



PHYSICAL BODY ASSESMENT IN FIRST YEAR STUDENTS OF TRAKIAN UNIVERSITY

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ABSTRACT

The PURPOSE of the study was to determine the physical assessment of the body in first year students of the Faculty of Veterinary Medicine and the Faculty of Economics at Trakia University – Stara Zagora. The METHODS used were: preliminary literature survey, bioelectrical impedance analysis with a professional Tanita instrument; mathematical-statistical methods and graphical analysis. The obtained RESULTS of the measurement provide information for physical assessment of the body according to the ratio of body fat and muscle mass in the body. The proposed CONCLUSION after summarizing the results is to assist the teacher in selecting an exercise training program to improve the overall physical assessment of freshmen students in higher education institutions.

Key words: bioelectrical impedance analysis, body fat and muscle mass, teacher assistance

INTRODUCTION

The principle used to determine body composition is bioimpedance analysis. With this method of measurement, when stepping on four electrodes on the platform of a professional medical device of the Japanese company "TANITA", a weak current passes through the body, completely safe for man. This takes into account the resistance, resp. number of different types of tissues in the body. Physical assessment is the ratio of body fat and muscle mass in the body. When you become more active and reduce the amount of body fat, the physique score also changes accordingly. Even if your weight doesn't change, your muscle mass and body fat levels can change, making you healthier and reducing your risk of disease. This will give you a clear idea of what body type you have, much more accurately than the body mass index. This allows you to track your health and see progress as you make positive

lifestyle changes. Each person should set their own goal of what kind of physique they like and follow medical programs with supplements, proper nutrition and fitness to achieve that goal (1, 2)

In Bulgaria, low physical activity is a current problem for all age groups, especially among young people. National Statistical Institute NSI data show that 18-25% of boys have low physical activity, with the relative proportion increasing with age. A nationally representative survey by the NCIOM found that almost half of the young people surveyed (48%) do not participate in sport, and 27.4% of them practice it less than once a week. In recent decades, most countries in the European region and worldwide have seen an increase in the prevalence of this health risk factor among adolescents, increasing their risk of developing chronic diseases in adulthood and becoming a serious public health problem (3-6).

Systematizing individual activities into a complete cycle is crucial for the results of any sporting endeavor. Assuming that the physical education learning process in university is such a cycle of specialised sport activities, there are significant

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limitations in its periodisation and cyclicity. This does not allow the achievement of the so-called cumulative training effect, as the periods between individual activities are too long. Therefore, in order to improve the functional capabilities of students, the application of other sports is necessary to complete the determination of physical exertion(7-10)

PURPOSE

The aim of the comparative research was to determine the physical body assessment of first year students of the Faculty of Veterinary Medicine and the Faculty of Economics at the University of Trakia - Stara Zagora

TASKS

1. To assess the physique according to the ratio of body fat and muscle mass in the student's body;
2. To conduct the research;
3. To analyze the results obtained.

Contingent of the research were a total of 50 male first-year students divided into two groups of 25 each, of the Faculty of Economics - specialty Software Engineering (SE) and the Faculty of Veterinary Medicine - specialty Veterinary Medicine (VM). The objects of the research are enrolled in the compulsory physical education training at Trakia University, Stara Zagora for the academic year 2022/2023

METHODS

To achieve the aim of the research and to solve the set tasks:

1. A method for preliminary investigation, analysis and synthesis of data from the literature;
2. Bioelectrical impedance analysis with professional medical device "TANITA";

3. Mathematical and statistical methods for quantitative assessment of the studied indicators and comparative analysis of the obtained results;
4. Graphical analysis.

In the present comparative research, 7 out of 9 comparable physical body assessments of first-year students at the University of Trakia - Stara Zagora were determined. As three of these body evaluations are manifested only in the group of the studied students of the Software Engineering major :

1. Standard body type;
2. Obesity body type ;
3. Solidly-built body type;
4. Thin body type;
5. Under exercised body type - only in the SE specialty group;
6. Hidden obese body type - only in the SE specialty group;
7. Thin and muscular body type - only in the SE specialty group.

RESULTS

The results of the research provide information on the physical assessment of the body of students trained during the 2022/2023 academic year, assisting the teacher in the selection of exercises to train the relevant muscle groups and training to burn subcutaneous fat. In this research, seven types of physical body assessment are determined by bioelectrical impedance analysis measurements on a professional medical device Tanita. The body fat and muscle mass quantifications of students from two different majors, Veterinary Medicine (VM) and Software Engineering (SE), were subjected to comparison.

Data for comparative analysis are provided in **Table 1** and **Table 2**

Table 1. Benchmarking data for students from the 2022/2023 academic year.

Body type	Measure unit	$\bar{X}1$ Body fat VM	$\bar{X}2$ Muscle mass VM	$\bar{Y}1$ Body fat SE	$\bar{Y}2$ Muscle mass SE	d1 $\bar{X}1$ $\bar{Y}1$ F.M.	d2 $\bar{X}2$ $\bar{Y}2$ M.M.
Standard VM/SE	kg	11,25	62,9	10,20	60,35	-1,05	+2,55
Obese VM/SE	kg	19,5	64,87	22,26	67,32	-2,76	+2,45
Solidly-built VM/SE	kg	38,03	77,56	50,55	81	-12,52	+3,44
Thin VM/SE	kg	3,7	55,9	3,46	53,92	-0,24	+1,08
Under exercised SE	kg	-	-	7,46	52,83	-	-
Hidden obese SE	kg	-	-	65,1	33,1	-	-
Thin and muscular SE	kg	-	-	4	53,6	-	-

Table 2. Summary data for fat and muscle mass in Veterinary Medicine (VM) and Software Engineering (SE) for the academic year 2022/2023.

Body type	Body fat VM	Body fat SE	Muscle mass VM	Muscle mass SE	Difference d Body fat	Difference d Muscle mass
1. Standard 2. Obese 3. Solidly-built 4. Thin 5. Under exercised 6. Hidden obese 7. Thin and muscular	18,2 kg	23,29 kg	65,3 kg	57,44 kg	-5,09 kg VM<SE	+7,86 kg VM>SE

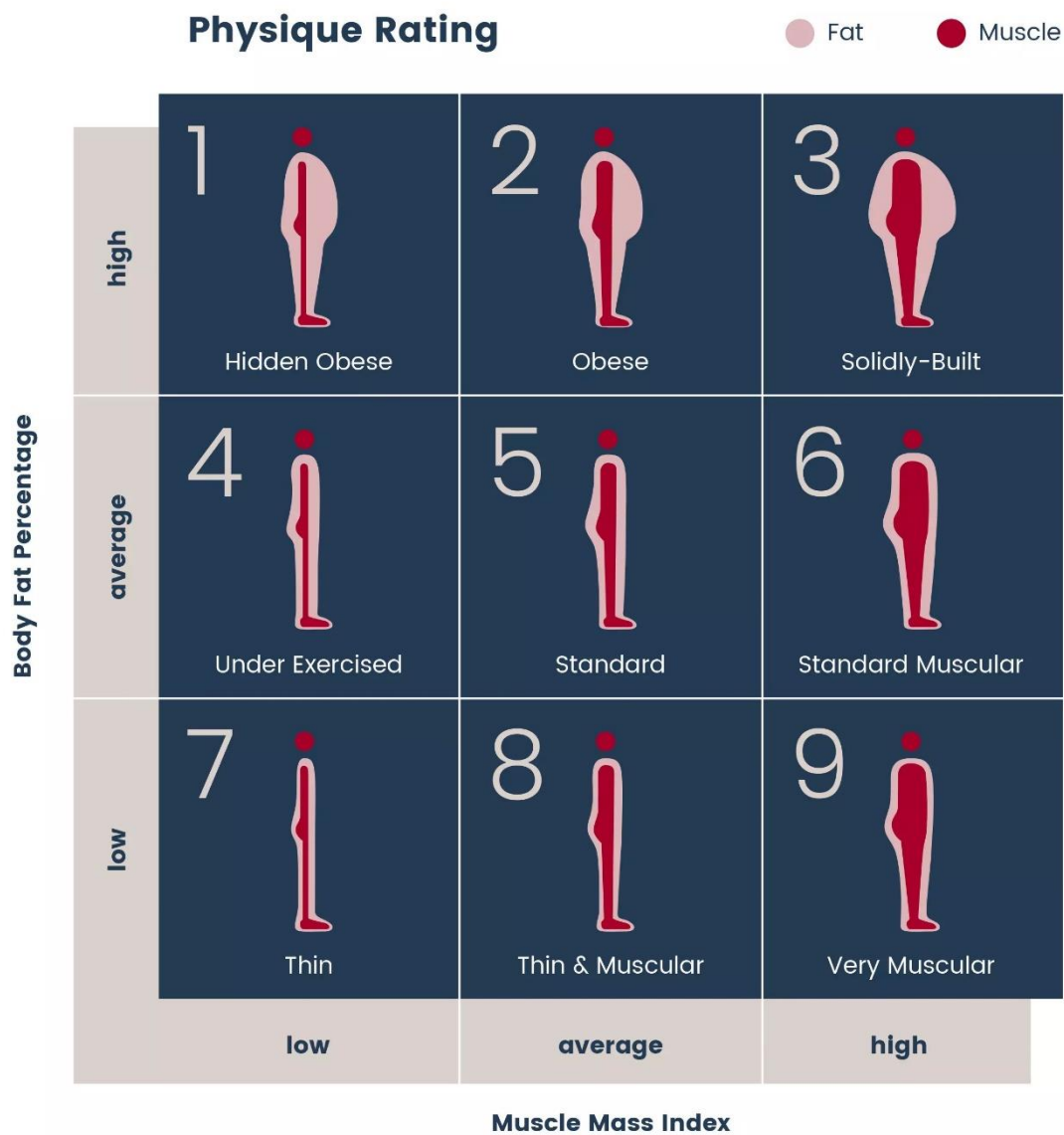


Figure 1. Types of physical body assessment

When comparing the data from the comparative analysis of the four of the seven physical assessments for students, there was a statistically significant difference, exceptions to this are the results of the body type assessment of SE students who have: under exercised, hidden obese and thin and muscular. One-fifth of the study contingent at

the Faculty of Economics showed a different physical assessment of body type than students at the Faculty of Veterinary Medicine (**Figure 3**). The quantitative data from the results obtained on these physical body assessments are involved in the study as part of the experiment to generalize the final result.

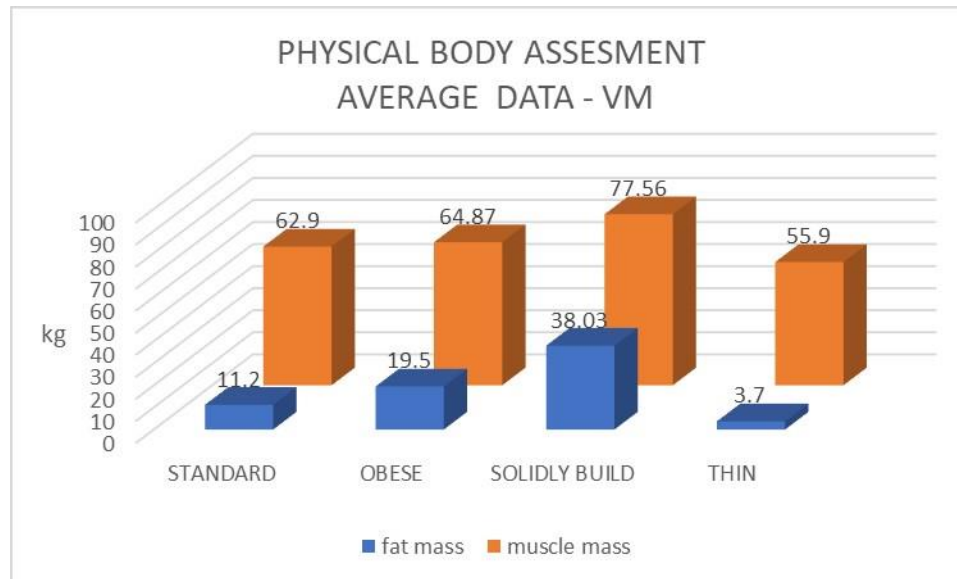


Figure 2. Physical body assessment average data – VM

A standard body type was observed in 50% of the male students studied at Trakian University - Stara Zagora. Twenty-five trainees had an average level of body fat and muscle mass. The mean values of muscle mass for the students of Veterinary Medicine (VM) were 62.9 kg and for the students of Software Engineering (SE) were 60.35 kg. The difference $d2 = +2.55$ kg indicates that VM students have a larger muscle mass than SE students. The mean fat mass values for SE were 10.2 kg. and for those studying in the specialty of VM are 11.2 kg. The difference $d1 = -1.05$ kg indicates that the SE students had lower fat mass than the VM students (**Table 1, Figure 2, Figure 3, Figure 5**). The standard body type contingent can make great progress when they start training.

Obese body type was observed in nine male students studied. Obesity means having a high percentage of fat and a standard level of muscle mass. The mean values of muscle mass for VM students were 64.87 kg and for SE students were 67.32 kg. The difference $d2 = +2.45$ kg indicates that SE students have a larger muscle mass than VM students. The mean fat mass values for SE were 22.26 kg. and for those studying in the

specialty of BM are 19.5 kg. The difference $d1 = -2.76$ kg indicates that the VM students had a lower fat mass than the SE students (**Table 1, Figure 2, Figure 3, Figure 5**). The obese contingent needs to be careful. Obesity can lead to serious health problems.

A solidly-built body type was observed in five graduates studied. This means that you have a high body fat percentage and a high level of muscle mass. The mean values of muscle mass for VM students were 77.56 kg and for SE students were 81 kg. The difference $d2 = +3.44$ kg indicates that SE students have a larger muscle mass than VM students. The mean fat mass values for SE were 50.55 kg. and for those studying in the specialty of VM are 38.03 kg. The difference $d1 = -12.52$ kg indicates that the VM students had lower fat mass than the SE students (**Table 1, Figure 2, Figure 3, Figure 5**). The contingent with a solidly-built body type, although outwardly appearing large, actually has a lot of muscle mass. Thin body type was observed in six students studied. This means they have a small amount of body fat and a low level of muscle mass. The mean values of muscle mass for VM students were 55.09 kg and for SE students were 53.92

kg. The difference $d2 = +1.08$ kg indicates that VM students have a larger muscle mass than SE students. The mean fat mass values for SE were 3.46 kg, and for those studying in the specialty of VM are 3,07 kg. The difference $d1 = -0.24$ kg

indicates that SE students have lower fat mass than VM students (**Table 1, Figure 2, Figure 3, Figure 5**). Too thin a contingent can lead to serious health problems, but a slightly slimming figure is normal.

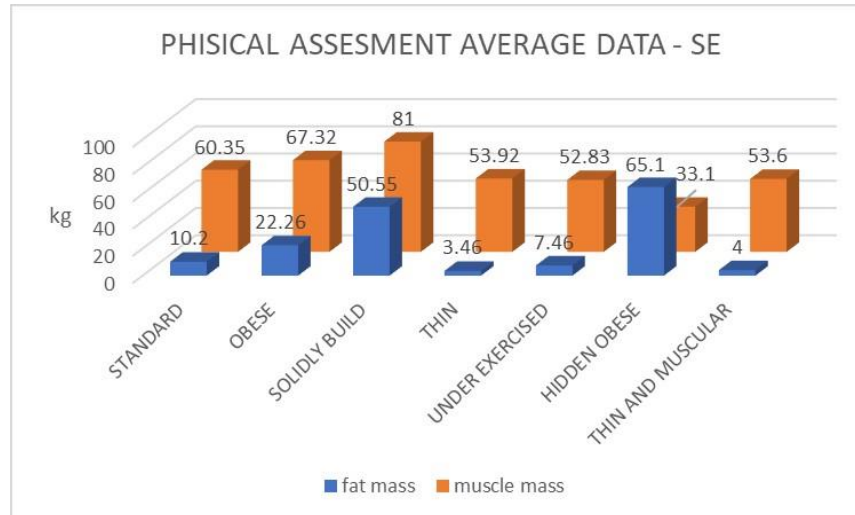


Figure 3. Physical body assessment average data – SE

Under exercised body type was experienced by three students in the SE major. This means they have an average amount of body fat and a low level of muscle mass. The average muscle mass values were 52.83 kg. The mean fat mass values were 7.46 kg (**Table 1, Figure 3, Figure 5**). The contingent should start gaining muscle mass by working out regularly.

A hidden obese body type has one SE graduate. This means that the body has a high percentage of fat and a low level of muscle mass. Although outwardly it looks like an average, its fat level is

too high. Average muscle mass values are 33.1 kg. The mean fat mass was 65.1 kg (**Table 1, Figure 3, Figure 5**). This can lead to obesity, which can lead to serious health problems. By eating healthier and increasing physical activity he should be able to reduce his fat levels.

Thin and muscular there is one SE student. This means it has a low amount of body fat and a standard level of muscle mass. Average muscle mass values are 53.6 kg. The mean value of fat mass was 4 kg (**Table 1, Figure 3, Figure 5**).

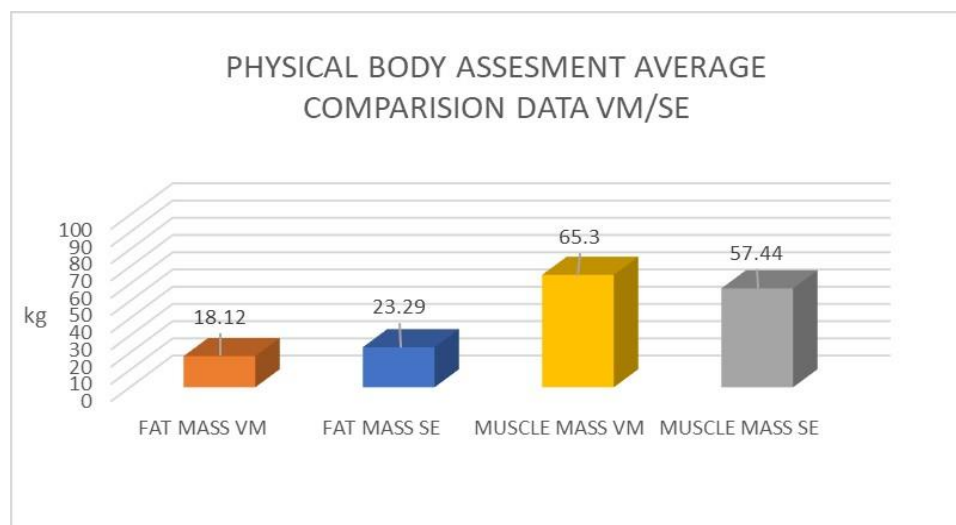


Figure 4. Physical body assessment average comparison data VM/SE

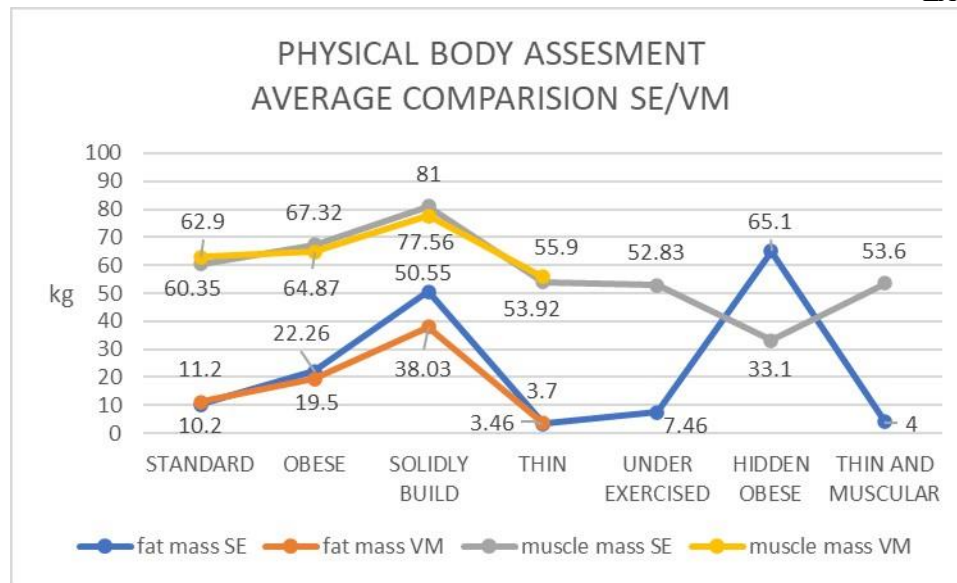


Figure 5. Physical body assessment average comparison data SE/VM

The summarized results of the research provide information on the fat and muscle mass in the bodies of the students of Trakia University - Stara Zagora for the academic year 2022/2023. The Veterinary Medicine and Software Engineering specialties demonstrated seven types of physical assessment: Standard, Obesity, Solidly-built, Thin, Under exercised, Hidden obese, Thin and muscular. After summing the means of the fat mass of all body type physical assessments, the VM students had 18.2 kg, indicating a difference of $d=5.09$ kg, less than their SE counterparts, who have 23.29 kg. After averaging the muscle mass of the body type physical assessments, the VM students had 65.3 kg, indicating a difference of $d=7.86$ kg, more than their SE counterparts, who have 57.44 kg. (**Table 2, Figure 4**)

CONCLUSION

1. In physical body type assessments, the Veterinary Medicine study group showed lower amounts of subcutaneous fat and greater muscle mass compared to the Software Engineering study group;
2. I hypothesize that the increased activity of the Veterinary Medicine group in organized activities, the inclusion of targeted exercise to improve physical fitness, and the higher health education are all predictors of the better physical body score compared to the Software Engineering group;
3. The results of the study provide information on the physical assessment of the body of students trained during the 2022/2023 academic year, assisting the teacher in the selection of

exercises to train the relevant muscle groups and training to burn subcutaneous fat;

4. In the study of fifty university students, not a single physical body type score of "Standard Muscular" and "Very Muscular" was observed. From which it follows that the guidelines in teaching the subject of physical education and sport should be for the development of physical quality strength.

RECOMMENDATIONS

1. The students' desire to play sports, the highly qualified lecturers and the availability of facilities are the leading factors that, through proper interaction, would complement the sports training of the students at the university
2. We should not forget the positive emotional impact of sport on students in the presence of mental fatigue, and hence the possibility of increasing their performance in academic and professional activities

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LAPADATOV L.

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