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## Rethinking Social Action. Core Values in Practice

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Nicoleta LEONTE, Ofelia POPESCU, Oroles FLORESCU,  
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## **Body Mass Determinations of Young People During the Period Between 2008-2017**

Nicoleta LEONTE<sup>1</sup>, Ofelia POPESCU<sup>2</sup>, Oroles FLORESCU<sup>3</sup>,  
Teodora WESSELLY<sup>4</sup>

### *Abstract*

*The physical / somatic dimension, embodied in the physical autonomy and the current anatomical-functional capacity, the vitality necessary for a normal life, subscribes to the complex concept of "quality of life". In our century, the amplitude of excessive technology (mechanization and automation) and the ease of communication and travels, led to a reduction in the physical effort made by young people. All these changes have a negative impact on the physical well-being, by increasing the percentage of sedentary people and obesity. Intercountry comparable overweight and obesity estimates from 2008 show that 51.0% of the adult population (> 20 years old) in Romania were overweight and 19.1% were obese. Adulthood obesity prevalence forecasts (2010–2030) predict that in 2020, 12% of men and 9% of women will be obese. This study aims to determine the somatic mass evolution (muscle mass / adipose tissue ratio) of the students from University "Politehnica" of Bucharest by comparing the data collected in 2008 with those of 2017 and by finding the changes occurred over time. The results of the research show a positive evolution of the students' physical development in 2017 compared to the students in 2008, by the significant increase of the muscle mass ( $t=4.2932$ ,  $p= 0.0001$ ). The values recorded in the adipose tissue do not display significant differences. The evolution identification of the muscle mass-adipose tissue ratio over time could highlight the effect of the educational and training process specific to the field of physical education and sport, and raising the awareness of the young people about the systematic practice of the physical activity combined with a healthy diet aims to increase the quality of life.*

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<sup>1</sup> University "Politehnica" of Bucharest, Bucharest, Romania, nicoleta\_leonte@yahoo.com.

<sup>2</sup> University "Politehnica" of Bucharest, Bucharest, Romania, ofeliapopescu2002@yahoo.com.

<sup>3</sup> University "Politehnica" of Bucharest, Bucharest, Romania, florescuoroles@yahoo.com.

<sup>4</sup> University "Politehnica" of Bucharest, Bucharest, Romania, teodoraw@yahoo.com

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Corresponding Author: Nicoleta LEONTE

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**Keywords:**

*Body mass; adipose tissue; students; physical education.*

**1. Introduction**

Many socio-human analysts believe that profound macro-social changes (the techno-economic development, the intense urbanization, the communication means perfecting and massification, the democratization and pluralism, the diversification of life styles) radically mark people's attitudes and particular behaviors. Among these behaviors we can also mention the food related behavior.

In general terms, food related behavior can be defined as the set of actions and attitudes related to nutrition. Nutrition along with sedentarism are the factors that have essentially contributed to the spread of metabolic and nutritional diseases. Overweight and obesity are recognized by specialists as a multifactorial disease, involving multiple interactions between the genetic, metabolic, behavioral, psychological and social factors that cause changes in the energy balance over time. [1]

Intercountry comparable overweight and obesity estimates from 2008 show that 51.0% of the adult population (> 20 years old) in Romania were overweight and 19.1% were obese. The prevalence of overweight was higher among men (53.1%) than women (49.1%). The proportion of men and women that were obese was of 16.9% and 21.2%, respectively. Adulthood obesity prevalence forecasts (2010–2030) predict that in 2020, 12% of men and 9% of women will be obese. By 2030, the model predicts that 15% of men and 10% of women will be obese. [2]

**2. Problem Statement**

Studies have shown that with age, the ratio of adipose tissue to muscle mass changes so that the percentage of the muscle tissue decreases and adipose tissue increases. The factors that contribute to the growth of adipose tissue are the lack of physical activity, the menopause status, nutrition or diseases. [3, 4, 5]

Most of the studies and research which aimed at the participation of adolescents and young people in physical activities were conducted or coordinated in the school environment. Each intervention was designed to increase the participation in the physical activity, diminish sedentarism and reduce risk factors as well as obesity. [6]

*From a biological point of view.* During adolescence, young people have experienced physical, social and emotional changes, gaining weight and

height. [7, 8] The distribution patterns of the adipose tissue during youth are related to levels of the reproductive hormones, especially with girls. [9] Studies have shown that at the end of puberty, girls have a weight plus of 11 kg, and more researchers have suggested that the increased percentage of adipose tissue of girls, compared to boys, is necessary for the onset and maintenance of the normal reproductive functions [10, 11].

*From a psychological point of view.* The experience of developing at puberty, and of the physical changes influence the psychological development of young people (aged 19-21). In the value system, over time, identity is related only to the physical appearance, psychological maturation, and new social status. In order to be accepted by the group, the female teenager should not differ too much from the others, in order not to become ridiculous. That is why, especially for girls, the concern about the physical appearance can become dominant.

The specialists in Psychology are of the opinion that the revision of the bodily scheme in young women is necessary due to the rapidity of the transformations in this period which can create a state of obsession and anxiety over the idea of being normal, of not being as the others. The distortion of the body image can be manifested by anxiety, depression, obsessive care for the physical appearance and even behavioral disorders. Self-ignorance can lead to a deformed or erroneous image of one's own self. Many young women tend to develop their self-image based on abilities or skills, compared to the others, or based on an idealized image of what they should be. [12]

*From the gender point of view.* In the recent years, there has been an increased interest in how girls' body image changes in adolescence and how weight changes in puberty and post-puberty act as a factor in the unhealthy behavioral patterns (diets, depressive disorders).

On the other hand, the normal weight and height changes in late adolescence (19-21 years old) are often positively felt by boys, especially those related to the increased muscle mass and height. Western cultures seem to favor boys who are stronger and taller. [13] The latest study (2014) conducted by the European Commission for Health on health and nutrition, attended by 25 countries, attests that girls are more prone to overweight and obesity than boys. In Romania, the proportion of obese adults is of 9.4%, that of men (18+) is of 9.1% and that of women (18+) is of 9.7%. [14]

*From an educational point of view.* Most times, health is associated with well-being and quality of life. The implications of education, especially that on nutrition, are a desideratum for today's society, contributing to setting long-term goals. Studies have shown that in the EU countries health is inversely proportional to education. In Romania the number of obese

people drops proportionally with the educational level thus: low education - 11.6%, medium education – 8.8% and high education 6.7%.

### **3. Material and Methods**

#### ***3.1. Aims of the research***

The paper aims at assessing the body composition of young people (19-21 years old / 2017) in order to appreciate the normality of the physical development and compare the results with similar data collected in 2008.

The repeated examination, at equal time intervals (7-10 years), allows to know the changes in the body composition (the muscle mass / adipose tissue ratio) of young women in technical universities, in order to improve and diversify the motor programs specific to the physical education lesson. It also follows the trend of the body composition in order to early detect overweight.

#### ***3.2. Objectives***

The fundamentation of the body composition standards of young women (19-21 years old) by establishing the average level of the two body composition indicators (the adipose tissue and muscle mass).

The dynamics of the adipose-tissue - muscle mass ratio – a prediction of subsequent disease risk.

### **4. Research Methods**

#### ***4.1. Experimental design***

This study falls in the comparative research category made between two equivalent experimental groups, having as dependent variables two indicators of the body composition: the adipose tissue and muscle mass.

In order to know the complex problematics of physical development of young people, we used the following research methods: the bibliographic documentation (necessary for forming the overall view on the previous achievements in the field), the direct observation (it consisted in the systematic monitoring of the anthropometric data, actions and motor activities) the comparative analysis (in order to find the similarities / differences between the anthropometric profiles of the young women at two different moments in time), the test and measurement method, the statistical and mathematical method and the graphic method

The evaluation of the muscle mass and adipose tissue was performed by means of the Tanita BC 601 body assay device. (Fig. 3) This measures the body composition through 8 segmental electrodes, using the BIA technology (Bioelectric Impedance Analysis - electrical currents of low intensity that penetrate the body through electrodes).

The measurements are analyzed according to gender, age, height and weight to give an overview of the general health state.



**Figure 3** Tanita BC 601 Assay Device

In the research, we obtained primary data, which was collected in a database and statistically processed through the SPSS program. The statistical parameters used were: the arithmetic mean, the standard deviation (SD), the standard error mean (SEM) and the Student test.

The results obtained were presented in tabular and graphic form.

#### ***4.2. Subjects and location***

The sample of subjects, participating in the research, was made up of female students from the University Politehnica of Bucharest, aged 19-21. The sample type is randomized, using the random selection technique. In psycho-pedagogical / methodical research, where subjects cannot be selected without the risk of discompleting the classes, parallel classes are considered as groups of experiment and control, considering that the "random" factor acted upon the initial formation of the classes [15].

The sample consisted of 238 subjects (female students). In 2008, 118 female students participated in the research, and in 2017 the study was conducted with 120 female students who did not have health problems at the time of the examination.

Prior to the experiment, the subjects were informed on the research data, and they expressed their verbal and written consent.

The research was carried out between May 15 - December 11, 2017 in the Research Laboratory of the Department of Physical Education and Sports - Physical Therapy (University “Politehnica” of Bucharest).

## 5. Results

By comparing the characteristics of the development process of young women in the last 9 years (2008) with the current ones (2017), we notice differences regarding the body composition of young women. (Table 1, 2, Figure 4).

**Table 1. Adipose tissue (%)**

	Average	Difference	SD	SEM	N
2008	24.1	0.79	5.38	0.491	118
2017	23.31		6.70	0.611	120
Student Test		t= 1.0071; p=0.3149			

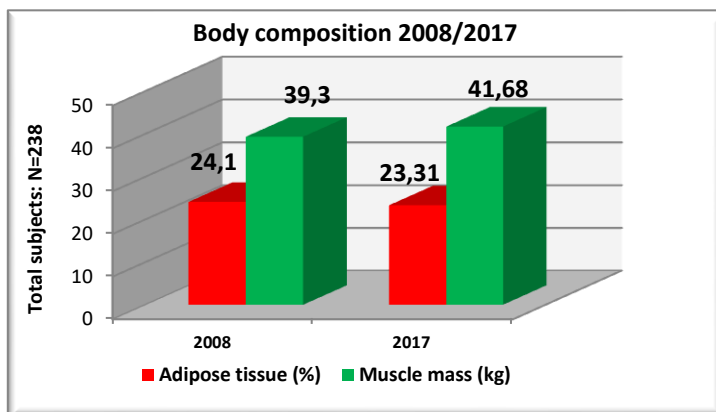
\*SD= Standard deviation; SEM=Standard error mean; N=number of subjects)

**Table 2. Muscle mass (kg)**

	Average	Difference	SD	SEM	N
2008	39.3	2.38	3.87	0.353	118
2017	41.68		4.68	0.427	120
Student Test		t= 4.2932; p=0.0001			

\*SD= Standard deviation; SEM=Standard error mean; N=number of subjects)

From the analysis of the averages difference in the "adipose tissue" indicator in 2008 compared to 2017, it results that the young women participating in the current research have the percentage of adipose tissue lower by 0.79 units, compared to that of the young women from 2008. This difference is not statistically significant, the significance threshold being of 0.314.



**Figure 4**

The analysis of the averages difference in the “Muscle Mass” body composition indicator shows an increase of 2.38 units for the young women participating in the research in 2017 compared to those participating in 2008. This difference is statistically significant, according to the Student Test, where  $t=4.2932$ ,  $p=0.0001$ .

## 6. Discussions

The objective of this study was to compare the two indicators of the body composition (the adipose tissue and muscle mass) of young women in two different time periods: 2008 and 2017. The results obtained are classified as normal, relative to the national and European average. Taking into account the implications of young women health on their activity, through this study we were able to observe the tendency of the body composition in time, given that the prediction function is as important as the control or evaluation one.

## 7. Conclusions

We can conclude, following the results obtained, that the parameters of the body composition (the adipose tissue and the muscle mass) of the subjects of the research conducted in 2017 (aged 19-21) compared to the subjects participating in the 2008 research, have lower indexes of the adipose tissue and higher indexes of the muscular mass.

Regular assessment by means of the advanced technology gives us important data about the health of the younger generation. It also provides us with milestones in the further didactic design of the physical education



lessons, and raises awareness and also encourages young students to approach a healthy lifestyle.

The school and university environment are the most appropriate means for implementing motor programs which should facilitate the acquisition of the skills and knowledge needed to support a healthy lifestyle.

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