

ABSTRACT

Introduction: The basis of obesity treatment is a conservative regimen based on a reduced diet and physical activity, individually set for each person. As the obese often show extreme deviations in body composition compared to individuals of normal weight, it is often difficult to determine their energy needs or determine their energy expenditure. The gold standard for determining resting energy expenditure (REE) is examination using indirect calorimetry (IC). This method can also detect deviations from the calculations of predictive equations, determine the degree of adaptation of the individual to low energy intake, and thus set the appropriate therapy.

Objectives: The main objective of the work is the analysis and description of data on body composition and resting energy expenditure values of selected groups of obese individuals whose REE measurement results using indirect calorimetry reached a level below 95 % of the predicted REE calculated using the Harris Benedict (H-B) equation. The sub-goals are to describe the dependence of the size of some components of body composition on the size of the REE and to find out if the deviations between the number of the total measured REE and the REE calculated using H-B in the adapted group are significant.

Methodology: For the research 71 patients of General Faculty Hospital in Prague were selected with a body mass index ≥ 30 kg/m². The research group consisted of 39 women and 32 men with an average BMI of $45.2 \pm 11,7$ kg/m² and an average age of $53.3 \pm 13,9$ years. Patients underwent measurement of resting metabolism using the method of indirect calorimetry using the Cortex MetaLyzer 3B device and body composition measurement on the bioimpedance tetrapolar device InBody 230, at the same time, the value of resting metabolism was calculated for each individual using the H-B equation. The whole group was divided into five groups according to the deviation of the measurement using IC and from the calculation of the H-B equation. The values were subsequently compared and statistically evaluated.

Results: In the total set of examined individuals, there were 32.4 % of individuals with a reduced RMR value compared to the RMR calculation according to Harris Benedict, which corresponds to 23 individuals. In the adapted group, the average measured RMR was 2242.0 ± 616.7 kcal compared to the H-B calculation of 2637.9 ± 712.9 kcal. Statistically, this result was not significant, but high case-to-case variation was found. The highest deviation from the H-B predictive calculation was -42 and +43 % in the whole research group. The amount of muscle tissue of the adapted group averaged 44.3 ± 11.9 kg and the amount of FFM 77.9 ± 20.1 kg. When statistically testing the dependence of REE on FFM and muscle tissue in the adapted group, a high degree of correlation was found.

Conclusion: The studied population showed a large number of obese persons with a reduced measured value of resting metabolism compared to the calculation of the H-B predictive equation. At the same time, a linear dependence was found between the amount of muscle mass and FFM and REE values. For these adapted individuals, the ideal intervention for weight

reduction and simultaneous improvement of health status is no longer primarily an appropriately adjusted weight loss diet, but rather the inclusion of regular physical activity and thus an increase in FFM values and muscle mass.

Keywords: obesity, energy expenditure, weight loss, indirect calorimetry