

Self-Management Patient Education and Weight Loss

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## **Dedication**

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## Abstract

Self-management of a disease is defined as “having or being able to obtain, the skills and resources necessary to best accommodate to the chronic disease and its consequences” (Holman & Lorig, 1992, p. 309). Self-management has been used in the management of several chronic conditions and this model may be useful in the management of weight loss. This research explored the relationships amongst participation in a self-management weight loss program and weight change, patient activation, health distress, and behavioral change. The purpose of this study was to evaluate a self-management weight loss program and provide some insight into factors that may need to be addressed when designing a weight loss program. Participants completed a six-week weight loss program that consisted of three components: exercise, nutrition classes, and self-management classes. Weight, patient activation, health distress and goal setting behaviors were collected at the beginning of the program and at completion of the program. Participation in the program was statistically significant associated for weight loss, change in health distress, and change in patient activation. Although the self-management model has been useful in other chronic diseases, further exploration is needed to understand the role of the model in weight loss programs.

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## **Chapter One: Background Information**

About 65% of American adults are either overweight or obese (Center for Disease Control and Prevention, 2007). The problem of obesity is increasing and current lifestyle modification programs have not been successful. A new approach to weight loss is needed. A self-management approach to weight loss may be one possible option. Self-management focuses on the individual learning knowledge, skills, and confidence in managing a condition. Through patient education, individuals may be able to learn a healthy way to lose weight, make lifestyle changes, and be able to adapt when changes occur in their weight.

### **Problem**

Obesity has greatly increased in the last 30 years. Between 1976 and 1980 the prevalence of obesity among adults age 20-74 was 15.0% (Centers for Disease Control and Prevention, 2007). By the years 1999 and 2000, the prevalence of obesity had risen to 30.5% (Flegal, Carroll, Ogden, & Johnson, 2002) and by 2004 the prevalence had increased to 32.2% (Ogden et al., 2006). The nation as a whole is now fatter than 30 years ago. According to the 2004 data, 66.3% of the United States population is overweight or obese and the trend continues to grow (Ogden et al., 2006.).

There are significant differences in obesity prevalence among race/ethnicity groups. About 30% of non-Hispanic white adults are obese, as are 45% of non-Hispanic black adults and 36.8% of Mexican Americans. Although there are significant differences amongst race/ethnicity groups in obesity, there is no significant difference among groups in the rate of increase of obesity (Ogden et al., 2006). All population groups are

becoming obese at the same consistent rate. The entire population is becoming fatter and it is not just occurring in one race/ethnic group.

Truong and Sturm (2005) examined United States weight gain trends across sociodemographic groups between 1986 and 2002 using data from the Behavioral Risk Factor Surveillance System ( $n = 1.88$  million) which included variables such as weight and education, relative income, race/ethnicity, and gender. Each sociodemographic group had similar weight gains. There was no statistically significant difference in increase in weight by educational attainment, or income group, except the lowest-income heavier individuals gained weight faster than the highest-income heavier individuals. There were no statistically significant differences among race/ethnic groups except that one group, non-Hispanic Blacks, had more weight gain relative to other groups. Women across all groups gained significantly more weight than men.

While some race/ethnic groups may have a larger percentage of their population obese, the population as a whole continues to gain weight. Regardless of sociodemographic group, the population-wide increase in weight is very detrimental to individuals because it is linked with comorbidities and life expectancy.

### **Comorbidities**

The rise in obesity has been accompanied by a rise in comorbidities. Several comorbidities have been linked to obesity (Schelbert, 2009). Comorbidities are diseases that exist at the same time as the primary disease in the same person. Being overweight and obese are associated with a greater risk for a number of diseases such as heart disease, diabetes, cancer and several others. Life expectancy can be greatly reduced by the increased body weight as well.

**Heart disease.** The incidence of increased coronary heart disease, increased triglycerides and decreased high density lipoproteins (HDL or “good” cholesterol) cholesterol is increased in overweight and obese individuals. There is an increase of 3.6 times risk of coronary heart disease for each unit increase in Body Mass Index (BMI) (Kopelman, 2007). BMI is a formula that uses height and weight to calculate body fat of an individual. If an individual’s BMI was 27 and it is now 28, the individual is 3.6 times more likely to have coronary heart disease. Hypertension or high blood pressure is another great concern related to heart disease. As weight increases, the risk for hypertension also greatly increases. Sixty-six percent of hypertension is linked to excess weight and 85% is associated with a BMI of greater than 25 (Kopelman, 2007).

One study (Kannel, Wilson, Nam, & D’Agostino, 2002) examined the prevalence of clusters of risk factors for heart disease related to being overweight or obese. Risk factors for heart disease included age, total cholesterol, HDL (“good” cholesterol), type II diabetes, increased heart rate, history of smoking, and high blood pressure. The sample included 2,048 overweight individuals and 731 obese individuals. Being overweight occurred in isolation of other heart disease risk factors in 22.0% of men and 16.4% of women. Being obese occurred in isolation in 12.8% of men and 9.0% of women. Clusters of two or more risk factors were found in 41.2% of overweight men and 47.5% in overweight women. Two or more risk factors occurred in 56% of obese men and in 62.4% of obese women. This study revealed that overweight and obesity increased the likelihood of developing several risk factors for heart disease such as high blood pressure, increased cholesterol, and diabetes.

**Diabetes.** Another comorbidity that occurs with overweight and obesity is type II diabetes. Over 80% of people with diabetes are overweight or obese (U.S. Department of Health and Human Services, 2007). The risk of developing diabetes is estimated to be three times higher for an obese individual than a healthy individual (Thompson, Edelsberg, Colditz, Bird, & Oster, 1999). When an individual gains weight, the fat cells gained associate poorly with insulin, decreasing the effectiveness of insulin in the body. Type II diabetes develops because an individual is no longer able to produce enough insulin to be effective with the added fat cells. Fortunately, diabetes is one disease that may be overcome through weight loss and diet.

**Cancer.** Some cancers such as endometrial, colon, gallbladder, prostate, kidney, and postmenopausal breast cancer are associated with being overweight and obese. Ten percent of all cancer deaths among non-smokers are related to obesity (Kopelman, 2007). Being overweight or obese is thought to increase the risk of developing cancer through the effects on hormones, specifically estrogen. For many of the cancers, the link between obesity and the cancer is not well-understood (Field, Barnoya, & Colditz, 2002).

**Other comorbidities.** There are several other comorbidities associated with being overweight and obese. One is arthritis. For every two pounds increase in weight the risk of developing arthritis is increased by 9 to 13% (U.S. Department of Health and Human Services, 2007). Losing weight can improve the symptoms of arthritis. Also, breathing problems can occur such as sleep apnea and asthma. In addition, increased weight is associated with infertility and difficult pregnancies. Finally, overweight and obese individuals are at an increase risk of liver and gall bladder disease (U.S. Department of Health and Human Services, 2007).

## **Life Expectancy**

Being overweight and obese with the addition of comorbidities also influences an individual's life expectancy. An estimated 300,000 deaths per year may be attributable to obesity. Individuals who are obese have a 50 to 100% increased risk of premature death from all causes, compared to healthy weight individuals (U.S. Department of Health and Human Services, 2007). The simple equation is that as weight increases, life expectancy decreases.

Peeters et al. (2003) examined the reductions in life expectancy and increases in premature death associated with overweight and obesity at 40 years of age. This prospective cohort study followed 3,457 participants in the Framingham Heart Study from 1948 to 1990. Findings revealed that an overweight 40-year-old female nonsmoker lost 3.3 years of life and 40-year-old male nonsmokers lost 3.1 years related to their weight. For 40-year-old obese nonsmokers, life expectancy was diminished by 7.1 years for females and 5.8 years for males. An individual's BMI at ages 30 to 49 years predicted mortality after ages 50 to 69 years. Overall, the study concluded that being overweight and obese in adulthood was associated with large decreases in life expectancy and increases in early mortality.

Increased weight is detrimental to an individual and weight management is an important issue. Weight management is not a new problem in the United States. In fact, weight management approaches have been around since the 1960's (Cooper & Fairburn, 2002). While the problem is not new, there is still no proven strategy to fight the problem. The great majority of individuals return to their pre-treatment weight within three years of completing a weight management program (Cooper & Fairburn, 2001).

Individuals often fail to maintain behavioral changes that are used during their weight loss treatment and begin to fall back to old patterns and habits. The reason for failure to maintain behavioral changes is unclear. Whether it is due to loss of knowledge and skills, loss of motivation, aversive side effects of behavior change or other variables remains a mystery in research on long-term weight loss (Jeffery et al., 2000). Behavioral treatment that has focused on long-term treatment after weight loss appears to only to delay rather than prevent weight regain (Wadden, Crerand, & Brock, 2005). A new approach to weight management is needed.

### **Problem Statement**

Current weight loss programs have been unsuccessful in sustained weight loss. Perhaps a different approach to weight management is needed. This study examined a different approach to weight loss using a self-management approach that has been used in treating several chronic disease processes. A self-management approach has not been used in weight loss before; its applicability to the chronic disease of obesity has not been determined. The purpose of this study was to evaluate a self-management weight loss program and provide some insight into factors that may need to be addressed when designing a weight loss program.

### **Research Questions**

This research study explored whether relationships exist amongst participation in a self-management weight loss program and weight change, patient activation, health distress, and behavioral change. The purpose of this study was to evaluate a self-management weight loss program and provide some insight into factors that may need to be addressed when designing a weight loss program. Several questions were explored in

this study. The primary question in this research study focused on the relationship between participation in a self-management weight loss program and outcomes related to weight change, patient activation, health distress, and behavioral change. Related to this question are several specific questions. The specific questions along with their respective hypotheses are as follows:

1. What is the relationship between participation in self-management weight loss program and weight change?

Hypothesis 1: Participation in a self-management weight loss program will be a significant positive predictor of weight loss.

2. What is the change in weight from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?

Hypothesis 2: Weight will be significantly less at program completion (and follow-up) than at baseline.

3. What is the relationship between the participation in self-management weight loss program and patient activation, health distress, and behavioral change?

Hypothesis 3: Participation in a self-management weight loss program will be a significant positive predictor of patient activation.

Hypothesis 4: Participation in a self-management weight loss program will be a significant negative predictor of health distress.

Hypothesis 5: Participation in a self-management weight loss program will be a significant positive predictor of behavioral change.

4. What is the change in patient activation from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?

Hypothesis 6: Patient activation will be significantly higher at completion of the self-management weight loss program than at study onset.

### **Glossary of Terms**

Several terms need defining for the understanding and clarification of this study, the following is a glossary of important terms used in this study.

Table 1  
*Glossary*

Term	Definition
Body Mass Index (BMI)	A measurement of the relative percentage of fat and muscle in the body based on a formula using an individual's height and weight.
Obese	Any individual with a BMI greater than or equal to 30.
Overweight	Any individual with a BMI between 25 and 29.9
Metabolic Syndrome	“An insulin-resistant state characterized by a cluster of cardiovascular risk factors, including various combinations of abdominal obesity, glucose intolerance, hypertension, and dyslipidemia” (Johnson & Weinstock, 2006, p. 1615).
Comorbidity	A disease that exists at the same time as the primary disease in the same person.

*Glossary (continued)*

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Term	Definition
Self-management	“Having or being able to obtain, the skills and resources necessary to best accommodate to a chronic disease and its consequences” (Holman & Lorig, 1992, p. 309)
Patient Activation	“A person’s knowledge, skill, and confidence for managing one’s own healthcare” (Mosen et al., 2006, p. 21).
Health Distress	The level of perceived grief, anxiety, or unhappiness and the ability to cope with changes in health status.

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## Chapter Two: Literature Review

There has been a great deal of research conducted in the area of weight management. Interventions have focused on surgery, medications, and lifestyle modifications. Lifestyle modifications primarily consist of behavioral modification strategies. A review of behavioral modifications strategies and the adult learning theories related to weight loss will be examined. In addition, self-management education is explored in relation to this study. Finally, a hypothesized model is used to explain this research, followed by a summary of key concepts.

### **Background on Weight Loss Interventions**

Current strategies for approaching weight loss are based on the severity of the weight gain. Treatment strategy is selected by the individual's BMI, health risks, and history of weight loss efforts (Wadden & Osei, 2002). A normal BMI is 18.5 to 24.9. Any individual with a BMI between 25 and 29.9 is considered overweight and a BMI of 30 or greater is considered obese. Current options for weight management include surgery, medication, and lifestyle modifications.

**Surgery.** Surgery is an option for a small population of obese individuals. Typically, surgery is reserved for individuals with BMIs of 40 or greater. Surgery may also be an option for an individual whose BMI is between 35 and 39.9 and who has comorbidities (Fabricatore, 2007). A meta-analysis (Maggard et al., 2005) of surgical treatment of obesity concluded that surgery was more effective than nonsurgical treatment for weight loss and control of some comorbidities in individuals with a BMI of 40 or greater. Weight loss from surgery on average produced a loss of two-thirds of excess weight within one to two years. Weight loss of this magnitude can correct

comorbidities of diabetes, high blood pressure, sleep apnea, and high cholesterol (McTigue et al., 2003). An inability to lose at least 40% of excess weight with surgery would be considered a failure. Between 10 and 15% of individuals regain lost weight or fail to achieve an acceptable weight loss following surgery (Latifi, Kellum, DeMaria, & Sugerman, 2002).

**Medications.** While surgery may be an excellent option for severe obesity, many individuals will never be candidates for surgery. Medications are recommended for individuals who have a BMI of 30 or greater. In addition, medications are an option for individuals with a BMI between 27 and 29.9 and who also exhibit comorbidities (National, Heart, Lung and Blood Institute, 1998). Medications are typically used for individuals who have failed to reach weight loss goals with lifestyle modifications alone. The use of medications typically has maximum effect when combined with lifestyle modifications of a healthy diet and exercise (Jeffery et al., 2000). The use of medications is not the magic fix for weight loss, but requires diligence in diet and exercise as well.

The amount of weight loss attributable to medication is less than 10 pounds a year (Snow, Barry, Fitterman, Qaseem, & Weiss, 2005). Medications appear to be effective for about nine months, after which weight regain occurs (Glenny, O'Meara, Melville, Sheldon, & Wilson, 1997). Pills are not a long-term answer to weight loss. A meta-analysis (Zhaoping et al., 2005) of pharmacologic treatment of obesity revealed that medications could lead to modest weight loss at one year, but data on long-term effectiveness and safety was lacking. Individuals should be cautious about taking these medications for long period of time.

**Lifestyle modifications.** While medications may be an option for weight loss, the cornerstone of all weight loss strategies is lifestyle modifications. Lifestyle modifications include changes in diet, increasing physical activity and behavioral therapy, which provides methods for overcoming barriers to compliance with dietary and physical activity changes (National, Heart, Lung and Blood Institute, 1998). Lifestyle modifications are recommended for all individuals with a BMI of 30 or greater. In addition, individuals with a BMI between 25 and 29.9 with comorbidities should begin lifestyle modifications. Typical programs incorporate a 1200 kcal/day diet, increased exercise, and behavioral modifications and produce about a 10% loss of initial body weight among those individuals who complete treatment (Cooper & Fairburn, 2001). Lifestyle modification is the most common approach to weight management. The idea is to teach individuals proper dietary habits as well as, how to incorporate more physical activity into their lives, and to learn how to make these changes permanent. Patient education focuses on teaching the individual these skills.

Although there is no proven strategy for weight management, a comprehensive program seems to be the best lifestyle modification approach. According to the U.S. Preventive Services Task Force (2004), “the most effective interventions combine nutrition education and diet and exercise counseling with behavioral strategies to help patients acquire skills and supports needed to change eating patterns and to become physically active” (p. 95). Individuals treated with a comprehensive program lose about 10% of initial weight in 30 weeks of treatment and about 80% complete their treatment programs (Wadden et al., 2005). Most comprehensive programs occur in large clinical research centers and require weekly meetings for 16 to 26 weeks. The classes are

delivered to groups of 10 to 20 people in classes that last 60 to 90 minutes (Fabricatore & Wadden, 2005). The weekly classes typically focus on diet, exercise, and behavioral treatment.

Besides diet and exercise, most comprehensive programs focus on behavioral treatment. Behavioral treatments for obesity have been around since the 1960s and have evolved to include cognitive approaches as well (Cooper & Fairburn, 2002). This behavioral component seems to have the greatest variance amongst programs because of the large variety of strategies used in treatment. No single method or combination of behavioral strategies has proved to be clearly superior (Lang & Froelicher, 2006) and because of this each comprehensive program takes a unique approach. This element is also where a large amount of patient education occurs. Classes, weekly readings from a treatment manual, and homework assignments can be used to help with the adoption of new behaviors (Wadden, Butryn, & Byrne, 2004).

### **Behavioral Modification Strategies**

A variety of behavioral modification strategies have been incorporated into weight loss programs and some strategies have been researched. Related research has focused on the behavioral modification strategies of self-monitoring, stimulus control, goal setting, incentives, and social support in weight loss and maintenance. Cognitive strategies have also been used in conjunction with behavioral approaches and are discussed below in the section focused on cognitive therapies. Most of these approaches are used in combination, but will be explored separately.

This review of the literature in relation to behavioral modification in weight loss focused on only adult participants using specific behavioral approaches to lose or

maintain weight loss. Children and adolescent studies were excluded as well as studies that only focused on diet and exercise. In addition, only studies published in English were reviewed.

**Self-monitoring.** The single most important component of behavioral therapy is self-monitoring (Fabricatore & Wadden, 2007; Wing & Gorin, 2004). Self-monitoring involves keeping a diary of food consumed, when and where the food was eaten, and the emotions and moods that are associated with the situation. In addition, an individual keeps an exercise diary. This process helps reveal patterns in eating behaviors and exercise and provides targets for intervention (Wadden et al., 2005). Many individuals eat without realizing the amount of calories consumed or the reason for eating. For example, a person may always eat chips during a favorite television show. A diary would help reveal this pattern.

Baker and Kirschenbaum (1993) examined the relationship between self-monitoring and weight control in 56 participants in an 18-week behavioral weight loss program. About 66% of participants monitored food for the entire day more than half of the days and 25% did not monitor on most days. Monitoring of any food consumed, time food was eaten, quantity of food, and grams of fat correlated significantly with weight change ( $r$  range = .54-.65,  $p < .001$ ). Additionally, not monitoring was negatively associated with weight change ( $r = -.41$ ,  $p < .01$ ). One other finding of interest was participants lost more weight on their “best” weeks of monitoring, compared to their “worst” weeks of monitoring.

In a similar study, Boutelle and Kirschenbaum (1998) explored the relationship between self-monitoring and weight control. Self-monitoring consistency, variability in

self-monitoring, and weight change were examined in 59 women and men in an eight-week behavioral weight loss program. Only 26% of the participants self-monitored all food eaten on less than half of the days in this study. Mean self-monitoring consistency correlated significantly with mean weight change ( $r = -0.35, p = 0.007$ ). In addition, participants lost more weight during their “best” weeks of monitoring than during their “worst” weeks ( $F[1,55] = 7.25, p = 0.009$ ).

Helsel, Jakicic, and Otto (2007) investigated the technique of self-monitoring and its influence on weight control. Forty-two participants took part in a sixteen-week behavioral weight loss program. The participants were randomly assigned to a traditional detailed method of self-monitoring or an abbreviated method of self-monitoring. Participants in the abbreviated method group returned significantly more entries than the traditional method ( $p = 0.04$ ). There was no significant difference in weight loss between the groups but weight loss was significantly associated with number of self-monitoring diaries completed ( $r = 0.53, p < 0.05$ ).

Another study (Butryn, Phelan, Hill, & Wing, 2007) examined the relationship between self-weighing and weight loss maintenance. Participants ( $n = 2,462$ ) of the National Weight Control Registry completed a self-weighing frequency survey upon entering the registry and then one-year later. In order to enter the registry, an individual had to have lost at least 30 pounds and kept it off for at least one year. At baseline, 36% of participants reported weighing themselves at least once per day and 43% reported weighing themselves less than daily but at least weekly. Weight gain at one-year follow-up was significantly ( $p < 0.001$ ) greater for those participants whose frequency of self-

weighing had decreased compared with those whose frequency had increased or remained the same.

Linde, Jeffery, French, Pronk, and Boyle (2005) also examined the relationships between frequency of weighing and weight loss or weight gain prevention. There were two groups in this study. One group of participants ( $n = 1226$ ) were enrolled in a weight gain prevention trial and another group ( $n = 1800$ ) were enrolled in a weight loss trial. Regular weighing of at least weekly was associated with lower BMI and greater weight loss over time in both of these groups. Also, higher weighing frequency was related with greater 24-month weight loss or less weight gain for the prevention group.

There have also been other significant findings related to self-monitoring. The consistent use of self-monitoring was also associated with long-term weight control (Elfhag & Rossner, 2005). Consistent self-monitoring could help decrease the likelihood of weight gain in high risk situations such as the holiday season (Baker & Kirschenbaum, 1998; Boutelle, Kirschenbaum, Baker, & Mitchell, 1999). Self-monitoring has also been associated with being more consistent in exercising regularly and can help with weight loss (Carels et al., 2005).

**Stimulus control.** Self-monitoring helps inform the next behavioral strategy of stimulus control. Through self-monitoring the individual is aware of cues that trigger eating. Stimulus control involves reducing the availability of cues for undesirable behaviors and increasing the cues for wanted behavior (Fabricatore, 2007). The individual begins to learn how to modify the environment to make it more conducive to healthy eating and exercise. Techniques include consciously avoiding situations in which overeating occurs, shopping from a list, and keeping high-calorie foods out of the house.

There have been no specific studies of stimulus control. The technique has only been evaluated as part of the larger behavioral package (Wadden et al., 2005).

One study (French, Jeffery, & Wing, 1994) examined stimulus control and whether or not there is a difference in behavioral and psychological variables in weight control related to sex differences. This study did not only look at stimulus control but a larger subset of variables. However, the authors did find that women used a significantly ( $p < .04$ ) greater number of stimulus control eating behaviors than their male counterparts. In addition, a multiple regression revealed that the utilization of stimulus control eating behavior was a significant predictor of weight loss. A high frequency of these behaviors at baseline was associated with weighing less at follow-up for both sexes. More research is needed to understand the role of stimulus control in weight loss.

**Goal setting.** Since behavioral treatment is goal oriented, another important strategy is goal setting. Individuals learn how to identify a goal and establish a specific plan towards reaching the goal. Goals should be observable behaviors, time limited, and realistic yet moderately challenging. For example, instead of a goal being stated as, “I will increase my physical activity,” the goal could be, “I will walk for 15 minutes a day at least 5 days this week.” The goals can then be reassessed weekly and changed to reflect the progress the individual has made. It is important that short-term goals are based on behavior rather than weight (Foster, Makris, & Bailer, 2005). Decreasing weight is the larger goal, but the importance is establishing behaviors that can be used to manage weight for a lifetime.

Knauper, Cheema, Rabiau, and Borten (2005) examined the relationship of self-set dieting rules for achieving dieting goals. One hundred thirty-two females, at baseline

and then two months later, individually recorded the eight rules that they followed during their present diet, BMI, and weight loss. About 27% of the sample reported the same dieting rules at both times. The more the individual reported rules related to reducing calories and exercising and sustaining these rules, the more likely the individual was to reach her weight loss goal.

Nothwehr and Yang (2007) investigated whether changing the frequency of goal setting affects the use of behavioral strategies for weight loss in a sample of 385 adults. A survey was completed at baseline and one-year by each participant that asked about goals, weight management, dietary intake, and physical activity. Frequency of goal setting about body weight was significantly ( $p < 0.0001$ ) and positively correlated with dietary strategies and physical activities. Frequency of goal setting about diet was significantly and positively related ( $p < 0.0001$ ) to all diet strategies. In addition, goal setting about physical activity was positively and significantly ( $p < 0.0001$ ) related to all physical strategies. The authors concluded that frequent goal setting was predictive of the individual actually using strategies to lose weight.

A review (Shilts, Horowitz, & Townsend, 2004) of goal setting research specific to diet and physical activity among adults revealed 23 studies. The studies were categorized into three categories: goal setting effectiveness, goal setting characteristics effectiveness, and goal setting intervention evaluation. Thirteen studies were related to goal setting effectiveness but only eight supported the effectiveness of goal setting. Although the authors reported statistically significant effect, the sample sizes were small in all of the studies. Six studies focused on goal setting characteristics effectiveness. Two supported this category, while the other four were not conclusive for this category.

Finally, the intervention category had four studies that identified positive outcomes but there were insufficient data to fully support this goal setting intervention evaluation. The authors concluded that further research was needed in goal setting.

Bagozzi and Edwards (2000) examined the process of implementing goal intentions in 141 university students. Students that indicated their goal was to lose weight were asked to complete a survey at baseline and one month later related to their goals about diet and physical activity to lose weight. The survey assessed self-efficacy (confidence in performing the goals), outcome expectancy (how likely they thought the goal would lead to weight loss), affect towards means (like/dislike of activity), performance of goal-directed behaviors, and goal attainment. Using multiple regression, this study revealed that for relatively easy-to-implement goal-directed behaviors either self-efficacy, outcome expectancy, or affect was ample to perform the goal. For more difficult goals, self-efficacy, outcome expectancy and affect were all needed to perform the goal. Goal initiation and completion may need to be a combination of several factors depending on the difficulty of the goal.

**Incentives.** Incentives are another behavioral strategy that may help reinforce the positive aspects of weight loss. Some weight management programs encourage individuals to reward small positive changes with pleasant activities or material goods. This positive reinforcement should occur soon after the accomplishment is met (Levy, Finch, Crowell, Talley, & Jeffery, 2007). For example, if an individual sets a goal of 10 pounds, then upon reaching that goal the individual will then treat him or herself to a new outfit or that piece of sports equipment he or she wanted. The purpose is to recognize the goal attained and provide reinforcement to motivate the individual to meet the next goal.

Weight loss programs have also used incentives such as money to encourage weight loss and participation in programs.

Mavis and Stoffelmayr (1994) compared five different strategies of monetary incentives in a behavioral weight management program. One hundred and one participants were randomly assigned to one of five different groups in a 10-session/14-week behavioral weight loss program. Group 1 was an attendance-contingent group, in which participants received a monetary incentive for each session that they attended regardless of weight loss. Group 2 was a monetary reward program, in which each time a participant made their weight loss goal for the session they received a monetary incentive. Group 3 was a monetary response cost group that received all of their money upfront and were docked money each time they did not reach their weekly weight loss goal. Group 4 was a lottery reward group, in which participants earned a chance in a lottery for each time they made their weekly weight loss goal. Finally, Group 5 was a lottery response cost group, in which participants started with ten chances for a lottery and were fined one chance per week that they did not reach their weekly weight loss goal. Amongst the five groups, there were no statistically significant differences in weight loss, class attendance, or weigh-in attendance. One significant finding was that over half of the participants in the monetary response cost group dropped out before the conclusion of the program.

Another study (Finkelstein, Linnan, Tate, & Birken, 2007) evaluated three different incentive payout schedules to encourage weight loss for overweight participants. Two hundred seven participants were randomly assigned to one of three groups: (a) back loaded, participants received no cash incentives at 3 months for weight loss and at 6

months \$14 per 1 percent of baseline weight loss, (b) front loaded, participants received \$14 per 1 percent of baseline weight at 3 months and no cash incentives at 6 months, and (c) steady payment, participants received \$7 for 1 percent at 3 months and 6 months. The front loaded group lost an average of 2.7 pounds more than those in the back loaded group ( $p < 0.05$ ) and 1.9 pounds more than those in the steady payment group ( $p = 0.05$ ). In addition, 17% of the front loaded participants achieved a clinically significant weight loss of 5%, compared to 4% in the back loaded and 8% in the steady payment group.

A quasi experimental study (Butsch et al., 2007) examined the effect of offering a reimbursement incentive on three aspects: the percentage of inquirers who enrolled in a weight loss program, weight loss, and program attendance among enrollees. Of the 401 people who inquired during the study periods, 24.5% enrolled in the intervention and 25% enrolled in the control group. The intervention consisted of an incentive for 50% (\$150) reimbursement of the total program cost if the participants attended 10 of 12 classes and lost at least 6% of their current body weight. There were no statistically significant differences between the two groups in percentage of weight loss or program attendance.

Jeffery, Wing, Thorson, and Burton (1998) found that offering incentives to participants increased the exercise session attendance in a weight loss program. Although some studies have found benefits, several studies have found no evidence for the benefits of using incentives in weight loss programs (Jeffery & Wing, 1995; Jeffery et al., 1993). Because of these mixed results, further research is needed in the use of incentives in weight loss.

**Social support.** Social support may play a role in weight loss and weight maintenance. Social support can be viewed as the help and support from other individuals. A group may help keep an individual on track of weight loss goals through encouragement, active participation with the individual, and as an outlet to express concerns, frustrations, and fears. The social support can be self-selected or be a group of strangers who are all beginning the weight loss process. Establishing a social network during weight loss is another possible behavioral strategy.

Wing and Jeffery (1999) explored the benefits of social support and a social support intervention in weight loss and long-term maintenance. One hundred and sixty-six participants were recruited either alone or with three friends or family members. These participants were then randomly assigned either alone or with their support group to one of two treatment groups: a standard behavioral intervention for weight loss or the standard behavioral intervention plus a social support intervention. The recruitment strategy and the social support intervention influenced completion of the program and weight loss maintenance. Participants enrolled with family/friends had greater weight loss at four months and at 10 months follow-up. Ninety-five percent of the participants recruited with a support group and given the social support intervention completed the treatment and 66% maintained their weight loss in full. In participants recruited alone and given the standard treatment, only 76% completed the treatment and 24% retained their weight loss in full. In addition, the social support intervention in itself increased the percentage of participants' completion by 23 percentage points.

Another study (Gorin et al., 2005) assessed whether the number of weight loss partners or the success of the weight loss partners in weight loss influenced the

participants' outcomes in a behavioral weight loss intervention. Participants in this correlational study ( $n = 109$ ) asked up to three weight loss partners to attend and participate in a weight loss program. The total number of partners (0 to 3) had no relationship with the participants' weight losses at 6, 12, or 18 months. Participants with at least one partner, who lost at least 10% of their body weight in 6 months, lost significantly ( $p = .004$ ) more weight at 6, 12, and 18 months compared to those without partners or no partners with a sizable ( $> 10\%$  of body weight) amount of weight loss. The number of support partners was not as significant as the success of the support partner in the weight loss intervention.

**Cognitive therapy.** Over the decades of behavioral treatment of obesity, cognitive skills or cognitive therapy has been introduced to supplement the other behavioral strategies. There has been great debate about the union of cognitive and behavioral therapies in weight management. Some professionals see cognitive therapy as a separate approach to weight management, while others see cognitive therapy as a useful supplement to already established behavioral treatments (Cooper & Fairburn, 2001). The important distinction between cognitive and behavioral therapies is that cognitive focuses on cognitive changes and behavioral is looking for behavioral change. With this in mind, it would seem that both therapies would be important in weight management.

One cognitive approach is problem-solving. Problem-solving is the process of self-correcting problem areas related to eating and physical activity (Lang & Froelicher, 2006). This therapy is important to help appraise why goals are not being met and what is the best approach for reaching the goals. Fabricatore and Wadden (2005) recommend a step-by-step approach to overcoming obstacles to goals: (a) define the problem in detail,

(b) brainstorm possible solutions, (c) weigh the pros and cons of each alternative, (d) select the most appropriate strategy, and (e) implement a solution and evaluate the results. Problem-solving is a skill to be learned and requires a great deal of practice. This skill is important for long-term maintenance to help deal with unanticipated setbacks and challenging situations.

One study (Perri et al., 2001) explored the use of relapse prevention training and a problem-solving model in weight management. Eighty obese women first completed 20 weekly group sessions of a standard behavioral weight loss program. Participants were then randomly assigned to one of three treatments: standard behavioral treatment, relapse prevention training, or problem-solving therapy. Relapse prevention training consisted of biweekly didactic meetings that focused on identifying personal high-risk situations for lapses, practice coping with high-risk situations, using problem-solving techniques, cognitive restructuring, and planning for long-term maintenance. Problem-solving therapy also consisted of biweekly meetings but a leader led the group in group problem-solving with the goal of creating a solution for dealing with one of the problems described by a group member. There were no significant weight changes between the standard behavior therapy and relapse prevention training or between relapse prevention training and problem-solving therapy. Problem-solving therapy did have significantly ( $p = .019$ ) greater weight loss reductions than the standard behavioral therapy. More research is needed related to problem-solving in weight loss programs.

One other trend in cognitive therapy is cognitive restructuring. Many individuals beginning weight management program are unrealistic in their thoughts and beliefs about weight loss. Cognitive restructuring is the process of “modifying negative thoughts,

unrealistic goals, and inaccurate beliefs about weight loss and preparing in advance for relapses” (Lang & Froelicher, 2006, p. 110). There are three categories of thoughts that are typically addressed in cognitive restructuring: (a) the impossibility of successful weight control, (b) unrealistic eating and weight goals, and (c) self-criticism in response to overeating or gaining weight (Fabricatore & Wadden, 2005; Wadden et al., 2005). By challenging and correcting these thoughts with more rational thoughts, an individual can increase their confidence in maintaining weight, therefore increasing their self-efficacy related to weight management.

Ames et al. (2005) conducted a randomized pilot study to examine the effects of a cognitive restructuring intervention to modify unrealistic expectations during weight loss and its impact on appearance, attractiveness, and self-esteem. Overweight and obese women ( $n = 28$ ) completed 10 sessions of a standard behavioral weight loss program and then were randomly assigned to 10 additional sessions of the standard program or 10 sessions of the cognitive restructuring intervention. After completion of the treatments, the cognitive restructuring participants had more realistic weight loss expectations, decreased motivation to lose weight as a means of improving self-confidence, and an increase in overall self-esteem compared with the standard treatment group (all  $ps < .05$ ). There were no significant differences in weight loss or long-term maintenance between the two groups.

Although there are many behavioral therapies available, research has focused on using different combinations to try to reach ideal weight management. The comprehensive program of diet, exercise, and behavioral therapy is still recommended as the best treatment option over the decades. As can be seen, further research is needed in

all behavioral strategies. The trends have been on using a flexible diet, encouraging lifestyle activities in exercise, and in incorporating cognitive therapy into established behavioral treatments. While it is currently the best option, it is not necessarily successful in maintaining long-term weight loss.

### **Adult Learning Theory and Weight Loss**

Many principles of weight loss management are based on adult learning theories; specifically, the behavioral modification strategies are based on learning theories. A brief review of behaviorism, cognitivism, and the principles of andragogy are important in understanding weight loss strategies. For the purpose of this research, the theory of social cognitivism will be used to guide this study.

**Behaviorism.** Behaviorism focuses on three assumptions. First, learning is evident by a change in behavior. Second, the environment shapes behavior. Finally, learning occurs through associations and bonds created between behaviors and the reinforcements that encourage the association (Merriam & Caffarella, 1999). For example, if an individual takes a two mile walk and wakes up extremely sore the next day, the individual associates pain with taking a walk and decides to stop this activity. The specific theories of classical and operant conditioning are especially used in weight management education (Fabricatore, 2007).

A tool used in many comprehensive programs based on behaviorism is the ABC model, Antecedents-Behavior-Consequences (Brownell, 2004). Antecedents are “events, situations, thoughts, and feelings that occur before behaviors such as eating or being inactive” (p. 70). Behavior refers to the specific action and thoughts and feeling during the action. Consequences are the events, thoughts, attitudes, and feelings following the

behavior. This analysis allows an individual to become aware of problem areas that may need intervention and to work on approaches for changing the behavior. The behavioral strategies of self-monitoring, stimulus control, setting goals, and incentives are important when using this model.

**Cognitivism.** Cognitivism is based on the learning occurring within the learner. Learning is not simply exhibiting a behavior, but involves internal mental processes such as insight, information processing, memory, and perception. The overall purpose of education in this theory is to develop capacity and skills to learn better (Merriam & Caffarella, 1999). For weight management, the individual learns the skills and capacity to understand weight struggles and pitfalls and how to work with these issues. The individual learner has control over the learning because it is an internal process. The treatment strategies of problem-solving and cognitive restructuring are based on cognitivism. These strategies help the patients to set realistic goals, evaluate the process of eating healthy and increasing activity, and to correct negative thoughts that occur when they do not meet their goals (Foster, Makris, & Bailer, 2005).

**Andragogy.** Andragogy is a humanistic approach of learning and is based more on a set of assumptions. Debate has focused on if it is an actual theory or a set of assumptions (Merriam & Caffarella, 1999). Andragogy is the how, why, and what of adults' learning. This theory is based on five assumptions about the adult learner. First, the self-concept of the adult learner moves from being dependent to autonomous and self-directed. Second, an adult's previous experiences serve as rich resources for learning. Third, readiness to learn of an adult is related to the developmental tasks of his or her social role. Additionally, adults desire learning for immediate application. Adults are

more problem-centered in orientation. Finally, adults are motivated to learn by intrinsic factors and personal payoff (Knowles, Holton, & Swanson, 1998).

Andragogy can be applied to most weight loss programs. First, many people with weight problems are looking for immediate application of the knowledge to their own lives. Weight management is problem-orientated and most people are hoping to battle the problem of excessive weight. Practical answers to weight loss and practical application are important. An individual's past experience with weight loss will influence how the individual pursues weight management and their willingness to try different approaches. For example, if an individual has been through a commercial program and failed, he or she may now be actively seeking information about alternative approaches and may be reluctant to try a commercial program again. Personal payoff is a huge component of any weight loss program. If an individual is not seeing the pounds melt off, an individual is more likely to pursue a different approach or seek out additional resources. The assumptions of andragogy should be incorporated into any weight loss program because these individuals are adult learners.

**Social cognitive theory.** Although many theories are applicable to weight loss, this study focuses on another adult learning theory that has been used in weight management and is critical for self-management education, Albert Bandura's social cognitive theory. According to the theory, the likelihood of behavior change is affected by three factors: self-efficacy, outcome expectations, and goals (Bandura, 1998). Self-efficacy is the primary source of action in this theory. Self-efficacy affects one's confidence to learn, one's motivation, and one's power and determination to face obstacles. Self-efficacy influences the other factors in behavior change by "determining

the goals people set for themselves, the strength of commitment to them and the outcomes they expect for their efforts” (Bandura, 1998, p. 624). By increasing self-efficacy, an individual can increase the likelihood of changing behaviors because the individual will have more confidence in overcoming obstacles, setting and reaching goals. Based on social cognitive theory, it would seem that a self-management approach to weight loss that focuses on increasing self-efficacy and providing individuals with skills to manage their own health could be a successful option for weight loss and maintenance.

### **Background on Self-Management Education**

As noted earlier, no single method or combination of behavioral strategies has proven to be clearly superior (Lang & Froelicher, 2006). In fact, the great majority of individuals return to their pre-treatment weight within three years of completing a weight management program (Cooper & Fairburn, 2001). Individuals often fail to maintain behavioral changes that are used during their weight loss treatment and begin to fall back to old patterns and habits. The reason for failure to maintain behavioral changes is unclear. Whether it is due to loss of knowledge and skills, loss of motivation, aversive side effects of behavior change or other variables remains a mystery in research on long-term weight loss (Jeffery et al., 2000). Behavioral treatment that has focused on long-term treatment after weight loss appears to only delay rather than prevent weight regain (Wadden et al., 2005).

The problem is that being overweight is seen as a temporary condition, when it should be viewed as a chronic disease. Being overweight and obese has to be treated as a chronic condition, just like asthma, diabetes, and high blood pressure. Weight

management is a life-long process and individuals need to accept that it will be a struggle for the rest of their life. The focus of being overweight must be viewed as a chronic condition, something that will not just disappear, but instead be managed throughout life. Weight management needs to move to a different approach that focuses on the chronic nature of the condition. This is why self-management is a viable option.

Holman and Lorig (1992) introduced the idea of self-management in chronic diseases. Self-management means “having or being able to obtain, the skills and resources necessary to best accommodate to the chronic disease and its consequences” (p. 309). Weight management can be seen as a chronic condition because lifestyle changes and strategies must be used throughout life to ensure that weight regain does not occur. To fully utilize the self-management approach, it requires an individual to have knowledge of the chronic condition, a development of self-management skills and an integration of self-management and professional medical management.

There are five core skills related to self-management: problem-solving, decision making, resource utilization, forming of patient/health care provider partnership, and taking action (Lorig & Holman, 2003). These skills can be developed through self-management education. Self-management education can help develop an understanding of the suitability and importance of managing one’s own weight, a development of the skills and confidence in using self-management in weight management and the coordination of self-management practices with a health care provider (Holman & Lorig, 1992).

Ideally, a self-management approach to weight loss would help increase an individual’s self-efficacy to implement some control over their weight and how it affects

their lives. Self-efficacy is the confidence an individual has that he or she can carry out a behavior to reach a goal (Bodenheimer, Lorig, Holman, & Grumbach, 2002). “Self-efficacy influences what people chose to do, their motivation, their perseverance in the face of difficulty, the self-enhancing or self-hindering nature of their thought patterns, and their vulnerability to stress and depression” (Holman & Lorig, 1992, p. 315). If learning self-management can foster self-efficacy related to weight loss, an individual may be more successful in long-term weight maintenance.

The self-management approach has not been researched specifically in weight management. A self-management approach to weight loss would ideally focus on teaching about self-management skills, viewing weight problems as a chronic condition, and learning and practicing appropriate self-management behaviors. Diet and physical activity will still remain important components in this approach, but behavior strategies would focus on self-management skills. These self-management skills include establishing realistic expectations and emotional response to the illness, interpreting and managing weight changes, learning ways to solve problems as they occur, communicating with health professionals, and using community resources (Holman & Lorig, 1992). Education would begin with a focus on diet, physical activity, and self-management information. Follow-up would occur in collaboration with a health care team of physicians, dieticians, and nurses. Ideally, the individual would learn the best way to collaborate with the team and learn how to manage their own weight. The self-management approach will be different than traditional approaches because the focus is on the long-term nature of being overweight, the collaboration with health providers, and the combination of behavioral and cognitive strategies.

Although research is limited related to weight management and self-management, the self-management approach has been used with other chronic conditions such as diabetes, high blood pressure, and osteoarthritis. One meta-analysis (Chodosh et al., 2005) revealed that self-management programs for diabetes and hypertension produced clinically important benefits. Self-management in osteoarthritis did not appear to be beneficial for pain or function. Another review of the literature (Warsi, Wang, LaValley, Avorn, & Solomon, 2004) reported similar findings. Research on self-management in chronic conditions in general demonstrated statistically significant improvements in health behaviors such as symptom management, communication with physicians, improvement in self-efficacy, health distress, and fewer visits to the emergency department (Farrell, Wicks, & Martin, 2004; Lorig et al., 2001; Lorig, Sobel, Ritter, Laurent, & Hobbs, 2001).

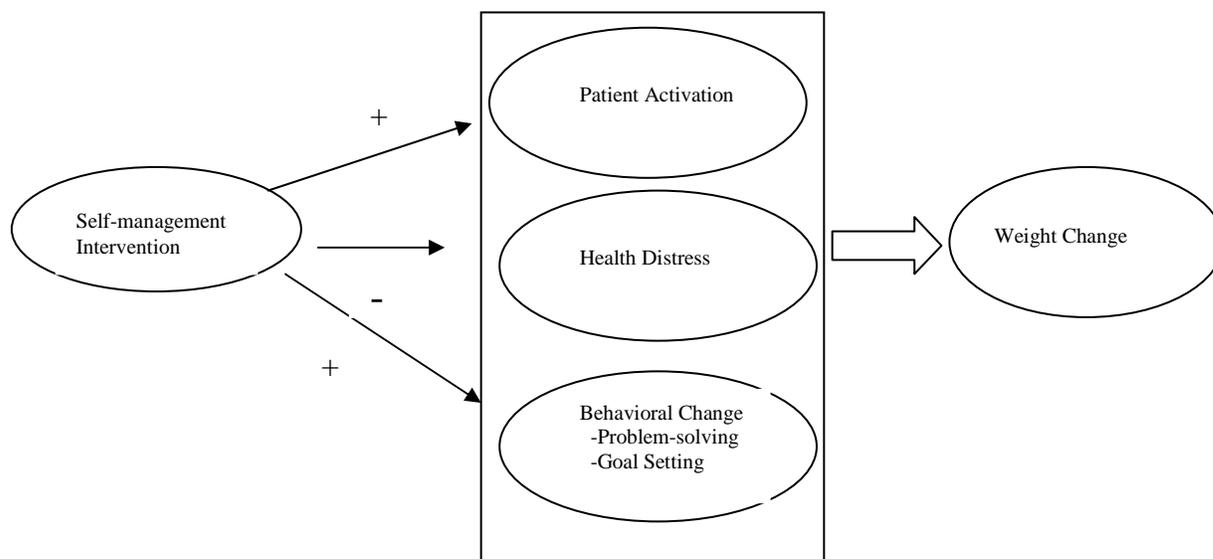
Several research studies indicate that self-management education could be used in weight management. Ideally, self-management would allow individuals to take control over their weight condition, feel less distressed about the condition, and provide them with the tools and resources necessary to lose weight and keep it off. Only through research will the application of this approach be understood.

### **Hypothesized Model**

This research explored the relationship between self-management and several variables. A self-management intervention in obesity would ideally work on several areas. One area is patient activation. Patient activation is “a person’s knowledge, skill, and confidence for managing one’s own healthcare” (Mosen et al., 2006, p. 21). As activation increases, an individual is more knowledgeable, more skilled, and more

confident in handling their behavior. Self-management education is geared specifically at these aspects. Another area that could be affected by the self-management education is health distress. Health distress is the level of perceived grief, anxiety, or unhappiness and the ability to cope with changes in health status. Self-management education in weight management would focus on realistic expectations and emotional responses of the disease and ideally decrease the distress related to dealing with increased weight. One final area self-management focuses on is behavioral change through problem-solving and the use of goal setting. These behaviors have been used in weight management before and are important in the management of this chronic condition (Fabricatore & Wadden, 2005). Problem-solving is a core skill of self-management and goals are critical for behavioral change (Bandura, 1998).

Based on social cognitive theory and the principles of self-management, a hypothesized model for this research study was developed.



*Figure 1.* Model of self-management in weight loss.

Table 2  
*Summary of Key Concepts*

	Self-management	Patient Activation	Problem-solving	Goal setting	Heath Distress
Bodenheimer et al. (2002)	“Takes place in the realm of patient education and includes a plan that provides patients with problem-solving skills to enhance their lives” (p.2470).	“Greater patient confidence in capacity to make life-improving changes yields better clinical outcomes” (p.2471).	Studies with self-management problem-solving plans have a greater tendency to improve outcomes.		
Lorig & Holman (2003)	Five core self-management skills: problem-solving, decision making, resource utilization, forming of a healthcare partnership, and taking action.		Core skill of self-management that focuses on learning basic problem-solving skills that can be adapted to many situations.		Self-management focuses on the task of emotional stability. This task focuses on “dealing with emotional sequel of having a chronic condition”(p.1).
Hibbard, Stockard, Mahoney, & Tusler (2004)		“The knowledge, skills, beliefs, and behaviors that a patient needs to manage a chronic illness. (p.1006)			Self-management helps individuals maintain functioning reducing health stress.
Wadden et al. (2005)			Behavioral therapy in weight loss is process orientated. When goals are not met, attention is devoted to finding strategies to reach goals.	Behavioral therapy is goal-oriented. Goals allow a clear assessment of progress.	
Holman & Lorig (1992)	“Being able to obtain, the skills, and resources necessary to best accommodate to the chronic disease and its consequences” (p.309).	To be effective in self-management, the individual must develop skills and confidence in using the self-management practices.	Problem-solving is a major self-management skill. “Success in dealing with new adverse situations greatly influences how a patient accommodates and manages an illness” (p. 312).		“Perceived self-efficacy influences what people chose to do, their motivation, their perseverance in the face of difficulty, the self-enhancing or self-hindering nature of their thought patterns, and their vulnerability to stress and depression” (p.315).
Wadden, McGuckin, Rothman, & Sargent (2003)			Problem-solving is key in behavior therapy for obesity. Problem-solving skills are needed to overcome barriers when working toward their goals.	Goal setting is a critical component of behavior therapy for obesity.	
Bandura & Locke (2003)		Self efficacy beliefs contribute to the level of motivation and performance.		“People set goals for themselves and anticipate likely outcomes of prospective actions to guide and motivate their efforts” (p.97).	

	Self-management	Patient Activation	Problem-solving	Goal setting	Heath Distress
Byrne (2002)		If individuals believe that they can control their weight loss, it increases the likelihood that the individual will continue in effective weight control behaviors.	Problem-solving skills help individuals cope with stressful situations.		When individuals are able to cope with stressful situations, they are more likely to adhere to weight management regime.
Kitsantas (2000)		“People are influenced by whether or not they expect that adapting new strategies will produce the desired health behavior change. People are influenced by the degree to which they believe that they have the capabilities to perform the desired health behavioral change” (p.813)		“Goal setting is important for motivation, attention, intensity, and focus in achieving optimal performance of a task” (p.812).	

### Chapter Three: Methods

A correlational research design was used in this study. The purpose of a correlational design is “to explore casual relationships between variables and to predict scores on one variable from research participants’ scores on other variables” (Gall, Gall, & Borg, 2007, p. 337). A correlational design does not establish a cause-and-effect relationship. A correlational design helps identify significant relationships amongst variables that can be then tested by using an experimental design (Gall et al., 2007). The data collected in this study examined the relationship between participation in a self-management weight loss program and weight change, patient activation, health distress, and behavioral change through measurements prior to starting the program, after completion of the program, and six months from initiating the program.

There are several advantages and disadvantages of using a correlational design. Correlational research is an efficient and effective way of collecting a large amount of data about a problem, including analyzing data about a large number of variables (Gall et al., 2007; Polit & Beck, 2010). In addition, correlational research provides information about the magnitude and direction of the relationships between variables (Gall et al., 2007). These relationships give insight into possible hypotheses for experimental research. The biggest disadvantage of correlational research is the inability to show cause-and-effect. Even relationships that are discovered can only be interpreted with caution since many other variables may influence the relationship (Polit & Beck, 2010). The lack of a control group limits interpretation of results.

## **Population and Sample**

The population for this study consisted of adults with metabolic syndrome who were receiving treatment at a medical research facility in the Midwest. Metabolic syndrome is a cluster of cardiovascular risk factors in which an individual has at least three of the following disorders affecting metabolism: high blood pressure, high blood sugar, high triglycerides, low HDL cholesterol, and abdominal obesity (Sarafidis & Nilsson, 2006). All individuals with metabolic syndrome, who were attending the Cardiometabolic Clinic at the medical research facility had the opportunity to participate in this self-management program. It was not mandatory for individuals to participate in the self-management weight loss program as part of their medical treatment; it was just one of their care options. A convenience sample was used with participants being referred from their physicians at the Cardiometabolic Clinic. The advantages of a convenience sample are: that they tend to require less time to identify, less expensive, and more flexible. Unfortunately, the use of convenience sample precludes being able to assure that the sample is representative of the population and there is an increase risk of bias (Gall et al, 2007).

The research population consisted of adult patients, 18 years of age or older, with a diagnosis of metabolic syndrome. All participants were receiving care at a medical research facility in the Midwest. Participants had to be able to attend multiple sessions in person over a six-week period. A physician provided a health clearance for each participant to partake in the exercise component of the program. In addition, all participants had to be able to read and speak English fluently. All criteria had to be met for each individual to be eligible for the study.

The total population of this study consisted of about 208 individuals with metabolic syndrome, who sought care at the Cardiometabolic Clinic. At least 36 participants were needed for this study. A minimum of 30 participants is required as a general rule in correlational research (Gall et al., 2007). Attrition is “the loss of research participants from a sample over a period of time” (Gall et al., 2007, p. 633). Attrition was a potential concern in this study. Attrition rates in research conducted during the last 10 to 15 years in weight management research have been about 20% (Teixeira et al., 2002). Because attrition was anticipated to be up to 20% in this study, the sample size was increased to 36 participants.

### **Definition of Variables**

**Independent variable.** An independent variable is “a variable that the researcher thinks occurred prior in time to, and had an influence on, another variable” (Gall et al., 2007, p. 642). The independent variable of this study was participation in a self-management weight loss program. The self-management program was a six-week program provided by staff at the medical research facility. Within the context of this study, participation was quantified in terms of the total number of sessions attended during each of the three components of the program. It was assumed that everyone would not attend all sessions of the program. One component of the self-management program was self-management classes that were offered weekly in hour-long group sessions. These classes were taught by a nurse educator who has a Master’s degree in nursing education and who focused on education and support to help individuals manage their weight. These classes provided information and self-management strategies. Strategies of self-management included problem-solving, assessing confidence to make small

behavioral changes, setting realistic goals that match confidence level, empowering individuals to take an active role in self-management, creating action plans, and reinforcing progress towards change.

The second component of the program consisted of three cooking sessions taught by a dietician. These hour-long classes focused on healthy cooking, portion sizes, and empowering of each individual to make and create healthy food options. The program's final component focused on exercise and involved working with a trainer for an hour up to five times a week for consultation, workout activities, and development of a personalized fitness plan. In addition to these three components, participants also received facility-approved printed educational materials and videos focused on behavioral change, diet, and physical fitness.

**Dependent variables.** A dependent variable is “a variable that the researcher thinks occurred after, and as a result of, another variable” (Gall et al., 2007, p. 637). One of this study's dependent variable was weight change. Weight change was defined as the percentage of weight change since initial weight measurement. Another dependent variable was patient activation. Patient activation is “a person's knowledge, skill, and confidence for managing one's own healthcare” (Mosen et al., 2006, p. 21). As activation increases an individual is more knowledgeable, more skilled, and more confident in handling their healthcare. The fourth dependent variable was health distress. Health distress is a measure of distress due to illness. The final variable was behavioral change. Behavioral change can occur through goal setting and problem-solving. Goal setting was defined as “developing the skills for defining realistic and manageable steps in the performance of a target behavior” (Nies, Hepworth, Wallston, & Kershaw, 2001, p. 349).

Problem-solving is the process of self-correcting problem areas to reach desired goals (Lang & Froelicher, 2006). Through goal setting and problem-solving an individual can create behavioral change. Descriptions of how each dependent variable was measured are provided in the following section.

### **Instrumentation and Measures**

**Participation.** Participation in the self-management weight loss program was measured through a medical chart review. After each individual completed a self-management class, exercise session, and/or cooking class, the instructor documented that participant's attendance in their medical record. The number of sessions of each component of self-management, exercise, and cooking was recorded. The self-management component had the potential for six sessions. The exercise component had a potential for 30 sessions and the cooking component had the potential for three sessions. An overall total number of sessions, as well as the number of sessions for each component, were tabulated.

**Weight change.** Each participant's weight was measured by the same weight scale in the clinic throughout the course of the study. Percentage of weight change was used to provide a more accurate comparison of weight change throughout the sample. Percentage was a more viable option because some individuals have more weight to lose than others and thus it has been used in weight loss research in recent decades (Anderson, Konz, Frederich, & Wood, 2001). For example, if a 300 pound man losses 30 pounds, he has lost 10% of his body weight. A 150 pound woman could lose half as much weight and still have a loss of 10% of her body weight. Percentage of weight change created a

way to have all participants at an equal starting point and more accurately reflected weight changes.

Reliability is “the degree of consistency or dependability with which an instrument measures an attribute” (Polit & Beck, 2010, p. 566). The same weight scale in the clinic was used for each measure to ensure reliability. The scales are calibrated every six months using standardized weights to ensure validity of the instrument. Validity is “the degree to which an instrument measures what it is intended to measure” (Polit & Beck, 2010, p. 571). A calibrated weight scale is a standard tool that is reliable and valid in measuring weight.

**Patient activation.** Patient activation was measured using the Patient Activation Measure (PAM), which is a 13-item questionnaire. The questionnaire was developed using a Rasch methodology and is a one-dimensional, interval-level, Guttman-like scale (Hibbard et al., 2004). The Rasch methodology is a method for constructing tests that provides a theory for item analysis and selection and a measurement scale for reporting scores. The Rasch methodology explores the person attribute and the item attribute and how this is related to the probability of a person answering a test item correctly (Isaac & Michael, 1997). This is one of the most commonly used models in test construction (Gall et al., 2007). The Guttman scale consists of “a relatively small set of homogeneous items that are supposedly unidimensional, measuring one, and only one, attribute” (Isaac & Michael, 1997, p. 149).

**Validity of patient activation measure.** Validity is defined as “the appropriateness, meaningfulness, and usefulness of specific inferences made from test scores” (Gall et al., 2007, p. 657). Without validity, it is difficult to assume any

meaningful test scores from an instrument. This instrument was valid and was established in several ways. Content validity is “the extent to which the items in a test represent the domain of content that the test is designed to measure” (Gall et al., 2007, p. 636). Content validity of this tool involved a literature review, systematic consultation with 18 experts using a consensus method and discussion with 20 individuals with chronic disease using a focus group approach to establish domains of activation. The domains were operationalized by selecting 80 questions from existing instruments and creating new ones. All 80 questions were reviewed with 20 respondents with chronic conditions for clarity. A pilot study was then conducted and then after using the Rasch methodology, 22- items were deemed appropriate for the scale (Hibbard et al., 2004). An item reduction analysis was completed that resulted in a 13-item measure that had psychometric properties similar to the 22-item version (Hibbard et al., 2005).

Criterion-related validity is “the degree to which scores on an instrument are correlated with some external criterion” (Polit & Beck, 2010, p. 551). Criterion-related validity was established by in-depth interviews of 10 respondents of an initial pilot study. Five participants who scored in the lowest end of the scale and five who scored at the highest end of the scale were interviewed regarding how each participant dealt with common problems associated with managing his/her health conditions. Interviews were transcribed and three judges reviewed and independently rated each transcript as either “low” or “high” activation. The judges were unaware of the person’s measured activation. Judges’ classification and measured activation level were the same 83% of the time. Cohen’s kappa for measured activation and each judge’s classification were .80, .90, and .90 ( $p < .001$  for all three kappas). Cohen’s kappa is used in clinical research “in

the evaluation of categorical data for the assessment of ‘agreement beyond chance’ when there is no independent means of assessing the probability of chance agreement” (Lantz & Nebenzahl, 1996, p. 431). The authors (Hibbard et al, 2004) suggested criterion-related validity based on these findings, but it is difficult to infer because of the limited information. There is no universal agreement about the significance of scores of greater than .80 with Cohen’s kappa, instead further testing would need to be reported to make assumptions about the criterion-related validity of this instrument (Lantz & Nebenzahl, 1996).

Construct validity was established through multiple strategies. Construct validity is “the degree to which an instrument measures the construct under investigation” (Polit & Beck, 2010, p. 550). Higher activation was related to better health ( $r = .38, p < .001$ ), lower rates of hospital visits ( $r = -.07, p < .01$ ), exercising regularly, low-fat diet, no smoking, eating fruits and vegetables ( $p < .001$ ), and health fatalism ( $p < .001$ ). This scale was also reliable. The internal reliability of this tool using Cronbach’s alpha coefficient was .87 (Hibbard et al., 2004). Cronbach’s alpha coefficient value ranges between .00 and +/- 1.00, with 1.00 being perfect reliable test scores. Reliability coefficients of “.80 or higher are sufficiently reliable for most research purposes” (Gall et al., 2007, p. 200).

**Self-management for weight loss survey.** The Self-Management for Weight Loss survey measured the variable of health distress and behavioral change. This survey was made up of several established measures. First, this survey had a four-item tool measuring health distress. This measure was a 6-point Likert-type scale, which asked individuals to assess how they felt about their health. Health is defined as “a state of

complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946, p. 100). Health distress can be defined as the level of perceived grief, anxiety, or unhappiness and the ability to cope with changes in health status. As the score on the measure increases, so does the health distress. The authors report that validity was determined by content experts, but the specifics were not reported. Overall, internal consistency reliability was reported at .87 and test-retest reliability at .87 (Lorig, Stewart, Ritter, Gonzalez, Laurent, & Lynch, 1996), thus this tool is reliable for research (Gall et al., 2007).

The second scale incorporated in the survey was a 16-item scale assessing a general approach to problem-solving (restructuring plans and relapse prevention) and goal setting (Nies et al., 2001). A 5-point Likert-type scale was used to assess the strength of agreement with each statement. Content validity was established through a panel of content and measurement experts who created the behavioral assessment survey (Nies et al., 2001). No information was provided about who the content experts were. Possible test items were identified through a literature review. Internal consistency reliability was reported at 0.78 for goal setting, 0.60 for restructuring plans and 0.78 for relapse prevention. Test-retest reliability was 0.76 for goal setting, 0.66 for restructuring plans and 0.66 for relapse prevention (Nies et al., 2001). Although reliability is not above .80, the scale can be viewed as moderately reliable (Nies et al., 2001). Two additional questions were added to this Self-management for Weight Loss survey. Those items asked each individual to rate their confidence in setting goals and problem-solving on a 6-point Likert-type scale.

## Data Collection

After appropriate Internal Review Board (IRB) approval, participants who were referred to the self-management weight loss program were introduced to the program at an initial meeting with a staff member of the Cardiometabolic Clinic at the medical facility. At the initial meeting, participants received a copy of the consent form (Appendix A) and a brief description of the study. Written consent was obtained as well as Health Insurance Portability and Accountability Act (HIPAA) authorization. Each participant then completed a demographics questionnaire including age, sex, race/ethnicity, education, marital status and employment status. They also completed the PAM questionnaire and the Self-management for Weight Loss survey (Appendix B), and were weighed at the initial meeting. Participants were then given information packets, the *LEARN Program for Weight Management* (10<sup>th</sup> ed.) handbook, and a schedule of self-management sessions, nutrition sessions, and exercise sessions.

Participants then completed the previously described six-week program. At the completion of that program, the participants returned to the Cardiometabolic Clinic for a follow-up evaluation with a staff member. Each participant was weighed on the same scale again and completed the PAM questionnaire and Self-management for Weight Loss scale. Participants were given additional readings at this appointment and provided with the Mayo Clinic cookbook. The readings and cookbook were supplemental readings for the participants to use at their discretion.

Information on participation in the self-management program was collected at this point via a chart review. A chart review consisted of the researcher examining the medical chart for documentation. The six-week period between the initial appointment

and the evaluation appointment was reviewed in the electronic chart for attendance. The number of self-management sessions, exercise sessions, and cooking sessions were tabulated separately and totals for each component were calculated. An overall total was then calculated for total participation.

After six months, the participants returned to the Cardiometabolic Clinic to meet for a follow-up appointment with a staff member. Each participant was weighed on the same scale and completed the PAM questionnaire and Self-management for Weight Loss survey. This completed the study's data collection process and participants were thanked for their participation.

### **Data Analysis**

After collection of the data, the researcher analyzed data using SPSS 15.0 (2006). Descriptive statistics and inferential statistics (linear regression) were used in analysis. Descriptive statistics were used to organize, summarize, and display the demographic information. Specific statistics included were mean, median, and standard deviations for the categories of gender, marital status, ethnicity, school completion, and employment status. Table 3 provides specific information about the statistical technique used with each research question.

Table 3

*Statistical Technique and Research Question*

Research Question	Statistical Technique
1. What is the relationship between participation in self-management weight loss program and weight change?	Linear regression
2. What is the change in weight from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?	Paired <i>t</i> -test
3. What is the relationship between the participation in self-management weight loss program and patient activation, health distress, and behavioral change?	Linear regression
4. What is the change in patient activation from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?	Paired <i>t</i> -test

**Linear regression.** Linear regression was used with Research Questions 1 and 3. Linear regression is a procedure used to understand the degree of relationship between two variables using mathematical terms. Linear regression can be used with interval, ordinal, or categorical data and in most quantitative research designs. The magnitude and the statistical significant of the relationships between the variables is also estimated (Gall et al., 2007). The level of significance to reject a hypothesis for this study was  $p < .05$ .

Educational researchers generally reject the null hypothesis “if the  $t$  value reaches a significance level of  $p < .05$  (Gall et al., 2007, p. 139).

The first research question asked: what is the relationship between participation in self-management weight loss program and weight change? Linear regression was used to see if the independent variable of entire participation in self-management program had a significant relationship with the dependent variable of weight change. Specifically, the hypothesis was participation in a self-management weight loss program will be a significant positive predictor of weight loss.

The other research question used linear regression to examine the relationship between the same independent variable and patient activation, health distress, and behavioral change. Three hypotheses were examined with this research question. First, participation in a self-management weight loss program will be a significant positive predictor of patient activation. Second, participation in a self-management weight loss program will be a significant negative predictor of health distress. The third hypothesis was participation in a self-management weight loss program will be a significant positive predictor of behavioral change.

**Paired  $t$ -test.** Paired  $t$ -tests were used with the two remaining research questions. One question was what is the change in weight from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program? The hypothesis was weight will be significantly less at program completion (and follow-up) than at baseline. The second research question was what is the change in patient activation from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?

The hypothesis was patient activation will significantly higher at completion of the self-management weight loss program than at study onset.

A paired *t*-test was used to determine if the difference between the before and after scores of individuals were statistically significant at  $p < .05$ . Several assumptions apply when using the paired *t*-test. First, scores should be interval or ratio measurements. Second, the scores should be normally distributed, and finally the score variances should be equal. Although these assumptions can be violated and still provide accurate results when analyzing data (Gall et al., 2007). The null hypothesis can be rejected if the statistical significance is  $p < .05$ . The paired *t*-test compared the means between pre-treatment weight and post-treatment weight. In addition, the means between pre-treatment patient activation scores and post-treatment patient activation scores were compared.

### **Protection of Human Subjects**

With research studies involving human subjects, it was important to protect the rights of the participants. All participants completed an informed consent form. Several important components related to the study were integrated into this consent form. The consent included an explanation of the purpose of the research, the duration of participation, and a general description of the procedures of the study.

The risks of the study were also addressed. The risks to the participants were minimal as indicated by Institutional Review Board. The self-management weight program was an appropriate approach to weight loss and did not place the participants at any greater risk than normal diagnostic and treatment for their condition. Another potential risk was the confidentiality of the information related to the use of information

in their medical record. This information was only released to the researcher and no unauthorized individual had access to the information. The information remained confidential and the individuals were assigned numbers to identify them in the study with only the researcher having access to the coded key. This ensured that sensitive information, such as weight, could not be linked back to the participant. Any publications or presentations would not include information that could possibly identify participants. In addition, under federal regulation the information was protected by HIPAA.

Next, the consent form discussed the benefits of the study. There were no known benefits of this study. Contact information was also provided in the consent form for participants to use if they had questions, concerns or needed clarification related to the research.

Finally, the consent form focused on the voluntary nature of the study. Participants had been referred to the program by their physician and were not required to participate. Patients had the right not to participate in the self-management program and also had the right to participate in the program and not the research study. Each participant's relationship with his/her physician was not affected by participation or lack of participation in the research. The participants also had the right to drop out of the project at anytime without being penalized.

### **Limitations**

There are several limitations to this study. First, the use of a correlational research design was a limitation. The biggest disadvantage of correlational research was an inability to show cause-and-effect. Any relationships that are discovered can only be interpreted with caution since many other variables may influence the relationship (Polit

& Beck, 2010). The lack of a control group limited interpretation of results and limited the generalizability of this study.

Second, the sample produced several limitations. The sample size was small. Although a minimum of 30 participants was required as a general rule in correlational research (Gall et al., 2007), samples of 100 participants are preferred for analysis and interpretation (Plichta & Garzon, 2009). Another limitation with the sample was lack of random selection. The convenience sample formed through self-selection, “thus, preexisting differences may be plausible alternative explanation for any group differences in outcomes” (Polit & Beck, 2010, p. 237).

The self-selection could create a bias in this study. Perhaps individuals who signed up for this study were more likely to seek out help from professionals, were more willing to try managing their own health, or were in greater distress about their health and wanted to participate. It is difficult to know how these variables contributed to the findings. This sample also lacked diversity. Ideally, the sample would represent the population but self-selection limited the diversity of the sample.

Another limitation of this study was that it was difficult to determine if one component of the self-management program, self-management classes, nutrition sessions, or exercise sessions, was more influential on the dependent variables. All three components may play a role, but one may be more beneficial when it comes to the dependent variable. The *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (National Institute of Health, 1998) recommended that comprehensive programs include nutrition, exercise, and behavioral modifications for optimal results. This was the approach used for this study. Because of

the small number of sessions in self-management classes and nutrition, it was difficult to complete statistical analysis for each individual component.

Another limitation of this study was attrition. Attrition can be a problem with research that extends over a period of time (Gall et al., 2007). In this study, the participants are available for the first six weeks through classes, but the six-month follow-up was difficult because responses were to be collected at six month follow-up visits. Many participants did not return to the Cardiometabolic Clinic for their follow-up appointment. The survey was then mailed to the participants with limited success. Several attempts were made to increase participation at the six-month time point to no avail.

## Chapter Four: Results

A correlational design was used to examine the relationship between participation in a self-management weight loss program and weight change, patient activation, health distress, and behavioral change through measurements prior to starting the program, after completion of the program, and six months from initiating the program. The data were collected from a Midwestern medical research facility that serves over 350,000 patients annually.

### Demographic Characteristics of Sample

The sample consisted of 67 participants, with 39 participants (58%) completing the six-week program and 14 participants (21%) completing the study at 6 months. Participant attrition is explored in the next section. The sample of 39 participants used for data analysis consisted of 25 females (64.1%) and 14 males (35.9%). All participants identified their ethnicity as white, not of Hispanic origin. They ranged in age from 30 to 75 years, with a mean age of 55.3 years ( $SD = 11.01$ ). The mean level of education was 14.72 years ( $SD = 3.07$ ); all participants had graduated from high school. Of the respondents, 22 (56.4%) were employed full-time, eight (20.5%) were retired, six (15.3%) were employed part-time, one (2.6%) was a homemaker, one (2.6%) was a student, and one (2.6%) participant was unknown. Thirty-four (87.1%) participants were married, three (7.7%) were divorced, one (2.6%) was not married, and one (2.6%) was not married but living with a partner (See Table 4).

Table 4

*Demographic Characteristics of the Study Sample (n = 39)*

Characteristics	<i>n</i>	%
<b>Age Group</b>		
30-40 years	4	10.3
41-50 years	7	17.9
51-60 years	13	33.3
61-70 years	10	25.6
71 years or greater	3	7.8
Unknown	2	5.1
<b>Employment</b>		
Full time	22	56.4
Part time	6	15.3
Retired	8	20.5
Homemaker	1	2.6
Student	1	2.6
<b>Education</b>		
High School	17	43.6
Some College/Trade School	22	56.4
<b>Marital Status</b>		
Married	34	87.1
Divorced	3	7.7
Not Married	1	2.6
Not Married, Living with Partner	1	2.6

The baseline weight in pounds of the sample ranged from 144 to 300 pounds, with a mean weight of 222.2 pounds ( $SD = 41.02$ ). Female participants ranged in weight from 144 to 277 pounds, with a mean weight of 207.5 pounds. Males ranged in weight from 193 to 300 pounds with a mean weight of 246.3 pounds. Participants were asked to rate

their general health on a scale of 1 to 5 with 1 = excellent, 2 = very good, 3 = good, 4 = fair, and 5 = poor. General health ranged from 2 to 4 with the mean score of 2.94 ( $SD = 0.62$ ).

### **Demographics of Participant Attrition**

Twenty-eight participants did not complete the program. Of the 28 participants who dropped out of the study there were 16 women (57.1%) and 12 men (42.9%). They ranged in age from 35 to 82 years with a mean age of 54.1 years ( $SD = 14.25$ ). The mean level of education was 15.15 years ( $SD = 3.66$ ); only one participant had not graduated from high school. Of the respondents, 14 (50.0%) were employed full-time, eight (28.6%) were retired, four (14.3%) were employed part-time, and one (3.6%) was unemployed. Eighteen (64.3%) were married, three (10.7%) were widowed, one (3.6%) was separated, three (7.7%) were divorced, and three (10.7%) were not married. Ethnicity did vary in this group; 22 (78.6%) participants identified as white, not of Hispanic origin, two (7.1%) participants identified as American Indian/Alaskan Native, and there was one (3.6) participant in each category of Black, not of Hispanic origin, Asian or Pacific Islander, Hispanic and other. There was not a statistically significant difference between the study participants and the attrition group in ethnic distribution,  $\chi^2(1,5) = 9.18, p = .10$ .

The weight in pounds of the sample ranged from 161 to 325, with a mean weight of 226.9 pounds ( $SD = 38.4$ ). General health ranged from 1 to 5 with the mean score of 1.87 ( $SD = 0.917$ ). There was not a statistically significant difference,  $F(1, 65) = 3.154, p = .080$ , in health distress between participant who completed the study and those who dropped out.

## Participation and Weight Change

The participation rate in the self-management program, which included self-management class, nutrition sessions, and exercise sessions with a trainer, ranged from nine sessions to 45 sessions, with a mean session participation of 21.85 sessions ( $SD = 9.18$ ). Participation in components of the self-management program is described in Table 5.

The percentage of weight change from baseline to completion of the program ranged from 2.5% weight gain to 6.2% weight loss. The mean weight loss was a 1.6% ( $SD = 2.19$ ) (Table 6). A linear regression analysis revealed that participation was a significant predictor of weight change,  $F(1, 37) = 7.36, p = .006$ . In terms of statistical significance, the value obtained for  $F$  was highly unlikely (.006) to have happened by chance alone. In this case, the observed group differences could be found by chance in 6 of 1000 samples, thus highly unlikely to have happened by chance.

Overall, the linear regression model using participation as an independent variable predicted 16.7% of the variance in weight change. According to effect size conventions (Cohen, 1988), the association between program participation and weight change was of large practical significance, with large being defined as greater than 0.14. For each additional session attended, weight decreased by 0.10 pounds. The hypothesis that participation in a self-management weight loss program will be a significant positive predictor of weight loss was supported. Data analysis could not be conducted on six-month data; because of attrition, the sample size was too small for analysis. As a general rule in correlational research, a minimum of 30 participants was required to conduct analysis (Gall et al., 2007).

Table 5

*Participation in Self-Management Program*

Program Components	<i>n</i>	%
<b>Self-Management Sessions</b>		
0-2 sessions	1	2.6
3 sessions	2	5.1
4 sessions	6	15.4
5 sessions	9	23.1
6 sessions	21	53.8
<b>Nutrition Sessions</b>		
0 sessions	6	15.4
1 sessions	11	28.2
2 sessions	16	41.0
3 sessions	6	15.4
<b>Exercise Sessions</b>		
0-10 sessions	15	38.5
11-20 sessions	15	38.5
21-30 session	7	17.9
Greater than 30 sessions	2	5.1

Table 6

*Percentage of Body Weight Change*

Weight Change (%)	<i>n</i>	%
Gain: Greater than 2%	2	5.1
Gain: 0.1-2%	8	20.6
No Change	1	2.6
Loss: 0.1-2%	10	25.6
Loss: 2.1-4%	14	35.9
Loss: 4.1-6%	2	5.1
Loss: Greater than 6.1%	2	5.1

**Change in Weight**

The percentage of weight change from baseline to completion of the program ranged from 2.5% weight gain to 6.2% weight loss. The mean weight loss was a 1.6% ( $SD = 2.19$ ) (Table 6). There was a significant change in percentage of weight change  $t(38) = 4.619, p < .001$  from baseline to completion of program. In terms of statistical significance, the value obtained for  $t$  was highly unlikely ( $p < .001$ ) to have happened by chance alone. In this case, the observed group differences could be found by chance alone less than in 1 of 1000 samples.

The change in weight, in pounds, ranged from 5.6 pound weight gain to 18.5 pound weight loss. The mean weight change was a loss of 3.88 pounds ( $SD = 5.36$ ) (Table 7). There was a significant change in weight  $t(38) = -4.52, p < .001$  from baseline to completion of program. In this study, the statistically significant level of  $p < .05$  and a

two-tailed test was used. Again in this case, the observed group differences could be found by chance alone less than in 1 of 1000 samples, so highly unlikely.

The hypothesis weight will be significantly less at program completion (and follow-up) than at baseline was supported for both percentage of weight and pounds of weight from baseline to program completion. Data analysis could not be conducted at six-months because of attrition.

Table 7

*Weight Change in Pounds (lbs)*

Weight Change (lbs)	<i>n</i>	%
Gain: Greater than 5.0 lbs	1	2.6
Gain: 0.1- 4.9 lbs	9	23.0
No Change	1	2.6
Loss: 0.1- 4.9 lbs	11	28.2
Loss: 5.0-9.9 lbs	14	35.9
Loss: Greater than 10 lbs	3	7.7

**Participation and Patient Activation, Health Distress, and Behavioral Change**

**Patient activation.** The PAM score could range from 13 to 52. The score was calculated by adding the responses to the 13 questions on the tool. The higher the PAM score, the greater the patient activation. The PAM scores for participants prior to the self-management program ranged from 32 to 52, with a mean score of 42.59 ( $SD = 4.67$ ). The PAM scores for participants after completion of the self-management program ranged from 29 to 52, with a mean score of 44.36 ( $SD = 5.43$ ). (Table 8). The change in PAM

score ranged from 14 (increase in activation) to -7 (decrease in patient activation) points. The mean change in score was 1.77 points ( $SD = 4.24$ ). Participation in the self-management program was significantly related to a change in patient activation,  $F(1, 37) = 4.22, p = .047$ . In terms of statistical significance, the value obtained for  $F$  was unlikely (.047) to have happened by chance alone. In this case, the observed group differences could be found by chance in 47 of 1000 samples, thus unlikely to have happened by chance.

Overall, the linear regression model using participation as an independent variable predicted 10.6 % of the variance in patient activation. For each additional session attended, patient activation increased by 0.04 points. The hypothesis participation in a self-management weight loss program will be a significant positive predictor of patient activation was supported. Data analysis could not be completed at six months because of attrition.

Table 8

*Change in Patient Activation Score*

	<i>n</i>	%
Increase: Greater than 10 points	3	7.7
Increase: 5-9 points	5	12.8
Increase: 1-4 points	15	38.4
No Change	6	15.4
Decrease: 1-4 points	9	23.1
Decrease: 5-9 points	1	2.6

**Health distress.** The health distress score could range from 0 to 5 points, with higher scores indicating more distress about health. The health distress scores for participants prior to the self-management program ranged from 0.25 to 4.50 points, with a mean score of 2.12 ( $SD = 1.16$ ) points. The health distress scores for participants after completion of the self-management program ranged from 0.0 to 3.5 points, with a mean score of 1.47 ( $SD = 0.79$ ) points. The change in health distress score range from 2 (increase in stress) to - 4.5 (decrease in stress) points. (Table 9). The mean change in score was -0.65 points ( $SD = 1.26$ ).

Participation in the self-management program was significantly related to a change in health distress,  $F(1, 37) = 4.44, p = .042$ . In terms of statistical significance, the value obtained for  $F$  was unlikely (.042) to have happened by chance alone. In this case, the observed group differences could be found by chance in 42 of 1000 samples, thus unlikely to have happened by chance.

Overall, the linear regression model using participation as an independent variable predicts 8.3 % of the variance in health distress. For each additional session attended, health distress decreased by 0.05 points. The hypothesis participation in a self-management weight loss program will be a significant negative predictor of health distress was supported. Data analysis could not be conducted at six months because of attrition.

Table 9

*Change in Health Distress*

	<i>n</i>	%
Increase: Greater than 1 point	2	5.1
Increase: 0.25-0.75 points	9	23.1
No Change	3	7.8
Decrease: 0.25-0.75 point	10	25.6
Decrease: 1-1.75 points	9	23.1
Decrease: 2.0-2.75 points	4	10.3
Decrease: Greater than 3 points	2	5.1

*Note.* Increase = more distress; decrease = less distress.

**Behavioral change.** Behavioral change was measured by assessing goal setting and problem-solving behaviors. The behavioral assessment score could range from 16 to 80. The behavioral assessment scores for participants prior to the self-management program ranged from 41 to 65 points, with a mean score of 50.87 ( $SD = 5.40$ ) points. The behavioral assessment scores for participants after completion of the self-management program ranged from 38 to 68 points, with a mean score of 53.23 ( $SD = 6.67$ ) points. The change in behavioral assessment score ranged from 15 (increase in behaviors) to -13 (decrease in behaviors) points (Table 10). The mean change in score was 2.36 points ( $SD = 6.24$ ).

Participation in the self-management program was not significantly related to a change in behaviors,  $F(1, 37) = 0.003$ ,  $p = .956$ . In terms of statistical significance, the value obtained for  $F$  was highly likely (.956) to have happened by chance. In this case,

the observed group differences could be found by chance in 956 of 1000 samples, thus highly likely to have happened by chance. The hypothesis participation in a self-management weight loss program will be a significant positive predictor of behavioral change was not supported. Data analysis could not be conducted at six months because of attrition.

Table 10

*Change in Behavioral Assessment Score*

	<i>n</i>	%
Increase: 11-15 points	2	5.1
Increase: 6-10 points	8	20.5
Increase: 1-5 points	11	28.2
No change	5	12.8
Decrease: 1-5 points	10	25.6
Decrease: 6-10 points	0	0.0
Decrease: 11-15 points	2	5.1

**Change in Patient Activation**

There was a statistically significant change in PAM scores for the participants from the beginning of the self-management program to completion,  $t(38) = -2.61$ ,  $p = .013$ . In this study, the statistically significant level of  $p < .05$  and a two-tailed test was used. In terms of statistical significance, the value obtained for  $t$  was highly unlikely (.013) to have happened by chance alone. In this case, the observed group differences

could be found by chance in 13 of 1000 samples, thus highly unlikely to have happened by chance.

The participants on average increased their patient activation by 1.77 points (95% confidence interval, .40, 3.14) after completion of the program. This loss was significant at  $p = .013$  by the paired  $t$ -test. The hypothesis patient activation will be significantly higher at completion of the self-management weight loss program than at study onset was supported.

The PAM score can be converted into four stages of activation. In Stage 1 (PAM score of 35 or lower), the patient may not yet believe that the patient role is important. In Stage 2 (PAM score 36 to 38), the patient lacks confidence and knowledge to take action. In Stage 3 (PAM score 39 to 42), the patient is beginning to take action. In Stage 4 (PAM score 43 or higher), the patient has made most of the necessary behavior changes, but may have difficulty maintaining the behaviors over time (Hibbard & Tusler, 2007). As shown in Table 11, there was a significant change in stages of activation,  $t(38) = 2.30$ ,  $p = .027$  for the participants from the beginning of the self-management program to completion. In terms of statistical significance, the value obtained for  $t$  was unlikely (.027) to have happened by chance alone. In this case, the observed group differences could be found by chance in 27 of 1000 samples, thus unlikely to have happened by chance. Data analysis could not be conducted at six months because of attrition.

Table 11

*Patient Activation Category*

	<i>n</i>	%
Category Prior to Self-Management Program		
Stage 1	2	5.1
Stage 2	4	10.3
Stage 3	14	35.9
Stage 4	19	48.7
Category After Completing Self-Management Program		
Stage 1	3	7.7
Stage 2	1	2.6
Stage 3	8	20.5
Stage 4	27	69.2

Overall, participation in the self-management weight loss program was associated with statistically significant changes in weight, patient activation, and health distress. Unfortunately, participation in the self-management weight loss program did not create significant changes in the behaviors of goal setting and problem-solving. The study findings are summarized in Table 12, 13 and 14.

Table 12

*Statistical Summary of Correlational Research Findings*

Research Question	Correlations
<p>1. What is the relationship between participation in self-management weight loss program and weight change?</p> <p>Hypothesis 1: Participation in a self-management weight loss program will be a significant positive predictor of weight loss.</p>	$r = .407$
<p>3. What is the relationship between the participation in self-management weight loss program and patient activation, health distress, and behavioral change?</p> <p>Hypothesis 3: Participation in a self-management weight loss program will be a significant positive predictor of patient activation.</p> <p>Hypothesis 4: Participation in a self-management weight loss program will be a significant negative predictor of health distress.</p> <p>Hypothesis 5: Participation in a self-management weight loss program will be a significant positive predictor of behavioral change.</p>	$r = -.320$
	$r = .327$
	$r = -.009$

Table 13

*Statistical Summary of T-Test Research Findings*

Research Question	Findings
<p>2. What is the change in weight from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?</p> <p>Hypothesis 2: Weight will be significantly less than weight at program completion (and follow-up) than at baseline.</p>	<p><math>t(38) = 4.619</math> <math>p = .000</math></p>
<p>4. What is the change in patient activation from baseline, at six Weeks when the formal program is completed and six months after completion of the self-management weight loss program?</p> <p>Hypothesis 6: Patient activation will significantly higher at completion of the self-management weight loss program.</p>	<p><math>t(38) = -2.61</math> <math>p = .000</math></p>

Table 14

*Summary of Research Findings*

Research Question	Findings
<p>1. What is the relationship between participation in self-management weight loss program and weight change?</p> <p>Hypothesis 1: Participation in a self-management weight loss program will be a significant positive predictor of weight loss.</p>	Supported
<p>2. What is the change in weight from baseline, at six weeks when the formal program is completed and six months after completion of the self-management weight loss program?</p> <p>Hypothesis 2: Weight will be significantly less than weight at program completion (and follow-up) than at baseline.</p>	Supported
<p>3. What is the relationship between the participation in self-management weight loss program and patient activation, health distress, and behavioral change?</p> <p>Hypothesis 3: Participation in a self-management weight loss program will be a significant positive predictor of patient activation.</p> <p>Hypothesis 4: Participation in a self-management weight loss program will be a significant negative predictor of health distress.</p>	Supported

Hypothesis 5: Participation in a self-management weight loss program will be a significant positive predictor of behavioral change.

Not Supported

4. What is the change in patient activation from baseline, at six Weeks when the formal program is completed and six months after completion of the self-management weight loss program?

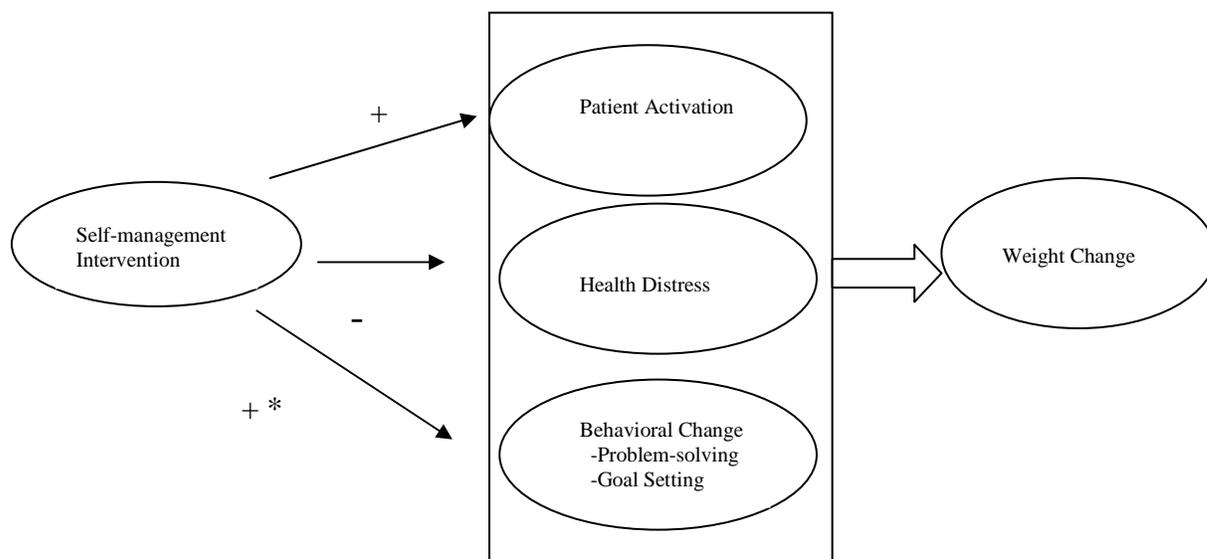
Hypothesis 6: Patient activation will significantly higher at completion of the self-management weight loss program.

Supported

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## Chapter Five: Discussion

Participation in a self-management weight loss program may have the potential to increase patient activation, decrease health distress and lead to weight change as hypothesized in the Model of Self-Management in Weight Loss Program (Figure 2). Behavioral change, specifically problem-solving and goal setting, did not increase in this study and does not support the hypothesized model. Although this study did not support the entire model, the literature has supported the use of self-management interventions and these variables. The findings are discussed below.



*Figure 2.* Model of self-management in weight loss program and overall findings.

\*Relationship of self-management intervention increasing behavioral change was not supported.

## **Participation and Weight Change**

In this study, there was a positive relationship between participation and weight change. The more an individual participated in the program, the more weight the individual tended to lose. Previous studies (Venditti et al., 2008; Wadden, Butryn, & Byrne, 2004) showed that the longer an individual attends program sessions over time, the greater the weight loss. In addition, individuals who participated in more weekly sessions lost more weight compared to those who participated less (Chao, Farmer, Sevick, & Espeland, 2000; Finley et al., 2007). This study was unique in the sense that the program sessions were only offered in a six-week period. The participants were provided with excellent resources in this timeframe but then support was discontinued. There were no opportunities for continued sessions to assist with the weight loss. Sessions beyond the six-week time frame might have been more helpful for long-term maintenance.

Although greater participation in the self-management program was associated with greater weight loss, it was difficult to determine if one component (i.e., self-management class, nutrition sessions, or exercise sessions) of the program was more effective in producing weight loss. It would be interesting to see if one component played a more critical role in weight loss. Behavioral therapies alone without diet and exercise are “marginally effective” (Yaskin et al., 2008, p. 306) in weight loss, so further research may indicate that self-management classes alone are effective.

The *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (National Institute of Health, 1998) recommended that comprehensive programs include nutrition, exercise, and behavioral modifications for

optimal results. Some evidence supports the comprehensive program but further exploration is needed (Yaskin, Toner, & Goldfarb, 2008). This study supported that participation in self-management program (diet, exercise, and behavioral modification) was associated with weight loss. Self-management is a viable option, but it is difficult to discern its influence on weight loss, when there are so many other variables influencing weight loss. Research is needed that focuses on the types of intervention and the duration of the programs in relation to optimal weight loss and maintenance to further the understanding of the comprehensive program in weight loss.

**Attrition.** The attrition rate in this study also made it difficult to determine the effectiveness of the self-management program. The attrition was very high for this study at 42%. A statistically significant relationship was found between participation and weight loss, but little is known about why so many individuals quit the program. Did individuals quit the program because they were not losing weight or because the program did not meet their learning needs?

Attrition rates in research conducted during the last 10 to 15 years in weight management research have been about 20% (Teixeira et al., 2002). The attrition rate for this study was 42% at 6 weeks. Although this is higher than average, Lowe, Miller-Kovach, Frye, and Phelan (1999) reported an attrition rate of 37% at 4-weeks in a study of 985 participants attempting to lose weight through Weight Watchers. As can be expected, as the weight loss program continued in duration the attrition rate continued to increase. A study (Finley et al., 2007) examining participation in a commercial weight loss program over a one-year time frame of over 60,000 participants, found 73% of participants were in the program after 4 weeks, 42% at 13 weeks, 22% at 26 weeks, and

only 6.6% at 52 weeks. At six months in this study, only 21% remained in the research study. Follow-up mailings and phone calls were unsuccessful in increasing the participation at six months in this study.

Additional research is recommended in order to better understand the natures of individuals who choose to lose weight through a weight loss program and who completes the program. Nationwide, about 24% of men and 38% of women are trying to lose weight. Only 3% of men and 5% of these individuals joined a weight loss program (Kruger, Galuska, Serdula, & Jones, 2004). Of this percentage of the population, who is more likely to complete a weight loss program? Dieting history (less attempts dieting, more likely to succeed), exercise self-efficacy, and quality of life are predictors of completion of weight loss programs (Teixeira et al., 2004). Realistic weight loss goals, good coping and problem-solving skills, and healthy perception of weight and body also predicted completion (Byrne, 2002; Carels et al., 2009; Dalle Grave et al., 2005). Although these variables are not assessed in this study, it could be helpful in the future to develop a tool to assess the readiness of an individual to begin a weight loss program in order to increase individual success rates.

Age and employment status are two variables that were examined in this study related to attrition. Participants age 50 years or younger have been associated with greater dropout in weight loss programs (Dalle Grave et al., 2005; Honas, Early, Frederickson, & O'Brien, 2003). This was not significant in this study, but it may be an important consideration for the future. How do we engage the participants under age 50 years? Another important indicator was employment status. Individuals employed full time are more likely to drop out of weight loss programs (Ineleme, Toffanelo, Enzi, Gasparini,

Miotto, Sergi et al., 2005). Employment status was not significantly related to attrition rates in this study, but it was a great concern when designing this self-management program. The self-management program asked participants to actively attend multiple sessions weekly. The self-management classes were only offered mid-morning once a week. This may not fit into a schedule of individuals working fulltime. Factors that affect attendance to self-management groups include scheduling, convenience, need for referral, cost, and size of the group (Bruce, Lorig, & Laurent, 2007). To increase participation, it may be beneficial to offer multiple times for classes, including evenings, and perhaps alternate locations might also increase convenience for the participants.

### **Change in Weight**

The average weight loss for participants in this study was 3.88 pounds after six weeks. While this was statistically significant, it is not clinically significant. The *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (National Institute of Health, 1998) recommends a weight loss of one to two pounds a week. To be clinically significant, the self-management program would have produced an average of six to 12 pounds of weight loss at six weeks. The self-management program was creating change but not at a level that will help individuals meet current recommendations. The weight loss attained in this study is similar to the amount of weight loss with other weight loss programs (Sacks et al., 2009; Venditti et al., 2008).

### **Participation and Patient Activation**

Patient activation is “a person’s knowledge, skill, and confidence for managing one’s own healthcare” (Mosen et al., 2006, p. 21). As activation increases individuals

tend to become more knowledgeable, more skilled, and more confident in handling their health. Higher patient activation was associated with better attendance and engagement (Skolasky, Mackenzie, Wegener, & Riley, 2008). In this study, participation was significantly related to changes in patient activation. The more an individual participated, the greater change in patient activation. Although a relationship was found, it was not possible to discern which variable was influencing the other. It is hoped that participating in the self-management classes increased individual's knowledge, skill, and confidence in weight loss management, thus increasing patient activation. It is also possible, that individuals became more engaged and confident in weight loss management through other avenues (e.g., books, internet, friends) and decided to attend more classes to supplement the knowledge base. Thus, the higher activation influenced the participation in the self-management program.

### **Patient Activation Scores**

Patient activation scores tended to increase during this study. Higher patient activation was related to increased quality of life, higher physical and mental function, and better health outcomes (Mosen et al., 2006; Remmers et al., 2009). Positive changes in patient activation are also related to increases in self-management behaviors (Hibbard, Greene, & Tusler, 2009; Hibbard, Mahoney, Stock, & Tusler, 2007; Rask et al., 2009). This finding was supportive of the purpose of the self-management classes that were trying to teach self-management behaviors. The average change in score for the participants in this study was an increase of 1.77 points on a scale of 13 to 52, so patient activation increased. Unfortunately, research has indicated that a meaningful change of 4 points was needed on the PAM tool (Hibbard & Tusler, 2007; Hibbard, Greene, & Tusler,

2009). According to Hibbard et al. (2009), “four points often is the difference between the average score of individuals who engage in any number of healthy behaviors and those who do not” (p. 359). Although the self-management program did not produce clinically significant changes on the PAM, it was reassuring to know that the program produced some patient activation changes and had the potential to create more changes, if revised.

### **PAM Stages of Activation**

There were statistically significant changes in PAM scores and changes in stages of activation. According to the model of Stages of Activation (Hibbard et al., 2007) in Stage 1, individuals tend to be overwhelmed and believe they are passive recipients of care. Interventions in this stage focus on building self-awareness and understanding of behavior patterns. In Stage 2, individuals lack understanding and confidence in self-management. Interventions center on making small changes in existing behaviors in this stage. In Stage 3, individuals have the basic knowledge and are beginning to take action, but lack skill and confidence. In this stage, interventions focus on the adoption of new behaviors and improvement of problem-solving skills. Individuals in Stage 4 have adopted behaviors but may not be able to maintain them with life stressors. Interventions focus on relapse prevention and handling challenges (Hibbard et al., 2009; Hibbard & Tusler, 2007).

Most participants in this study started in Stage 3 (35.9%) or Stage 4 (48.7%) of four possible stages. By the end of the six-week program, more participants were in Stage 4 (69.2%). Based on the different stages, it might be feasible to provide two different self-management programs based on patient activation. Individuals in Stages 1 and 2

need basic knowledge about health status and disease process, assistance in analyzing behavior patterns, and practice in making small changes to reach larger goals. This self-management program would look very different than the program for Stages 3 and 4. These individuals in Stages 3 and 4 understand the need and the tools for weight loss but need practice with skills to increase confidence, prevent relapse and handle life stresses. If the program were more tailored to the specific patient activation stage, there may be more success at increasing patient activation. One study (Hibbard et al., 2009) found that tailored interventions based on patient activation scores improved clinical indicators, decreased healthcare utilization, and improved patient activation scores. There is a potential to maximize the self-management classes through adapting the classes to the learner's needs.

### **Health Distress**

There was a statistically significant relationship between participation in the self-management program and health distress. Health distress can be defined as the level of perceived grief, anxiety, or unhappiness and the ability to cope with changes in health status. Previous research (Lorig et al., 1999; Lorig et al., 2001; Lorig & Holman, 2003) had reported that health distress decreases as individuals participate in self-management programs. Previous research did not look at the influence of number of sessions attended but simply participating in the program and how it influenced health distress. This study adds to the body of knowledge that self-management programs may decrease health distress and that greater participation in a self-management program may influence health distress. Perhaps greater participation decreased health distress because individuals become confident in managing their health and feel like active participants in their health.

As confidence grows, an individual may become less distressed because they can problem-solve and cope with life stresses related to health status.

### **Behavioral Change**

Behavior was not significantly related to participation in the self-management program. Goal setting and problem-solving were the concepts measured in relation to behavioral change. These concepts were selected because goal setting and problem-solving are identified as critical components in behavioral therapy for weight management (Wadden et al., 2003). Problem-solving skills are needed to overcome barriers when working toward goals and goal setting is important for motivation, intensity, and attention when trying to perform tasks (Bandura & Locke, 2003; Kitsantas, 2000). Additionally, problem-solving is a core skill of self-management programs and goal setting is used extensively in self-management (Lorig & Holman, 2003), so it would make sense that these concepts would be appropriate to evaluate a self-management weight loss program.

**Goal setting.** Unfortunately, behaviors were not statistically significant to participation and perhaps the self-management program needs to be changed to foster goal setting and problem-solving. Some research (Estabrooks et al., 2005; Knauper, Cheema, Rabiau, & Borten, 2005) has been done on providing individuals with goals and rules for weight loss to promote goal setting and behavioral change with good results. This approach may not be appropriate for self-management classes. This would require the self-management program to dictate goals, which could take away from the concepts of self-management. Although Estabrooks and colleagues (2005) did use the concepts of self-management in their study, they simply provided the participants with activities to

support the goal, and identified barriers and provided strategies to overcome barriers, rather than engaging participants in the problem-solving aspects of self-management. Another way to increase goal setting would be to increase the frequency of goal setting. Instead of making more challenging, long-term goals once a week, it may be more beneficial to make more concise, short-term goals more often. Frequent goal setting is predictive of individuals actually using strategies to lose weight (Nothwehr & Yang, 2007). Frequency of self-management classes may need to be altered to promote goal setting.

**Problem-solving.** Problem-solving is a major self-management skill (Holman & Lorig, 1992) to be learned and requires a great deal of practice. Problem-solving involves identifying a problem, identifying solutions and barriers, trying a solution, reflecting on results, and possibly trying other solutions (Holman & Lorig, 1992). A six-week program may not be long enough to truly foster this skill. Problem-solving classes have been shown to significantly create greater weight loss, but in the study the program met biweekly for one year (Perri et al., 2001). Problem-solving is a skill that takes a lengthy time to practice. A longer program would provide more time to practice the skills and apply the skills to daily life challenges with the support of the self-management program. Another possible change would be to promote action plans in the program to a greater degree. Action plans identify a specific goal, identify an individual's confidence in completing the goal, and then involves problem-solving to help foster the completion of the goal. In other self-management classes, action planning was identified as a key element in skill mastery (Lorig & Holman, 2003). In self-management studies, incorporation of action plans had a greater tendency to improved outcomes (Bodenheimer

et al., 2002). Therefore, weekly incorporation of action plans would likely enhance problem-solving skills. Action plans were used in the current self-management weight loss program but greater emphasis and practice is needed.

**Measuring behaviors.** Another option is to measure specific behaviors instead of goal setting and problem-solving when using this self-management program to indicate behavioral change. For example, individuals could indicate if they are reading food labels for content, engaging in exercise three times a week or more, or managing stress in a healthy way. Health related behaviors in self-management programs have been studied related to patient activation in several diseases including arthritis, diabetes, and hypertension (Hibbard et al., 2007). No specific tool has been created for weight loss, although many of the behaviors indicated in the Hibbard et al. study (2007) would be appropriate for self-management weight loss program. It is important to quantify key aspects of the concepts of goal setting and problem-solving since these are key concepts in self-management, but it may be helpful to know if the current self-management weight loss program is creating behavior change in a concrete way. Additional research on the quantification of behavioral changes, could help healthcare providers document the behavior change in concrete ways. This would help them identify which behaviors need reinforcing, which behaviors are leading to better health outcomes, and how to revise the self-management program to help individuals change behavior.

### **Implications**

This study adds to the body of knowledge related to self-management education. The self-management approach has been used with other chronic conditions such as diabetes, high blood pressure, and osteoarthritis, but not directly with weight

management. One study (Estabrooks et al., 2005) examined a diabetes self-management program and assessed reported physical activity, dietary fat, and fruit and veggie consumption, but did not focus specifically on weight loss. Self-management education can be a feasible option in weight loss, since there was an association between participation in the self-management weight loss program and weight loss. Although this study was small ( $n = 39$ ), it does identify the need for future research in self-management programs and weight loss and emphasizes the potential benefits of self-management education in healthcare.

**Format of self- management program.** A self-management program focused on weight loss seems to be appropriate to help lose weight, increase patient activation, and decrease health distress, but changes need to be made in order to optimize the program. First, the program should be lengthened to provide support for individuals who need help beyond six weeks. A one-time approach may not be effective to sustain behavioral change. This is a chronic condition and long-term support is needed to sustain weight loss. The American Dietetic Association (2008) has recommended at least six months for a weight loss program and then an implementation of a weight maintenance program. This current self-management program was not long enough, and weight maintenance program was not even offered. Participants are given tools for self-management but lack long-term support which is important for long-term success.

Second, the self-management weight loss program should provide more flexible options for meeting times and places to accommodate participants' schedules. Currently, the self-management class was offered once a week in the morning. This is not feasible for individuals who have to work. Offering additional classes at a variety of times may

increase participation and completion rate. As indicated by this study, the more participation in the program, the greater the weight loss. Finally, the self-management classes should be revised to optimize weight loss. Patient activation should be assessed prior to beginning the program and participants would attend specific classes based on the patient activation measure. Ideally, there would be two types of classes, one for individuals in Stages 1 and 2, and one for those in Stages 3 and 4. This division could help tailor classes specifically to the learners' needs. A greater incorporation of action plans and goal setting techniques would be appropriate to increase the use of self-management behaviors. All of these program revisions would need to be validated through research to fully understand the use of self-management programs in weight loss.

**Metabolic syndrome research.** This study was conducted with a population of metabolic syndrome participants. This population may not have been the most appropriate group for a program focusing just on weight loss. Metabolic syndrome consists of a combination of the following disorders: high blood pressure, high blood sugar, high triglycerides, low HDL cholesterol, and abdominal obesity. All of these conditions can be helped by weight loss, but each component also has very specific requirements for management. For example, high blood pressure can be decreased by weight loss, but other components for management may include limiting salt intake, limiting alcohol intake, and starting medications. This self-management program focuses on weight loss in general and not on the many other components of managing the disease of metabolic syndrome.

This study supports the idea that a self-management program in weight loss program is associated with weight loss, but would the weight loss be more if the program

was designed more appropriately for the specific population of metabolic syndrome? A self-management program specifically designed for participants with metabolic syndrome may be more appropriate for this population. The program could incorporate a specific diet for high blood pressure and high cholesterol, exercise, medication management, blood pressure measuring, smoking cessation, and stress management. The same self-management core skills of problem-solving, decision making, resource utilization, forming of patient/health care provider partnership, and taking action (Lorig & Holman, 2003) would be incorporated, but the focus would change from weight loss to overall management of metabolic syndrome.

**Weight loss tools.** There also seems to be a need for more tools in weight loss research. A potentially beneficial tool specifically measuring self-management behaviors in weight loss could further the understanding of health outcomes of self-management classes in weight loss. How can we measure self-management if the behaviors to be managed are not defined? A tool with measurable behaviors is needed. This tool could help quantify the influence of the program on specific health behaviors. For example, in self-management of individuals with high blood pressure specific behaviors include check blood pressure daily, keep a written diary of blood pressure readings, and know what blood pressure the physician would like the individual to have. Specific behaviors like this could be developed for this weight loss program such as read food labels for content, keep written diary of food consumption, know recommended weight, and engage in physical activity. This tool then could be used to measure how many self-management behaviors were being done at baseline and then if the program is successful in increasing the behaviors. If the goal to the program is to increase self-management, then it necessary

to have a tool to measure the self-management behaviors to truly understand if the program is successful.

Another potentially beneficial tool could assess the readiness, willingness, and motivation of an individual to lose weight. If a person is not ready to change and commit, he or she will fail regardless of the program format. The U.S. Department of Health and Human Services, Public Health Services, National Institute of Health, and National Heart, Lung, and Blood Institute (2000) recommended assessing readiness to lose weight, but no tool has been developed. The PAM tool may have the potential to assess a stage of readiness for the weight loss program. The PAM tool has been study in relation to attendance and engagement in a physical therapy program with increased patient activation associated with improved adherence to the program (Skolasky et al., 2008). The PAM was also predictive of health outcomes in patients with diabetes (Remmers et al., 2009), so there could be the potential to use the PAM as a predictor in weight loss programs. Further research is needed to explore this possibility.

One final tool of interest would be a tool to assess learning styles and learning needs to tailor a weight loss program to each individual. There are multiple formats for weight loss programs, such as online, face-to-face, books, or chat rooms. Each individual learns differently and in different formats, a tool assessing the ideal format and needs of the individual may increase success in weight loss programs.

### **Subsequent Research**

Overall, participation in the self-management weight loss program was associated with statistically significant changes in weight, patient activation, and health distress. Unfortunately, participation in the self-management weight loss program was not

associated with significant changes in the behaviors of goal setting and problem-solving. A self-management program for weight loss may be a feasible option for weight loss with some modifications. More research is needed in this area to understand the impact of the program in weight loss management.

Although weight loss programs have been researched for decades, there are still many unanswered questions. There needs to be a better understanding of the participants in weight loss programs, so that programs can tailor learning objectives and formats to meet their needs. Why do so many individuals quit weight loss programs? How do we engage younger participants? The assumptions of andragogy may give insight into why individuals leave the program and how programs should be tailored. Self-management programs try to incorporate these assumptions but further research is needed to understand the influence in adult learners trying to lose weight and the best way for them to learn.

Another area of future research is the concern over the “ideal” format for weight loss programs. The *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (National Institute of Health, 1998) recommended frequent contact with practitioners in order to increase weight loss success. The guidelines did not have evidence to recommend the amount of contacts or the duration of contacts when it was published, but this study supports the idea that greater participation with health care providers is associated with increased weight loss. Are there an ideal number of contacts with a practitioner to produce optimal weight loss? Further research would need to be conducted to explore this idea and to explore the optimal duration for weight loss programs.

Research is also needed exploring the role of self-management programs in weight loss. Self-management programs in weight loss have not been studied. This study would seem to indicate there is potential for the concepts in weight loss programs, but further research is needed. Research studies with larger samples need to be completed in diverse settings and with experimental designs. Without control groups, it is difficult to establish cause and effect related to weight loss programs. In addition, research is needed to explore the specific component of participation in self-management classes, since this study looked at participation in the overall program and not just the classes. Further exploration is also needed to study current measures used in self-management programs. How do we measure behavioral change in self-management programs? What role does patient activation play in self-management? Do individuals with higher patient activation use more self-management behaviors or because they use more self-management behaviors they are more activated? Research is needed to understand the complex concept of self-management in chronic diseases, specifically individuals with comorbidities.

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## Appendix A

# CONSENT FORM

## Evaluation of a Cardiometabolic Program

You are invited to participate in a research study evaluating the possible benefits of participating in a cardiometabolic program. You were selected as a possible participant because you were referred to the program by your physician. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

## 1. General Information About This Research Study

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**Study Title:** Evaluation of A Cardiometabolic Program

**Name of Principal Investigator on This Study:** Angela Stombaugh, RN, MSN (University of Minnesota Doctorate student), Kristin Vickers-Douglas, PhD, and Julie Hathaway, MS

### A. Study Eligibility and Purpose

You are being asked to take part in this research study to assess to what extent participation in the Cardiometabolic Program impacts participant's confidence, positive health behaviors, goal setting, and problem solving in regards to health behaviors related to their diagnosis of Metabolic Syndrome (i.e. weight management, exercise, dietary changes, etc.)

As you read this form describing the study, ask any questions you have. Take your time to decide. Feel free to discuss the study with your family, friends, and healthcare provider before you decide. You may stop participating at any time during the study. You may decide not to participate. If so, none of your current benefits or normal health care will be affected in any way. When you feel comfortable that all your questions have been answered, and you wish to take part in this study, sign this form in order to begin your participation. If you are agreeing for someone else, you need to sign this form. Your signature means you have been told about the study and what the risks are. Your signature on this form also means that you want yourself, or your child/relative/principal/ward to take part in this study.

If you do not understand any part of this consent form, please ask until you feel you understand.

### B. Number of Participants

The plan is to have 45 people take part in this study at Mayo Clinic.

## 2. What Will Happen To You While You Are In This Research Study?

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If you agree to be in the study, you will be asked to participate in the following:

- 1) *QUESTIONNAIRES*: You will be asked to complete questionnaires about your health behavior at the beginning of the Cardiometabolic program (approximately 20 minutes to complete) and again at the end of the 6 week class. (approximately 15 minutes to complete) In addition, you will be asked to complete a brief questionnaire at 6 months after completing the class. (approximately 15 minutes to complete) This will occur at your physician appointment.
- 2) *WEIGHT*. Your weight will be recorded at your physician appointments at the beginning of the program, at the end of the 6 week class and at your 6 month appointment.

## 3. How Long Will You Be in This Research Study?

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You will be in the study for 6 months.

## 4. Why You Might Want To Take Part In This Research Study

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This study will not make your health better. It is for the benefit of research.

## 5. What Are the Risks Of This Research Study?

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There are no known risks to you from taking part in this research study.

## 6. What Other Choices Do You Have If You Don't Take Part In This Research Study?

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This study is only being done to gather information. You may choose not to take part in this study.

## 7. Are There Reasons You Might Leave This Research Study Early?

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Taking part in this research study is your decision. You may decide to stop at any time. You should tell the researcher if you decide to stop and you will be advised whether any additional tests may need to be done for your safety.

In addition, the researchers, or Mayo may stop you from taking part in this study at any time:

- if it is in your best interest,
- if you do not follow the study rules,
- if the study is stopped.

## 8. Will You Need To Pay For Any Of The Tests And Procedures?

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You will not need to pay for tests and procedures which are done just for this research study. These tests and procedures are:

- *study questionnaires*

However, you and/or your health plan will need to pay for all other tests and procedures that you would normally have as part of your regular clinical care.

In the event that this research activity results in an injury, treatment will be available, including first aid, emergency treatment and follow-up care as needed. Care for such injuries will be billed in the ordinary manner to you or your insurance company. If you think that you have suffered a research related injury, let the study investigators know right away.

**If you have study related questions regarding billing, insurance or reimbursement, stop by or call:**

**Rochester:** Admission and Business Services office, or call Patient Account Services at (507) 287-1819

## 9. Will You Be Paid For Participating In This Research Study?

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You will not be paid for taking part in this study.

## 11. What Are Your Rights If You Are In This Research Study?

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Taking part in this research study will not change your rights and benefits. Taking part in this research study does not give you any special privileges. If you decide to not participate in this study, or stop in the middle of the study, no benefits are taken away from you. Specifically, you do not have to be in this research study to receive or continue to receive medical care from Mayo Clinic.

You will be told of important new findings or any changes in the study or procedures that may affect you or your willingness to continue in the study.

## 12. What About Your Privacy?

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### **Authorization To Use And Disclose Protected Health Information**

Your privacy is important to us, and we want to protect it as much as possible. By signing this form, you authorize Mayo Clinic and the investigators to use and disclose any information created or collected in the course of your participation in this research protocol. This information might be in different places, including your original medical record, but we will only disclose information that is related to this research protocol for the purposes listed below.

This information will be given out for the proper monitoring of the study, checking the accuracy of study data, analyzing the study data, and other purposes necessary for the proper conduct and reporting of this study. If some of the information is reported in published medical journals or scientific discussions, it will be done in a way that does not directly identify you.

This information may be given to other researchers in this study, or private, state or federal government parties or regulatory authorities in the USA and other countries responsible for overseeing this research. These may include the Food and Drug Administration, the Office for Human Research Protections, or other offices within the Department of Health and Human Services, and the Mayo Clinic Office for Human Research Protections or other Mayo groups involved in protecting research subjects.

This authorization lasts until the end of the study. The study does not end until all data has been collected, checked (or audited) and analyzed. Sometimes this can be years after your study visits have ended. For example, this could happen if the results of the study are filed with a regulatory agency like the Food and Drug Administration.

You may stop this authorization at any time by writing to the following address:

Mayo Clinic  
Office for Human Research Protection

ATTN: Notice of Revocation of Authorization  
200 1st Street SW  
Rochester, MN 55905

## 13. What Will Happen to Your Samples?

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No biological samples will be collected as part of this research study.

## 14. What Is The Institutional Review Board (IRB) And How Does It Protect You?

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The Mayo Clinic IRB is made up of:

- Physicians and Scientists
- IRB Specialists
- Allied Health Employees
- Local Community Members
- Visitors (Lawyers, Compliance, Administration, and others).

The IRB reviews human research studies. It protects the rights and welfare of the people taking part in those studies. You may contact the IRB if you have questions about your rights as a participant or if you think you have been treated unfairly.

## 15. Who Can Answer Your Questions?

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You can call ...	At ...	If you have questions or concerns about ...
Principal Investigators: Angela Stombaugh, RN, MSN  Kristin Vickers-Douglas, PhD	Phone: 715-577-6735  507-255-6782	Questions about the study tests and procedures  Research-related injuries or emergencies  Any research-related concerns or complaints
IRB Administrator: Marcia Andresen-Reid	Phone: 507-266-4000  Toll-Free: 866-273-4681	Rights of a research subject  Use of protected health information  Any research-related concerns or complaints
Research Billing	Rochester: 507-287-1819  Jacksonville: 904-953-7058  Arizona: 480-301-8000	Billing / Insurance Questions

## 16. Summary and Enrollment Signatures

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You have been asked to take part in a clinical trial, also called a research study, at Mayo Clinic. The information about this study has been provided to you to inform you about the nature of this IRB approved study.

- I have read the whole consent form, and all of my questions have been answered to my satisfaction.
- I know that joining the study is voluntary and I agree to join the study.
- I know enough about the purpose, methods, risks, and possible benefits of the study to decide that I want to join.

- I know that I can call the investigator and research staff at any time with any new questions or to tell them about side effects.
- I understand that a copy of this form will be put in my medical records and that I will be given a copy of this completed form.
- I understand that I may withdraw from the study at any time.

Please sign and date to show that you have read and understand all of the above guidelines. Please do not sign unless you have read the entire packet of information. If you do not want to sign, you don't have to, but if you don't you cannot participate in this research study. You will be given a copy of this form to keep for your records.

\_\_\_\_\_  
(Date / Time)

\_\_\_\_\_  
(Printed Name of Participant)

\_\_\_\_\_  
(Clinic Number)

\_\_\_\_\_  
(Signature of Participant)

\_\_\_\_\_  
(Date / Time)

\_\_\_\_\_  
(Printed Name of Individual Obtaining Consent)

\_\_\_\_\_  
(Signature of Individual Obtaining Consent)

## Appendix B



## Demographics

**Tell us about yourself:** Please answer the following questions based on your present situation. Please select the best response from the choices and mark or circle the correct answer.

Female      Male

2 Date of Birth \_\_/\_\_/\_\_\_\_

3 Height: \_\_\_ ft. \_\_\_ in. Weight: \_\_\_\_\_ lbs

4 Would you say your general health is?

· Excellent      Very Good      Good      Fair      Poor

5 What is your marital status?

· Married      Widowed      Separated  
Divorced      Not Married      Not married, but living with a partner

6 What is your background/ethnicity?

·  
White, not of Hispanic origin  
Asian or Pacific Islander  
Hispanic  
Black, not of Hispanic origin  
American Indian/Alaskan Native  
Other \_\_\_\_\_

7 Please circle the highest year of school you completed:

· Primary school    High School    College/University    Graduate  
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20  
21+

8 Which of the following best describes your current employment status?

Employed Full-Time      Unemployed      Homemaker  
Retired      Student      Employed Part-Time

## Self-Management with Weight Loss

These questions are about how you feel and how things have been with you during the past month. For each question, please "X" the **one** number that comes closest to the way you have been feeling.

How much during the past month....	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
...were you discouraged by your health problems?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
... were you fearful about your future health?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
... was your health a worry in your life?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
... were you frustrated by your health problems?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

As you complete the next 16 items, think about how you generally approach solving problems and setting goals for yourself. Please indicate your level of agreement with each of the following statements.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. Setting goals is an important activity.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
2. When I start something new, I usually don't think of	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
problems that I might encounter.					
3. I try to break a big problem down into several smaller, more manageable problems.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
4. When I set goals, I usually write them down.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
5. Once my routine is broken, it is very hard for me to get back into the routine again.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	
6. Once I've achieved a goal, I usually don't stay with it	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
7. It is easy for me to change my behavior.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
8. When I set goals, I also develop a plan for evaluating how well I have achieved the goals.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
9. If I miss doing something for a day or two that I should be doing, I know that I can start it again at the next opportunity.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
10. I set goals on a regular basis.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
11. Once I am side-tracked, it's difficult for me to get back on	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
track again.					
12. There are many ways to solve a problem.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
13. When I achieve a goal, I reward myself.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
14. I find it easy to come up with ideas for solving problems.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
15. When I have difficulties achieving a goal, I feel like a failure.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
16. I talk about my goals with others.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

The next two questions ask about confidence related to weight management.

<b>How confident are you in your ability....</b>	Not at all confident	Confident a little of the time	Confident some of the time	Confident a good bit of the time	Confident most of the time	Confident all of the time
...to set short term realistic goals to help you with your weight management?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
...to problem solve around barriers and difficulties you experience when you are working on managing your weight?	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

## Patient Activation Measure

Below are some statements that people sometimes make when they talk about their health. Please indicate how much you agree or disagree with each statement as it applies to you personally by circling your answer. **Your answers should be what is true for you and not just what you think the doctor wants you to say.**

If the statement does not apply to you, circle number 5 (Not applicable).

	Disagree strongly	Disagree	Agree	Agree strongly	N/A
When all is said and done, I am the person who is responsible for managing my health condition.	1	2	3	4	5
Taking an active role in my own health care is the most important factor in determining my health and ability to function.	1	2	3	4	5
I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition.	1	2	3	4	5
I know what each of my prescribed medications does.	1	2	3	4	5
I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself.	1	2	3	4	5
I am confident I can tell a doctor concerns I have even when he or she does not ask.	1	2	3	4	5
I am confident that I can follow through on medical treatments I need to do at	1	2	3	4	5

	<b>Disagree strongly</b>	<b>Disagree</b>	<b>Agree</b>	<b>Agree strongly</b>	<b>N/A</b>
home.					
I understand the nature and causes of my health condition(s).	1	2	3	4	5
I know the different medical treatment options available for my health condition.	1	2	3	4	5
I have been able to maintain the lifestyle changes for my health condition that I have made.	1	2	3	4	5
I know how to prevent further problems with my health condition.	1	2	3	4	5
I am confident I can figure out solutions when new situations or problems arise with my health condition.	1	2	3	4	5
I am confident that I can maintain lifestyle changes, like diet and exercise, even during times of stress.	1	2	3	4	5