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THE ROLE OF PHYSICAL ACTIVITY IN ANTHROPOMETRIC PARAMETERS AT TEENAGE GIRLS IN DIFFERENT KIND OF SPORTS

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Abstract:

The aim of the study is to compare the levels of physical activity and anthropometric parameters during the curricular time of a 45 minutes physical education lesson three time a week, in different kind of sports: volleyboll, basketball and athletics. A total of 88 teenage girls aged from 13-14 years old from "Pjetër Budi" elementary school in Tirana, have taken part volunteering in this study. The study period lasted from September to June 2014. The body mass index (BMI) significantly decreased in the group which was engaged with basketball ($p < 0.000$), which was associated from a decreased in body weight. A significant increase in height, body weight and BMI ($p < 0.005$) was observed in both volleyball and athletic groups. No significant changes were detected comparing between groups by paired t-test for equality. The t-test within groups revealed that some anthropometric parameters significantly were changed during this period in all three groups of sports. The Anova analysis showed that no significant changes were observed comparing these groups to each-other ($p > 0.005$), except the height parameter between volleyball and athletic groups ($p < 0.05$). Although an addition of an hour a week increase in physical activity, accordingly to the new curricular program of physical education lesson, a clear improvement in health fitness parameters will help the children to achieve better results of motor performance in the future.

Keywords: anthropometric parameters, physical activity, motor performance, fitness

Introduction

Physical Activity (PA) comprises all modes of movement caused by muscle activity resulting in increased energy expenditure (23, 24, 27). Physical fitness consists of three

components muscle strength, endurance and motor ability, and is a prerequisite for completing daily activities without fatigue and for participating in leisure time activities (16). Exercise is a form of PA that is planned, structured, repetitive and performed with the goal of improving health or fitness (31). Some important factors of being overweight include lifestyle factors such as PA, nonsmoking, high quality diet, sedentary activities and normal weight. Some PA is better than none. For most health outcomes, additional benefits occur as the amount of PA increases through higher intensity, greater frequency and longer duration. Both aerobic endurance and muscle strengthening resistance PA are beneficial. PA is good for the body and the mind. Regular exercise helps maintain weight, builds muscle, strengthens bones. Individual sports help the subjects to set goals, improve self-discipline and develop social skills. Regular PA in childhood and adolescence improves strength and endurance, helps control weight, reduces anxiety and stress, increases self-esteem and may improve blood pressure and cholesterol levels (31). Schools can promote comprehensive school PA programs, classroom-based PA, interscholastic sports and physical education. Teens that are physically active have higher self-esteem and experience less anxiety and depression than inactive youth. Health experts recommend that all teens be active every day as part of play, sports, work, gym class, or planned exercise. According to Pesa et al., (25) adolescence is a period of life marked by pronounced physical, psychological, emotional and social changes. With pubertal development, girls experience an increase in body fat (19) and they generally become more dissatisfied with their bodies. It stands to reason that excess body weight may have a negative impact in the well-being especially of female adolescents (3). Contrary to expectations, body image dissatisfaction was strictly related to BMI, but not to PA. Habitual PA is an important dimension of childhood activity, especially since the spontaneity of children's movement makes assessing specific activities difficult.

Nowadays, the concept of health related physical fitness has been frequently used in evaluation of health status in individuals. It has been focused on body composition which has connected with functional and motor skills, cardiovascular and muscular fitness (20). The higher physical fitness and PA levels of people, has been thought as an important for protection from disease (30). Greater amounts of PA are even more beneficial, up to a point. Excessive amounts of PA can lead to injuries, menstrual abnormalities, and bone weakening (4).

Inactive forms of leisure such as watching television, computer games, etc, are responsible for the reduction in the level of PA and together with inadequate nutrition, constitute important predictors of increased frequency of overweight and obese children, and decreased PA (10).

Objective: The primary goal of the presented study was evaluation of the effect of various type of PA in three kinds of sports and the ways of spending leisure time by adolescents' girls aged 13-14 on their anthropometric parameters.

The physiological and biological development of a child is measured in the form of observations concerning changes of his physical and motor development (8). One of the most interesting developmental aspects, which are connected with both physical and motor development, is proper body mass index BMI.

Methods and materials

Children attending the state school (aged 13-14 years) and have taken part in the study. The sample for this study was composed of 88 teenage girls, recruited from the seventh to eighth grades, from our public elementary school in an urban area of Tirana, Albania. The representative study was conducted in 2014-2015 during September to June months. The samples were selected from the following three kinds of sports groups: athletic, volleyball and basketball groups during physical education lessons in school. Informed consent was obtained from the parents of subjects, in order to consider them as participants of the study. Anthropometric measurements were performed during obligatory physical education PE lessons (3 x 45 minutes per week) and were not participating in any additional sports activities were included in experiment. The reason was that the engagement of the study subjects in any other kind of sports has significantly distorted the results.

Anthropometric measurements were taken following the protocol from the Canadian PA, Fitness and Lifestyle Approach (5). The anthropometric assessment comprised measures of body weight, height. Height was recorded to the last completed millimeter, using a fixed ruler on the wall. Weight was measured, in minimal clothing and recorded to the nearest 0.1 kg. The measures were taking the mean of three consecutive measurements for analysis and with the children unshod and wearing light clothing. BMI was calculated by dividing body weight by square of their height.

All groups performed the same workout routine, consisting in slow run, dynamic stretching exercises and running drills. The main part of the practice was obviously different. The athletic group performed running techniques exercises, speed lieder, speed runs, relays, hurdles exercises and running ball exercises. Girls in basketball group did throwing and dribbling techniques. Also, basketball basic movement without the ball and basketball games in half Courtland rarely in the whole court. The volleyball group performed basic volleyball movements, passing, receiving,

blocking and serving exercises with the wall or in pass. They also did different volleyball games for girls in small court.

Statistical analysis

Descriptive statistical analysis were conducted to explore the characteristics of the data and to assess statistical assumptions. This analysis was performed, calculating the means and the standard deviation for quantitative variables (age, weight, height and BMI). The means of quantitative variables were compared between different groups of sports before after training period. After descriptive statistics were calculated, Kolmogorov-Smirnov Test was applied whether data were normally distributed or not. Because the data showed normal distribution, Independent Sample t-test was used, as well as the ANOVA's one-way analysis. The significance level was accepted as 0.01 and 0.05. All statistical analyses were performed with the SPSS package, version 20.0 for Windows.

Results

The general descriptive of the anthropometric characteristics and the t-test values of the girls according to kind of sports are shown in table 1. The subjects were nearly similar in age, weight, height and BMI variables. T-test analysis applied at these groups, through the mean comparison before after training period, emphasis the differences between them and their statistical and practical significance. Due to the means of measurements and the direction of the t-values, we can conclude that was an improvement accordingly to respective t-values ($p < 0.01$). It can be seen that there are significant differences in BMI in all three groups ($p < 0.05$).

The body mass index (BMI) significantly decreased in the group which was engaged with basketball ($p < 0.000$), which was associated from a decreased in body weight. A significant increase in height, body weight and BMI ($p < 0.005$) was observed in both volleyball and athletic groups. No significant changes were detected comparing between groups by paired t-test for equality. The t-test within groups revealed that some anthropometric parameters significantly were changed during this period in all three groups of sports. The Anova one-way analysis showed that no significant changes were observed comparing these groups to each-other ($p > 0.005$), except the height parameter between volleyball and athletic groups ($p < 0.05$).

Table 1: The descriptive statistics and t-test values of the teenage girls for three kinds of sport groups

Kind of sport	Parameter	Mean ± SD Before training	Mean ± SD After training	t-value	p-value
Volleyball	Height	1.54±0.06	1.58±0.06	-6.938	0.000
Basketball		1.55±0.05	1.57±0.06	-5.926	0.000
Athletics		1.58±0.09	1.62±0.08	-2.480	0.033
Volleyball	Weight	46.77±9.46	50.18±5.58	-7.618	0.000
Basketball		49.05±7.73	48.73±7.61	0.726	0.485
Athletics		45.85±8.47	48.60±7.64	3.581	0.005
Volleyball	BMI	19.62±3.34	20.13±3.71	-6.021	0.000
Basketball		20.24±2.83	19.64±2.78	-4.280	0.002
Athletics		18.12±2.36	18.61±2.27	-2.292	0.048

Discussion

The intensity of activity in development of aerobic fitness has been important. Cichy & Rokita 2012 (6) has been stated that the low intensity educational games haven't affected the physical fitness levels, but they have supported their motor skills such as speed and agility, while Jamner et al. 2004 (14) has mentioned that the activities such as dance, basketball and swimming have developed the aerobic fitness.The distinguished kinds of sports and PA showed a positive effect on physical fitness components. In addition, in the total group of girls in the study, PA significantly affected positively in all body parameters.

Some studies have reported that PA has a positive influence on both fitness and fatness in children (11) and that moderate to vigorous-intensity PA are positively associated with improved fitness (9, 11, 28,).

The effect of exercises and PA in different kinds of sports to adopt body weight are well accepted (1, 22, 33). Thus, every adolescent should adopt strategies to maintain sufficient PA in daily life, in order to restrict obesity. The effects of PA leading to better physical fitness have been reported by many earlier studies (2, 15, 22). Regular PA is known to improve all anthropometric and physical parameters, by improving recovery heart rate (13), which may be attributed to such physiological benefits of PA. Greater cardio respiratory fitness may promote executive control of working memory, attentive abilities, adjustment of cognitive skills, faster reaction time, activation of regions of brain related to memory (12). It may thus be expected that these physiological benefits,

in conjunction with healthy body composition, may positively affect academic performance.

Many studies have confirmed the well-documented positive effect of PA on children's health during school education lessons (7, 18, 29). In order to increase the effectiveness of PA, it is proposed, based on the experience of many years on physical education lessons in our country, the application of new curricular programs has to intensify the physical load in spontaneous and organized forms of PA. In addition, the exercises applied in conditions of school, should be performed as the means for promoting active forms of spending free time and also to identify possible health problems, including overweight and obesity.

In the literature, studies describing the health-related physical fitness of Albanian children, especially girls are rare. Evaluating the trends in physical fitness component levels among children and adolescents should provide useful information in which to base public policies to promote better quality of life and general status within this population, both today and in the future.

Limitation of the study

The methods that had been used for determining the level of PA and anthropometric characteristics itself needs more standardized studies to fully explore the effect of kind of sports on this relation. The higher intensity activities, the less time spent and its benefits needs to be more fully investigated. A 9 month period of measurements and a few numbers of participants are the main limitations of this study. There is the relatively small sample size, which could not properly represent all considered data, but may provide baseline data to begin to examine all body parameters and its related factors during adolescence. The sample size was selected by convenience, which compromises the generalization of the findings to a broader Albanian population. The information about the PA intensity and exercises in different kinds of sports, could contribute to a better understanding of the relationships among PA and anthropometric parameters.

Conclusion

The findings in present study may support the implementation of adequate PA in daily life of adolescents to prevent obesity, improve the anthropometric and physical parameters and academic performance. The results of this study showed that the sport of basketball has much more effect in body weight decreasing. Our schools have to be

orientated toward to basketball sportive class, because this kind of sport is more effective in their physiological and physical development. The results demonstrated that anthropometric parameters such as BMI may play an important role in the development of adolescents at specially girls and provided helpful information about risk population that should be target of interventional programs. It is thought that the activities applied in elementary school under the supervision of the physical educational teaches, the physical education lessons have to be intense and functional to enhance the components of PA and physical fitness. Because children spent a significant amount of their time at school, strategies for promoting PA and fitness components across different kind of exercises and sports among children can be implemented in this setting. The physical education class provides an opportunity to engage children in vigorous–intensity PA that can improve fitness. Physical education teachers could promote fitness during class by including aerobic PA such as running, that are a prolonged duration and that make children work at a moderate–to-vigorous intensity. Although an addition of an hour a week increase in physical activity, accordingly to the new curricular program of physical education lesson, a clear improvement in health fitness parameters will help the children to achieve better results of motor performance in the future.

Research involving larger, more representative population samples is required to further explore these associations in Albanian children.

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