

Original Article

The Effects of Weight Loss in Body Composition of Obese and Overweight Patients

Alexandra Alexescu^{1,2}, Emilia Rusu^{2,3}, Andreea Dragomir⁴, Nicoleta Pietrisi⁴, Gabriela Radulian^{2,5}

¹ Private Medical Practice – Alexandra Alexescu, Bucharest, Romania

² Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

³ Nicolae Malaxa Clinical Hospital, Bucharest, Romania

⁴ „Nutrislim“ Clinic, Bucharest, Romania

⁵ N. C. Paulescu National Institute for Diabetes, Nutrition and Metabolic Diseases, Bucharest, Romania

* Corresponding Author: Alexandra Alexescu, E-mail: alexandra.ilinca1@gmail.com; Phone: +40732756459. Bld. Regiei, No 8, Room 4, Bucharest, Romania, 060204

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Abstract

Introduction: The optimal management of overweight and obese patients should combine medical nutritional therapy with caloric restriction, physical activity, and cognitive-behavioral therapy. **Material and Methods:** We conducted an observational study, which included patients who underwent nutritional intervention to lose weight, in the Nutrislim nutrition and diabetes clinic, in Bucharest, between 2016 and 2018. The patients were adults, mostly women, overweight or obese and sedentary. After analyzing the eating patterns, nutritional therapy was adjusted for every patient in accordance with his/her needs. **Results:** Most of the patients were overweight (n=10). The eating patterns showed a protein consumption of 14.95% in women and 14.17% in men. Carbohydrates accounted for 43.72% of female's nutrition and 40.23% of male's nutrition. An important intake was from lipids (38.95% for women and 43.49% for men), of which polyunsaturated fat reached the lowest proportion (7.71% in women, 3.37% in men). **Conclusions:** Implementation of a healthy diet, which can remain a lifestyle intervention after the nutritional program ends, is the most beneficial for the patient. The weight loss is sustained by conserving the muscular mass.

Keywords: Metabolism, Overweight, Obese, Diet, Bioimpedance

Introduction

The morbidity and mortality associated with obesity represent a fact well known for more than 2500 years, since the time of Hippocrates [1].

The optimal management of overweight and obese patients should combine medical nutritional therapy with caloric restriction up to 800 kcal, physical activity, and cognitive-behavioral therapy. In addition, some patients may also require pharmacological therapy or bariatric surgery [2].

Material and Methods

We conducted an observational study, which included patients who underwent nutritional inter-

vention to lose weight in the Nutrislim nutrition and diabetes clinic in Bucharest, between 2016 and 2018.

The criteria for inclusion in the study were the following:

- Age over 18 years
- Balanced chronic conditions under treatment
- Overweight or obesity
- Patients who can perform physical activity, at least walking within the minimum limit of 5000 steps.

Initially, the patients completed an evaluation questionnaire that includes personal medical history, family background, lifestyle, current eating habits, self-assessment of motivation, degree of preparation and opportunity of starting a weight loss program, approved by the local Ethics Committee.

During the first visit, we evaluated the patient's weight history, nutritional history, all the con-



tent of the previous questionnaire completed by the patient, as well as the food preferences and the daily program of activities (waking time, time spent at work, hobbies).

The biological parameters used were: complete blood count, lipid profile, total cholesterol, LDL, HDL, triglycerides), renal function tests (uric acid, urea, creatinine), liver function tests (ALT, AST), glycaemia, glycated hemoglobin, total calcium, magnesemia, serum iron, TSH.

The food survey was based on the completion of a food log for seven consecutive days. Patients completed in full detail each ingested food, at all times of the day, at meals and snacks, if they existed.

Following this step, the data collected from the survey were processed using a software that contains a database of the United States Department of Agriculture (USDA).

In this way, the average, maximum and minimum of calories consumed by the patient during the seven days could be calculated and, moreover, it was possible to find the average consumption of carbohydrates, proteins and lipids (saturated, monounsaturated and polyunsaturated), as well as and the percentage of the recommended daily dose of vitamins (A, D, E, K, B1, B2, B3, B5, B6, B9, B12, C) and minerals (calcium, magnesium, phosphorus, zinc, selenium, iron, copper, manganese, sodium, potassium).

In order to prepare the nutritional intervention program, the resting metabolic rate was determined by the indirect calorimetry method. The device used was FitMatePRO.

The protocol of indirect calorimetry consisted of:

- fasting for at least 8 hours prior to the investigation
- no physical activity prior to the investigation
- complete rest, for 15 minutes, in a horizontal position.

Weight assessment was performed with the help of a body analyzer that uses the bioimpedance method as a working method, with the help of the TANITA MC-780U analyzer.

After performing these assessments, along with the biological parameters, each patient was assigned a diet that took into account the metabolic rate, the level of physical activity achieved, the possible biological deficiencies, if any, and the dietary preferences observed by the physician following the dietary investigation.

Calorie restriction was between 500 and 1000 kcal from the measured resting metabolic rate; the pa-

tients' diets were between 1200 and 1800 kcal/day.

The nutritional intervention was adapted to the preferences of the patients, both in terms of culinary preferences and the number of meals (minimum three meals/day) and followed the structure of 50% carbohydrates, 20% proteins, and 30% lipids.

Patients were explained the importance of doing physical activity, so during each visit, they were committed to having a minimum target of exercise, such as 10,000 steps/day or 30 minutes of moderate-intense physical activity 5 times/week, such as bicycle, jogging, speed walking or fitness, and aerobics programs).

Results

Fifteen adult patients were evaluated until the present time, of which 93.3% are women (n = 14) and 6.7% men (n = 1).

After analyzing patients' personal medical history, we found high blood pressure in 6.7% of patients (n = 1) and dyslipidemia, with a higher proportion, in 20% of the cases included in the study (n = 3).

The distribution of patients by body mass index (BMI) group was the following:

- Normal weight (BMI between 18.5 and 24.5 kg/sqm), 1 patient,
- Overweight (BMI between 25 and 30 kg/sqm), 10 patients,
- Obese (BMI over 30 kg/sqm), 4 patients.

Regarding the patients' weight, we noted that 86.7% had previously followed diets, and the majority (53%) chose a high-protein diet.

The distribution of physical activity performed at the beginning of the weight loss program is the following:

- Sedentary: 20%
- Active environment: 26.7%
- Active: 40%
- Very active: 13.3%

The average basal rate calculated using the Harris-Benedict equation for women was 1579 kcal/day and 1857 kcal/day for men, and the one measured for women was 1402.36 kcal/day and 1800 kcal/day for men.

Following the analysis of the 7-day diet purchase prior to the start of the weight loss program, the patient's nutrition brought to light a protein consumption of 14.95% in women and 14.17% in men. Carbohy-

drates accounted for 43.72% of female's nutrition and 40.23% of male's nutrition.

An important intake was from lipids (38.95% for women and 43.49% for men), of which polyunsaturated fats reached the lowest proportion (7.71% women, 3.37% men), followed by saturated fats (12.87% women and 16.25% men). The highest weight in lipid distribution was represented by monounsaturated ones (15.21% women and 15.46% men). Differences in food choices regarding the gender of patients did not reach statistical significance.

Regarding the body analysis at the beginning of the weight loss program, by BMI groups, the weights showed as follows:

- Normal weight - They presented an average weight of 71.5 kg. Of the total amount of water, 58.5% was intracellular and 41.5% extracellular.
- Overweight - They presented an average weight of 75.85 kg. Of the total amount of water, 56.3% was intracellular and 43.7% extracellular.
- Obese - They presented an average weight of 101.27 kg. Of the total amount of water, 53.8% was intracellular and 44.2% extracellular.

The ratio between the decrease of the fat and the storage of the muscle mass has reached statistical significance, as explained in Table 1.

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Table 1: Body composition changes and average weight loss.

	First visit	Last visit	p
Total weight (kg)	82.273	76.913	<0.001
Fat Mass (kg)	29.04	25.43	<0.001
Fat percent (%)	34.54	32.94	<0.001
Muscle mass (kg)	50.54	48.9	<0.001
Muscle percent (%)	62.72	36.393	<0.001
Total water (kg)	37.973	36.72	<0.001
BMI (kg/mp)	28.7876	26.897	<0.001

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According to the BMI, the body analysis at the beginning of the weight loss program showed three groups:

- Normal weight - They presented an average weight of 71.5 kg. Of the total amount of water, 58.5% was intracellular and 41.5% extracellular.
- Overweight - They presented an average weight of 75.85 kg. Of the total amount of water, 56.3% was intracellular and 43.7% extracellular.
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Discussion

Given the dietary habits of the patients, the results of the food survey, which underlined a significant contribution in terms of lipids, with the preponderance of the saturated ones and the caloric intake much higher than recommended, we chose not to apply in this initial phase a strict amount of calories per day, but to implement a healthy lifestyle. The choice of a nutrition plan in the form of “principles for healthy eating” was based on two considerations: on the one hand, the patient who approaches this lifestyle may be able to maintain the lost weight more easily, and on the other hand, after receiving a diet plan with written recommendations and quantities to measure, adherence will be better because it can easily be adapted to the patient’s daily schedule.

A similar approach that involved the nutritional education of patients for the management of obesity was proposed in 2001 by Rippe and Melanson.

The points addressed were about the different caloric values of foods, description of macronutrients, explanation of product labels, healthy ways of food preparation, adoption of new healthy habits, adequate

water intake, reduction or limitation of alcohol portions, strategies for approaching festive meals/restaurants and awareness of emotional versus physiological hunger [4].

Another study that investigated 63 patients and aimed to analyze from a statistical point of view the differences between a conventional diet (1500-1800 kcal/day for men and 1200-1500 kcal/day for women) with a distribution of dietary principles of 60% carbohydrates, 25% lipids and 15% proteins, with a high-protein diet (maximum 20 g carbohydrates/day), concluded that the effects on weight loss in terms of total weight initially reached statistical significance between the two groups. However, subsequently, at the 6-month follow-up, this difference did not maintain its statistical significance. [5]

The fact that the rate of weight loss was significantly different between the two groups, but the subsequent maintenance or continuation of the weight loss no longer depended on the eating style, conveys that the diet’s aggressiveness is not directly proportional to its relevance for the weight loss.

The inability to have absolute control over a patient’s diet, as long as he or she complies with the doctor’s recommendations, is a limitation of any study that aims to analyze the nutrition of a patient or group of patients.

The only tool we can use in this direction is the food survey, which has limitations regarding the patients’ subjectivity and sincerity.

Conclusions

Although the group of patients was not very large at the moment of this study, the statistical significance regarding the weight loss in body composition has been reached.

The food survey emphasized the patients’ choice of foods high in saturated fats and carbohydrates, so that the simple implementation of a healthy diet, without severe restrictions with a balanced intake of macronutrients resulted in a statistically significant weight loss, with the maintenance of muscle and water mass.

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