

IMPROVING THE EFFECTIVENESS OF OBESITY TREATMENT BY COMBINING A DIET AND MOTIVATIONAL TECHNIQUES

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ABSTRACT

Background. Obesity is considered a disease. The treatment of obesity should include the modification of health behaviors in order to achieve long-term weight loss.

Objectives. The comparison between traditional weight loss treatment with and without a motivational therapy.

Materials and Methods. The study included 104 overweight women or women with obesity with a median age of 34. They were under the supervision of a dietician. The patients were divided into two groups: the standard group which was on an individualized and low-calorie diet developed by a dietitian and received substantial support, and the study group which additionally used motivational techniques.

Results. Mean weight loss, mean reduction in waist measurement and body fat after a 5-month treatment were calculated. The mean body weight loss in control group was 10.56 kg (± 8.65), the waist measurement was 11.84 cm (± 10.62), and fat loss was 5.11 (± 3.17) kg on average - it corresponds to 8.02% (± 6.55). The study in which additional motivational techniques were used, the mean weight loss was 17.31 kg (± 9.29), the waist measurement was 15.25 cm (± 8.28), and fat loss was 8.34 kg - it corresponds to 12.19% (± 7.32) of adipose tissue. All the differences between treatment results in both groups were statistically significant ($p < 0.05$).

Conclusions. The dietary treatment process employing motivational techniques has greater therapeutic efficacy than a traditional approach.

Keywords: *motivation, obesity, nutrition, overweight, weight reduction*

STRESZCZENIE

Wprowadzenie. Otyłość uważana jest za chorobę. Leczenie otyłości powinno obejmować modyfikację zachowań zdrowotnych w celu osiągnięcia długoterminowej utraty masy ciała.

Cele. Porównanie efektywności tradycyjnego postępowania dietetycznego z postępowaniem wykorzystującym w terapii techniki motywacyjne.

Materiał i metody. Badaniem objęto 104 osoby z nadwagą lub otyłością, z medianą wieku 34 lat. Wszystkie pacjentki uczestniczyły w procesie dietoterapii pod kontrolą dietetyka. Pacjentki podzielono na dwie grupy: standardowa grupa stosowała zindywidualizowaną i niskokaloryczną dietę opracowaną wraz z wsparciem merytorycznym. Grupa badana dodatkowo stosowała techniki motywacyjne i była poddana modyfikacji zachowań zdrowotnych podczas stosowania dietoterapii.

Wyniki. Obliczono średnią utratę masy ciała, średnie zmniejszenie pomiaru talii i tkanki tłuszczowej po 5-miesięcznym leczeniu. Średnia utrata masy ciała w grupie kontrolnej wynosiła 10,56 kg ($\pm 8,65$), pomiar talii 11,84 cm ($\pm 10,62$), a utrata tkanki tłuszczowej średnio 5,11 ($\pm 3,17$) kg - odpowiada 8,02% ($\pm 6,55$). W badaniu, w którym zastosowano dodatkowe techniki motywacyjne, średnia utrata masy ciała wynosiła 17,3 kg ($\pm 9,29$), pomiar talii 15,25 cm ($\pm 8,28$), a utrata tłuszczu 8,34 kg - odpowiada 12,19% ($\pm 7,32$) tkanki tłuszczowej. Wszystkie różnice między wynikami leczenia w obu grupach były statystycznie istotne ($p < 0,05$).

Wnioski. Proces leczenia dietetycznego wykorzystujący techniki motywacyjne ma większą skuteczność terapeutyczną niż tradycyjne podejście.

Słowa kluczowe: *motywacja, otyłość, żywienie, nadwaga, redukcja masy ciała*

INTRODUCTION

Obesity is a pathological state endangering human life [25]. People with obesity are predisposed to develop type 2 diabetes, hypertension and cardiovascular diseases, liver and biliary tract diseases, and the dysfunction of the skeletal system [20]. Obesity contributes to a high psychological burden and significantly increases the expenses of national health care [14]. The genesis of obesity is multifactorial. Health and nutrition behaviors constitute the main role in the prevalence of obesity. Irregular eating habits, eating ready-made meals, the increased consumption of highly processed food, including Fast Food and lack of physical activity are the most common reasons for weight gain in patients. In the dietetic practice, BIA (bioelectrical impedance analysis) method is used for the diagnosis of obesity. The analysis also automatically reports the patient's current body weight, BMI (body mass index), obesity grade and weight. Additionally, anthropometric measurements are used, primarily the waist measurement [7, 15]. The aim of treating obesity is to normalize body weight and the improvement of patients' well-being. It includes the modification of nutritional behaviors and introducing a proper, low-calorie diet under the supervision of a dietitian [3].

During the weight reduction process, the patient's individual approach and psychological support are very important. Motivational techniques are based on behavioral modification (cognitive behavioral therapy). Abnormal eating habits have been continued by obese patients over the years, so it requires a great deal of time and commitment to change them [10]. Motivational techniques and behavior modification also allow the patient to understand the causes of obesity and all its consequences. These include working on negative beliefs about weight reduction and self-observation. They also teach them how to control the quantity and quality of food they eat [8]. The strongest incentive to change is the internal motivation which comes directly from the person involved in the process. In this case, a patient is on a diet to improve his appearance, health or well-being. Giving nutritional lectures and creating support groups for people with obesity is an eminently effective method [17].

The aim of the study was to compare the effectiveness of traditional dietary treatment with or without the motivational techniques in the group of overweight women or women with obesity and the comparison of psychological aspects of the treatment using the author's questionnaire.

MATERIALS AND METHODS

Study subjects

One hundred and four overweight women or women with obesity were included in the study. The patients were under the supervision of a dietitian from January 2015 to June 2016 in the Diet Clinic in Jaworzno, Poland. The participants were on a low-calorie diet that was developed individually for each patient. The age-group selection was determined by several factors: the emotional maturity of the women, the low likelihood of disease occurrence, the premenopausal age, the same nutritional standards and the reference values recommended by the manufacturer of the body composition analyzer. A questionnaire in the course of treatment was conducted among the subjects. The survey has been validated. The study was anonymous and the patients responded on their individual forms. Overweight women or women with obesity, identified on the basis of calculated BMI > 25, were included in the study. The criteria of inclusion and exclusion was shown in Table 1.

The effectiveness of both slimming methods was examined by appropriate measurements.

Nutritional plan

All patients used a diet developed for them individually by a dietitian in accordance with the methodology of planning a low-energy diet. The slimming treatment was carried out based on the standards developed by the Polish Society of Dietetics (PTD). The low-calorie diet used by the participants of the study aimed at weight reduction, the improvement of well-being in patients and minimizing their hunger. The energy value of the diet was reduced from 500 to 1000 kcal compared with the total energy requirements of the patient. The nutritional plan was balanced in terms of nutrient content. The energy level of the menu was developed individually. It considered a patient's primary metabolic value (PPM), calculated by means of the *Mifflin-St. Jeora's* equation, according to the standards of the low-calorie diet. In the diet we limit the supply of fats, whose energy content should not exceed 25% of the diet. The recommended amount of fat intake is in the range of up to 40 g of fat per day, of which 25-30 g should be invisible fat being a natural component of food products. Protein supply is in the physiological standard (1g per 1 kg of body weight). Carbohydrates in the diet complement the total energy demand and should include mainly products with a low glycemic index (IG) containing a low percentage of simple sugars and a high content of dietary fiber. The menu in a low-energy diet should be balanced for five meals a day. It is necessary to appoint with the patient hours of meals consumed, depending on the lifestyle.

Measurements

To accomplish the purpose of the study, the women were divided into two subgroups (Table 3).

The patients were assigned to groups according to their preferences. The control group were 52 women who followed the previously discussed low-energy diet. The visits with the dietician were held once a month. During those visits, weight loss was measured using a Tanita's body composition analyzer. The waist was measured using a SECA meter ruler. The task of the dietitian in this group was primarily substantial support. At each visit, the researcher touched on the aspects of the use of low-energy diet and checked the diet schedule. The study group of 52 women was on the same diet. The dietary inspection visits took place weekly. The motivational techniques and psychological support were used to improve the effectiveness of the slimming treatment. The effectiveness of the methods was measured in the same way as in the first group. The qualification for a particular group was based on the conscious decision of the patient about the treatment.

Motivational techniques

Motivation training in the study group was developed for the study and composed so that each follow-up visit contained its elements. Expectations, among other things, were analyzed: the first visit examined the patient's individual needs, the dietician's expectations and treatment ideas. An analysis of past weight loss tests was also performed, each patient could present, from their point of view, the reasons why previous weight loss was not successful. Then the past weight loss tests were compared with the current ones to avoid repeating the same mistakes. The contracts were concluded with each participant and the terms of cooperation were discussed. The contract included the responsibilities of both the patient and the dietician.

The dietician presented the patients an individual weight reduction goal and the amount of time necessary to achieve it. The attention was also paid to the other benefits of the weight reduction process. Only positive goals were set. At every visit, the dietician did not use ready-made solutions and tried to be patient by showing the right way to accomplish the goal. The members kept diet diaries during the weight reduction process. At one of the first follow-up visits, the patients were asked to list their strengths and weaknesses in the table, which could affect the weight loss process. At follow-up visits, the dietician tried to visualize the patients' final weight loss goals. At subsequent visits, the dietician tried to keep the patients' motivation high. The important element of obesity treatment is identifying bad habits and proposing a change in thinking to a patient. Each

patient was supposed to prepare a vision of the "new self" on the piece of paper with the help of photo collages from women's magazines. Once a month, the patients participated in support group meetings. During the joint talks they shared ideas and experiences related to slimming. Once every two months, a series of lectures were organized to allow patients to learn the importance of sensible nutrition. In order to maintain constant contact with the patients, the Internet was used to solve arising problems. In order to monitor daily physical activity, the patients in the study group used devices measuring the steps taken. All the above methods aimed at increasing the efficiency of the treatment [4, 5, 11, 12, 24].

Effectiveness of dietary treatment

To evaluate the effectiveness of dietary treatments in both groups, the following parameters were calculated for the first twenty weeks of weight loss (5 months):

- average weight loss in kilograms;
- average waist circumference reduction in centimeters, measured midway between the highest point of the hip plate and the lowest rib curve;
- fat loss measured by bioimpedance expressed in percentages and kilograms;
- authorized survey in the course of treatment.

Each patient was weighed on the SECA 711 medical scale. This is a 100 g medical column. This scale also includes the SECA 220 height gauge. The Tanita BC 420 was used to analyze the composition of the body every week. Anthropometric measurements in each participant were measured every three weeks.

Ethical standards

All participants gave oral informed consent and written informed consent on the questionnaire. The project was approved by the behavioral and ethical review committee of the Medical University of Silesia (KNW/0022/KB/89/I/16).

Statistical analysis

The quality of the slimming methods was also compared with the questionnaire. STATISTICA 12 and Microsoft Excel 2013 were used to perform statistical analyzes. In the analysis of quantitative variables, the *Shapiro-Wilk* test was used. In a statistical test for two independent variables, *U-Man Whitney* was used. The statistical analysis of dependence of non-measurable features was performed on the basis of descriptive statistics and chi-square test, V-Cramer correlation coefficient and Fi factor (ϕ). All statistical analyzes were carried out at significance level $\alpha = 0.05$.

RESULTS

The median age of the whole group was 34 (30-39). Twelve of the whole group of patients (11.5%) had vocational education, 36 (34.5%) secondary and 56 (54%) higher education. Seventy five percent of the study population was professionally active. Thirty-six (34.5%) women were childless, with the largest proportion 38% of women having one child. The average weight at the beginning of the reduction in the study population was 80.50 kg (± 15.70). The average weight of the study group was 80.00 kg (± 14.61) kg, with the lowest body weight being 64 kg and the highest 130 kg. The average BMI for the entire population was 31.5 (± 5.08). Forty-three (41%) women included in the study were overweight, 38 (36.5 %) of the whole population had obesity of 1 degree, 13 (12.5 %) suffered from obesity of 2 degree, 10 (10 %) had obesity of 3 degree, and there was no case of obesity of 4 degree. The distribution of BMI in both group shown in Table 2. There were no significant differences in the analysis in the examined parameters before treatment in the studied groups ($p > 0.01$).

Table 1. Study qualification criteria

Inclusion criteria	Exclusion criteria
Age 30-39	No patient's consent
Overweight or obesity (BMI > 25)	Psychiatric care or eating disorders
Consent to attending follow-up visits in Diet Clinic	Pregnancy or breastfeeding
Use of a diet that is designed individually for each person	Diseases in which a low-calorie diet is contraindicated

BMI – body mass index

The average waist measurement in the study population was 99.00 cm before the treatment. In the control group and in the study group it was 100.00 and 97.50 cm respectively. In the total studied population, the mean weight loss was 13.90 kg (± 9.55), the waist measurement decreased by 13.54 cm (± 9.63). Fat loss on average is 10.10 kg (± 7.22), which corresponds to 6.37% (± 4.28) of adipose tissue. The comparison of weight loss effectiveness in both groups has shown that the mean weight loss in the study group expressed in kg is statistically significantly higher by 6,75 kg ($p < 0.001$) in the study group using additionally motivational techniques than in the control group. The mean reduction in waist measurement is also higher by 3.41 cm in the study group and the difference is statistically significant ($p = 0.002$). Fat reduction in % and kg in the same way as the previous assessed values is statistically significant ($p < 0.001$) higher in the study group by 3.23 and 4.17, respectively. In the study group using motivational techniques in weight reduction, the women exhibited internal motivation, which prompted them to lose weight. In this group, the women declared that they had tried treatment to take care of their appearance (38%) and because of the desire to improve their well-being (30%). In contrast, the women in the control group were characterized by weaker motivation, which came from their environment. In this group, the patients most frequently attempted to reduce weight due to the perceived social stigma associated with their appearance (19%).

To assess the effectiveness of nutrition education during the treatment, the patients were asked whether they had changed their eating habits through weight loss. In the study group, 86.5% ($n=45$) women answered that they had changed their eating habits. It was statistically lower in the control group, because only 36.5% ($n=19$) ($p < 0.0001$), it was high correlation.

The patients who completed a weight loss diet statistically more frequently ($p < 0.0001$) reduced their body weight to a normal BMI (< 25 kg/m²) in the

Table 2. BMI value before beginning dietary treatment in both groups

Body Mass Index	Control group (n = 52)		Study group (n = 52)	
	No of women n (%)	Average BMI [kg / m ²] (OS)	No of women n (%)	Average BMI [kg / m ²] (OS)
Overweight	20 (38.5)	27.65 (± 0.88)	23 (44)	27.42 (± 1.08)
Obesity I degree	18 (34.5)	32.44 (± 1.28)	20 (38.5)	32.47 (± 1.13)
Obesity II degree	7 (13.5)	37.36 (± 1.24)	6 (11.5)	37.50 (± 1.32)
Obesity III degree	7 (13.5)	43.21 (± 2.01)	3 (6)	43.36 (± 1.31)
Obesity IV degree	0 (0)	-	0 (0)	-

n – numer

study group using motivational techniques. There is therefore a link between the BMI value obtained after the weight loss treatment and the type of group that the patient belonged to. To determine the strength and direction of this relation, correlation was 0.48, which means that the average force is correlated.

Another important aspect during the treatment is a well-adjusted diet plan. In the current study, the authors also investigated these issues, according to them, during the weight reduction process, there may be a fixation on the diet used, which manifests itself with burdensome thinking about food, energy metabolism and mental discomfort. Such statistically significant findings ($p < 0.0001$) occurred during a weight loss regimen in the control group, in which 29 women (55.8%) declared such feelings, it was a high correlation power. In the motivational group, only 11 women (21.2%) declared their occurrence.

Table 3. The comparison of methods of the therapy in the control group and the study group

Control group	Study group
FIRST VISIT	
preliminary interview, medical and nutritional history body composition analysis, anthropometric measurements	
-	examining patient's needs
-	analysis of the previous slimming attempts
-	contract determining the rules of cooperation between a dietician and a patient
FOLLOW UP VISITS	
monthly	weekly
medical history, discussing possible dietary problems, checking the meal schedule from the previous visit	
body composition analysis by bio-impedance, anthropometric measurements	
Substantial discussion of the next nutrition plan	
-	use of motivational techniques
-	support groups, nutritional talks

In the motivational group, 78.9% ($n=41$) declared that during the course there had been no doubts or desire to discontinue treatment, compared to only 9.6% in the control group. In contrast, only 22 subjects in the control group (42.3%) responded the same. The study showed that the people in the study group were statistically more determined in the weight loss process compared with the control group ($p < 0.0001$).

The coefficient was used to determine the strength and direction of this relation, which showed that the correlation between the variables was strong (0.77).

During the current study on weight loss, the women in both groups were advised to exercise regularly. In the control group, the patients used pedometers to improve their exercise motivation. Comparing the two groups statistically significantly ($p = 0.0003$), 40 women in the study group were motivated (76.9%) and only 19 (36.5%) in the control group. The strength of the coefficient F_i is 0.41, which means average correlation. In the control group, the women were most likely to experience physical activity alone, since statistically more frequently ($p < 0.0001$) they felt shame (43.3%) in front of other people in comparison with the women in the second group. The correlation was 0.32, which means average correlation. In the study group, the women preferred physical activity in the group as it increased their overall motivation.

DISCUSSION

Currently, there are many methods of treating excessive body mass, including unconventional methods. Patients with overweight or obesity often seek easy and quick ways to reduce body fat and become slim. Obesity is a chronic disease and its treatment is long-lasting. It requires a professional approach from the doctor and a dietitian, and great involvement of the patient in the therapeutic process. Studies indicate that obesity is incidental to many destructive attitudes that impair the process of weight loss, including: negative beliefs, impaired self-image, inadequate expectations, low self-esteem of the patient [4]. The lack of significant treatment and prevention progress highlights the need for a more expanded strategy because psychological and emotional distress is a fundamental link between socioeconomic disadvantage and weight gain [12]. According to *Hamilton et al.*, the holistic approach to treatment is the most important aspect of the treatment process [11]. Good dietitians and supportive life partners or family are key to weight loss treatment. In the current study, the patients were asked to evaluate the nutritionist's work. In the study group, all the women declared that the dietician had spent enough time being properly involved in the weight loss process. *Ryden et al.* have shown that in difficult and stressful situations, people with obesity cannot actively solve problems [24]. They use less effective strategies and approach the problems too emotionally, which makes the weight reduction process easier to discourage. People with obesity often have a feeling of the powerlessness caused by the low efficiency, which Bandura introduced as the first [5]. *Bak-Sosnowska* [4] has shown that overweight patients have lower self-esteem compared to those with normal

body weight. In difficult situations, people with obesity overexerted themselves and could not actively solve the problem. In the present study, the patients were asked about the problematic moments and the desire to doubt while being on the low-calorie diet. Studies indicate that multicomponent behavioral weight management programs, incorporating diet, exercise and behavioral counselling, can lead to significant weight loss [9]. According to the study, people with obesity should boost their confidence. Studies show that obese individuals are highly stigmatized and face multiple forms of prejudice and discrimination because of their weight [22]. Studies indicate that the best way to reduce overweight is the implementation of proper, low-calorie diet and the increase of physical activity. Patients with obesity should be on a diet for a long period of time. This is the only way to reduce body fat [4].

Body mass reduction in people with obesity can be performed in a variety of ways. Today's methods of pharmacotherapy, bariatric surgery, physical activity, and a proper diet are available. The *Nurses' Health Study* found that women who had low-energy diets did not gain as much weight as women who did not follow any diets [13]. In *Ostrowska et al.* study obesity treatment with a low-energy diet was conducted. The women with obesity were on a diet, but were not routinely monitored at a dietitian's and no motivational techniques were introduced. As a result, the weight loss in this study was significantly smaller than in our study. The treatment of obesity is time-consuming and requires good planning of the entire course of the diet. Therapy must lead to a permanent modification of the behavior, because only a momentary adherence to dietary recommendations, and then return to the old eating habits, cause a rapid increase in body weight [21]. The TOHP II study also reported patients who had no weight loss in spite of following a low-calorie diet. It is necessary to find an expert dietitian during the treatment process and to implement appropriate treatment, based on the principles of rational nutrition. It is important to reduce your body weight at the right pace. It is possible that follow-up visits and regular measurements in the current study make it more effective than the implementation of individual spontaneous self-monitoring [2].

An important indicator in the diagnosis of obesity in patients is the measurement of waist circumference. In our study, the effectiveness of the weight reduction process in both groups of women was also compared using the measurement [7]. The waist circumference as well as the waist-hip ratio anthropometric index is often used in practice. This is a simple way to determine the amount of fat tissue, central obesity and excessive fat accumulation in the abdominal region [27]. Long-term MORGEN study shows that a waist circumference of >88 cm leads

to increase of cardiovascular risk factors [20]. According to *Romanowska-Tolloczko et al.* study, comprehensive actions during the treatment constitute the main role in an overweight therapy. There are the three most important components in this process: a diet, physical activity and a psychological influence. Dietetics have to support the change of eating habits [23]. *Adachi's* study has shown that psychological support in weight loss treatment maximize the patient's own ability to maintain new healthy eating habits after a slimming cure. Motivational techniques used in the process of weight reduction can be a permanent element of the treatment carried out through individual consultations of the patient with a psycho-dietitian or multi-person consultations, such as support groups, lectures, and independent exercises prepared by a dietitian to perform by the patient at home alone [1]. Creating effective motivation in patients' attitude is a very important factor for their weight loss. The most fundamental element in the process of weight loss during the obesity treatment is a correct behavior therapy [26]. It may increase the patients' capacity for self-control and boost their confidence [16]. Motivational techniques teach patients how to improve their eating habits, be healthier and maintain this healthy lifestyle for the rest of their lives [6, 18].

CONCLUSIONS

The combination of motivational techniques and diet therapy for overweight women or women with obesity who are slimming is more effective in reducing body weight, adipose tissue and waist circumference than diet therapy only.

Acknowledgements

The authors greatly appreciate the study subjects for their participation.

Conflict of interest

Nothing to declare.

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Received: 27.03.2018

Accepted: 21.06.2018