

AMOUNT OF BODY FAT IN THE BODY STRUCTURE OF STUDENTS OF THE FACULTY OF PHYSICAL EDUCATION IN ZAGREB

Marjeta Mišigoj-
Duraković*
Jelka Gošnik-Oreb**

DELEŽ MAŠČOBE V TELESNI STRUKTURI ŠTUDENTOV FAKULTETE ZA TELESNO KULTURO V ZAGREBU

ABSTRACT

In the sample of 405 male students (201 students of the Faculty of Physical Education and 204 students of other University of Zagreb faculties) the amount and percentage of body fat were investigated using anthropometry and the generalised equation by Jackson and Pollock.

The results have shown that Physical Education students have lower relative and absolute body fat values already at the very beginning of their university education. It is possible to conclude that male students of physical education belong to a population quite different from that of students of the other faculties in regard to the analysed characteristics.

Key words: body structure, fat, comparison, students

IZVLEČEK

Cilj analize je bil ugotoviti količino telesne maščobe ter udeležbo maščobne komponente v skupni telesni teži pri študentih prvega letnika študija na različnih fakultetah Univerze v Zagrebu. Izpeljano je bilo antropometrično merjenje s posebnim ozirom na dimenzije podkožnega maščobnega tkiva ter odstotne udeležbe "rezervne" maščobe v telesni strukturi študentov. Vzorec so predstavljali 204 študentje Fakultete za telesno kulturo in 201 študent drugih fakultet Univerze v Zagrebu.

Rezultati so pokazali, da imajo študentje Fakultete za telesno kulturo že na začetku študija manj podkožnega maščobnega tkiva. Izračunani odstotek telesne maščobe v sestavi telesa (15,4%) je nižji pri študentih Fakultete za telesno kulturo kot pri študentih drugih fakultet (17,7%). Brez dvoma gre za že pri samem vpisu selekcionirano populacijo študentov, ki ima manjšo količino "rezervne" tolšče in bolj razvito "nemaščobno" maso. Takšna sestava telesa daje prednost pri izvajanju večine motoričnih nalog.

Ključne besede: telesna struktura, maščevje, primerjava, študentje

*Zavod za kineziološko antropologijo, Fakultet za fizičko kulturo Sveučilišta u Zagrebu

**Katedra za tjelesnu i zdravstvenu kulturu, Filozofski fakultet Sveučilišta u Zagrebu

INTRODUCTION

Even if researchers paid quite a lot of attention to the morphologic status and body composition of the student population, the data was mainly obtained on selected samples of this population, for example students involved in some sport activities (Walsh et al.; 1984, Siders et al.; 1991). Very seldom were these biologic characteristics studied on the non-selected student population (Katch and McArdle; 1973, Momirović et al.; 1969). Specially deficient are longitudinal monitoring of the final formation of morphologic characteristics for young adults.

Today, a special meaning is given to the determination of body composition in anthropological populational and epidemiological analyses. This is due to the ever increasing correlation between a more than normal percentage of the fatty component in the body structure and increased arterial blood pressure, hypercholesteromia, diabetes – a risk factor for the development of cardiovascular diseases. It should be superfluous by now to stress the negative influence of a too great amount of the so-called "reserve" fat in performing many motor tasks.

The determination of the fatty component in the body with the percentage of body fat is therefore very important in anthropometric studies of the morphologic status. Even if many methods for the determination of body composition exist, of various precision, reliability, measuring costs, ease of use etc., the most often used method in large analyses is the anthropometric method. This method offers sufficient precision, is simple to use for a practised measurer, is cheap and suitable also for field use. From the numerous number of published formulae for the determination of the percentage of body fat, based on anthropometry, the preference today goes to generalised regression equations. The most often used are those of Jakson and Pollock (1985).

The purpose of this research, which is a part of a greater longitudinal study of the morphologic and functional-physiologic characteristics of the students of the University of Zagreb (the scientific project 5-10-111 of the Ministry for Science, Technology and Informatics of the Republic of Croatia), is to show the amount of body fat and the percentage of the fatty component in the body structure of students of the first year at various faculties of the university. Of special interest to us is the existence of a possible difference between students of the Faculty of Physical Education and the other faculties of the University of Zagreb in the space of measures of subcutaneous fat and the percentage of the "reserve" fat in body structure already at the start of studies.

METHODS

The measured sample comprised of 405 students of the first year of the University of Zagreb, of these 204 were students of the Faculty of Physical Education and 201 students of the other faculties of the university.

Of the 21 anthropometric measures taken in the framework of the above-mentioned four year project, the following anthropometric variables were used in this study: body height (cm), body weight (kg), skinfold-back (mm), skinfold-upper arm (mm), skinfold-lower arm (mm), skinfold-chest (mm), skinfold-belly (mm), skinfold-suprail. (mm), skinfold-lower leg (mm).

The measurement of the skin-folds was performed according to the proposals of Jackson and Pollock (1985) in order to be able to compute the body composition as proposed by the authors. All the skin-folds were measured three times. The measures were taken by two experienced measurers.

On the basis of the body height and body weight the index of body mass was computed (body mass/body height²). Using three skin-folds (upper arm, chest and back) the body density was computed using the Jakson and Pollock method (1985), then a correction of the "John Bull" calliper was performed and at the end the percentage of body fat according to the equation of Siri (Siri, 1956) determined.

The basic statistical parameters were computed using descriptive statistics and the significance of the differences between the two groups tested with the Student t-test.

RESULTS AND DISCUSSION

In comparison with the results of the research on the anthropometric status of Croatian students in 1966 (Momirović et al., 1969) it is obvious that today's students are higher and heavier, have higher values of skin-folds, except for current students of the Faculty of Physical Education, who have lower values of the lower-leg skin-fold. This described difference can be ascribed to the phenomenon of biologic acceleration.

Table 1 shows the basic statistical indicators of the used variables, separately for the students of the Faculty of Physical Education (FPE) and the students of the other faculties. We have found that students of FPE are quite heavier than the students of the other faculties of the University of Zagreb. The results

show, however, that no significant difference exists in body height. Also, the value of the index of body mass is higher for FPE students.

Table 1. Comparison of the two groups of students

Variable	Group 1		Group 2		Difference test
	Mean	St.dev.	Mean	St.dev.	
Body height	180.0	6.5	180.7	6.6	-1.14
Body weight	74.8	8.4	72.5	9.3	2.57*
Skinfold-back	9.0	2.6	10.3	3.0	-2.66**
Skinfold-upper arm	8.7	3.3	10.4	3.6	-4.02***
Skinfold-lower arm	5.5	1.5	5.6	2.6	-0.47
Skinfold-chest	5.5	2.1	6.3	2.5	-2.16*
Skinfold-belly	10.2	4.3	13.9	5.5	-6.58***
Skinfold-suprail.	6.1	2.4	7.8	3.8	-3.72***
Skinfold-lower leg	6.8	3.0	9.3	4.8	-6.69***
Body weight index	23.1	2.3	22.2	2.5	3.82***
% of body fat	15.4	3.2	17.7	5.1	-3.13***

Legend: Group 1=FPE, Group 2= other faculties *** = 0.001,

** = 0.01, * = 0.05 statistical significance

However, such data do not say much, especially in connection of the possible morphological "suitableness" for performing various motor tasks. The surplus body weight can be the result of an excess of the "reserve" body fat, which would make it ballast in the execution of most of the motor tasks. On the other hand, it can also be the result of the development of the skeleton and muscles, being a distinct advantage in solving some motor tasks. Therefore it is imperative to analyse this different body composition, specially the percentage of the fatty component in the gross body weight. The students of FPE have markedly lower values in all skin-folds, except that on the lower arm. Also, the percentage of subcutaneous fat in the body structure is significantly lower for FPE students, their average is 15.4% (11.5 kg), the average of the other students 17.7% (12.8 kg). In comparison with the known normative values of the percentage of body fat according to age and gender, the obtained values – specially for the FPE students – are placed at the level of average values (Lohman, 1987).

CONCLUSION

The differences in the values of the various skin-folds and the percentage of body fat between the students of the Faculty of Physical Education and the students of the other faculties of the University of Zagreb are without doubt the basis of the expected differences in the ability to perform various motor tasks. Inequalities, seen already in the first year, speak in favour of the fact that students of the Faculty of Physical Education are chosen according to the amount of "reserve" fat – ballast body mass through their execution of the great majority of motor tasks.

REFERENCES

1. Jackson AS, Pollock ML. Practical assessment of body composition. *The Physician and Sports Medicine* 1985; 5: 76–90
2. Lohman TG. The use of skinfold to estimate body fatness on children and youth. *JOPERD* 1987; 98–102
3. Katch FI, McArdle WD. Prediction of body density from simple anthropometric measurements in college-age men and women. *Human Biology* 1973; 45: 445–454
4. Momirović K. et al. Faktorska struktura antropometrijskih varijabli (Factor structure of anthropometric variables). Zagreb: Institut za kineziologiju, 1969
5. Siders WA, Bolonchink WW, Lukaski, HC. Effects of participation in a collegiate sport season on body composition. *J. Sports Med Fitness* 1991; 4: 571–567
6. Walsh FK, Heyward VH, Schau CG. Estimation of body composition of female intercollegiate basketball players. *The Physician and Sports Medicine* 1984; 11: 74–89