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BODY TOTAL WATER BEFORE AND AFTER THE CLASS OF PHYSICAL EDUCATION AND SPORT

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Research article
UDC: 613.3: [371.3:796]

Abstract
The aim of this study is to determine the need for rehydration of male students during the class of physical education and sport. The methodical-organizational form of work that was applied in class is named assault course. The activity was monitored with the use of pedometer, which registered a number of steps in class. Total number of monitored male subjects was 29. The following were analyzed: number of steps, body weight before and after the class and BTW worth before and after the class. After applying ANOVA analysis, the results showed registered weight loss, but without statistical significance. Besides weight loss, the BTW worth loss that was registered, had statistical significance. The analyzed BTW shows the need for an organized rehydrating of students. So, during the class of physical education and sport, it is necessary to provide the students with liquid. It is preferred to check the results of this study within other age categories or within different conditions of realization of teaching content.

Key words: **Number of steps, Assault courses, Body liquids, Students**

Introduction

Positive transformation of anthropological status occurs under the influence of the contents in class of physical education and sport (Burgeson, Wechsler, Brener, Young & Spain, 2001). Because of this, it can be concluded that the implementation of educational activites can always be interesting for reserach. Greater efforts in training affects on larger transformation, i.e. their higher work intensity (Thivel and Duché, 2013). If the student becomes familiar with the significance of the need to move, it is assumed that there will be more effort in the class. In teen age, male population is more active in comparison to female population (Amstrong, Welsman, 2006.).

Other research has shown that females, for example, use school holidays as a time for realization of different exercise programs (Mota et al 2005). A number of authors (Thivel and Duché, 2013), noted the positive significance of moving activity, which should be encouraged while young persons are in school. While at school, they have gym teacher supervising them and who can teach them, when they finish school, to practice on their own (Corbin et al, 2007, Bowles, 2012). Part of the class analyzed in this work is recovering liquid during the class. Water is essential for normal functioning of the organism (Popkin, D'Anci and Rosenberg, 2010), but, individual pauses for recovering liquid can disrupt organized work in class. By students leaving their positions, formations, apparatus and teacher's tools without supervision, can cause danger to other students. Therefore, in this research, the goal is set to determine the need for rehydration during the class of physical education and sport. If the need for rehydration really exists, the teacher should be the one to provide it. The pause for rehydration, instead sporadic intake of fluids, can be sensibly organized for the students during the class. That will be the way to improve safety during work, but also provide the satisfaction of real physiological need of all students. Aim of this research is to determine the need for rehydration of male students during the class of physical education and sport.

Methods of work

Sample of examinees

The sample of examinees consisted of students from high school in the Canton of Sarajevo. Total number of monitored male examinees was 29. All students were completely healthy during the class and research process. All students were regularly attending class of physical education and sport and voluntarily agreed to participate in the work in class. Age of examinees ranged from 17 to 18 years.

Sample of variables

The size of school gym in which educational content was realized is 20 m x 15 m. The temperature in the school gym was continually 20 to 21 degrees Celsius, and methodical-organizational form of work that was applied was an assault course (Hmjelovjec et al, 2005). Depending on the part of educational class, different single-path assault courses were applied during the class, in order ro prevent the saturation or boredom within students.

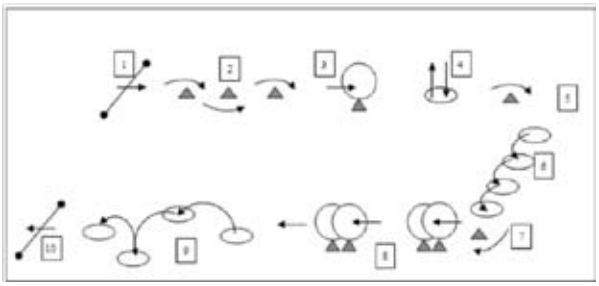
Treated variables in this study, which are considered to be able to provide appropriate indicators of work, loss of fluids and the need for recovering it are:

- Number of steps made during the class (NS)
- Body weight of students before and after the class (BM1 and BM2)
- BTW worth before and after the class(BTW1 and BTW2)

Description of class structure

In the first part of the class, students made an average of 383,5 or 15% of the total number of steps.

Scheme 1. Assault course in the introductory part of the class, lasting 4,5 minutes

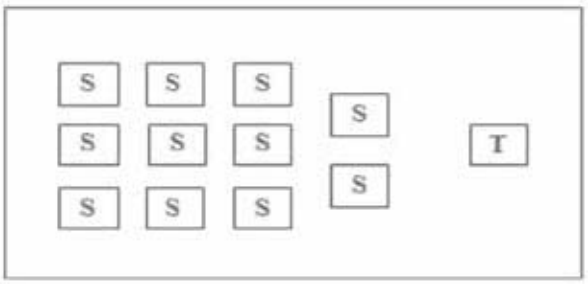


Description of an assault course 1:

1. Start
2. By-passing the cones
3. Slipping through the hoop
4. Jumping into the hoop, raising it and putting it down the body
5. Rounding cones
6. Two-leg hops through the hoops
7. By-passing the cones
8. Slipping through two and two hoops
9. Skips from one foot to other from hoop to hoop
10. Running through the finish line

In the second part of the class, students made an average of 178,9 steps or 7% of the total number of steps.

Scheme 2. The preparatory part of the class, lasting 9 minutes



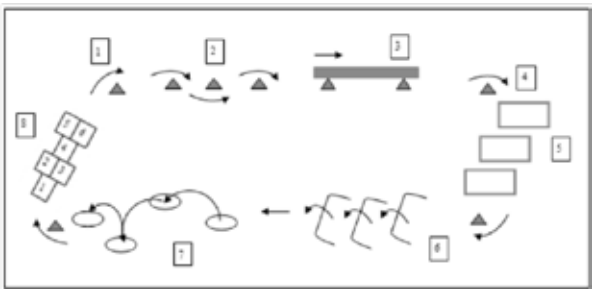
Scheme 2 Agenda: S – student, T – teacher

Description of Scheme 2 exercises:

1. Heel position, arms bent at the elbows, run side circles
2. Push ups
3. Lie down on stomach
4. Bend the torso forward
5. Two-leg hops
6. Squats
7. Straddle stand with hands on hips, deep half squats

In the third main „A" part of the class, students made an average of 1022,8 or 40% of the total number of steps.

Scheme 3. Assault course in main „A" part of the class, lasting 18 minutes



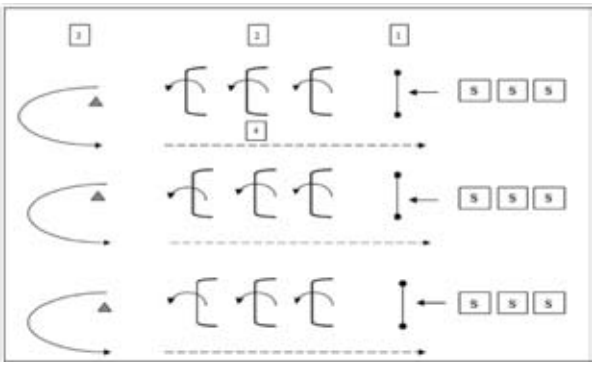
Description of scheme 3:

1. Start
2. By-passing around the cones
3. Running across the beam
4. Rounding the cone
5. Slipping through parts of sweden crate
6. Rounding the cone and two-leg hops over hurdle
7. Hops from one foot to other from hoop to hoop
8. Rounding the cone and playing „Hopscotch"

Note for assault course 3: First nine minutes was realized by moving with face forward, while other nine minutes the same assault course was realized by moving backward.

In third main „B" part of the class, students made an average of 613,6 or 24% of the total number of steps.

Scheme 4. Assault course in main B part of the class, lasting 9 minutes

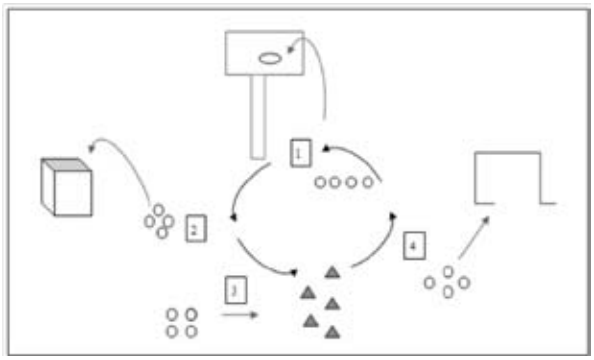


Description of scheme 4:

1. Start
2. Skipping over a hurdle
3. Running around the cone
4. Running through the finish line

In the final part of the class, students made an average of 306,8 or 12% of the total number of steps.

Scheme 5. Assault course in the final part of the class, lasting 4,5 minutes



Description of scheme 5:

1. Throwing the ball in the basket (by hands)
2. Throwing the ball in the box (by hands)
3. Bowling and hitting cones (by hands)
4. Scoring the goal (kick by foot)

Methods of collecting data

Weight of the students was measured by TANITA scale (model BC-418 MA). The number of steps was monitored by using pedometer appropriate for the research process (Schofield, Mummery & Schifield, 2005) which was attached to the belt of each tested student.

Methods of processing data

The collected data were processed in program SPSS 22 (license owned by the Faculty of Sports and physical education in Sarajevo). Descriptive data analysis was applied, as well as ANOVA analysis for determining the difference between the initial and final measurements.

Results

Table 1. Basic characteristics of a sample - Boys

Characteristics	n	Mean	SD
Body mass (kg before exercise)	29	79,85	8,48
Body mass (kg after exercise	29	78,98	8,41
Number of steps	29	2557	661,0

Agenda: n - number tested, Mean - average value, SD - standard deviation

In the first stage of analyzing data, descriptive statistical data was observed. Weight of the boys before exercising was 79, 85 while after exercising dropped to 78,98. Number of steps was an average of 2557 for one student. Length of steps of all students was measured and the average value was 65 cm (Rašidagić, Mirvić, Nikšić, 2015).

Table 2. ANOVA analysis of weight, Boys 1:Boys 2

	Sum. of Sq.	df	Mean	F	Sig.
Between Groups	18,28	1	18,28	,255	,61
Within Groups	39,66	55	71,63		
Total	39,94	56			

Agenda: Sum. of Sq. - Summary of Squares. df – difference, Mean – average, F–frequency, Sig–significance of difference

Table 2. which contains the results of ANOVA analysis, is testing the difference in weight, which is descriptive evident in table 1. ANOVA analysis showed a statistically insignificant significance (,61) which confirms that the difference between loss of body weight through sweat is not significant.

Table 3. ANOVA analysis TBW, Boys 1: Boys 2

	Sum. of Sq. Boys	df Boys	Mean Boys	F Boys	Sig. Boys
Between Groups	2.658	9	295.0	210.4	.000
Within Groups	.027	19	.001		
Total	2.685	28			

Agenda: Sum. of Sq. - Summary of Squares, df – difference, Mean – average, F–frequency, Sig–significance of difference

The results of ANOVA analysis – table 3, ratio of BTW before and after the class have noted a statistically significant difference. ANOVA analysis confirmed the level of significance (,00) for the boys who actively worked in class, which voids the previous assumption that the difference between loss of body fluids before and after the class is statistically insignificant.

Discussion

During the exertion in class, students lose their body fluids and they sense that by feeling thirsty. By this research, it is checked if that feeling is realistic. First thing determined, was the number of steps that students made during the class. These steps were tracked by pedometer, during theclass which lasted 45 minutes (Schofield, Mummery & Schifield, 2005). In order to objectify if it was necessary to make an organized break and allow recovering the fluids, the loss of fluids was checked by monitoring body weight changes before and after the class. Basically, stated weight loss can be explained by the loss of fluids through sweat, as a result of effort that is caused by implemented class. It is stated by Silva et al (2010) that this can be the way to perform the check for dehydration. There are three ways to check: 1 – urine

color control, 2 – weighing before and after physical activities and 3 – measuring with different measurement instruments that show the structure of the body build. This research applied one more way to check the loss of fluids – the structure of BTW worth. The students implemented teaching contents during the class which lasted 45 minutes. The methodical-organizational form of work that was applied in class called „single-path assault course" is explained in the book published by Hadžikunić and Mađarević (2004). During the class activity, the boys made 2557 steps.

The implementation of assault course in class enables high intensity of work in class of physical education and sport, and causes greater effort and by that, greater loss of fluids through sweat. In a positive sense, greater effort contributes to a faster transformation processes of anthropological status, which directly affects the student's motivation to work and active participation in the teaching process (Wallhead, Garn, Vidoni, Youngberg, 2013). By checking the weight of students before and after the class, we concluded that it dropped, which is caused by loss of fluids through sweat. However, that weight loss did not show statistical significance. Contrary to this conclusion, the check of BTW worth which was also reduced after activities, showed to be statistically significant. In this kind of relation structure, it is undeniable that students should be allowed to make pauses to rehydrate. So, the aim of this research is completely accomplished, the students should be allowed to rehydrate during the class. This approach increases the humanization of teaching process, but does not answer the question of exactly how much liquid should be recovered (Gobson, Gunn, Maughan, 2012). Teachers are left on their own to figure out the dilemma whether to make organized pauses or to let students make pauses on their own (Cale, Harris, 2006). The statement gains on relevance, particulary if the classes are realized with higher intensity forms of work. It is preffered to check the results of this research within different age categories or within different conditions of realization of teaching content (temperature lower or higher than 21 degrees Celsius, open space, bigger or smaller size of school gym and similar).

Conclusions

Considering that loss of fluids during the class was concluded as statistically significant, teacher of physical education and sport should provide organized pauses in roder to rehydrate.

If the teacher does not organize pauses, and the student expresses the need, the teacher, considering humanistic approach to the work, with his own assessment acquired on experience in previous work, should provide fluid recovery. On that occasion, he is required to determine if the student left the position appropriately considering that apparatus or teacher's tools could cause harm to other students.

References

Amstrong, N., Welsman, J. R. (2006). The physical activity patterns of European youth with reference to methods of assessment. Sports Medicine, 36 (12), pp. 1067-1086.

Bowles, H. R. (2012). Measurement of Active and Sedentary Behaviors: Closing the Gaps in Self-Report Methods. Journal of Physical Activity and Health , 9 (Suppl 1), S1-S4.

Burgeson, C. R., Wechsler, H., Brener, N. D., Young, J. C., & Spain, C. G. (2001). Physical education and activity: Results from the school health policies and programs study 2000. Journal of School Helth, Vol. 71, NO 7, pp. 279 - 293. ASHA.

Cale, L., Harris, J. (2006). School-based physical activity interventions: effectiveness, trends, issues, implications and recommendations for practice. Journal of Sport Sciences, Vol. 11, Issue 4, pp. 401-420.

Corbin, C.B., Welk, G.J., Corbin, W.R., & Welk, K.A. (2007). Fitness i wellness. Condition, Fitness, Health. Publisher: Zysk i Ska.

Gobson, S., Gunn, P., Maughan, RJ. (2012). Hydration water intake and beverage consumption habits among adults. EFSA Journal , Nutrition Bulletin, 37: pp. 182-192.

Hmjelovjec, I., Kalić, E., Hmjelovjec, D. (2005). Gimnastički poligoni kao sredstvo. [Gymnastic polygons as a means], Fakultet sporta i tjelesnog odgoja Univerziteta u Sarajevu, [Faculty of Sports and Physical Education of the University of Sarajevo], pp. 138 – 149.

Hadžikadunić, M., Mađarević, M. (2004). Metodika nastave tjelesnog odgoja sa osnovama fiziologije vježbanja [Method of teaching physical education with the basics of exercise physiology]. Pedagoški fakultet u Zenici [Faculty of Pedagogy Zenica]. Bosnia and Hercegovina.

Mota, J., Silva, P., Paula Santos, M., Ribeiro, J. C., Oliveira, J. &. Duarte, J. (2005). Physical activity and school recess time: Differences between the sexes and the relationship between children's playground physical activity and habitual physical activity. Journal of Sports Sciences; Vol. 23, Issue 3, pp. 269 – 275.

Popkin, B. M., D'Anci, K. E., Rosenberg, I. H. (2010). Water, Hydration and Health Nutrition, 68(8): 439–458. Pub. Med. Central (PMC) National Institutes of Health. USA.

Rašidagić, F., Mirvić, E., Nikšić, E. (2015). Razlika u aktivnosti na času sporta i tjelesnog odgoja [Difference in sports and physical education activities]. Zbornik sažetaka sa 5. međunarodnog znanstvenog kongresa „Suvremena Kineziologija" [Proceedings of the 5th International Scientific Congress "Contemporary Kinesiology"], 28. do 30. sept, pg. 526-533. Split.

Schofield, L., Mummery, W. K., & Schifield, G. (2005). Effects of a controlled pedometer-intervention trial for low-active adolescent girls. Medicine and Science in Sports and Exercises, Vol. 37 (8), pp 1414-1420.

Silva, R., P., et al (2010). Preexercise urine specific gravity and fluid intake during one-hour running in a thermoneutral environmen-a randomized cross-over study. Journal of Sports Science and Medicine, Vol. 9, Issue 3, Pages 464-471. Hamilton, New Zealand.

Thivel, D., Duché, P. (2013). Physical Activity for Weight Loss In Children: Is There Any Compensatory Mechanism. Journal of Physical Activity and Health; 26(2): pp. 121-3.

Wallhead, T. L., Garn, A. C., Vidoni, E. D., Youngberg, C. (2013). Game Play Participation of Amotivated Students During Sport Education , JTPE, Vol. 32, Issue 2, pp 149 – 165, Academy of the National Association for Sports and Physical Education and International Association for Physical Education in Higer Education.

Submitted: November 01, 2017
Accepted: December 16, 2017
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