ORIGINAL PAPER
ORYGINALNY ARTYKUŁ NAUKOWY

Health Prob Civil. 2019, Volume 13, Issue 1
ISSN 2353-6942

THE RELATIONSHIP BETWEEN FAMILY SOCIO-ECONOMIC STATUS, FAMILY SOCIAL SUPPORT AND ADOLESCENT PHYSICAL ACTIVITY

ZWIĄZEK POMIĘDZY STATUSEM SPOŁECZNO-EKONOMICZNYM RODZICÓW, WSPARCIEM SOCJALNYM DLA RODZINY A AKTYWNOŚCIĄ FIZYCZNĄ MŁODZIEŻY

Hrvoje Ajman[1(A,B,C,D,E,F)], **Marita Ukić**[2(B,E,F)], **Dejan Madić**[3(D,E)]

[1]Faculty of Education in Osijek, Josip Juraj Strossmayer University in Osijek, Croatia
[2]Faculty of Kinesiology, University of Zagreb, Croatia
[3]Faculty of Physical Education and Sport, University of Novi Sad, Serbia

Authors' contribution
Wkład autorów:
A. Study design/planning
zaplanowanie badań
B. Data collection/entry
zebranie danych
C. Data analysis/statistics
dane – analiza i statystyki
D. Data interpretation
interpretacja danych
E. Preparation of manuscript
przygotowanie artykułu
F. Literature analysis/search
wyszukiwanie i analiza literatury
G. Funds collection
zebranie funduszy

Summary

Background. There are numerous benefits of undertaking regular physical activity on health. The World Health Organization (WHO) recommends for young people to undertake at least 60 minutes of moderately intense physical activity daily. Despite the well-known health benefits of exercise, the levels of physically inactive young people are continuously increasing. A large number of studies have found a relationship between socio-economic status and chronic disease. The aim of our study was to examine: the association between family socio-economic status and adolescent physical activity and also to assess the link between social support and adolescents' physical activity and finally to examine whether there are any gender differences.
Material and methods. There were 3396 final year secondary school students from 33 randomly selected secondary schools from Zagreb included in our study. The study was conducted from April 2015 to June 2016. Physical activity was measured using a short version of the International Physical Activity Questionnaire (IPAQ-SF). Socio-economic status and family social support was assessed using questionnaires.
Results. Boys were significantly more physically active than girls. The results of the logistic regression analysis did not determine a statistically significant association between the socio-economic status and physical activity of the participants.
Conclusions. Family social support and socio-economic status were not positively related to physical activity in Croatian adolescents.

Keywords: IPAQ-SF, socio-economic status, Croatia, students, social capital

Streszczenie

Wprowadzenie. Regularna aktywność fizyczna ma liczne korzyści dla zdrowia, co zostało naukowo potwierdzone badaniami wstępnymi. Światowa Organizacja Zdrowia (WHO) zaleca, aby codzienna aktywność fizyczna dzieci i młodzieży o intensywności umiarkowanej do wzmożonej wynosiła co najmniej 60 minut. Pomimo korzyści zdrowotnych oraz zaleceń WHO liczba dzieci i młodzieży niepodejmujących aktywności fizycznej stale rośnie. Liczne badania stwierdzają pozytywny związek między statusem społeczno-ekonomicznym a chorobami przewlekłymi i wskaźnikami umieralności. Niniejsze badanie miało na celu: 1) analizę związku pomiędzy statusem społeczno-ekonomicznym rodziców a aktywnością fizyczną młodzieży; 2) ocenę związku pomiędzy wsparciem socjalnym rodziców a aktywnością fizyczną młodzieży oraz ustalenie, czy istnieją różnice w odniesieniu do płci.
Materiał i metody. W badaniu wzięło udział 3396 uczniów ostatniego roku szkoły średniej z 33 losowo wybranych szkół średnich z Zagrzebia. Badanie to było prowadzone od kwietnia do czerwca w roku szkolnym 2015/2016. Aktywność fizyczną mierzono za pomocą skróconej wersji Międzynarodowego Kwestionariusza Aktywności Fizycznej (IPAQ-SF). Status społeczno-ekonomiczny oraz wsparcie socjalne rodziców oceniono za pomocą kwestionariuszy.
Wyniki. Chłopcy wykazywali znacznie większą aktywność fizyczną niż dziewczęta. Wyniki analizy regresji logistycznej nie wskazują na statystycznie istotny związek pomiędzy statusem społeczno-ekonomicznym a aktywnością fizyczną uczestników.
Wnioski. Wsparcie socjalne dla rodziny oraz status społeczno-ekonomiczny rodziców nie wywierają korzystnego wpływu na aktywność fizyczną chorwackiej młodzieży.

Tables: 5
Figures: 0
References: 34
Submitted: 2018 Jul 27
Accepted: 2018 Nov 7

Słowa kluczowe: IPAQ-SF, status społeczno-ekonomiczny, Chorwacja, uczniowie, kapitał społeczny

Ajman H, Ukić M, Madić D. The relationship between family socio-economic status, family social support and adolescent physical activity. Health Prob Civil. 2019; 13(1): 48-55. https://doi.org/10.5114/hpc.2019.81108

Address for correspondence / Adres korespondencyjny: Dejan Madić, Faculty of Physical Education and Sport, University of Novi Sad, Lovćenska 16, 21101 Novi Sad, Serbia, e-mail: nele_trajce@yahoo.com, phone: +38 169680314; ORCID: Hrvoje Ajman https://orcid.org/0000-0003-3663-4008

Introduction

Daily physical activity is an essential for optimum growth and development of children and young people. The numerous benefits of regular physical activity on health have been proven from previous research [1]. The World Health Organization (WHO) recommends at least 60 minutes of physical activity moderate to vigorous intensity daily for children and young people. Despite the numerous health benefits and WHO's recommendations, the prevalence of physically inactive adolescents and children has been increasing [2]. According to the WHO, physical inactivity is one of the leading risk factors for global mortality [3].

Levels of physical activity is affected by several factors, and in the recent years there has been an increase in research interest on the impact of socio-economic status on levels of physical activity [4]. Socio-economic status (SES) is defined as an economic and social measure of an individual's position in the social hierarchy based on income, education level and occupation [5]. SES is an important predictor of health as it influences the attitudes, experiences and exposure of people to health risk factors. A large number of studies have found a relationship between lower socio-economic status and chronic diseases and their mortality rates [6, 7]. The relationship between lower socio-economic status and health is not limited exclusively to adults. The children of low SES parents are exposed to a higher risk of cardiovascular disease and unhealthy lifestyle than the children of higher SES parents [8]. However, some research has revealed a negative relationship between the level of physical activity among young people and the parental socio-economic status [9-11].

Family social support is an important factor in the life of children and adolescents. Previous studies have determined a positive association between family social support and physical activity of adolescents [12]. Physical activity habits of the parents' [13], parental attitudes and beliefs toward physical activity [14] and social support of parents are some of the factors who have been positively associated with children and youth physical activity. However, some research have shown the contrary, revealing a negative relationship between the level of family social support and physical activity of adolescents [15].

Due to the conflicting results of the research conducted so far, the main objective of our study was to identify the relationship between parents' socio-economic status, family social support and physical activity among adolescents and to examine whether there are gender differences in order to better understand the importance of physical activity on the health of adolescents.

Material and methods

Subjects

The sample was drawn from the population of final year secondary school students from Zagreb. A planned number of respondents were 4000, from 33 randomly selected secondary schools. After data collection the total number of useable respondents was 3396 (1726 female students and 1670 male students) who participated in this study. Questionnaires containing a majority of missing information (N = 604) were excluded from the analysis. Informed written consent was obtained from the students before filling out the questionnaires. The average age of the adolescents was 18.1 y (range 17/20).

Socio-economic status

Socio-economic status (SES) is based on the employment of both parents at the time the study was conducted. The employment of the father and the mother was categorized into three groups: high SES marked with number 1 (e.g. managerial positions), middle SES marked with number 2 (e.g. white-collar worker) and low SES marked with number 3 (e.g. blue-collar worker) [16]. Socio-economic status of parents was calculated based on the combination of the socio-economic status of the mother and of the father. The values in the variable of the father's and the mother's SES were added up and the variable was then dichotomized to a high socio-economic status (the sum of answers ranging from 2 to 4) and to a low socio-economic status (the sum of answers ranging from 5 to 6).

Family social support

Family social support was assessed by the single item: 'Do you feel your family understands and gives attention to you during high school?' [17]. The response options were rated 1-5 on a Likert scale: 5 'strongly agree'; 4 'agree'; 3 'neither agree or disagree'; 2 'disagree'; 1 'strongly disagree'. The responses 1-3 dichotomized variable indicating lower perceived family social support and responses 4-5 indicating higher perceived family social support.

Assessment of physical activity

Physical activity (PA) was assessed by using the short version of the International Physical Activity Questionnaire (IPAQ-SF). This version consists of nine items and provides information on the time spent walking, in vigorous- and moderate-intensity activity and in sedentary activity. Participants of the study were instructed to refer to all areas of physical activity over the previous seven days. The questionnaire was translated into Croatian and metric characteristics were determined. In 2016, Ajman, Đapić-Štriga and Novak [18] identified the reliability level of the questionnaire to 0.64. The results referring to the physical activity level obtained by the IPAQ-SF questionnaire were categorized into one of three possible categories of physical activity (Table 2): insufficient activity (0-600 MET-min./week), minimum activity (601-3000 MET-min./week) and sufficient activity (x > 3001 MET-min./week), in order to be in line with the recommendations of the WHO on at least 60 minutes of moderate to vigorous intensity physical activity daily for children and young people [19]. In further data analysis, the variable of physical activity was dichotomized to satisfactory (high level PA) physical activity indicated by number 0 and insufficient physical activity (low and moderate PA level) indicated by number 1.

Procedure

The study was conducted from April 2015 to June 2016. Questionnaires were distributed during physical education classes and filled out by 4000 students. Questionnaires containing a majority of missing information (N = 604) were excluded from the analysis. A total of 3396 questionnaires were available for data analysis. A response rate of 84.9% was obtained. Surveys were designed to protect the privacy of the students by enabling anonymous participation. The study protocol was approved by Committee for Scientific Research and Ethics, Faculty of Kinesiology University of Zagreb.

Statistical analysis

The data were analyzed using SPSS (IBM SPSS Statistics for Windows, Version 20.0.). The data analysis involved descriptive statistics, nonparametric test and multivariate analysis. The descriptive statistic parameters were calculated for the physical activity variable. Distribution normality was tested using the Kolmogorov-Smirnov test. The frequency response was calculated for the socio-economic status variables. Statistically significant differences were identified using the Mann-Whitney U test, regarding the gender of the participants. The association of physical activity with family social support and socio-economic status was examined with a logistic regression model, odds ratios (ORs) and 95% confidence intervals (CIs) for low physical activity were calculated.

Results

Descriptive statistics for the physical activity and determinant variables are shown in Table 1. In all categories evaluating the level of physical activity, the average values are higher among male students, which indicates that the level of physical activity in the male is higher than the level of physical activity in female students. The results of the Kolmogorov-Smirnov test indicate that the distribution of results of all items of the physical activity questionnaire deviates significantly from the normal distribution. The average values in variable family social support and socio-economic status are higher among female students, but gender differences in these characteristics didn't determine this value as being significant.

Table 1. Physical activity, family social support and socio-economic status and their relationship with the gender of participants

(MET-min./week)	Male (N = 1726)	Female (N = 1670)	p
Physical activity (total)	6563.83 ± 7226.42	5618.48 ± 6996.37	< 0.05
Physical activity (low)	1123.65 ± 1456.06	539.98 ± 1102.46	< 0.05
Physical activity (moderate)	1267.16 ± 2133.13	982.52 ± 2063.06	< 0.05
Physical activity (high)	4173.01 ± 5906.68	4095.98 ± 5849.34	< 0.05
Family social support	4.19 ± 0.89	4.21 ± 0.90	n.s.
Socio-economic status	3.86 ± 1.65	3.87 ± 1.65	n.s.

n.s. - not significant

The results indicate that the level of physical activity in male students is higher than that of female students. When the data was sorted into the physical activity categories it is obvious that the level of physical activity is higher at boys than the girls (Table 2).

Table 2. Percentage of female and male respondents in physical activity categories

	Total (N = 3396)	Female (N = 1670)	Male (N = 1726)
0 - 600 MET-min/week	14.00	16.90	11.00
601 - 3000 MET- min/week	26.86	29.10	24.40
> 3001 MET- min/week	59.14	54.00	64.60

The parents' SES in this sample indicates that the percentage of both fathers and mothers of the respondents holding managerial positions, white-collar jobs and blue-collar jobs is similar. The highest percentage of fathers is employed in managerial positions, a slightly smaller number hold a blue-collar job, while the smallest number of fathers hold white-collar jobs. The highest percentage of mothers hold blue-collar jobs, followed by managerial positions, while the lowest percentage hold a white-collar job (Table 3). According to the results of the study, there were not unemployed parents. The results have shown that there is no statistically significant difference in socio-economic status among male and female students. The values in the variable of the father's and the mother's SES were combined and the value was then dichotomized to a high socio-economic status (the sum of answers ranging from 2 to 4) and to a low socio-economic status (the sum of answers ranging from 5 to 6).

Table 3. The socio-economic status of parents among student participants

SES	Father			Mother		
	Manager	Blue collar	White collar	Manager	Blue collar	White collar
Total	39.80	21.80	38.40	38.60	21.90	39.50
Male	39.70	22.50	37.80	37.50	23.30	39.20
Female	39.90	21.60	38.50	38.90	22.60	38.50

In the next step, all data was dichotomized and Spearman correlations between socio-economic status, family social support and physical activity are shown in Table 4. For both sexes, socio-economic status and family social support was not significantly related to adolescents' self-reported physical activity.

Table 4. Correlation between socio-economic status, family social support and physical activity

	PA males	PA females	PA total
Socio-economic status	0.70	0.08	0.33
Family social support	0.12	0.63	0.36

$p < 0.01$

Logistic regression analysis found the connection between the physical activity variable and the socio-economic status variable. The results of the logistic regression analysis have shown that there is no statistically significant connection between the socio-economic status of the family, family social support and physical activity of the respondents (Table 5).

Table 5. Odds ratios of physical activity among high school students in Croatia

	Low physical activity (N)	Model 1 OR (95% CI)
Family social support		
High	2797	1.00
Low	599	0.93 (0.78-1.11)
Self-perceived socioeconomic status		
High/Middle	2192	1.00
Low	1204	0.93 (0.81-1.07)
Gender		
Male	1726	1.00
Female	1670	1,551 (1.35-1.78)

OR- odds ratio; CI- confidence interval

Discussion

This study examined the associations between socio-economic status, family social support and adolescent physical activity. Evidence from the study confirms some of the earlier findings that parental social support and the social class of the families were not positively related to adolescent self-reported physical activity. This supports the theory that parents do not have a strong influence on the physical activity habits of adolescents (Table 4).

The results of the logistic regression analysis have shown that there is no statistically significant connection between the socio-economic status of the parents, family social support and physical activity of the respondents and odds ratios (ORs) and 95% confidence intervals (CIs) for low physical activity were calculated (Table 5).

The results of the logistic regression analysis suggest that socio-economic status and family social support does not have a positive connection with the level of physical activity among male and female final year secondary school students, which complies with previous research in this area [9-11]. The results of this study are compatible with the conclusions of the research conducted by Macintyre and Mutrie (2004) [20], which confirmed that SES does not affect the overall level of physical activity, but only the participation in sports clubs.

Family support has been found to influence the participation of physical activity of young people [4]. Previous studies have shown that parental participation in physical activity, encouragement and accessibility to transportation to sporting events have been linked to higher levels of activity among children and adolescents [21]. Our results do not indicate an association between family social support and adolescents' self-reported physical activity. Similar results were also found by Kimiecik, Horn, Shurin (1996) [14] on a sample of 81 families. They tried to establish the link between the physical activity of parents and children, and mutual trust. Results indicate that mutual trust is not associated with physical activity of one or the other. Morgan McKenzie, Sallis, Nader (2003) [22] on a sample of 214 young people also come to the conclusion that the trust and support of parents are not positively associated with physical activity of their children.

The reason of these results can be found in the fact that adolescence is the age at which young people are almost independent of their parents and significant part of free time they spend alone or hanging out with their peers, and the influence of parents on their everyday decisions is much smaller than in earlier age [23].

Physical inactivity and a sedentary lifestyle have unfortunately been recognized as one of the characteristics of modern life. Research has shown that adolescence is the most important life period for creating positive healthy habits, primarily for physical activity whose habits will be practiced at a later stage in life as well [24]. There is a growing prevalence of young people who do not meet the recommended targets for physical activity given by WHO. The results of two global surveys, Health Behaviour in School-aged Children (HBSC) and Global School-Based Student Health Survey (GSHS), covering 105 countries, indicate that 80.3% of respondents do not meet the given recommendations on physical activity [25, 26]. The results of this study have shown that 40.80% of respondents also do not meet these targets, which represent a significantly better result compared to the results of the aforementioned studies.

The level of physical activity is gender-dependent. A number of studies has revealed a higher level of physical activity in boys than in girls [27, 28]. In a sample of adolescents, scientific research has also confirmed that boys are more active than girls. Based on the results of the questionnaire on physical activity, Mota et al. (2008) [29] found that 56.50% of female respondents and 84.80% of male respondents reported a sufficient level of physical activity. In a sample of adolescents from Texas (USA), Springer et al. (2010) [30] concluded that 42.20% of female respondents and 60.00% of male respondents reported a sufficient level of physical activity. However, Mak et al. (2011) [31], based on the results of the questionnaire on physical activity conducted on a sample of adolescents from Hong Kong, established that 70.30% of female respondents and 75.10% of male respondents reported a sufficient level of physical activity. Another international study which was conducted on sample of adolescents from four European countries (Czech Republic, Poland, Slovakia and Hungary), Bergier et al. (2016) [32] concluded that 56.70% to 77.80% of male students occurred in high PA level category opposite to female students where this rate was from 42.4% to 67.40%. Authors also found significant differences between the four countries (χ^2=131.814 p<0.001). In Slovakia, Poland and the Czech Republic significant differences were established between sexes, but this was not true for Hungary which showed no significant difference between the two groups.

The results of our study, carried out on a sample of final year secondary school students, are similar to the results of previously conducted research and indicate that female respondents are less physically active than male respondents (54.00% of female respondents and 64.60% of male respondents meet the recommendations on physical activity). The research conducted by Petrić et al. in 2014. [33] on a sample of secondary school students from Istria aged between 16 and 18 showed that 33.10% of female students and 36.90% of male students

reported a sufficient level of physical activity. This study also confirms the hypothesis that boys are more physically active than girls, but the results obtained from the sample of Istrian adolescents differ substantially from the results of this study where a much larger number of respondents who meet the recommendations on physical activity was identified, which may be attributed to the regional aspect. There is a trend of a higher level of physical activity among boys due to their greater interest in sport and sports events and to the fact that boys are often involved in team sports in their free time, while girls are more interested in fashion and show business and are prone to doing independent exercise in their free time [34].

Conclusions

The results of this study have shown that 40.80% of respondents do not meet the given recommendations on physical activity, which represents a significantly better result compared to the results of two global surveys, Health Behaviour in School-aged Children (HBSC) and Global School-Based Student Health Survey (GSHS), which covered 105 countries and found that 80.30% of respondents did not meet the given recommendations. The results, carried out on a sample of final year secondary school students, are similar to the results of previously conducted research and indicate that female respondents are less physically active than male respondents. The results of socio-economic status have shown that the percentage of both fathers and mothers of the respondents holding managerial positions, white-collar jobs and blue-collar jobs is very much similar and that there is no statistically significant difference in socio-economic status among male and female students. The results of family social support have shown that parents equally support male and female respondents to be physically active. The results of the statistical analysis have shown that socio-economic status and family social support does not affect the level of physical activity among male and female final year secondary school students, which complies with previous research.

The advantages of this study are reflected in the fact that the sample of respondents included more than 3000 students in their final year of grammar schools and vocational schools. This study has identified the level of physical activity based on a representative sample of adolescents, the population covered the least by scientific research. However, this study has does have some limitations. Subjective methods of assessment of physical activity, family social support and socio-economic status were used, so there may be the certain methodological bias which could result in a statistical error in sample results.

References:

1. Penedo FJ, Dahn JR. Exercise and well-being: a review of mental and physical health benefits associated with physical activity. Current Opinion in Psychiatry. 2005; 18(2): 189-193. https://doi.org/10.1097/00001504-200503000-00013
2. Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, McDowell M. Physical activity in the United States measured by accelerometer. Medicine and Science in Sports and Exercise. 2008; 40(1): 181. https://doi.org/10.1249/mss.0b013e31815a5lb3
3. World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva: World Health Organization; 2009.
4. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. Medicine and Science in Sports and Exercise. 2000; 32(5): 963-975. https://doi.org/10.1097/00005768-200005000-00014
5. Patro BK, Jeyashree K, Gupta PK. Kuppuswamy's socioeconomic status scale 2010 – the need for periodic revision. Indian Journal of Pediatrics. 2012; 79(3): 395-396. https://doi.org/10.1007/s12098-011-0517-7
6. Borrell LN, Roux AVD, Rose K, Catellier D, Clark BL. Neighbourhood characteristics and mortality in the atherosclerosis risk in Communities Study. International Journal of Epidemiology. 2004; 33(2): 398-407. https://doi.org/10.1093/ije/dyh063
7. Pollitt RA, Kaufman JS, Rose KM, Diez-Roux AV, Zeng D, Heiss, G. Early-life and adult socioeconomic status and inflammatory risk markers in adulthood. European Journal of Epidemiology. 2007; 22(1): 55-66. https://doi.org/10.1007/s10654-006-9082-1
8. Bradley RH, Corwyn RF. Socioeconomic status and child development. Annual Review of Psychology. 2002; 53(1): 371-399. https://doi.org/10.1146/annurev.psych.53.100901.135233
9. Sallis JF, Zakarian JM, Hovell MF, Hofstetter CR. Ethnic, socioeconomic, and sex differences in physical activity among adolescents. Journal of Clinical Epidemiology. 1996; 49(2): 125-134. https://doi.org/10.1016/0895-4356(95)00514-5

10. Sundquist J, Malmström M, Johansson SE. Cardiovascular risk factors and the neighbourhood environment: a multilevel analysis. International Journal of Epidemiology. 1999; 28(5): 841-845. https://doi.org/10.1093/ije/28.5.841
11. Bergier J, Niźnikowska E, Bergier B, Junger J, Ács P, Salonna F. Diversity of physical activity among the school youth depending on the type of place of residence. Health Prob Civil. 2016; 10(1): 24-31. https://doi.org/10.5114/hpc.2016.58205
12. Beets MW, Cardinal BJ, Alderman BL. Parental social support and the physical activity-related behaviors of youth: a review. Health Education & Behavior. 2010; 37(5): 621-644. https://doi.org/10.1177/1090198110363884
13. Raudsepp L, Viira R. Influence of parents' and siblings' physical activity on activity levels of adolescents. European Journal of Physical Education. 2000; 5(2): 169-178. https://doi.org/10.1080/1740898000050205
14. Kimiecik JC, Horn TS, Shurin CS. Relationships among children's beliefs, perceptions of their parents' beliefs, and their moderate-to-vigorous physical activity. Research Quarterly for Exercise and Sport. 1996; 67(3): 324-336. https://doi.org/10.1080/02701367.1996.10607960
15. Davison KK, Nishi A, Kranz S, Wyckoff L, May JJ, Earle-Richardson GB, et al. Associations among social capital, parenting for active lifestyles, and youth physical activity in rural families living in upstate New York. Social Science & Medicine. 2012; 75(8): 1488-1496. https://doi.org/10.1016/j.socscimed.2012.06.002
16. Wang Z, Byrne NM, Kenardy JA, Hills AP. Influences of ethnicity and socioeconomic status on the body dissatisfaction and eating behaviour of Australian children and adolescents. Eating Behaviors. 2005; 6(1): 23-33. https://doi.org/10.1016/j.eatbeh.2004.05.001
17. Furuta M, Ekuni D, Takao S, Suzuki E, Morita M, Kawachi I. Social capital and self-rated oral health among young people. Community Dentistry and Oral Epidemiology. 2012; 40(2): 97-104. https://doi.org/10.1111/j.1600-0528.2011.00642.x
18. Ajman H, Dapić-Štriga S, Novak D. Reliability of the short version of the International Physical Activity Questionnaire for Croatia. Croatian Sports Medicine Journal. 2015; 30: 87-90.
19. International Physical Activity Questionnaire Research Committee. Guidelines for data processing and analysis of the international physical activity questionnaire (IPAQ)-short and long forms [Internet]. 2005 [cited 2016 Sep 18]. Available from: http://www.ipaq.ki.se
20. Macintyre S, Mutrie N. Socio-economic differences in cardiovascular disease and physical activity: stereotypes and reality. The Journal of the Royal Society for the Promotion of Health. 2004; 124(2): 66-69. https://doi.org/10.1177/146642400412400209
21. Anderssen N, Wold B. Parental and peer influences on leisure-time physical activity in young adolescents. Research Quarterly for Exercise and Sport. 1992; 63(4): 341-348. https://doi.org/10.1080/02701367.1992.10608754
22. Morgan CF, McKenzie TL, Sallis JF, Broyles SL, Zive MM, Nader PR. Personal, social, and environmental correlates of physical activity in a bi-ethnic sample of adolescents. Pediatric Exercise Science. 2003; 15(3): 288-301. https://doi.org/10.1123/pes.15.3.288
23. Tokić A, Pećnik N, Radočaj T. [Public testimonies of the proper parenting procedures for children of the youngest age]. Društvena Istraživanja-časopis za opća društvena pitanja. 2011; 3: 625-646 (in Croatian). https://doi.org /10.5559/di.20.3.02
24. Kalman M, Inchley J, Sigmundova D, Iannotti RJ, Tynjälä JA, Hamrik Z, et al. Secular trends in moderate-to-vigorous physical activity in 32 countries from 2002 to 2010: a cross-national perspective. The European Journal of Public Health. 2015; 25(suppl 2): 37-40. https://doi.org/10.1093/eurpub/ckv024
25. Centers for Disease Control and Prevention (CDC). School health guidelines to promote healthy eating and physical activity. MMWR. Recommendations and reports: morbidity and mortality weekly report. Recommendations and Reports/Centers for Disease Control. 2011; 60(RR-5): 1.
26. Inchley J, Kirby J, Currie C. Longitudinal changes in physical self-perceptions and associations with physical activity during adolescence. Pediatric Exercise Science. 2011; 23(2): 237-249. https://doi.org/10.1123/pes.23.2.237
27. Tudor-Locke C, Neff LJ, Ainsworth BE, Addy CL, Popkin BM. Omission of active commuting to school and the prevalence of children's health-related physical activity levels: the Russian Longitudinal Monitoring Study. Child: Care, Health and Development. 2002; 28(6): 507-512. https://doi.org/10.1046/j.1365-2214.2002.00295.x
28. Romanzini M, Reichert FF, Lopes ADS, Petroski ÉL, Farias Júnior JCD. Prevalence of cardiovascular risk factors in adolescents. Cadernos de saude publica. 2008; 24(11): 2573-2581. http://dx.doi.org/10.1590/S0102-311X2008001100012

29. Mota J, Fidalgo F, Silva R, Ribeiro JC, Santos R, Carvalho J, et al. Relationships between physical activity, obesity and meal frequency in adolescents. Annals of Human Biology. 2008; 35(1): 1-10. https://doi.org/10.1080/03014460701779617
30. Springer AE, Lewis K, Kelder SH, Fernandez ME, Barroso CS, Hoelscher DM. Physical activity participation by parental language use in 4th, 8th, and 11th grade students in Texas, USA. Journal of Immigrant and Minority Health. 2010; 12(5): 769-780. https://doi.org/10.1007/s10903-009-9249-4
31. Mak KK, Ho SY, Lo WS, McManus AM, Lam TH. Prevalence of exercise and non-exercise physical activity in Chinese adolescents. International Journal of Behavioral Nutrition and Physical Activity. 2011; 8(1): 3. https://doi.org/10.1186/1479-5868-8-3
32. Ács P, Bergier J, Salonna F, Junger J, Melczer C, Makai A. Gender differences in physical activity among secondary school students in the Visegrad countries (V4). Health Prob Civil. 2016; 10(3): 21-29. https://doi.org/10.5114/hpc.2016.61363
33. Petrić V, Novak D, Blažević I, Antala B. Physical activity and nutritional status among secondary school girls and boys. Research in Kinesiology. 2014; 4(1): 3-8.
34. Markuš D, Andrijašević M, Prskalo I. Physical activity of final grades students. Odgojne Znanosti. 2008; 10(2): 349-367.