RESEARCH
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The Influence of Weight-Loss Expectations on Weight Loss and of Weight-Loss Satisfaction on Weight Maintenance in Severe Obesity

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ABSTRACT

Background Conflicting evidence exists as to whether cognitive mechanisms contribute to weight loss and maintenance.

Objective To assess the influence of weight-loss expectations on weight loss, and of weight-loss satisfaction on weight maintenance, in individuals with severe obesity.

Design A randomized controlled trial comparing two types of energy-restricted diets (high protein vs high carbohydrate) combined with weight-loss cognitive behavioral therapy, conducted over 51 weeks and divided into two phases: weight-loss phase (3 weeks of inpatient treatment and 24 weeks of outpatient treatment) and weight maintenance phase (24 weeks of outpatient treatment).

Participants/setting Eighty-eight participants with severe obesity (mean age=46.7 years and mean body mass index=45.6), referred to an eating and weight disorders clinical service, were studied.

Main outcome measures Body weight was assessed at baseline, and after 3, 27 (end of weight-loss phase), and 51 weeks (end of weight maintenance phase). Weight loss expectations were assessed at the time of enrollment, and weight-loss satisfaction was assessed after 27 weeks.

Statistical analyses performed The relationship between weight-loss expectations and weight loss was assessed using a linear mixed model. The association between weight-loss satisfaction and final outcomes was tested by linear regression.

Results The two groups had similar weight-loss expectations and satisfaction, and their results were therefore pooled. In general, the total amount of expected weight loss (in kilograms), but not the percentage of expected weight loss, predicted weight loss, and both satisfaction with weight loss and the amount of weight lost (in kilograms) were independent predictors of weight maintenance.

Conclusions Higher expected weight loss improves weight loss, and both the total amount of weight lost and satisfaction with weight loss are associated with weight-loss maintenance at 1-year follow-up.
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THE TREATMENT OF OBESITY IS HINDERED BY A complex interaction between environmental, biological, behavioral, and cognitive factors that are only partly known. Furthermore, the health benefits that result from weight loss are partially dependent on the maintenance of weight loss over time, but most individuals who are initially successful in losing weight are unable to maintain their lower weight.[1,2] This underscores the importance of detecting the predictors of long-term maintenance of intentional weight loss. Indeed, the biological pressure to overeat to restore the original weight[3] does not completely account for weight regain, as demonstrated in large clinical trials.[4,5] It is plausible that cognitive mechanisms interacting with specific changes in diet and physical activity may play a pivotal role, and therefore be instrumental to weight loss and maintenance.[6]

Two cognitive factors potentially associated with weight loss and weight maintenance, namely weight-loss expectations and satisfaction, have previously been studied in detail, but results have not been consistent. Indeed, of several studies investigating the relationship between weight-loss expectations and outcome in the treatment of obesity, some reported that higher weight-loss expectations were associated with greater weight loss,[7-13] whereas others found no

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relationship.[14,15] The controversy associated with this issue was emphasized in a recent review that included the importance of setting realistic goals for weight loss as one of the seven myths about obesity treatment, because empirical data show no consistent negative association between ambitious goals and treatment completion.

Conflicting data have also been reported on the role of weight-loss satisfaction on weight-loss maintenance. There is some evidence of a correlation between the two,[16] with long-term studies showing that greater weight-loss satisfaction is predictive of weight-loss maintenance over time.[12,17,18] However, other authors who compared the effects of two satisfaction-enhancement interventions for weight control on behavior and weight changes were unable to confirm these findings, or to demonstrate that the intervention manipulation was successful in influencing cognition, satisfaction, or weight change.[19] Moreover, conclusions to date have been limited by high attrition rates and difficulties in improving participants' weight-loss satisfaction.

To shed some light on these issues, a secondary analysis was performed on the influence of weight-loss expectations on weight loss, and of weight-loss satisfaction on weight maintenance, in individuals with class II or III obesity enrolled in a randomized clinical trial to compare two types of energy-restricted diets combined with cognitive behavioral therapy (CBT).[20]

METHODS

This study is registered at ISRCTN12558934 (http://www.isrctn.com/ISRCTN12558934).

Eighty-eight participants were assigned to one of two types of energy-restricted diets (high-protein diet [HPD] or high-carbohydrate diet [HCD]). Following baseline assessment, they were assessed after 3 weeks of supervised diet or CBT, delivered in an inpatient setting, after 27 weeks (end of the weight-loss phase), and again after 51 weeks (end of the community-based weight-maintenance phase). Details of the trial design, eligibility, and baseline characteristics have been reported elsewhere.[20]

The study was approved by the ethical committee of Local Health Unit 22-Bussolengo (Study Protocol no. USL22#01/07-CEP31, approved June 19, 2007), and all participants gave informed written consent to their participation, and to the anonymous use of their personal data.

Participants

Participants were recruited from consecutive referrals to the Eating and Weight Disorders Inpatient Unit of Villa Garda Hospital (Northern Italy) by family doctors and other clinicians. Patients were considered eligible in cases where they were in the 18 to 65 years age range and had a body mass index (BMI) $\geq$40.0, or between 35 and 39.9 in cases where they had at least one weight-loss-responsive comorbidity (eg, type 2 diabetes, cardiovascular diseases, sleep apnea, severe joint disease, and/or two or more risk factors defined by the Adult Treatment Panel III[21]). Patients were excluded in cases where they had severe psychiatric disorders (eg, acute psychotic states, bipolar disorder, and bulimia nervosa), were pregnant or lactating, or were taking medications affecting body weight.

Intervention

The treatment was divided into two phases: the weight-loss phase (comprising 3 weeks of inpatient treatment and 24 weeks of outpatient treatment) and the weight-maintenance phase (24 weeks of outpatient treatment). Participants were started on their assigned diet on their second day as inpatients, and the diet was continued throughout the outpatient treatment. Both diets were energy-restricted (1,200 kcal/day for women and 1,500 kcal/day for men), with 20% energy deriving from fats (<10% from saturated fats), and accompanied by daily multivitamin supplements. However, the HPD derived 34% of energy from proteins and 46% from carbohydrates, whereas the HCD featured 17% energy from proteins and 63% from carbohydrates.

All participants received comprehensive manual-based CBT, integrating education with cognitive behavioral procedures, and strategies to enhance their adherence to lifestyle modification.[22] The inpatient treatment included 15 group CBT sessions (five per week) led by physicians, registered dietitians (RDs), and psychologists, as well as 18 sessions of aerobic exercises (eg, 30 minutes of treadmill or exercise bike) and six sessions of calisthenics, led by physical-education trainers. The outpatient treatment included 12 individual sessions of 45 minutes each with a CBT-trained RD over 48 weeks. The first four of these sessions were held at 2-week intervals, followed by four sessions every 4 weeks, and then four sessions every 6 weeks in the last 24 weeks. During the weight-maintenance phase, the calorie content was gradually adjusted to ensure weight maintenance in the $\pm$3 kg range, without changes in the macronutrient balance. The behavioral component of the treatment was based on the principles of the Lifestyle Exercise Attitudes Relationships Nutrition (LEARN) program for weight control,[23] and the cognitive component of CBT for obesity developed by Cooper and colleagues.[24]

Measurements

Demographic Information. Demographic information, and a detailed weight and diet history, were recorded by physicians during direct interview at the time of enrollment.

Weight and Height. Weight was measured on a calibrated scale (Seca Digital Wheelchair Scale Model 664), with participants wearing light clothing and no shoes, on the first and last days of inpatient treatment and at each treatment session of the outpatient treatment. Height was measured at baseline using a stadiometer (Wall-Mounted Mechanical Height Rod Model 00051A; Wunder) and BMI was then calculated via the standard formula (body weight in kilograms divided by height in meters^2).

Weight-Loss Expectations. Part II of the Goals and Relative Weights Questionnaire (GRWQ)[15] was used to assess weight-loss goals at the time of enrollment. The questionnaire is a 4-item measure of the expectations and evaluations of specifically defined weight-loss outcomes. Participants were asked to write a numerical weight (in kilograms) for each of the following four items: dream weight (a weight they would choose in cases where they could weigh whatever they wished); happy weight (although not ideal, a weight they would be happy to achieve); acceptable weight (a weight they would not be particularly happy with, but could accept, because it would