and sedentary lifestyle, it is necessary to start introducing intervention programs already at preschool in order to improve the level of physical activity. Such programs should be enhanced, especially before entering adolescence as this is the age when physical activity starts to decline. At the young school-age, children are more inclined to listen to their parents' advice and at this age parents can still exhibit considerable influence on them. Therefore, parent awareness about health benefits of physical activity should be increased and they should be encouraged to acquire healthy lifestyle habits in order to directly influence the development of healthy lifestyle habits in their children.

Conclusion

The aim of this study was to determine the level of physical activity of 10-year-old male and female students in the city of Zadar area and to explore the existence of possible gender differences in the level of physical activity. The average summary result used to evaluate the overall level of physical activity points to a moderate level of physical activity of respondents. Only 39.32% of participants in the study meet the recommended daily requirements for physical activity, which is definitely disturbing and points to the necessity of introducing intervention programs in order to increase the level of physical activity among 10-year-olds. Considering the fact that we are dealing with pre-puberty population whose bodies characteristically experience a whole series of morphological changes, and having in mind that physical activity has positive effects on a young organism, regular physical activity becomes an even greater necessity.

Descriptive parameters indicate that there exists a difference in levels of physical activity with respect to gender, as verified by the results of the Mann-Whitney U test. The statistically significant difference was obtained in the overall level of physical activity, as well as in the level of physical activity during break and lunch break. Male students are the ones who are more active, which is to be expected at this age, since boys are more inclined to participate in games and sports activities.

On observation of individual components of physical activity, the results have shown the highest level of physical activity during Physical Education classes with no significant differences with respect to gender. The results obtained point to the benefits of organized physical activity and to the conclusion that the intervention programs should be focused on organized physical activities. It is desirable to start introducing intervention programs to improve physical activity levels as early as possible, and they should be enhanced especially before entering adolescence as this is characteristically the age when the level of physical activity starts to decline.

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Razlike u tjelesnoj aktivnosti desetogodišnjaka s obzirom na spol

Sažetak

Nedovoljna tjelesna aktivnost (TA) djece i mladih postala je rastućim problemom suvremenog društva i jedan je od čimbenika koji utječu na porast prekomjerne tjelesne mase već u predškolskoj i mlađoj školskoj dobi. Preporuka Svjetske zdravstvene organizacije (WHO) je da djeca i mladi barem 60 minuta dnevno provedu u nekoj od kineziološkim aktivnosti srednjeg intenziteta, no usprkos poticanju na bavljenje TA, razina TA počinje se smanjivati već u doba adolescencije (Armstrong, Welsman i Kirby, 2000; Wickel, Eisenmann i Welk, 2009). Istraživanje je provedeno na uzorku od 206 ispitanika (111 učenica i 95 učenika) polaznika četvrtih razreda osnovnih škola grada Zadra, s ciljem utvrđivanja razine TA učenika i ispitivanja postojanja razlika u razini TA s obzirom na spol. Razina TA procijenjena je upitnikom Physical Activity Questionnaire (PAQ-C) (Crocker, Bailey, Faulkner, Kowalski, i McGrath, 1997). Izračunati su osnovni deskriptivni pokazatelji, a Man-Whitney U test primijenjen je za ispitivanje razlika u razini TA s obzirom na spol. Učenici imaju značajno veću ukupnu razinu TA od učenica (Z=-2.15, p=0.03) pa se značajno razlikuju u varijablama koje procjenjuju razinu TA u školi za vrijeme malog (Z=-3.05, p=0.00) i velikog odmora (Z=-3.74, p=0.00). I u ostalim varijablama koje procjenjuju TA u večernjim satima, vikendom i po danima, a koje ne pokazuju statistički značajnu razliku, učenici također imaju više vrijednosti, što znači da su tjelesno aktivniji. Razina TA ukupnog uzorka je niska, vrlo mali broj ispitanika zadovoljava preporučene dnevne potrebe za TA, što upućuje na potrebu promicanja TA u svim dobnim skupinama, a posebno u doba adolescencije.

Ključne riječi: *desetogodišnjaci; spolne razlike; tjelesna aktivnost.*