

# The evaluation of the most important anthropometric variables in adult population in Oltenia County

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**ABSTRACT** Anthropometric measurements allow us to establish population health state and the tendency and evolution of the variables resulted from those measurements. By studying height, weight and body fat and also by calculating the waist circumference hip circumference ratio and by calculating the body mass index, we could group the adult population of Oltenia county into the category of the overweight subjects and I class obesity; therefore the risk of the coronarian and diabetes mellitus type II diseases increases simultaneous to the significant fat accumulations.

**KEY WORDS** *anthropometry, anthropometric variables*

## Introduction

The study and comparative analysis of the main variable anthropometric to a homogeneous batch of subjects adults, allows an orientation on the state of health of the population in our region, with a focus on accumulative adipose tissue, is the primary phenotypic of obesity. Value, quantity and distribution of adipose tissue are associated with various consequences of obesity, such as coronary conditions, diabetes mellitus type 2.

## Material and method

Subjects of study were 178 subjects, 83 women and 95 men, with ages between 18 and 65 years. In the selection of subjects I had in mind the State of their health; they excluded those with chronic diseases, using the diuretic therapy, those with diabetes, subjects with body mass index 18.5 (underweight) < or  $\geq$  40 (morbidly obese), subjects with cortisone or lipid-lowering therapy.

### Anthropometric measurements

Height measurement (waistline) was measured with a stadiometer, the results being expressed in centimeters.

Weight was measured with an electronic scale, calibrated from 0, 1 kg.

Measure skin folds were made using a caliper Holtain type, taking into account the following considerations:

- correct positioning of the tool and standard subject;
- the correct way to approach the cutaneous fold;
- the skin of the subject to be clean, no lotions or oils. [1, 2, 3].

Also cite were made 2 measurements for each skin fold, and the calculations were done by the same person for all subjects of the lot.

Were measured following skin folds:

- tricipital, in the middle point of the face side of the arm, between the olecranon and acromion process ends, parallel to the longitudinal axis of the arm;
- lower subscapular, angle of the scapula, at 45 ° to the vertical;
- abdominal fold horizontal, the umbilicus, 5 cm lateral skin folds.

Values are expressed in millimeters.

### Circumferences measurements

Waist circumference was measured at the middle of the distance between the last rib and the anterior superior spinous process of the ilium.

Hip circumference was measured at the level of great trochanter.

The results obtained in measuring these two circumferences are expressed in centimeters.

Recommended procedures for correct anthropometric measurements: subjects in orthostatic, with light clothing and no measurement is performed after a great physical effort on the part of taxpayers.

The equations used in this study for calculation of the percentage of body fat are:

$$\text{Brozek : GC} = (4,57/\rho - 4,142) \times 100$$

$$\text{Siri : GC} = (4,95/\rho - 4,50) \times 100$$

where GC is fat and  $\rho$  is body density, in kg/l [4, 5, 6]

For calculating body mass index uses the formula: BMI = weight (kg)/height (m) <sup>2</sup>.

Body density is calculated using equation linear regression of Durnin and Womersley:  $\text{body Density} = C - [M (\log_{10}\Sigma)]$

where  $\Sigma$  is the sum of skin folds, and C and M are standard coefficients, with certain specific values depending on age and sex. [2,7]

## Results and discussion

Mean values and standard average distortion in terms of weight, height, thickness of skin folds and waist and hip circumference at lot studied, are specified in the tables, and the evolution of these parameters anthropogenic environmental factors is evidenced through graphical representations.

### Height and weight

In terms of height study subjects (table No 1) in this paper, an ascending evolution from female sex, in accordance with the theory of the secular acceleration; differences between age groups are relatively small, about 1 cm, but there are nearly 5 cm between the group 20-29 years old and women over 60 years of age.

The men notice a peak of height at age group 30-39 years, differences between age groups being about 2 cm; keep though the same ascending evolution as the female sex. Between the first two age groups in males, notice the biggest difference, I mean over 6 cm. age group 20-29 years has roughly the same size as the subjects of 40-49 years. After age of 50 the height average decreases. (chart no 1)

So we can note the evolution of the ascending of the height in both sexes, with positive annual rates of growth both in men and in women, but only at young ages. Subjects of the last two age groups were born about the middle of the 20th century, the difficult period after the second world war, when it is known that food sources were poor; childhood and adolescence their ran in similar conditions, because the standard of living has improved somewhat in the eighth decade.

Compared with the data of the National Institute of Anthropology, regarding average country height, the group studied notice a slight increase of the height in women 30-49 years, with approximately 1 cm of the average values per country; a significant increase, by 2 cm exists but in young women, with age between 20-29 years; at the age of three, the values are similar to the women in the study, with average values on the country. (chart no. 2)

The male subjects notice below the average values at the group studied, at all age groups, except men with age between 30 and 39 years,

where the mean height is approximately 2 cm above the average height of the male population at the national level. (chart 3) The National Institute of Anthropology data are obtained through somatic measurements at the level of all regions of the country, and the mean height in men study in this paper is below the average for the country as a result of the characteristics of population submediteranian in the area of Oltenia.

Having in mind all these aspects and the average values of height to both sexes, you can appreciate the secular acceleration phenomenon was more intense in women.

Weight in men study shows an irregular evolution, with approximately equal values to the age groups 40-49 years and 50 to 59 years; There was an increase in the weight values in men 30-39 years, this increase being correlate with elevated levels of height of these subjects; an important difference is found between the age group of 20-29 years, where the average values are  $68,30 \pm 1,08$ , and the next age group, 30-39 years, the average weight is  $82,00 \pm 0,75$ .

Comparing the average values of the country, the weight is the net over these values to the group of study, both in men and in women; You may notice an increase in constant weight at all male subjects, except for young people 20-29 years, where the average weight of data fit into the national Institute of anthropology, at the same age ranges; significant difference is the age group 30-39 years, approximately 9 kg. The same increase in weight it is noticed at all groups of women, compared to the average values on the country, growth of around 8-9 kg.

Significant accumulation of over 13 kg between group 20-29 years and 30-39 years in men, is a phenomenon visible all around us, these men do not practice hardly any physical activity or sport, have sedentary occupations are fueling chaotic usually high calorie products.

The mean weight of men between 40-60 years is almost unchanged. After retirement age, sedentary act and adds weight.

Large differences in terms of the lot weight at studied population and media can be put and on account of differences in height, that is an evolution of the ascending height there is an increase in weight, but this is noticed only in men 30-39 years and women with age between 20 and 59 years.

Waist circumference and hips circumference (table no. 2)

Regarding WHO rules [6, 7] in terms of waist circumference and the fact that this is a predictive factor in abdominal obesity-related conditions

(high blood pressure, coronary heart disease, type II diabetes, vascular cerebral accidents), the subjects of study in this paper presents the following classification of disease risk:

-low risk (waist circumference  $\leq 93$  cm) to men with age between 20 and 39 years, which represent subjects 38,73% of total male of the batch; the same aspect is obvious and to men in the age group 50-59 years and over 60 years, i.e. at 40,14% of men;

-increased risk (waist circumference 81-87cm to women and 94-101 cm in males) in women with ages between 20 and 40 years old and the men in the age group 40-49 years; Notice that 35,29% of women studied and 21,12% of men shows an increased risk of disease;

-increased substantially (waist circumference  $\geq 88$  cm in women) at women in the age group 40-49 years 50-59 years and over 60 years, i.e. at 67,70% of women.

The young men with the age between 20 and 29 years notice the value of the circumference of the waist below the average country in men of the same age group, the difference being about 3 cm; otherwise, all variables measured anthropometric at this age group is below the average for the country. Values higher than the national average are found in men 30-49 years and lower values in male subjects age groups 50-59 years and over 60 years. It is important to consider increasing the circumference in men of 30-49 years, knowing scientifically proven link between waist circumference value and risk of cardiovascular disease and type II diabetes, especially as discussed subjects are young and mature with an active lifestyle [8, 9, 10]

A significant increase in waist circumference in female team studied than the national average, it is found in all age groups, the differences are considerable, the 5-9cm and the risk of disease correlated with the value of the anthropometric variables increased substantially.

Applying body density values in formulas of Siri and Brozek, we obtained the following percentages of body fat, according to sex and age (table No 3) Results of Siri and Brozek equations reveal unequivocally a constant accumulation of fat, in both sexes, with the exception of women over 60 years of age, where there is a decrease in the percentage of fat about 2% the age group 50-59 years. The increasing importance of the percentage fat it is noticed in men 40-49 years, 7% more than the age group 30-39 years. Women have accumulations of about 4% per decade of age, up to 60 years. The highest values of body fat percentage, can be found in women with age

between 50 and 59 years. (chart no 5). Also, in the same age group there are no significant differences between men and women, with higher values of percentage of body fat to the females, about 5-7%.

Of note is the similarity of the two equations, which are based on the density of the body, the results being comparable, there are differences of up to 2% between results, Siri's equation discussion values consistently higher than Brozek's equation.

Body mass index is an important index in evaluating the state of health of the population, and the values for the studied are highlighted in the following table (table no. 4) in accordance with the recommendations of the WHO [3, 7, 11] regarding the classification of the population according to the body mass index values, the lot is studied in this paper presents the following features:

-there are no respondents underweight, with BMI  $< 18.5$ ;

-acceptable weight is found only at the age of 20-29 years, in both sexes, where BMI values fit into the range 18.5-24, 9 kg/m<sup>2</sup>, the subjects being considered healthy, normal;

-to all other age groups, in both sexes, with the exception of men over 60 years old, BMI has values that indicate pre - obese, (according to the WHO, BMI 25-29, 9 kg/m<sup>2</sup>), the population being described as overweight;

-men over 60 years of age have a body mass index over 30,0 kg/m<sup>2</sup>, but till 34, 9 kg/m<sup>2</sup>, corresponding to the class I obesity, according to the who, these subjects being considered obese;

-studied group shows no subjects with BMI values of 35,0 — 39, 9 kg/m<sup>2</sup> or over 40, 0 kg/m<sup>2</sup>, obesity class II (obesity) or class III (morbidly obese).

Still analyzing body mass index values, see values very close, about equal in both sexes, the same age group; exceptions are men over 60 years of age, where BMI value is about 4kg/m<sup>2</sup> higher than body mass index of women from the same age group; also relevant is the fact that there is an increase of the index values directly proportional with advancing age, to all male subjects. The same upward evolution of body mass index directly proportional with the age is evident in women, up to 60 years; over 60 women shows a reduction in BMI value of about 2 kg/m<sup>2</sup> of girl group age 59-60 years.

## Conclusions

The subjects Height has slightly reduced values study compared to the average for the country.

In terms of weight, both women and men shows values above the national average, the evolution of this parameter is rising along with anthropometric age. Hence the considerable accumulation of fat in both sexes.

Calculating body mass index proves a simple method and correct assessment of the degree of obesity, according to the who recommendations; the group studied fit into group healthy subjects, pre-obese and obesity class I waist circumference report/waist girth balances is also easy to calculate and is significantly related to the risk of disease.

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