

A Systematic Review of Literature on the Effectiveness of Behavioral Weight Loss Programs to Achieve Weight Reduction

Houston K

Southeastern Louisiana University, USA

Abstract

The goal of this systematic review of literature is to determine the efficacy of behavioral weight loss programs at reducing weight and maintaining weight loss. The review of literature consists of articles focusing on the Health Management Resources (HMR) behavioral weight loss program focusing on specific aspects within the weight loss program and how they contribute to overall weight loss and weight maintenance.

Keywords: Behavioral weight loss programs; Health management resources; HMR program; Weight management; Weight maintenance; Weight loss programs

Introduction

Obesity is an increasing problem in the United States. According to Centers for Disease Control (CDC) more than one-third of U.S. adults (35.7%) are obese. Obesity can lead to multiple health problems such as heart disease and stroke. According to the CDC [1], in 2008, medical costs associated with obesity were estimated at \$147 billion and the medical costs paid by third-party payers for people who are obese were \$1,429 higher than those of normal weight. Adequate screening is necessary in an effort to reduce obesity rates within the United States. Body Mass Index (BMI), a simple screening tool that is calculated using weight and height, usually correlates to the amount of body fat a person has. An adult who has a BMI between 25 and 29.9 is considered overweight and a BMI of 30 or higher is considered obese [1]. While a BMI greater than 30 is not the sole indicator of obesity, it is a simple, cost effective tool that gives healthcare providers insight into a patient's overall well being [1]. Maintaining a healthy BMI reduces costs to both the patient and third party insurance providers.

A walk through any local supermarket will reveal numerous products that offer quick and easy weight loss. Few of these products, however, offer the necessary tools for people to achieve a complete lifestyle change. The United States Preventative Services Task Force [2] is responsible for making recommendations related to the effectiveness of specific clinical preventative services. It is the recommendation of the USPSTF that clinicians offer or refer patients with a BMI of 30 or higher to intensive, multi-component behavioral diet and lifestyle interventions [2]. According to the USPSTF [2], effective weight loss interventions should be comprehensive and highly intense, including 12-26 sessions per year. In order to be considered a complete behavioral weight loss program, the following must be included: providing a comprehensive diet and lifestyle education program, offering multiple education and support sessions, promoting physical activity, the use of self-monitoring and record keeping, and a maintenance component [2].

Purpose/Rationale

Obese patients are often presented with several options for achieving quick weight loss. It is important for patients to choose a program that offers not only diet change, but the tools necessary to effect a total lifestyle transformation in order to achieve and maintain weight loss. There are multiple health benefits to achieving weight loss including reduction in comorbidities associated with obesity such as increased risk for coronary heart disease, type II diabetes mellitus, various cancers, gallstones, and disability. These comorbidities are

often associated with increased utilization of healthcare services and higher costs to the patients with these conditions [2]. It is important for patients and clinicians to understand the features and benefits of specific types of weight loss programs.

There is significant evidence which indicates that intensive, multicomponent behavioral interventions for obese adults can lead to weight reduction, as well as better glucose tolerance and a decrease in other physiologic risk factors for cardiovascular disease [2]. The purpose of this systematic review of literature is to evaluate the effectiveness of behavioral weight loss programs on reducing weight and maintaining weight loss. All programs included in this literature review meet the USPSTF's recommendations for defining complete behavioral weight loss program in that all programs provide a comprehensive diet and lifestyle education program, offer multiple education and support sessions, promote physical activity, the use of self-monitoring and record keeping, and include a maintenance component [2].

Framework for synthesis of literature of research

Rohrer et al. [3] refer to obesity as a worldwide epidemic and recognize the role care providers can play in providing patients with the tools and resources that will allow them to successfully reverse obesity and improve health. The theoretical framework to be utilized in this synthesis of literature is Nola Pender's Health Promotion Model. Nola J. Pender firmly believed that the goal of nursing is to help people care for themselves [4]. Nola Pender's Health Promotion Model is, "an attempt to depict the multifaceted natures of persons interacting with the environment as they pursue health" [4]. Pender's model allows caregivers to understand how a patient's prior behavior, interpersonal influences, and situational influences can have an effect on the patient's ability to promote their health [4].

Behavioral weight loss programs function based on several of the theoretical assertions of Pender's Health Promotion Model. Pender et al. [4] believed people are more likely to do things if they believe

***Corresponding author:** Katie R Houston RN, BSN, Southeastern Louisiana University, USA, E-mail: katie.houston@selu.edu

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it will be beneficial to them and if they feel it will be easy for them to do. Behavioral weight loss programs work by limiting choices in diet, thereby increasing the likelihood of success [2]. Pender et al. [4] also believed peers and health care providers play an important role in a person's commitment to engaging in health promoting behavior. A key component to behavioral weight loss programs is the multiple educational and support sessions with other patients in the program and medical personnel [2,5].

Pender et al. [4] believed there is a direct correlation between a person's overall commitment to a program and the likelihood that health-promoting behaviors will be maintained over a period of one's lifetime. Using Pender's Health Promotion Model along with the USPSTF's recommendations for a complete behavioral weight loss program as a guide, the goal for this systematic review of literature is to determine the efficacy of behavioral weight loss programs to achieve weight reduction.

Review of Literature

The online databases of Academic Search Complete, MEDLINE, CINAHL, and the Cochrane Library were searched using the keywords: behavioral weight loss, medically supervised weight loss effectiveness, benefits of behavioral weight loss programs, weight management with behavioral weight loss, and weight management programs effectiveness.

Articles relating to any program that did not meet all of the USPSTF's recommendations for a comprehensive behavioral weight loss program were excluded. The search yielded articles relating to Health Management Resources (HMR), a behavioral weight loss program that met all of the USPSTF's recommendations to be considered a comprehensive program.

The systematic review of literature includes articles that show data evaluating the effectiveness of Health Management Resources (HMR) behavioral weight loss program. This program is based on a diet consisting of five meal replacements in the form of shakes or prepackaged entrees, minimum physical activity requirement, and weekly educational class sessions. Some options within this program include medical supervision, introduction of fruits and vegetables into the diet, and at home prepackaged diet kits [6].

Anderson et al. [7] performed an observational study to assess outcomes of patients who lost at least 100 pounds (lbs) over the course of nine years. Charts from 118 patients, who met the 100 lb. weight loss criteria while enrolled in an intensive behavioral weight loss program, through HMR, were systematically reviewed to assess rate of weight loss and long-term weight management. Anderson et al. [7] found that men lost weight faster than women (66 kilograms (kg) in 43 weeks versus 55 kg in 44 weeks), but weight loss as a percentage of starting weight did not vary significantly between men and women (38% men versus 38.4% women). Long-term weight maintenance was also evaluated on 31 of the 118 eligible subjects and an average weight loss of 29.4 kg was maintained. This represented 46.5% of initial weight loss maintained averaging 17.9% of initial body weight after five years [7]. A self reported limitation to this study was the availability of long-term follow-up weights.

Gotthelf and Grant [6] performed a chart review of patients enrolled in three HMR based behavioral weight loss clinics over a three year period to evaluate the results achieved using each of the five treatment options available through HMR. Inclusion required completion of the 12 week core requirement set by HMR. All options included the

same lifestyle changes of weekly class attendance, at least 2000 kcal/week of physical activity, at least 35 servings of meal replacements a week, and at least 35 serving of fruits and vegetables per week in the Healthy Solutions (HS) and At Home (AH) options. The five options were Medically Supervised (MS) which requires a BMI of over 35 or diabetes, hypertension, or other significant medical problems, Intermediate (INT) which requires a BMI of 30-35 without significant medical problems and consequently less frequent medical monitoring than MS, Moderate (MOD) which requires a BMI of 25-30 with no medical supervision, Healthy Solutions (HS) and HMR At Home (AH) which uses phone based support rather than class attendance.

The authors reported initial BMIs of 42.5 for MS, 33.1 for INT, 30.5 for MOD, 35.6 for HS, and 35.3 for AH. Weight loss as a percentage of initial weight was 22.6% after 29 weeks for MS, 19.7% after 29 weeks for INT, 18.4% after 24 weeks for MOD, 18.5% after 27 weeks for HS, and 15.9% after 27 weeks for AH. Limitations to this study include lack of documentation of physical activity, and lack of analysis based on sex or race.

Anderson et al. [8] performed a chart review on patients seen at three weight loss centers to review initial weight loss and maintenance for severely obese individuals enrolled in HMR's intensive behavioral weight loss program. For the purpose of this study, the authors classified severe obesity as a BMI of 40 or above. Data for patients who achieved at least 100 lb. weight loss were also reviewed as a separate group. Anderson et al. [8] subdivided the severely obese patients into a "Study Group" of patients who completed at least one week of treatment including those who completed the entire 12 week core classes, and the "Completer Group" which consisted only of patients who finished the 12-week core classes included in the weight loss program. Over eight years, 1531 patients fell into the "Study Group," 1100 (72%) completed the 12-week core classes ("Completer Group"). Of the "Completer Group," 268 patients (24.4%) lost at least 100 pounds. The authors reported an average weight loss of the "Study Group" at 28.1 kg or 19.9% of initial weight. The "Completer Group" saw an increase in weight loss averages to 35.2 kg or 24.9% of initial weight. The "100 lb Group" had an average weight loss of 62.3 kg or 39.8% of initial body weight in an average of 57 weeks. The authors go on to say that men were more likely to complete the program, lose at least 100 lbs and lose more absolute weight than women in all three groups. They also found men achieved higher percentage weight loss than women in the "Study Group" (22.5% vs. 18.5%) and the "Completers Group" (26.7% vs. 23.9%), but women lost more percentage of initial weight in the "100 lb. Group" (41.5% vs. 37.5%).

Anderson et al. [8] reported that follow up weights were available for 72% of the "Study Group," 86% of the "Completer Group," and 94% of the "100 lb Group". The "Study Group" patients maintained an average weight loss of 20.6 kg or 61% of their initial weight loss at an average of 64 weeks. Patients within the "Completers Group" maintained an average weight loss of 22.7 kg, which was around 59% of their initial weight loss at an average of 72 weeks. The patients in the "100 lb. Group" were able to maintain an average of 41 kg or 65% of their initial weight loss at an average of 95 weeks.

Rohrer et al. [3] performed a retrospective study comparing weight loss in an Intensive Structured (IS) program (HMR) using health educators versus a population of patients who lost weight using Less Intensive (LI) methods. The IS sample included all patients enrolled in a set IS program who met the authors set inclusion criteria of a BMI of 35-50, and between the ages of 17-65. Patients in the IS group also received

a minimum of 500 calories a day, 2-4 quarts of non caloric fluid intake, attended weekly group sessions, and followed one of the several meal replacement options available through the HMR behavioral weight loss program. The LI sample was a convenience sample of obese patients from pre-determined clinics. A survey was mailed to the participants in the LI group and the authors reported a response rate of 29%. Data from the LI sample was self-reported from the survey unless the patients indicated in writing that it was ok to use their medical records. The authors reported that the LI weight loss strategies included LA Weight Loss, Nutri-System, SlimFast, Weight Watchers, own approach, and others.

Rohrer et al. reported that the final sample included 45 patients in the LI group and 58 in the IS group for whom weight was known after one year. Females made up 70.4% of the IS group and 69.1% of the LI group. Mean ages of the LI and IS groups were 48.9 and 45.3 years respectively, and baseline BMIs were 40.0 for the LI group and 40.7 for the IS group. The authors reported the mean change in weight for the IS group was 18.8 kg lost and the LI group was 0.87 kg gained. Self-reported limitations to this study included lack of physical activity recording, lack of records for the frequency of weight loss sessions attended for the IS group, the lack of a randomized trial, and a lack of a sample that would allow for analysis of race or ethnicity [3]. Other limitations include the validity of self-reported surveys for the LI group, and the mean weight reported could mask individual success in the LI group.

Anderson et al. [9] performed a randomized control trial to compare a standardized behavioral weight loss program (HMR) to a control group receiving only dietary counseling at eight, 16, and 24 weeks. The behavioral program consisted of three shakes, two entrees, and five servings of fruits and vegetables a day averaging around 1200 calories a day along with weekly weight loss classes. The authors reported that, after randomization, the average age for the two groups was 47.9 years, 76% were female, and BMI average was 35.4 for both groups. Anderson et al. [9] reported the weight loss average at 24 weeks for the control group that received only 3 dietary counseling sessions as 3.1 lbs. The 24-week weight loss average for the patients assigned to the behavioral program was 37 lbs. Limitations to this study include a small sample size, 13 in the control group and 18 assigned to the weight loss group, and lack of documentation of calorie consumption or physical activity for the control group.

Smith et al. [10] performed a 12 week randomized control to compare the efficacy of the HMR at home program with weekly phone support (Group I) to the HMR at home program without weekly phone support (Group II). The third group, Group III was not following any structured diet and no weekly phone support was provided. Groups II and I received meal replacements and shakes while group III received none. Group I received counseling support through a weekly phone call, while the other two groups received no outside support. After 12 weeks, weight loss averages were obtained for all three groups. The authors reported weight loss as 8.5% of initial body weight for the group receiving the meals shakes and call, 6.0% for the group receiving only the meals and shakes with no call, and 1.2% for the control group. Limitations to this study include the self-reporting (of meal, shake, fruits and vegetable, and physical activity) and lack of initial BMI or weight averages for all groups.

Anderson et al. performed a randomized control trial to compare the weight loss outcomes of a commercial behavioral intervention program using Meal Replacements, Fruits, and Vegetables (MR-FV) to

usual-care weight-loss counseling. The authors reported that patients were recruited from the community through a commercial program provided at a university medical center, were between the ages of 20 and 65, and had a BMI of 30 to 39.9. Characteristics for both groups were similar with the average age of all patients of 46, 76% of the patients were female, and initial BMI average was 35. Control group members met with a registered dietician and received instructions designed to achieve 10% weight loss over six months and attended follow up meetings every eight weeks [11]. MR-FV group members were placed on a 1200 kcal diet including two entrees, three shakes, and five servings of fruits and vegetables. MR-FV members were expected to attend weekly classes and keep records of meal replacements, food intake, and physical activity [11].

The authors found that the MR-FV group lost 12.5% of their initial body weight in the first 16 weeks while the control group lost 0.7%. After 24 weeks, the MR-FV group lost an additional 1.4% of initial weight while attending "weight maintenance" classes and the control group had no net weight loss for the final eight weeks. Limitations to this study include its focus on one weight loss program. The study went on to compare results with randomized control trials from other major diet plans but the authors admitted that results would not be truly comparable unless programs were studied together in one trial.

Synthesis of Literature

The overall goals when losing weight should be not only weight reduction, but also discovering the tools necessary for lifelong maintenance of healthy lifestyles, which promotes a healthy weight [1]. Behavioral weight loss programs utilize several tools that promote not only initial weight reduction, but also key components of weight maintenance [2]. Behavioral weight loss programs rely upon key assumptions from Pender's Health Promotion Model by understanding the influence health care providers have upon patients and making patients responsible for their behavior and actions towards compliance of their specified program [4]. This is achieved through demanding accountability and compliance through attending scheduled sessions with health educators and self-monitoring compliance with set program guidelines [6].

Data from all studies reveal that a diet consisting of five meal replacements and five servings of fruits and vegetables daily and a minimum of 2000 calories burned in physical activity weekly yield higher initial weight loss when compared to other interventions. Two of the studies, Anderson et al. in 2011 [11] and Anderson et al. in 2007 [7], found positive reduction in certain laboratory findings associated with comorbidities including cholesterol, triglyceride, glucose, and blood pressure. Studies from Rohrer et al. [3], Anderson et al. [11], and Smith et al. [10] showed that patients receiving weekly outside support achieved better weight loss results than those receiving no outside support. Anderson et al. [7] found that men lost weight quicker than women but overall weight loss percentage was the same.

Follow up data indicates that patients are able to maintain around half of their initial weight loss after a period of one to five years. This shows the importance of the maintenance component of the program and attending maintenance classes. Anderson et al. [8] suggests utilizing the keys to long term maintenance of weight loss taught in the HMR maintenance classes, which include: physical activity of at least 2000 calories burned each week, at least five servings of fruits and vegetables a day, and supplementing a diet with two meal replacements a day.

Results

This comprehensive literature review yielded three randomized control trials [9-11] that looked at how dietary counseling and meal replacements within the HMR behavioral weight loss program compared to subjects receiving no dietary counseling or meal replacements. All three trials found that subjects receiving dietary counseling and meal replacements lost more weight than those subjects receiving either meal replacements alone. The most significant weight loss difference was seen when comparing subjects receiving meal replacements and counseling to those receiving no outside help or meal replacements.

When compared to other diet options, the retrospective chart review performed by Rohrer et al. [3] found that subjects enrolled in the HMR group lost an average of 18.8 kilograms after one year compared to the self reported 0.87 kilogram gain reported by the subjects dieting on their own. The retrospective chart review performed by Gotthelf and Grant [6] compared the five diet options available within the HMR program. They found that medically supervised patients averaged the highest weight loss of 60.9 pounds, or 22% of initial weight, over 29 weeks. Intermediate patients lost an average of 39.6 pounds, or 19.7% of initial weight, over 29 weeks. Moderate patients lost an average of 35 pounds or 18.4% of initial weight over 24 weeks. Healthy Solutions patients (adding five fruits and vegetables to diet) lost an average of 41.1 pounds, or 18.5% of initial weight, over 27 weeks and the at home group lost an average of 35.2 pounds, or 15.9% of initial weight over 27 weeks.

One year follow up data from the retrospective chart review performed by Anderson et al. [8] indicated that patients were able to maintain an average of 60% of initial weight loss for patients who completed one to 12 weeks of core classes within the HMR program. Patients who lost at least 100 pounds in the program were able to maintain an average of 65% of their initial weight loss after almost two years. Anderson et al. [7] also reviewed follow up data for patients who lost at least 100 pounds on the HMR program. Five-year follow up data revealed patients were maintaining around 50% of initial weight loss.

Anderson et al. described other benefits beyond weight loss as an average reduction in Low-Density Lipoproteins (LDL) of 20%, triglyceride reduction of 36%, glucose reduction of 17%, and a reduction of blood pressure averaging 15%. 66% of patients were able to discontinue medications for comorbidities associated with obesity at an average savings of 100 dollars per month. Anderson et al. also found a reduction in glucose levels, serum cholesterol, LDL, and blood pressure within the group receiving meal replacements and fruits and vegetables [8,9].

Summary and Significance

The USPSTF in 2012 found, "adequate evidence that intensive, multicomponent behavioral interventions for obese adults can lead to weight loss, as well as improved glucose tolerance and other physiologic risk factors for cardiovascular disease". The review of literature provides adequate data for healthcare providers to understand the many benefits of a behavioral weight loss program. Behavioral weight loss programs could provide a non-surgical option for obese patients to achieve weight loss in a non-invasive, low-risk method [8]. With surgical intervention offering "quick fixes" to obesity, it is important for patients to understand there are options available for weight loss that do not require surgical intervention.

Anderson et al. [8] suggests patients who complete a behavioral weight loss program consisting of dietary requirements using meal

replacements and physical activity recommendations have a, "higher likelihood of continuing these health-promoting physical activity behaviors than patients who have had bariatric surgery without the benefit of intensive behavioral training related to physical activity". Behavioral weight loss programs are consistent with the foundations of Pender's Health Promotion Model through the provision of easy to follow, highly structured diet plans that offer the benefit of losing weight. The knowledge gained through lifestyle changes developed through the HMR program enables patients to also maintain weight loss. The HMR behavioral weight loss program relies heavily on the relationship between the healthcare provider and patient with the role of the health care provider being to offer encouragement, support, and accountability to the patient, which is consistent with Pender's Health Promotion Model [12].

Learning to live by the healthy behaviors taught in behavioral weight loss programs sets the patients up for a successful lifetime of health promotion and maintenance of achieved weight loss [8].

Implications

The findings of this review of literature reveal several important implications for future practice. According to the USPSTF (2012), obesity is associated with several health issues such as increased risk for coronary heart disease, type two diabetes mellitus, and various types of cancer, gallstones, and disability. An understanding of the benefits of behavioral weight loss programs is important for primary health providers to be able to guide their obese patients to proper interventions offering the best results with lowest risks. Health care providers should be familiar with behavioral weight loss programs offered within their geographical area. They should work with the patients to determine the best program, taking into consideration health issues that could exclude them and personal issues such as limited time commitment, limited finances, and overall willingness to commit to the lifestyle change necessary in behavioral weight loss programs.

Behavioral weight loss programs also play an important role in self-promotion with marketing to local physicians in order to fully educate them on their program. Good promotional marketing material should include the benefits, results, and requirements patients must meet such as attendance, physical activity, and meeting their minimum dietary prescription. This marketing process is vital in ensuring patients are properly referred to the appropriate behavioral program which best fits their weight loss needs. Another important practical implication involves each patient's understanding of his or her role in achieving weight loss. Patients need to be willing to accept and be compliant in regards to all requirements of a behavioral weight loss program including: self monitoring, physical activity, addressing personal barriers to their own weight loss, committing to improved diet and lifestyle changes both during and after weight loss, participation in individual and group sessions, and strategizing how to maintain lifestyle changes [2].

Plans for Dissemination

Healthcare providers are the front line in the fight against obesity. It is up to these providers to be advocates for their patients. Knowledge of behavioral weight loss programs and their effectiveness is an effective weapon in the fight against obesity. The data from this review of literature could prove useful in spreading the word about behavioral weight loss programs as an option for weight management as well as when to refer patients to these programs using the USPSTF's recommendation that

all patients with a BMI of 30 and higher should be referred to a program that offers an intensive multicomponent behavioral diet and lifestyle interventions [2]. Healthcare providers should be aware of programs available within their area, either through marketing material received through area programs, or word of mouth from other healthcare providers in order to refer their patients to an appropriate program.

Implications for Further Research

Based on the review of literature, there are still several areas that could benefit from further research. One key area would be to perform a randomized controlled trial comparing major commercially available weight loss programs to determine overall weight loss results and health benefits. Other opportunities for research include focusing on specific aspects of behavioral weight loss programs and their influence on overall weight loss. One possible example of this would be to study how different levels of physical activity affect weight loss. Further research is also needed to evaluate how compliance to a program's guidelines affects the rate of weight loss. Finally, research is needed in determining effective methods that improve the ability to maintain achieved weight loss over a period of time.

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