DIFFERENCES IN PHYSICAL ACTIVITY LEVELS OF HIGH SCHOOL STUDENTS

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Abstract
Physical activity is an important factor in achieving optimal health, and it reduces the risk of the development of various diseases. This research, which is of a transversal character, had a goal to determine differences in the physical activity level between students attending different grades of high school. The population from which the sample of 349 respondents was taken is defined as the population of the first, second, third and fourth grade students from Zavidovići high schools, male, 15 to 18 years old ± 6 months. To assess the level of physical activity, a survey questionnaire was used. It consisted of 9 questions specifically rated on a scale of 5 degrees. In order to determine the differences in the treated variables for assessing the level of physical activity among students of different grades, the Kruskal-Wallis Test was applied. The obtained results showed that statistically significant differences exist among treated groups in the following ranges: the frequency of engagement in certain sports activities during their free time (two particles), at school (two particles), after school (three particles) and for each day of the week (three particles). Continuous monitoring and synchronization of measurement methodology can greatly contribute to the quality of evaluation of strategies and interventions for improvement of physical activity, and thus to address the problem of physical inactivity more effectively.

INTRODUCTION

Physical activity can be defined as any movement that is a consequence of the voluntary activation of muscles, and results in energy consumption (Caspersen, Powell & Christenson, 1985). Numerous studies from other interdisciplinary areas prove the positive effects of physical activity on the general health as well as psychosocial condition of people (Weyerer and Kupfer, 1994; Bouchard et al., 2007; Jurakić et al., 2010; WHO, 2010). Physical activity is an important factor in achieving the optimal health, and it reduces the risk of development of various diseases (Eyler et al., 2003). Industrialization and technological advances have led to a change from a physically active to a sedentary lifestyle. Physical inactivity on one hand, and increased caloric intake on the other, lead to the activation of pathophysiological mechanisms and the development of chronic non-contagious diseases (Biswas et al., 2015). In addition, numerous studies confirm that physical inactivity leads to health deterioration (Vouri, 2004; Markuš et al., 2008). Jurakić and Andrijašević (2008) state that insufficient physical activity is associated with the development of various diseases: cardiovascular diseases, obesity, hypertension, type 2 diabetes, which is confirmed by (Kohl, 2001; Jakičić & Otto, 2005). The negative trend of physical inactivity is a serious public health problem, both in the world and in the surrounding environment (Jurakić and Heimer, 2012). Assessing the level of physical activity is now considered the first stage in the introduction of intervention measures that can benefit health at the population level (Dishman, Washburn & Heath, 2004).

The main goal of this research is to determine the differences in the level of physical activity among high school students of the first, second, third and fourth grade.

METHODOLOGY OF WORK

Sample of respondents

The research was conducted in three high schools from Zavidovići (Gymnasium "Rizah Odžecić", Mixed High School and Secondary Technical School). The population from which the sample of 349 respondents was taken was defined as the population of students of the first, second, third and fourth grade of high school, male, 15-18 years old ± 6 months.

Sample of variables

For the assessment of the physical activity level, the survey questionnaire called "Assessment of the physical activity level - PAQ-C (Kowalski et al., 2004)" was used. The questionnaire consists of 9 questions specially rated on a scale of 5 degrees. The overall result of physical activity is based on the median value of the responses given. These responses were particularly rated on the scale from 1 to 5, and according to the

set criterion (1 - "physically inactive", 2 - "insufficiently physically active", 3 - "moderately physically active"; 4 - "physically active"; 5 - "extremely physically active").

Data processing methods

In order to determine the differences in the treated variables for assessing the physical activity level among high school students from different grades, the Kruskal-Wallis Test was applied. This test is a nonparametric alternative to a single-factor analysis of the variance of different groups. It is used to compare the results of a continuous variable for three or more groups. Results are converted to ranks, so the middle ranks of each group are compared. This is an analysis of different groups; therefore, each group must have different entities. In order to determine which of the treated groups are statistically different, Bonferroni's correction of the alpha value was subsequently completed in order to avoid mistakes of the first type.

RESULTS AND DISCUSSION

In order to determine the differences in the treated variables for assessing the frequency of certain engagement in leisure time sports activities among the students from different grades, the Kruskal-Wallis Test was applied. Students are divided into 4 groups according to the grade they attend (first, second, third and fourth). Based on the results of this test (**Table 1**), the difference between the treated groups in the variables was found to be statistically significant ($p \leq 0.05$): TASV01-HOD "Walking" (0.00) and TASV01-TRC "Running" (0.00).

In order to determine which of the treated groups are statistically different, Bonferroni's correction of the alpha value was subsequently made in order to avoid mistakes of the first type. This would mean dividing the alpha value of 0.05 by the number of tests we plan to do, and then using such a revised alpha level as a criterion for determining significance. This would mean a more severe alpha level of 0.01. The obtained multiple comparisons results of the examined groups of students (Differences between groups) tell us that statistically significant differences exist in the TASV01-HOD variable "Walking": between the first (Mean Rank=222,34; Med.=2) and the second grade (Mean Rank=172.70; Med.=1); between the first (Mean Rank=222.34; Med.=2) and the third grade (Mean Rank=152.33; Med.=1); and between the first (Mean Rank=222.34; Med.=2) and the fourth grade (Mean Rank=159.45; Med.=1).

Statistically significant differences exist in the TASV01-TRC variable "Running": between the first (Mean Rank=144.01; Med.=1) and the third grade (Mean Rank=225.63; Med.=2); between the second (Mean Rank=158.54; Med.=1) and the third grade (Mean Rank = 225.63; Med.=2); and between the third (Mean Rank=225.63; Med.=2) and the fourth grade (Mean Rank=154.72; Med.=1).

Table 1. Differences in variables the frequency of engagement in certain physical activities during leisure time among questioned students from different grades

Test Statistics - Kruskal Wallis Test									*Bonferroni*
Grouping Variable	Chi-Square	df	Asymp. Sig.	Mean Rank	Med.	Min.	Max.	Grupa N	Differences between groups
TASV01 – HOD *(frequency of physical activity engagement during leisure time - WALKING)*	31,85	3	0,00*	222,34	2	1	5	1 (77)	1
				172,7	1	1	4	2 (101)	2 ♦
				152,33	1	1	3	3 (106)	3 ♦
				159,45	1	1	4	4 (65)	4 ♦
TASV01 – TRC *(frequency of physical activity engagement during leisure time -RUNNING)*	64,12	3	0,00*	144,01	1	1	4	1 (77)	1
				158,54	1	1	4	2 (101)	2
				225,63	2	1	5	3 (106)	3 ♦,
				154,72	1	1	4	4 (65)	4 ♦

Table 2 presents the differences in treated variables used for assessing the frequency of engagement in certain physical activities during school time among the students from different grades. The obtained results show that a statistically significant ($p \leq 0.05$) difference exists between treated groups in variables: TATST2 - "In the last 7 days, during the physical and health education classes, how often were you extremely active?" (0.00) and TAZVO4 - "In the last 7 days, what did you mostly do during lunch break (apart from eating lunch)?" (0.00).

The obtained multiple comparisons results of different groups of students (Differences between groups) tell us that for the variable TATST2 - "In the last 7 days, during the physical and health education classes, how often were you extremely active?") there are statistically significant differences: between the first (Mean Rank=202,40; Med.=5) and third grade (Mean Rank=141,06; Med.=4); and between the third (Mean Rank=141.06; Med.=4) and fourth grade (Mean Rank=204.73; Med.=5).
For the TAZVO4 variable - "In the last 7 days, what did you do during lunch break (apart from eating lunch)?", statistically significant differences exist: between the first (Mean Rank=224,90; Med.=3) and the second grade (Mean Rank=174.23; Med.=2); between the first (Mean Rank=224,90; Med.=3); and third grade (Mean Rank=132,34; Med.=2); between the second (Mean Rank=174.23; Med.=2) and the third grade (Mean Rank=132.34; Med.=2); and between the third (Mean Rank=132.34; Med.=2) and the fourth grade (Mean Rank=186.66; Med.=3).

Table 2. Differences in variables the frequency of engagement in certain physical activities during school hours among questioned students from different grades

Test Statistics - Kruskal Wallis Test									*Bonferroni*
Grouping Variable	Chi-Square	df	Asymp. Sig.	Mean Rank	Med.	Min.	Max.	Grupa N	Differences between groups
TATST2 *(In the last 7 days, **during** the physical and health education **class**, how often were you extremely active?)*	27,87	3	0,00*	202,4	5	1	5	1 (77)	1
				170,6	5	1	5	2 (101)	2
				141,06	4	1	5	3 (106)	3 ♦
				204,73	5	1	5	4 (65)	4 ♦
TAZMO3 *(In the last 7 days, what did you mostly do **during recess**?)*	0,44	3	0,93	180,25	2	1	5	1 (77)	
				171,1	2	1	5	2 (101)	
				174,05	2	1	5	3 (106)	
				176,38	2	1	5	4 (65)	
TAZVO4 *(In the last 7 days, (apart from eating lunch) what did you mostly do **during lunch break**?*	41,37	3	0,00*	224,9	3	1	5	1 (77)	1
				174,23	2	1	5	2 (101)	2 ♦
				132,34	2	1	5	3 (106)	3 ♦♦
				186,66	3	1	5	4 (65)	4 ♦

Table 3 presents the differences in the treated variables for assessment of the frequency of engagement in certain physical activities after school among students from different grades. The obtained results show that a statistically significant ($p \leq 0,05$) difference exists between the treated groups in the variables: TAONŠ5 - "How often, over the past 7 days, immediately after school did you engage in a sport, dance or play a game in which you were extremely active?" (0.00), TAPVI7 - "How many times, over the last weekend, did you engage in some type of sport, dance or a play a game in which you were extremely active?" (0.00) and TATNO8 - "Which of the following statements best describes you for the past 7 days?" (0.00).
The obtained multiple comparisons results of the questioned groups of students (Differences between groups) tell us that with the TAONŠ5 variable - "How often, over the past 7 days, immediately after school, did you engage in a sport, dance or play a game in which you were extremely active?" statistically significant differences exist: between the first (Mean Rank=204.14; Med.=3) and the second grade (Mean Rank=143.30; Med.=3); and between the second (Mean Rank=143,30; Med.=3) and the fourth grade (Mean Rank=196,48; Med.=3).
With the variable TAPVI7 - "How many times, over the last weekend, did you engage in some type of sport, dance or a game in which you were extremely active?" statistically significant differences exist: between the first (Mean Rank=197.83; Med=3) and second grade (Mean Rank=142.87; Med.=3); and between the second (Mean Rank=142.87, Med.=3) and the fourth grade (Mean Rank=200.75; Med.=3).
With the variable TATNO8 - "Which of the following statements best describes you for the past 7 days?" there are statistically significant

differences: between the first (Mean Rank=195.75; Med.=3) and the second grade (Mean Rank=137.65; Med=3); between the second (Mean Rank=137.65; Med.=3) and the third grade (Mean Rank=179.44; Med.=3); and between the second (Mean Rank=137.65; Med.=3) and the fourth grade (Mean Rank=201.22;Med.=3).

Table 3. Differences in variables the frequency of engagement in certain physical activities after school among questioned students from different grades

Test Statistics - Kruskal Wallis Test									*Bonferroni*
Grouping Variable	Chi-Square	df	Asymp. Sig.	Mean Rank	Med.	Min.	Max.	Grupa N	Differences between groups
TAONŠ5 *(How often, over the past 7 days, immediately **after school** did you engaged in a sport, danced or played a game in which you were extremely active?)*	20,66	3	**0,00***	204,14	3	1	5	1 (77)	1
				143,3	3	1	5	2 (101)	2 ♦
				170,87	3	1	5	3 (106)	3
				196,48	3	1	5	4 (65)	4 ♦
TAUVS6 *(How often, in the past 7 days, **during the evening hours** did you engage in some type of sport or were extremely active?)*	2,59	3	0,46	187,2	3	1	5	1 (77)	
				167,1	3	1	5	2 (101)	
				169,15	3	1	5	3 (106)	
				182,37	3	1	5	4 (65)	
TAPVI7 *(How many times, over the **last weekend**, did you engage in some type of sport, danced or played a game in which you were extremely active?)*	19,7	3	**0,00***	197,83	3	1	5	1 (77)	1
				142,87	3	1	5	2 (101)	2 ♦
				173,25	3	1	5	3 (106)	3
				200,75	3	1	5	4 (65)	4 ♦
TATNO8 (Which of the following statements best describes you for the past 7 days?)	23,38	3	**0,00***	195,75	3	1	5	1 (77)	1
				137,65	2	1	5	2 (101)	2 ♦
				179,44	3	1	5	3 (106)	3 ♦
				201,22	3	1	5	4 (65)	4 ♦

Table 4 presents the differences in treated variables for assessing the frequency of engagement in certain physical activities for each day of the week among questioned students from different grades. The obtained results show that a statistically significant ($p \leq 0,05$) difference exists between the treated groups in the variables: TAČET9 - Thursday (0,00), TASUB9 - Saturday (0,00) and TANED9 - Sunday (0,00).

The obtained multiple comparisons results of the questioned groups of students (Differences between groups) tell us that in the variable TAČET9 - Thursday statistically significant differences exist: between the first (Mean Rank=194,36; Med.=4) and second grade (Mean Rank=135,46 ; Med.=2); between the second (Mean Rank=135.46; Med.=2) and the third grade (Mean Rank=178.92; Med.=3); and between the second (Mean Rank=135.46; Med.=2) and the fourth grade (Mean Rank=207.12; Med.=4).

With the TASUB9 variable - Saturday statistically significant differences exist: between the first (Mean Rank=208,14; Med.=5) and the third grade (Mean Rank=119,18; Med.=2); between the second (Mean Rank=187.15; Med.=4) and the third grade (Mean Rank=119.18; Med.=2); and between the third (Mean Rank=119,18; Med.=3) and the fourth grade (Mean Rank=207,88; Med.=5).

With variable TANED9 - Sunday statistically significant differences exist: between the first (Mean Rank=204,80; Med.=5) and the second grade (Mean Rank=116,75; Med.=2); between the second (Mean Rank=116.75; Med.=2) and the third grade (Mean Rank=187.25; Med.=4); and between the second (Mean Rank=116.75; Med.=3) and the fourth grade (Mean Rank=210.23; Med.=5).

Jurakić et al. (2010) noted in their research the connection between physical activity in all segments of life and health quality of life, a positive correlation between physical activity in leisure time and health. The study shows that the population between 15 and 24 years is the most inactive. It also showed that the

respondents are most active in the domains of work, transport and housework while they are most inactive during their free time (Jurakić et al., 2009).

Table 4. Differences in variables the frequency of engagement in certain physical activities for every day of the week among questioned students from different grades

Test Statistics - Kruskal Wallis Test									*Bonferroni*
Grouping Variable	Chi-Square	df	Asymp. Sig.	Mean Rank	Med.	Min.	Max.	Grupa N	Differences between groups
TAPON9 (frequency of engagement in certain physical activities for every day of the week *MONDAY)*	1,79	3	0,62	182,52	3	1	5	1 (77)	
				167,76	3	1	5	2 (101)	
				170,67	3	1	5	3 (106)	
				184,39	3	1	5	4 (65)	
TAUTO9 (frequency of engagement in certain physical activities for every day of the week *TUESDAY)*	0,2	3	0,98	179,06	3	1	5	1 (77)	
				172,56	3	1	5	2 (101)	
				174,7	3	1	5	3 (106)	
				174,47	3	1	5	4 (65)	
TASRI9 (frequency of engagement in certain physical activities for every day of the week *WEDNESDAY)*	1,86	3	0,6	180,34	3	1	5	1 (77)	
				167,81	3	1	5	2 (101)	
				170,86	3	1	5	3 (106)	
				186,6	3	1	5	4 (65)	
TAČET9 (frequency of engagement in certain physical activities for every day of the week *THURSDAY)*	26,3	3	0,00*	194,36	4	1	5	1 (77)	1
				135,46	2	1	5	2 (101)	2 ♦
				178,92	3	1	5	3 (106)	3 ♦
				207,12	4	1	5	4 (65)	4 ♦
TAPET9 (frequency of engagement in certain physical activities for every day of the week *FRIDAY)*	1,02	3	0.80	179,92	4	1	5	1 (77)	
				170,31	4	1	5	2 (101)	
				171,12	4	1	5	3 (106)	
				182,78	4	1	5	4 (65)	
TASUB9 (frequency of engagement in certain physical activities for every day of the week *SATURDAY)*	54,72	3	0,00*	208,14	5	1	5	1 (77)	1
				187,15	4	1	5	2 (101)	2
				119,18	2	1	5	3 (106)	3 ♦♦
				207,88	5	1	5	4 (65)	4 ♦
TANED9 (frequency of certain engagement in physical activities for every day of the week *SUNDAY)*	54,77	3	0,00*	204,8	5	1	5	1 (77)	1
				116,75	2	1	5	2 (101)	2 ♦
				187,25	4	1	5	3 (106)	3 ♦
				210,23	5	1	5	4 (65)	4 ♦

CONCLUSION

The obtained results show that statistically significant differences between the tested subsamples have been established. Kruskal-Wallis test of different groups with subsequent tests, within the research area, determined the existence of statistically significant differences between treated groups in the following scales: the frequency of engagement in certain sports activities during their free time (two variables), in school (two variables), after school (three variables) and for every day of the week (three variables). The appropriate level of physical activity during free time is considered the first step in contributing to overall health. The

component of sports activity is very important for adolescents and deserves special attention. The physical activity of students in school is significantly reduced, due to the large number of hours spent sitting and due to the amount of homework and studying that again condition a certain amount of time spent in a sitting position at home. Every school, despite the consequences, would have to ensure unhindered extra-curricular sports activities, since it could be one of the basic steps, which will influence the increase in the adolescent's level of physical activity (Petrić, 2011). The fact is that physical activity significantly influences the reduction of excessive body weight and obesity and is considered the most natural way to use up energy and regulate body weight. It is finally time to draw attention of the society and the individuals towards physical activity and for it to become a habit and to be included in the everyday life routine of a modern man, because movement allows a man a balanced and stable psychosocial status.

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