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Original Article

Differences in Body Composition Between Physically Inactive People and Students of Faculty of Sport and Physical Education

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Abstract

The research aim is to identify differences in body composition between physically inactive persons and students of the Faculty of sport and physical education. The sample consisted of 32 people (16 men and 16 women) with an average age of 24.6 ± 3.3 years. Body composition measurements were performed using bioelectrical impedance (BIA) method using an electric scale, bioimpedance (In Body 720). The MANOVA and t-test results showed that there were no statistically significant differences in body composition between physically inactive persons and students of the Faculty of sport and physical education ($F = 0.778$; $p = 0.595$). The obtained results could indicate the shortcomings of the curriculum at the Faculty of sport and physical education, whose contents, intensity and/or volume do not sufficiently stimulate the student body, as well as the failure of students to fulfil extracurricular obligations and their poor health habits.

1. Introduction

Body composition is an important part of anthrological status of a person, plays an important role in an individual's health status and it is an important factor in the process of physical education, sports training and recreation. In today's advanced technology and diminished movement (hypokinesia), where obesity is one of the leading factors for the development of various diseases (primarily cardiovascular), body composition is a particular subject of interest for both physical education teachers, trainers, fitness instructors and other individuals involved in the physical exercise process.

Body composition refers to the proportion of muscle mass, water, fat, bone

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and other elements that are important for a person's health status (ACSM, 2008). Body composition depends on many factors such as diet, social status, genetic predispositions and others (Heyward & Wagner, 2004). One of the most important factors affecting body composition is certainly the type and intensity of physical activity.

To date, the body composition and influence of physical activity on the body composition of humans has been extensively investigated (Kohrt, Malley, Dalsky, & Holloszy, 1992; Rahimi, 2006; Tremblay et al., 1990). It is well known that regular physical activity has a positive effect on the body composition. However, in accordance with the accelerated development of technology, medicine, sports training technology, research methodology, sports diagnostics and other fields, the knowledge about the body composition and the influence of different physical activities on the body composition of different populations of people are changing and developing. Therefore, it is still necessary to investigate phenomena related to physical activity and body composition.

According with the previously said, the aim of this paper is to examine differences in body composition between physically inactive individuals and students of the Faculty of sport and physical education. It is expected that there will be significant differences between these groups in certain body composition parameters. The results of this research can give us an insight into the body composition of differently trained populations of people, about the curriculum of the Faculty of sport and physical education and its positive impact on the body composition of students, as well as the health habits of students of the Faculty of sport and physical education.

2. Material and methods

The sample consisted of 32 people (16 men and 16 women) with an average age of 24.6 ± 3.3 years: physically inactive individuals (8 men and 8 women) and students of the Faculty of sport and physical education of the University of Priština – Kosovska Mitrovica (8 men and 8 woman). The group of physically inactive people was composed of individuals who did not participate in the physical exercise process or did not engage in regular physical activity, while the group of students at the Faculty of sport and physical education consisted of students of bachelor and master academic studies. All respondents were informed about the purpose of the research and voluntarily agreed to participate in the research. All testing was conducted in accordance with Declaration of Helsinki.

Body composition measurements were performed using bioelectrical impedance (BIA) method using an electric scale, bioimpedance (In Body 720), according to the manufacturer's instructions and previous similar research (Dopsaj et al., 2017; Völgyi et al., 2008). The sample of variables comprised 6 parameters for assessing body composition: body height (BH); body weight (BW); body mass index (BMI); percent of body fat (PBF); skeletal muscle mass (SMM); percent of muscle mass (PMM).

The tests were performed in the morning and the temperature in the room

where the tests were performed was between 20 and 25 degrees. The procedure was: the subjects did not intake food for at least 2 hours before the measurement; the subjects did not exercise for 12 hours prior to the measurement; the subjects did not consume alcohol for 48 hours prior to the measurement; the subjects did not consume diuretics (coffee, chocolate) for 24 hours prior to the measurement; respondents did not use the sauna before measuring; subjects emptied the bladder before measuring.

Respondents spent 5 minutes in standing posture before measurement. At the time of testing, the subjects were only in their underwear and were required to remove all metal from themselves if they had one. Prior to testing, all subjects were familiar with the method of measurement. Respondents were first asked to stand on the scale and place their hands and feet on contact surface (Figure 1). During the measurement, the subjects were asked to stand upright, to be calm and relaxed, i.e. not to clamp their hands, legs and torso, to look forward, to breathe normally and not to talk. The measurement took about two minutes. All measurements were made under the same conditions, subjects were healthy and followed the pre-measurement procedures required. All measurements were made by the same experienced meters in the research room of the Faculty of sport and hysical education, University of Priština – Kosovska Mitrovica.

Figure 1. *Measurements on bioelectrical impedance*

Of the statistical analysis, descriptive statistics (Mean, SD, cV, Min, and Max), as well as multivariate analysis of variance (Manova) and t test were applied. Descriptive statistics were used to describe the measured variables, while multivariate analysis of variance and t test were applied to determine the difference in body composition between physically inactive individuals and students of the Faculty of sport and physical education. All statistical procedure was done in SPSS 20 (IBM).

3. Results and Discussions

Tables 1 and 2 show descriptive indicators of measured body composition parameters for physically inactive individuals and students of the Faculty of sports and physical education, on the basis of which it can be concluded that both groups of respondents are the least homogeneous when it comes to the percent of body fat (cV = 34.3% in average) while being the most homogeneous when it comes to body height (cV = 7.1% on average).

Table 1. *Descriptive parameters of body composition in physically inactive people*

	TV (cm)	TM (kg)	BMI (kg/m²)	PBF (%)	PMM (%)	SMM (kg)
Mean	174.6	70.9	23.07	20.7	44.3	31.4
SD	9.2	15.5	3.7	6.1	3.8	7.4
cV	5.3	21.9	16.2	29.5	8.6	23.6
Min	161.7	48.4	17.2	7.2	39.1	20.5
Max	196	104.2	31.8	31.7	53.1	45.3

Table 2. *Descriptive parameters of body composition in students of Faculty of sport and physical education*

	TV (cm)	TM (kg)	BMI (kg/m²)	PBF (%)	PMM (%)	SMM (kg)
Mean	174.3	71.7	23.4	18.06	46.2	33.3
SD	9.1	12.1	2.7	7.08	4.6	7.1
cV	5.2	16.9	11.7	39.1	9.9	21.3
Min	157.7	52.4	19.7	3	37.5	24.6
Max	187.9	98.6	31.5	32.2	56.1	43.9

Table 3 shows the general differences in all measured parameters of body composition between physically inactive persons and students of the Faculty of sport and physical education, on the basis of which we can conclude that there are no significant differences in the measured parameters between these groups ($F = 0.779$; $p = 0.595$). Also, based on the results presented in the Table 4, it can be concluded that there is no statistically significant difference between groups in any parameter of body composition, i.e. there is no statistically significant difference between groups in body height ($t = 0.112$, $p = 0.911$), body weight ($t = -0.151$, $p = 0.882$) , body mass index ($t = -0.365$, $p = 0.715$), fat percentage ($t = 1.136$, $p = 0.264$), muscle percentage ($t = 1.313$, $p = 0.198$), and absolute muscle values ($t = -$

0.714, p = 0.476).

Table 3. *MANOVA results – general differences in body composition between groups*

	Value	F	Sig.
Wilk's lambda	0.843	0.778	0.595

Table 4. *T-test results – differences in individual parameters of body composition between groups*

	t	df	Sig.	Mean differnce	Std. Error Difference
TV	0.112	30	0.911	0.3625	3.26292
TM	-0.151	30	0.882	-0.74375	4.93134
BMI	-0.365	30	0.715	-0.425	1.16312
PBF	1.136	30	0.264	2.64375	2.33735
PMM	-1.313	30	0.198	-1.97438	1.49688
SMM	-0.714	30	0.476	-1.84375	2.5746

These results are unexpected as it can be assumed that students of the Faculty of sport and physical education, that is, individuals who are assumed to be engaged in regular physical activity, have a better value of the body composition parameters than individuals who do not exercise regularly. The results obtained are not in line with previous research in this area, which supports the fact that there are statistically significant differences in body composition between physically active and physically inactive individuals (Kohrt et al., 1992; Tremblay et al., 1990).

Although there were no statistically significant differences in body composition parameters between groups, it can be concluded that physically inactive individuals had higher body height (by 0.36 cm, 2.07 %), lower body weight (by 0.74 kg, 1.03 %), lower body mass index (by 0.43 kg / m², 1.8 %), higher percent of body fat (by 2.64 %, 14.6 %), a smaller percent of muscle mass (by 1.97 %, 4.4 %), and less absolute skeletal muscle mass (by 1.84 kg, 5.8 %) than students of the Faculty of sport and physical education.

The absence of differences in body height, body mass and body mass index between physically inactive individuals and students of the Faculty of sport and physical education are somewhat expected. First of all, physical activity does not affect body height, which is largely genetically determined (Silventoinen, Kaprio, Lahelma, & Koskenvuo, 2000). Also, body weight is highly influenced by physical activity (Dipietro, 1995; Hughes, Frontera, Roubenoff, Evans, & Singh, 2002), but total body weight does not have to be different between exercise and non-exercise individuals. differences can and should be seen in other parameters such as body fat and muscle mass. Given the above, it is clear that there is a somewhat expected absence of differences between physically inactive individuals and students of the Faculty of sport and physical education and in these parameters of body

composition.

On the other hand, the absence of differences between physically inactive individuals and students of the Faculty of sport and physical education in the parameters of body fat percent and absolute or percentage values of muscle mass is completely unexpected since it has been shown that regular exercise of various physical activities contributes to the reduction of fat tissue as well as increase in muscle tissue (Ball, Owen, Salmon, Bauman, & Gore, 2001; Dideriksen, Reitelseder, & Holm, 2013; Kay & Singh, 2006; Hughes et al., 2001). Students studying at the Faculty of sport and physical education are individuals who are or should be currently engaged in sports, so it is assumed that they exercise regularly, that is, they are expected to have lower body fat percent and higher muscle mass than individuals who do not exercise regularly. Also, the curriculum at the Faculty of sport and physical education is such that it requires from students to be physically engaged, i.e. the teaching process is such that students are obliged to practice certain physical activities on their lectures during the week.

The results obtained in this study can be explained by several factors. The results can be attributed to the curriculum of the Faculty of sports and physical education itself. On the one hand, the curriculum is such that students have to attend classes regularly, which is almost impossible for professional athletes. This further leads to the assumption that the Faculty of sport and physical education is not enrolled by active athletes, that is, it is enrolled by individuals with relatively average values of body composition, which of course does not necessarily mean that they are, or will be, poor sports or physical education expert. On the other hand, more importantly, these results point to the shortcomings of the curriculum at the Faculty of sport and physical education. The curriculum has been shown to be such that attendance alone does not have a significant impact on the physical composition of students, that is, the practical teaching is not intensive enough and/or has insufficient quality content and scope, that is, it does not stimulate the student body sufficiently. Also, these results may indicate that students do not sufficiently engage in extracurricular activities prescribed by the rules and principles of the Bologna Declaration, which require each student to have extra activities outside the classroom. Finally, these results indicate that students do not have good health and eating habits in relation to their profession.

4. Conclusions

Based on the obtained results, it can be concluded that physically inactive persons and students of the Faculty of sport and physical education do not differ in the parameters of body composition. Studying at the Faculty of sport and physical education (and other similar educational institutions) do not lead by itself to an improvement in the body composition of students. Obtained results indicate the need of reducing the curriculum of the Faculty of sport and physical education, but also the need to increase students' awareness of the importance of daily exercise.

In addition to the necessary consideration of the curriculum at the Faculty of sport and physical education and the stimulation of students to engage in regular

physical activity, further research in this area with a larger sample of respondents and more parameters is needed to determine the difference between physically inactive persons and students of the Faculty for sport and physical education, with aim of getting a wider picture of the impact of physical activity on the body composition, but also the health and hygiene habits of students of the Faculty of sport and physical education and the quality of the curriculum at this and similar educational institutions.

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