ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Biological and Medical Sciences

Student: Barbora Talová

Supervisor of master thesis: PharmDr. Miroslav Kovařík, Ph.D.

Title of master thesis: Body composition determination by means of bioimpedance analysis in healthy volunteers

The aim of this thesis in theoretical part was to elaborate the existing knowledge about the composition of a human body and methods used for evaluation of body fat. The second aim was to compare the conformity and differences among several methods used to determine total and visceral fat.

A total of 43 women participated in the study. They were divided into two groups according to their BMI. The first group consisted of 35 women with normal BMI (21.2 ± 2.2). The second group consisted of 8 obese women with a BMI of 43.4 ± 8.7. Three methods were used to determine body fat in the body-bioimpedance method with bipedal electrode arrangement (Tanita instrument), bioimpedance method with Abdominal fat analyzer and skinfold thickness measurement. The body fat percentage was determined by using the Deurenberg, Brozek, Siri, Bunc and Parizkova calculations.

Significant statistical differences between the measured groups were found in age, weight and BMI. A greater amount of fat mass and a lower proportion of fat-free mass and hence total body water were registered in the obese group of women. The obese group of women was also characterized by a larger waist circumference and the amount of visceral fat. While determining the percentage of visceral fat, there was a significant conformity between the two bioimpedance methods within the obese group, while the results of the control group were different.

While determining the total body fat, the highest agreement in the control group of women was between the Deurenberg calculation and the bioimpedance method with bipedal electrode arrangement. In the obese group of women, the highest agreement was recorded between bioimpedance methods. Less agreement of results was observed in both groups in the Brozek, Siri and Bunc calculations compared to the bipedal method. Calculation according to Parizkova significantly underestimated body fat in both groups.

Key words: body composition, bioelectrical impedance analysis, skinfold thickness measurement, prediction equation, obesity