

DIETARY TREATMENT OF OBESITY

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This article evaluates the dietary treatment of obesity used by health care professionals and a National Institutes of Health (NIH) review regarding the efficacy of treatment. The dietary treatment for obesity used by the private sector is also discussed. Factors that relate to the organization of care that may improve the effectiveness of dietary (and other) treatments are defined.

DIETARY TREATMENT OF OBESITY USED BY HEALTH CARE PROFESSIONALS

Conventional Reducing Diets

The key to conventional reducing diets is to advocate a diet lower in energy than the patient's estimated energy intake. Frost and co-workers¹¹ have demonstrated that the prescription of severe reductions of food intake may be less effective in the achievement of sustained weight loss than more moderate changes. They showed that a deficit of 500 kcal/d (estimated) was sufficient for most obese persons to achieve a continuing weight loss averaging 0.5 kg/week. Regardless of the energy content of the reducing diet, it requires skill to manipulate the patient's existing diet to one that contains fewer calories but takes into account the patient's needs, preferences, and limitations. Although it is easy to suggest that the patient simply eat less of everything, it is prudent to advise changes

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that will make the diet as satiating as the existing diet in the hope that these changes will be maintained in the long-term. Dietitians have the skills required to manipulate diets in this way. Although diets high in dietary fiber are more satiating than low-fiber diets, a recent study has shown that the fiber content does not explain all of the variability in the satiating capacity of foods.¹⁸ In clinical practice, the health care professional needs to recommend a number of options for all meals and snacks consumed by the patient so that they contain a similar energy value but add variety (both in terms of nutritional value and palatability) to the diet.

Calorie Counting

A conventional reducing diet is formulated by counting the energy content of foods and drinks consumed each day to ensure that no more energy is consumed than desired. Labeling regulations now make calorie counting an easier task. Almost all foods reveal their energy content. Calorie counting is not normally recommended by health care professionals because it is thought to cause obsessive behavior (although there is little evidence to support this concern). Regardless of the advice given by health care professionals, many patients will use calorie counting as a method of controlling their food intake, particularly patients who have used some private weight-loss programs in the past. Indeed, a form of calorie counting is implicit in the advice given by some weight-loss programs. This counting helps the person understand the composition of foods and control his or her intake.

Warning on Low-calorie Products

Common advertising slogans suggest that a food can be "part of a low-calorie diet" when, in fact, any food can be part of a low-calorie diet. The range of low-calorie foods and ready-made meals continues to increase, which suggests that they are a popular choice for some people. Although some low-calorie products are highly palatable, these foods tend to be more expensive when compared with direct alternatives that are not advertised as low-calorie. The health care professional may need to give advice on the value of such products. The availability and use of sugar and fat substitutes have also increased dramatically. The names of substitutes that are available, their chemical formulas and long-term safety, and their characteristics are detailed elsewhere.¹⁶ Research suggests that sugar and fat substitutes may be useful in helping obese persons lose weight.^{6, 23}

Healthy Eating

The type of weight-reducing diet advised by health care professionals has changed from a diet not only low in energy but also in line with

healthy eating guidelines.⁵ The rationale for the trend toward healthy eating is twofold. First, healthy eating–reducing diets can promote health in terms of reducing the avoidable mortality from diseases other than obesity, which are thought to be exacerbated by an excess of saturated fat and sugar and a deficiency of dietary fiber and antioxidant vitamins and minerals. Second, healthy eating–reducing diets are thought to promote long-term compliance (although there is little evidence to support this claim) because they are not specifically designed for obese persons and therefore inappropriate for persons who have lost weight. Healthy eating–reducing diets also have the advantage that the obese member of a family does not need to prepare different foods than the nonobese members. He or she simply needs to eat smaller quantities.

As is true for all foods, the nutritional and energy value of healthy foods are variable. Healthy foods do not necessarily contain more nutritional value or fewer calories than foods that are not labeled as “healthy.” The only way of assessing the energy content of these foods is by reading the food label, and the health care professional should help the patient understand the importance of this fact in the education process.

Low-fat reducing diets are of two types: low-fat, energy-restricted diets and low-fat ad libitum diets. The difference between these diets and the healthy eating diet in terms of food consumed and nutritional composition is usually minimal.

The types of reduced fat and low-fat foods that are available have increased dramatically in the past 10 to 20 years in response to changing consumer demands. Reduced fat varieties of most dairy foods are now available and a popular choice of persons who want to lose weight. Nevertheless, food labels with the descriptors “low fat or reduced fat, lower fat, very low fat, light, or lite” contain little information about the fat content of the product and nothing about its energy content because no legislation governs the labeling of foods with these descriptors. Many products are naturally low in fat, such as yogurt, breakfast cereals, jams and honey and all fruits and vegetables. Simply informing the consumer that these foods are low in fat is not very helpful. In addition, many products that are labeled as “low-fat” alternatives are still high in fat content (and more expensive).

Foods that are labeled as “low cholesterol” are not necessarily low in fat. A good example of this is polyunsaturated margarine, which is low in cholesterol but very high in fat (as are all margarines and butters). Indeed, polyunsaturated margarine contains the same number of calories as any other type of margarine or butter, and if a patient desires to lose weight, it does not really matter which spreading fat he or she chooses. The patient should eat less of the spreading fat of choice or choose a low-fat spread.

High Fiber Diets

The rationale behind the effectiveness of high fiber diets is that if one consumes enough fruit and vegetables, whole-meal bread, pasta, rice,

and beans (foods that are not energy dense), he or she will have little appetite remaining for other foods that are energy dense, and thus the patient will consume a diet low in energy.

Very-low-calorie Diets

Very-low-calorie liquid diets are nutritionally complete and provide about 600 kcal/d in the form of drinks. A modification of this approach is to substitute two to three meals each day with a liquid formula diet. Very-low-calorie diets are produced by several manufacturers and tend to be expensive when compared with other dietary treatments for obesity. The use of such diets should not be recommended by health care professionals for the majority of obese patients because these diets do not help the patient make permanent eating and other behavioral changes that are necessary if weight loss is to be maintained. Nevertheless, the efficacy of very-low-calorie diets in terms of weight loss is good in the short-term, and there may be instances in which the health care professional may deem their use as appropriate. When such diets are used, care should be taken to ensure that the diet is part of a treatment package to prevent weight gain in the long-term. The range of very-low-calorie diets and the concerns associated with their use have been reviewed in detail by an expert committee elsewhere.⁷

Meal Replacements

Meal replacement products are designed to replace one or more meals per day while leaving the remainder of the diet unaffected. They are sold over-the-counter in supermarkets and drug stores, usually in the form of cereal-based biscuit bars or milk-based shakes (ready-to-drink or in powder form).

The Milk Diet

The milk-only diet is a simple, cheap, and readily available version of very-low-calorie liquid diets. Its use as a dietary treatment for obesity was pioneered by Garrow in his obesity clinic.¹² The milk diet can be advocated for selected patients for the same reasons one would advocate a very-low-calorie liquid diet. Considering the advantages of the milk diet versus a very-low-calorie diet, one can see little reason for advising a patient to use the latter.

Nibbling Versus Gorging

Occasional reports in the media purport that the frequency of eating may affect the rate of weight loss, that is, they suggest that nibbling

promotes weight loss as compared with gorging. Indeed, a special diet called "The Body Clock Diet" has been proposed on this basis.¹⁴ Research data suggest that feeding frequency has little impact on energy balance,³⁷ although a diet that allows a patient to eat more often may confer some psychologic benefit.

NATIONAL INSTITUTES OF HEALTH REVIEW: THE EFFICACY OF DIETARY TREATMENTS

Randomized controlled trials are (almost) the best source of evidence for assessing the efficacy of behavioral interventions.³⁶ Systematic reviews of randomized controlled trials are even better methods,³⁸ primarily because they are less biased. Several reviews on the treatment of obesity have been published in the last few years. Reviews that have assessed the efficacy in terms of long-term weight loss at 1 year or more are reviewed herein^{8, 15} and at the Web sites <http://www.york.ac.uk/inst/crd/obesity.htm> and http://www.nhlbi.nih.gov/nhlbi/cardio/obes/prof/guidelns/ob_home.htm.

The findings from these reviews vary because each asked a slightly different question and thus included different studies. These differences are highlighted in Table 1. The following discussion is based on the largest review, the NIH review, which included studies from 12 weeks' duration upward but which assessed the studies by their duration. The studies identified by the NIH review that are referred to in this section can be found in the NIH report (pages 42 to 44 for included studies and page 114 for excluded studies), which is available for review at their Web site. Additional studies identified by Douketis⁸ or Glenny¹⁵ are discussed that fulfill the following characteristics:

- A direct comparison of at least two dietary treatments
- A comparison of a dietary treatment with a placebo or usual care
- The addition of a dietary treatment to another intervention (e.g., a behavioral intervention, counseling, or exercise) versus the other intervention

Table 1. SEARCH STRATEGY AND MINIMUM FOLLOW-UP CRITERIA EMPLOYED BY THREE SYSTEMATIC REVIEWS ON THE TREATMENT OF OBESITY

Study	Search Strategy	Minimum Follow-up
Douketis et al, 1998	MEDLINE, 1966–April 1998, plus review articles and listing of <i>Current Contents</i>	2 Years
Glenny et al, 1997	MEDLINE, EMBASE, BIDS, PSYCHLIT, plus review articles and peer reviewers	1 Year
NIH, 1998	MEDLINE, 1980–September 1997, plus two books published in the early 1980s	3 Months, but grouped findings by duration of study

Low-calorie Diets

The NIH review examined 34 randomized controlled trials to determine the impact of a low-calorie diet consisting of approximately 1000 to 1200 kcal/d on weight loss. Many of these low-calorie diets also promoted low fat intake as a practical way to reduce energy intake. Twenty-five of these randomized controlled trials covered interventions lasting 6 months or more. All of the studies, regardless of the length of the intervention, showed that low-calorie diets resulted in weight loss. When the subjects in the 25 trials with a duration of 6 months or more were compared with controls, the low-calorie diets brought about a mean weight loss of approximately 8% of body weight over a period of 6 months and up to 1 year. Four studies that included a long-term follow-up lasting 3 to 4.5 years reported an average weight loss of 4% over the long-term. In addition, Douketis identified a trial by Skender and co-workers³⁵ who found no difference in weight loss at 2 years between a group who exercised and another group who exercised and consumed a low-calorie diet.

Low-fat Diets

The NIH review identified nine randomized controlled trials testing the impact of diets that varied in fat and energy content on weight loss. Two of these randomized controlled trials were also included in the NIH assessment of low-calorie diets,^{17,24} and one of the randomized controlled trials was also included in the list of excluded studies.³⁴ The low-fat diets included 20% to 30% of energy from fat, and the energy content ranged from 1200 to 2300 kcal/d. Three trials, all 6 months or greater in duration, promoted low-fat diets with ad libitum energy intake. Two of the three trials reported that low-fat diets with ad libitum energy intake resulted in a reduction in energy intake of 85 kcal and 300 kcal, and three trials produced a greater weight loss by a mean of 1 to 3.9 kg when compared with a higher-fat diet. Three randomized controlled trials compared low-fat diets with targeted energy reduction with low-fat diets alone. All three trials found that weight loss was greater in the low-fat diet with energy reduction than in the low-fat diet alone. When there were similar energy levels in the low- and higher-fat diets, similar amounts of weight loss were reported in two studies, whereas one study showed 1.8 kg greater weight loss on the low-fat when compared with the higher-fat diet, despite similar reported energy levels. Glenny and co-workers¹⁵ identified an additional study by Pascale and colleagues²⁸ who found that subjects with non-insulin-dependent diabetes consuming calorie- and fat-restricted diets lost more weight than subjects consuming restricted calorie only. Taken together, these studies show that low-fat diets including 20% to 30% of energy intake as fat can contribute to lower energy intake even when energy reduction is not the focus of the intervention; however, when low-calorie diets are targeted with low-fat diets, better weight loss

is achieved. Little evidence suggests that low-fat diets cause weight loss independent of energy reduction.

High-fiber Diets

Although the evidence suggests that high-fiber diets can be effective in the short-term,³⁰ because these diets are seen as specific for weight loss rather than overall health, compliance to a high-fiber diet in the long-term is likely to be poor. Glenny and co-workers¹⁵ identified two studies in their review that directly compared diet alone, both examining the effects of dietary fiber.^{2, 32} Fiber supplements were more effective than placebo in increasing weight loss when given in conjunction with a 1200 to 1600 kcal/d diet³²; however, this regimen did not seem to lead to greater mean weight loss than a low-fiber, low-calorie diet.²

Very-low-calorie Diets

The NIH review identified four randomized controlled trials comparing very-low-calorie diets (providing about 400 to 500 kcal/d) with low-calorie diets (providing about 1000 to 1200 kcal/d). During the active phase, the very-low-calorie diets were given exclusively for 12 to 16 weeks and then followed by low-calorie diets for a total duration ranging from 24 weeks to 5 years. The participants in these trials were primarily women who were extremely obese. Very-low-calorie diets either alone or combined with behavioral therapy promoted a weight loss of approximately 13 to 23 kg during the active phase of the very-low-calorie diet intervention, whereas the low-calorie diets promoted a weight loss of 9 to 13 kg. In three of the four studies, very-low-calorie diets resulted in 4 to 12 kg greater weight loss than the low-calorie diets at the end of the active phase. Over the medium term of 6 to 12 months, weight loss on the very-low-calorie diets ranged from 1.1 to as much as 10.4 kg greater than weight loss on low-calorie diets. One of the studies that was excluded by the NIH review⁴¹ but included by Glenny and co-workers¹⁵ provided similar findings at 1 year follow-up. One study did not show a particular advantage of a very-low-calorie diet versus a low-calorie diet either during the active phase or at 24 weeks. After 1 year, there was no long-term advantage of a very-low-calorie diet versus a low-calorie diet.

Douketis and co-workers⁸ included three additional trials in their assessment of very-low-calorie diets. At 2 year follow-up, they found that a very-low-calorie diet plus behavioral therapy produced greater weight loss when compared with behavioral therapy only. Miura and co-workers²⁷ found a mean difference of 1.3 kg and Torgerson and colleagues⁴⁰ a mean difference of 2.9 kg. The NIH review identified the trial by Miura but excluded it from their assessment. Unlike the other studies, Miura and co-workers²⁷ found that a very-low-calorie diet alone produced a greater weight loss than either behavioral therapy alone or behavioral

therapy plus a very-low-calorie diet. In a comparison of a continuous very-low-calorie diet versus a very-low-calorie diet followed by a low-calorie diet, Ryttig and co-workers³³ found no difference in weight loss at 2 years.

Anderson and co-workers¹ compared a liquid supplement diet providing 800 kcal/d with a diet consisting of a combination a liquid supplements providing 320 kcal/d and conventional foods to the value of approximately 500 kcal/d. Both groups also received individual meal plans that gradually introduced conventional foods over a period of 4 to 6 weeks. Both groups lost significant amounts of weight (approximately 15% of their initial weight) by the end of the 12-week, weight-loss phase. At 1 year follow-up, the two groups combined sustained weight losses over time ($P < 0.001$), but between-group differences were not analyzed.

A randomized controlled trial assessed the short-term (over 16 weeks) efficacy of the milk diet versus a conventional weight-reducing diet.³⁹ Patients on the milk diet lost significantly more weight than subjects on the conventional weight-reducing diet, although part of the reason for this success may have been the initial novelty of the milk diet, which may have worn off with time.

Glenny and co-workers¹⁵ also reviewed studies that assessed the usefulness of food provision. Standard behavioral therapy combined with the provision of meal plans and grocery lists to obese women produced significantly greater weight loss when compared with standard behavioral therapy alone.⁴² A similar result was found when all required food was provided to participants.^{19, 20, 21, 22}

A Word of Caution in the Interpretation of These Results

Although the findings of these systematic reviews are disappointing in terms of long-term weight loss, generalizing to the whole overweight and obese population is not justified. Most people attempt to lose weight on their own using books or commercial programs.⁴ Brownell⁴ surveyed the dieting activity of more than 20,000 readers of Consumer Reports magazine. Of the readers who reported losing a significant amount of weight (mean = 15 kg) and maintaining the loss, 72% did so on their own, compared with 20% reporting weight loss with commercial programs, 3% with diet pills, and 5% with assistance in a health care setting. It could be argued that obese persons who enroll in hospital-based trials are resistant to dietary treatment. Furthermore, obese patients who actively seek treatment are more likely to have binge-eating problems and additional psychopathology when compared with obese persons who do not seek treatment or ideal weight control.¹⁰ Likewise, obese patients who actively seek treatment and who remain in weight loss programs because they do not lose weight are more likely to sustain binge-eating problems and have more psychopathology than previously obese patients who once actively sought treatment but who left the weight loss program because they

achieved weight loss.⁴² The poor results from long-term studies may be explained in part by bias because the patients who were recruited to these studies were obviously the most difficult to treat.

THE RANGE AND EFFICACY OF DIETARY TREATMENTS USED BY THE PRIVATE SECTOR

Weight-Loss Programs

The dietary treatments offered by weight-loss programs are conventional reducing diets with a "twist." Some programs, such as Weight-Watchers UK, use a form of calorie counting to help the patient control his or her energy intake. Foods are given "points" on the basis of their energy value and saturated fat content, and there are no "forbidden" foods. The client is allowed to eat foods up to the value of a given number of points, which is calculated on the basis of body weight (heavier clients are allowed more points). Clients following this diet are advised to eat a healthy diet, are allowed five "free" foods per day, and obtain "bonus" points for exercise. Other weight-loss programs, such as Slimming World, do not use calorie counting. Clients are advised to follow one of two diet plans—original or green. Both contain a list of free foods, healthy extras (which are allowed in moderation), and "sin." Clients are allowed between 5 and 15 sins a day. A chocolate bar comprises 15 sins, whereas a glass of wine comprises five.⁴

The main concern of health care professionals regarding weight-loss programs is that they are for profit. Nevertheless, this status may act in their favor because one could argue that if the overweight person was unconvinced that the programs were worthwhile, he or she would not enroll. Indeed, good evidence suggests that financial incentives may improve the effectiveness of dietary treatments for obesity.¹⁵ Furthermore, simply believing that a treatment will work can improve effectiveness, as clearly shown by weight loss in the placebo arm of anti-obesity drug trials.

It is difficult to assess the efficacy of the advice offered by weight-loss programs because such an assessment would require a randomized controlled trial, which has never been (and is never likely to be) conducted. There is no reason to believe that the dietary treatments advocated by these programs are less effective than those advocated by health care professionals. When Biesalski³ compared the results from a Weight-Watchers study with the results in a clinical study (both performed in Sweden), he found that the Weight-Watchers group lost significantly more weight than the clinical group at 24 months. These findings do not suggest that obese persons who attend weight-loss programs fare better than patients who attend hospital obesity clinics (because different types of people attend different types of treatment) but, instead, that weight-loss programs are effective for a certain type of person.

It would seem sensible for the health care professional to recommend the use of weight-loss programs to patients who believe that they are the

best option for them and who can afford them, although it may be prudent to ask patients to make a follow-up appointment after an interval of approximately 3 months. The patient should also be instructed to return to that clinic if weight loss stops or if he or she has any medical problems.

Popular/Commercial Diets

A myriad of popular diets are purported to aid weight loss.²⁵ They all work on the principle that consuming a low-calorie diet will stimulate weight loss, however, few of these diets admit to such a simple claim. The diets are usually explained in paperbacks that are widely available in bookshops. They claim to offer something different, perhaps suggesting that the diet can disturb an as yet unknown metabolic pathway in favor of weight loss. The claims are always compelling (which one would expect, otherwise the author would not make any profit from writing the book). Perhaps most distressing is the fact that some of these books claim that weight loss will not be difficult using the diet. All patients find losing weight by dieting difficult, and sometimes impossible, but never easy.

Perhaps the most popular diet of the 1990s in the United Kingdom has been the Food-Combining Diet.²⁶ The book provides a no-hassle 28-day menu plan that does not involve calorie counting and that encourages the consumption of fruit and vegetables. The author (Marsden) claims that the diet will not only enable the reader to achieve pain-free weight loss but will also improve health and spirits to a remarkable degree by means of a built-in cleansing program that helps to improve the elimination of toxins. The diet is based on the principles of the Hay diet, a diet that separates foods that "do not digest well together so that the body can use the food we eat more efficiently and without clogging up the system." Essentially, the reader is told not to eat foods rich in protein at the same time as foods rich in starch or sugar (no more burgers and french fries). Marsden explains the reason why as follows, "Given that proteins take longer to digest than starches and that starches take longer than vegetables and fruit, mixing them together on the same plate or in the same mouthful can cause some people's digestive system a great deal of grief. Have sympathy for those poor old enzymes and acids down there in the dark, trying to sort out the muddle of which stays in the stomach for several hours and which moves on more quickly to the next department. Mix starches with protein at the same meal and the digestive system won't know if it is functioning on acid foot or alkaline horseback."

The basic premise of the diet is confusing. If the foods that Marsden suggests do not "digest well together" are eaten separately, the foods should be absorbed more efficiently and thus provide more calories. The diet can cause weight loss because the restrictions in food choice are likely to result in a decrease in energy intake.³¹ Restriction of food choice combined with the consumption of many fruits and vegetables is why the Hay diet (and the Food-Combining Diet) promotes weight loss.

THE BOTTOM LINE: IS IT WORTH DIETING?

Some experts argue that dieting may not be worthwhile if the weight is regained because evidence suggests that weight cycling is worse than staying obese. Others suggest that dieting is a worthwhile activity¹³ but must be undertaken seriously. Obese patients who have succeeded in losing weight are faced with the challenge of maintaining the dietary changes they have made for the rest of their lives. Treatment must help patients to recognize the possibility of relapse and to develop strategies to manage it.³ The maintenance of lost weight requires continued monitoring and support and the acquisition of a set of skills and behavior modifications that are different from the actions required for weight loss.⁹ Specific relapse recognition and prevention techniques developed for use in addictive behavior²⁹ should be considered. Furthermore, health care providers must recognize that long-term monitoring and support for previously obese patients should be available.

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