THE RELATIONSHIP OF SELF-EFFICACY AND WEIGHT LOSS MAINTENANCE IN POST-OPERATIVE BARIATRIC PATIENTS

A dissertation submitted to the Kent State University College of Nursing in partial fulfillment of the requirements for the degree of Doctor of Philosophy

by

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It is with a sense of celebration that I find myself at this stage of the dissertation process – thanking those who helped me to achieve this grand goal of becoming a PhD. To all those over 50 years of age who may be contemplating a doctoral degree, take heart – it can be done – if you have the support of a loving family, faithful friends, and dedicated professors.

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ABSTRACT

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NURSING

THE RELATIONSHIP OF SELF-EFFICACY AND WEIGHT LOSS MAINTENANCE IN POST-OPERATIVE BARIATRIC PATIENTS

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Bariatric surgery, such as gastric bypass surgery (GBS) and laparoscopic gastric banding (Lap-band), has emerged in response to the epidemic of obesity which is now the leading cause of preventable death in the United States (U.S.), second only to smoking. Although the majority of bariatric surgical patients experience successful outcomes, the overall failure rate (those who fail to lose weight or regain more than 50% of their excess body weight lost (Deitel, 2001; Halverson, 1981)) of bariatric surgeries is approximately 20% (Benotti & Forse, 1995; Rusch & Andris, 2007).

Research has been done which studied the physiological issues related to this surgery; however, little is known about possible psychological and sociological factors that influence weight loss and maintenance in post-operative bariatric patients. While there is research that has identified self-efficacy as influencing weight loss maintenance in medical weight loss programs, to date there is no published research
linking the construct of self-efficacy to weight loss maintenance in bariatric patients. Therefore, the purpose of this study was to examine the role of self-efficacy on weight loss maintenance in post-operative bariatric surgical patients.

This study was guided by social cognitive theory of which self-efficacy is an important construct and incorporated a descriptive, correlational design. A study questionnaire was administered to 91 bariatric patients from two bariatric surgical centers in Northeast Ohio. Descriptive statistics, correlation, and multiple regression were used to answer the research questions. Findings revealed that of all study variables only self-efficacy was found to be associated with weight loss maintenance in multivariate regression ($p > 0.001$) and explained 41% of the variance in the regression model.

This study represents the first research done in nursing to find a significant relationship between level of self-efficacy and a bariatric patient’s ability to maintain weight loss. Findings from this study can lay the groundwork for future intervention studies investigating manipulation of factors that can influence self-efficacy and weight loss maintenance.
CHAPTER I
INTRODUCTION

The purpose of the study was to examine the role of self-efficacy on weight loss maintenance in post-operative bariatric surgical patients. Bariatric surgery has become the treatment of choice for morbidly obese patients who have failed medical treatment for obesity. Once thought to be the “magic bullet” (Welch, Wesolowski, Piepul, Kuhn, Romanelli, & Garb, 2008) for permanent weight loss, statistics (Bennoti & Forse, 1995; Dymek, leGrange, Neven, & Alverdy, 2002; Hsu, Bennoti, Roberts, Saltzman, Shikora, Rolls, & Rand, 1998; Sabbioni, Dickson, Eychmuller, Franke, Goetz, & Hurney, 2001; Woodward, 2003) reveal that some patients are regaining weight following bariatric surgical procedures. Some researchers have suggested that bariatric surgery should only be viewed as an adjunct for the patient to start over and learn new healthy eating and fitness habits (Bocchieri, Meana, & Fisher, 2002; Sabbioni et al., 2001). Behavior change is key to the bariatric surgical patient’s ultimate success (Bond, Evans, DeMaria, Meador, Warren, Shannon, & Shannon, 2004; Elkins, Whitfield, Marcus, Symmonds, Rodriguez, & Cook, 2005) in overcoming morbid obesity.

Obesity has been recognized as a national epidemic and is now a leading cause of preventable death in the United States (U.S.), second only to smoking. Of the total U.S. population, 30% of adults are obese and an additional 35% are overweight. Furthermore, the prevalence of obesity among young adults, age 19-29, increased 70% between 1998 and 2001 (Baskin, Ard, Franklin, & Allison, 2005; Racette, Deusinger, & Deusinger, 2003). The National Institutes of Health (2002), Healthy People 2010 (2000), and the
United States Department of Health and Human Services (2001) identify health implications of obesity to include an increased risk for cardiovascular disease, dyslipidemia, diabetes mellitus, selected types of cancer, and social impairment. The U.S. spends $117 billion in direct and indirect costs for the over 63 million people who meet the criteria for obesity (Devlin, 2000; Kelly, Tarnoff, Shikora, Thayer, & Jones, 2005).

Standard non-surgical approaches for the treatment of obesity, such as dietary restriction, behavioral modification and pharmacological interventions produce initial success in most cases; however, the majority of dieters maintain weight loss for only a year, and nearly all dieters will relapse within five years (Karlsson, Sjostrum, & Sullivan, 1998; Wilson, 1994). Morbid obesity is generally defined as being 100 pounds or more over the ideal body weight or having a Body Mass Index (BMI) of over 40 (Choban, Jackson, & Bistolarides, 2002). More aggressive approaches to morbid obesity have resulted in bariatric surgical procedures such as the gastric bypass surgery (GBS) and laparoscopic gastric banding (Lap-band). The popularity of these interventions has caused the number of bariatric surgeries to increase exponentially in the past few years. In 2004, 140,000 bariatric surgeries were performed making weight loss surgery one of the most common of all general surgical procedures (McCarthy, Arnold, Lamont, Fisher, & Kuhn, 2005).

There are specific requirements to qualify for the surgery. The original (and still current today) bariatric surgical requirements set forth by the National Institutes of Health (1992) include being 100 pounds or more overweight with a BMI of 40 and over, or a BMI of 35 and over with one or more obesity-related health problems including diabetes,
hypertension, and cardiovascular conditions (Buchwald, Avidor, Braunwald, Jensen, Pories, & Fahrback, 2004).

Although the majority of bariatric surgical patients experience successful outcomes, the overall failure rate (those who fail to lose weight or regain more than 50% of their excess body weight lost (Deitel, 2001; Halverson, 1981)) of bariatric surgeries is approximately 20% (Benotti & Forse, 1995; Rusch & Andris, 2007). Investigators are just beginning to examine possible factors that may lead to relapse and weight gain in patients following such drastic, and sometimes, irreversible procedures. Halverson and Koehler (1993) studied a group of bariatric patients that were unsuccessful at maintaining weight loss following the surgical procedure. They found that patients did not comply with acceptance of responsibility for the result of the operation and adherence to the strict guidelines of eating three small, well-balanced meals per day, cessation of eating when no longer hungry, taking five minutes between mouthfuls, avoidance of high calorie food and sugars, and not drinking liquids with meals. Hsu et al. (1998) investigated the impact of binge eating disorder in post-operative bariatric patients and found that binge eating behavior, common in the morbidly obese, may reoccur after surgery and is associated with weight regain.

Saunders (2004) reviewed databases from several bariatric surgeons’ practices and found that some patients continue to be preoccupied with thoughts of food and return to former habits of ‘grazing’ and emotional eating. Many patients reported not knowing when they were full, because compulsive eaters often have a difficult time distinguishing between physical and emotional hunger and have lost touch with normal body signals. Elkins et al. (2005) studied a cohort of 100 post-operative bariatric patients and
concluded that noncompliance with behavioral recommendations is pervasive following bariatric surgery, with lack of exercise being the most likely area where patients are non-compliant.

Indeed, it may be surprising that only 20% of patients are unsuccessful following bariatric surgery, considering the fact that gastric bypass patients have most likely become morbidly obese due to eating behaviors that are habitual in nature. Verplanken (2006) defines a habit as a form of automaticity that develops from repeated actions. Further, a habit involves the formation of memory between actions and certain environmental circumstances such as pleasant memories of childhood gathered around a bountiful dinner with family. However, unlike other negative habits or addictions, such as drug, alcohol and gambling, where the individual through rehabilitation can potentially lead a life free of their addictions, it is virtually impossible for a person to avoid eating, which is a necessary function to sustain life. The fact that bariatric patients face a reality where food is ubiquitous may be another possible explanation for their problems with compliance to dietary restrictions (Fernandez-Aranda, 2007).

The gastric bypass surgery is a drastic procedure which suddenly and severely limits the amount of food that a patient can ingest. Patients that disregard the post-operative prescription of limited food intake invite the possibility of excruciating pain and/or emesis. Some researchers have suggested that bariatric surgery may be thought of as a type of aversion therapy initially, and an effective manner of breaking long-held habits (Collene & Hertzer, 2003). However, this initial response is time-limited, and as the post-operative period progresses, patients may experiment with eating a little more
than they should, or begin a habit of grazing all day. Weight gain begins to creep up and eventually, patients may find themselves in that 20% who are considered unsuccessful.

Bariatric centers recognize that overeating is, unquestionably, a hard habit to break and devote a dedicated phase to the pre-operative preparation of the patient. Guidelines from the American Society for Metabolic and Bariatric Surgery’s Surgical Review Corporation (http://www.asbs.org/) which award the distinction of ‘Center of Excellence’ to bariatric surgical centers, mandate that each patient undergo rigorous preparation prior to the bariatric procedure. Each center is unique, but most require those considering the surgery to follow a set of very specific guidelines.

Some of the specific steps involved for candidates for bariatric surgery include: review and show understanding of selection guidelines for the surgery, complete a lengthy health information form, obtain a support letter and exam from the primary medical physician, complete a lengthy patient education teaching manual, compose a patient letter (a letter written from the patient’s perspective detailing the risks and benefits of the surgery and acknowledging the lifestyle changes that must be made to insure a successful outcome), schedule a teaching session with the dietician to discuss the essential dietary changes necessary for a successful outcome, undergo a complete psychological evaluation, attend a support group of post-operative patients, submit a letter of support from the family, and make a pre-operative clinic visit (Centers for Laparoscopic Obesity Surgery, 2008). Although pre-operative preparation of bariatric patients is specifically defined in the literature, less can be found which outlines structured post-operative follow-up programs and details of educational components.
Despite extensive pre-operative preparation, a percentage of bariatric patients are unsuccessful in maintaining lost weight (Benotti & Forse, 1995; Rusch & Andris, 2007). Part of the answer may lie in the fact that weight loss surgery is introduced at a point in the patient’s life well after life-long habits have been established. McKinlay (1975) proposes that conventional approaches to assist patients with health problems offer a “downstream” intervention designed to change behavior of people already suffering from a given risk factor. McKinlay (1975) uses the analogy of trying to help the drowning man by jumping in to save him “downstream,” when the more appropriate intervention is to teach him to swim (an “upstream” approach). In healthcare, “upstream” approaches to obesity would include policy and environmental interventions to prevent undesired outcomes and maintain healthy lifestyles. Such approaches, applied to bariatric patients, could begin early and be implemented on a variety of fronts such as the school system, the public health system, the primary care physician, and within the individual family.

Although the logic of “upstream” interventions is apparent, obesity is an epidemic today in the present moment. Morbidly obese patients suffer a myriad of chronic illnesses that require immediate attention (Sheipe, 2006). Bariatric surgery has evolved to meet the needs of the morbidly obese for whom medical weight loss regimens have been unsuccessful. Statistics (Maggard, Shugarman, Hilton, Suttorp, et al., 2005) support the fact that bariatric surgery produces significant weight loss, especially in the first year following the surgery. Yet, despite its documented success, bariatric surgery has been viewed by some critics as a ‘quick fix’ (Solomen & Dluhy, 2004) that promotes a surgical solution to a life-style problem.
While bariatric surgeries can bring about dramatic weight loss, the procedure will not be effective unless it is part of a long-term weight-management program. To help address the issue of surgery as a quick fix, it would be desirable for bariatric centers to strengthen the pre-operative education of the patient by stressing the adoption of necessary life changes and exposing the myth of this surgery as an easy answer to all their problems (Smith, 2005). Specific programs might be designed incorporating concepts of functional learning focusing on specific behavioral outcomes. Further, attention may also be directed toward developing structured educational programs in the post-operative phase of the journey, and finding ways to follow patients who do not return for appointments. This may include finding novel ways to keep in contact with patients, such as home visits, developing on-line follow-up programs, and networking with patients’ primary care physicians.

Aside from concerns about bariatric surgery’s ‘quick fix’ appeal, several authors (Bocchieri, et.al. 2002; Dymek et al., 2001; Elfhag & Rossner, 2005; Greenberg, 2003) have identified the urgent need for further research on the long-term effects of bariatric surgery and speak to the ‘scarcity’ of long-term data related to outcomes of the surgery. Of studies dealing with weight regain in medically supervised programs (Kayman, Bruvold, & Stern, 1990; Hsu, 1998; McGuire, Wing, Klem, Lang, & Hill, 1999), researchers have focused on adoption of behavioral strategies leading to successful weight maintenance.

While there is research that examines the relationship between behavior change theories and weight loss (Palmeira, Teixeira, Branco, Martins, Minderico, Barata, Serpa, & Sardinha, 2007; Teixera, Going, Sardinha, & Lohman, 2005) there is no guiding
theoretical framework on which to base this area of inquiry. One concept that has been associated with behavior change in individuals is self-efficacy. Self-efficacy is a construct of Social Cognitive Theory (SCT) (Bandura, 1977, 1986) and is defined as a person’s feelings and thoughts about one’s capability of accomplishing any given task (Bandura, 1977). Social Cognitive Theory represents a triadic reciprocal causation model which is made up of behaviors of the person, characteristics of that person, and the environment which are constantly interacting (Bandura, 1977, 1986). Further, it provides a useful framework for promoting positive outcomes in behavioral based weight control programs (Bernier & Avard, 1986; Glynn & Ruderman, 1986; Jeffery, Epstein, Wilson, Drewnowski, Stunkard, & Wing, 2000; Palmeira et al., 2007; Teixera et al., 2005). A growing body of literature supports the concept of self-efficacy in helping to account for initiation and maintenance of health behavior change (Bandura, 1991; Bandura, Adams, & Beyer, 1977; Bernier & Avard, 1986; Edell, Edington, O’Brien, & Witkin, 1987; Palmeira et al., 2007; Teixera et al., 2005). Self-efficacy as has been used as a variable of interest in many areas of nursing research including diabetic control (Kott, 2008), overcoming barriers to physical activity (Lee, Arthur, & Avis, 2008), medication adherence in chronic mental illness (McCann, Clark, & Lu, 2008), depressive symptoms of kidney transplant patients (Weng, Dai, Wang, Huang, & Chiang, 2008), to mention a few.

Behavior change requires the belief that one is capable of making a change. In several studies of medically managed weight loss, positive associations between self-efficacy and weight loss were evident during the weight loss phase (Edell, et al., 1987; Strecher, Devellis, Becker, & Rosenstock, 1986) as well as during 1-year and 2-year
follow-ups (Jeffery et. al. 2000). In a study by Kinsantas (2000) that examined how individuals used self-regulatory strategies to lose and maintain weight, analysis of data suggested that obese people who had high self-efficacy beliefs were able to lose more weight than those reporting low self-efficacy perceptions. Further, it was found that participants with low self-efficacy perceptions failed to implement the self-regulated strategies thought to be an essential part of their weight maintenance routines. However, no research has been done that examines the relationship of self-efficacy on weight loss and maintenance in bariatric surgical patients.

The underlying assumption of this study is that nurses working in bariatric clinics must actively support the weight loss efforts of post-operative bariatric surgical patients and design programs that enhance self-efficacy. Jacob (2002) posits that the construct of self-efficacy is of utmost importance to professionals who assist individuals to facilitate healthy lifestyle changes.

Purpose of the Study

The purpose of the study was to examine the role of self-efficacy on weight loss maintenance in bariatric surgical patients. Standard approaches to weight loss, such as behavioral modification and pharmacologic approaches produce initial success in most cases; however, the majority of dieters maintain weight loss for only a year, and nearly all dieters will relapse within five years (Choban, Poplawski, Jackson, & Bistolarides, 2002; Wilson, 1994). Surgical procedures, such as gastric bypass surgery and laparoscopic gastric banding that have emerged to address this problem in the morbidly obese population, have in most cases been successful in producing significant loss of excess body weight. However, researchers are just beginning to see a phenomenon where
patients are gaining back a significant amount of their lost weight after a period of time. Kinzl (2003) contends that surgical treatment is not the solution but an important precondition for successful management of morbid obesity. These findings underscore the importance of not only identifying reasons for emergence of the phenomenon, but more importantly, of extending research into the area of possible factors that affect a patient’s ability to maintain weight loss.

Self-efficacy has been shown to be an underlying mechanism in a wide range of health behaviors including smoking cessation, weight control, exercise, nutrition, alcohol use, contraception, and AIDS prevention (Bandura, 1991; Martin, Dutton, & Brantley, 2004; O’Leary, 1985; Stretcher et al., 1986; Wadden, Butryn, & Byrne, 2004; Yallow & Collins, 1987). Self-efficacy is a person’s feelings and thoughts about one’s capability of accomplishing any given task (Bandura, 1977). If people believe that a given situation exceeds their capabilities, they will avoid that situation. Self-efficacy determines not only how much effort one puts into an activity but also how long one will persist in engaging in the activity when faced with obstacles and negative consequences. Health promotion interventions that enhance self-efficacy, in turn, foster health behavior itself. Further, a review of self-efficacy research (Cervone, 2000; Lowe, Cockshott, & Greenwood, 2008; Shannon, Bagby, Wang & Trenkner, 1990; Stretcher et al., 1986) reveals that self-efficacy has predicted behavior and that interventions to increase self-efficacy consistently contributed to change in targeted behavior. Although research has been done on self-efficacy and behavior change, Linde, Rothman, Baldwin, and Jeffery (2006) found a gap in the empirical literature on the topic of self-efficacy related to weight loss.
Since self-efficacy is hypothesized as influencing positive health behaviors (Holden 1991; Linde, Rothman, Baldwin, & Jeffery, 2006; Palmeira et al., 2007), it would be prudent for bariatric nurses to consider assessing self-efficacy of patients during pre- and post-operative visits to the clinics. If this is assessed to be low, individualized treatment programs may be designed that can enhance patients’ self-efficacy.

For this study, behaviors that were studied for their relationship to weight loss maintenance in bariatric surgical patients are: eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups. Limited research in the area of weight regain in bariatric patients suggests that these four variables positively influence successful outcomes (Cook & Edward, 1999; Courcoulas & Flum, 2005; Elkins et al., 2005; Fontaine & Cheskin, 1997).

Although the medical literature is rich with articles related to bariatric surgery (Choban et al, 2002; Courcoulas & Flum, 2005; Karmali & Shaffer, 2005; Larsen, 2004; Maggerd et al., 2005; Padwal, 2006), the literature relates almost exclusively to issues connected with the procedures themselves or physical problems encountered in the post-operative period. In the general weight management literature, self-efficacy has been linked with more successful weight management outcomes. However, the majority of research on weight self-efficacy has addressed eating behaviors and weight loss maintenance in medical weight loss programs and has not related self-efficacy specifically to the bariatric population. Therefore, this study aimed to investigate these unanswered questions:
1) What is the relationship between eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups, and the outcome variable of weight loss maintenance among bariatric surgical patients?

2) How does self-efficacy influence eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups among bariatric surgical patients?

There is a clear need for further research on the relationship of cognitive factors such as self-efficacy on weight loss maintenance in the bariatric surgical population. Findings from this study can add to the understanding of patients’ perceptions of their ability to affect behavior change. This information would be of benefit to healthcare workers as well as patients, and would inform treatment and policy change to support successful outcomes in bariatric surgery patients.

In this study, maintenance of weight loss was the dependent variable. The behaviors of eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups were the independent variables. Perceived self-efficacy was tested for its mediating effect on the ability to adopt behaviors that lead to the outcome of maintenance of weight loss. Refer to Appendix A for listing of variables with conceptual and operational definitions, tool names, tool descriptions, and rationale.

Theoretical Framework

In this study, the ability of bariatric surgical patients to make behavior changes that lead to weight loss maintenance is thought to be influenced by the person’s perceived level of self-efficacy. Self-efficacy is defined as people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of
performances (Bandura, 1977). The idea that self-efficacy plays an important role in predicting behavior and its outcomes flows from Social Cognitive Theory (Bandura, 1977). First introduced in 1977, Bandura’s Social Learning Theory, later known as Social Cognitive Theory, posits that behavior is determined by expectancies and incentives. According to Bandura’s theory, the level of self-efficacy significantly predicts behavior change and/or therapy outcome. Furthermore, self-efficacy theory holds that self-referent thinking (the process through which people appraise and evaluate their progress toward valued goals), is the core element of perceived control and that people are unlikely to take action to control events if they doubt their own capability to execute requisite behaviors (Cervone, 2000). Therefore, in this study self-efficacy is examined for its role in affecting behavior change in maintaining weight loss in bariatric surgical patients.

The self-efficacy model (Bandura, 1977) has the following elements: person, behavior, outcome and self-efficacy. In this model of behavior, Bandura posits that the expectations of personal mastery and success determine whether an individual will engage in a particular behavior. In this study, the person of interest is the bariatric surgical patient. The behaviors are eating restraint, adherence to exercise, attendance at follow-up appointments and participation in support groups. Self-efficacy is seen as a factor that influences the bariatric surgical patient’s ability to perform the intended behaviors. In the model for this study (Figure 1.) self-efficacy is viewed as exerting a mediating effect upon the dependent variable, weight loss maintenance.

A mediation model is defined as one that seeks to identify and explicate a mechanism underlying an observed relationship between an independent variable and a dependent variable via the inclusion of a third explanatory variable known as the
mediator (Baron & Kenny, 1986). Further, the mediator serves to clarify the relationship between the independent and dependent variables.

In Woodworth’s (1928) S-Q-R model of mediation (Figure 2), ‘S’ represents the stimulus, ‘R’ represents the response, and ‘Q’ represents the mediator, described as an active organism that intervenes between stimulus and response. Further, Woodworth (1928) proposed that the central idea of the mediation model is that effects of stimuli (independent variables) on responses (dependent variables) are mediated by various transformative processes internal to the organism.

There are certain conditions that must be met for a variable to act as a mediator (Figure 2): (a) variations in the level of the independent variable significantly account for variations in the presumed mediator (path a), (b) variations in the mediator significantly account for variations in the dependent variable (path b), and (c) when paths a and b are controlled, a previously significant relation between the independent variable and the dependent variable is no longer significant (Baron & Kenny, 1986).

In the model for this study, self-efficacy is seen as an intervening variable between the independent variables (eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups) and the dependent variable (weight loss maintenance). Although, it may be plausible that there could exist a multidirectional effect between the behaviors of interest in this study and self-efficacy (i.e. as the individual engages in the behaviors, he/she enhances his/her self-efficacy; and as the individual gains more self-efficacy, he/she would be encouraged to further engage in the behaviors of interest), it would be difficult to assess this concept in this particular study design, which is cross-sectional in nature. If this were a longitudinal study, then it
could be possible to study the back and forth flow from the participant behaviors to self-efficacy. Hence, in this figure, the relationship between the independent variables and the mediator is depicted by a one-way arrow. In the next section, the specific pieces of the conceptual model will be discussed in greater detail.

*Figure 1*

Study Model: Self-efficacy as mediator between behavior change and outcome
Central to Bandura’s model is the concept of the person. In Bandura’s sociological view, the person is complex and is always striving to control events that shape his/her life. Exercise of control that obtains the desired outcome provides a strong source of motivation. Bandura referred to the person as ‘referent’, and among the mechanisms of agency (those characteristics that contribute to the whole person, (Bandura, 1977) none is more central or pervasive than beliefs of personal efficacy. Unless the person believes he/she can produce desired effects by their actions, they have little incentive to act (Bandura, 1977). The bariatric surgical patient is the person of interest in this study whose exercise of control takes the form of being able to adhere to the post-operative regimen by exercising eating restraint under the dietary regimen, adhering to an exercise program, keeping follow-up appointments, and participating in support groups in order to maintain weight loss.
**Behavior**

Bandura believed that most human behavior is determined by many interacting factors and, therefore, people are contributors to, rather than the sole determinants of, what happens to them (Bandura, 1977, 1986). In this model, many actions are performed with the idea that the actions will bring about a desired outcome, in other words, the power to originate actions for specific purposes is the key feature of personal agency. In Bandura’s model, self-efficacy expectations are the most powerful determinants of behavior change; these determine the initial decision to perform a behavior, the effort expended, and persistence in adversity. Bandura argued that perceived self-efficacy influences all aspects of human behavior, including: acquisition of new behaviors and inhibition of existing behaviors. Researchers (Bond et al. 2004; Cook & Edward, 1999; Elkins et al., 2005) have identified that patients who experience long-term success following bariatric surgery demonstrate certain behaviors that relate to taking personal responsibility for their success: the ability to avoid overeating, adhering to an exercise regimen and attendance at follow-up appointments and support groups. In this study, the acquisition of new behaviors to be examined are eating restraint, exercise adherence, attendance at follow-up appointments and participation in support groups.

**Outcome**

According to Bandura, outcomes arise from actions. Behavior largely determines the outcomes of experiences. Further, Bandura posits a causal relationship between beliefs of personal efficacy and outcome expectation. In this relationship, self-efficacy may be viewed as a judgment of one’s ability to organize and execute given types of performances, whereas outcome expectation is a judgment of the likely consequence such
performance will produce (Bandura, 1977). In research studies, the two components are often combined into the one concept of self-efficacy. In this study, outcome refers to the bariatric surgical patient’s ability to maintain weight loss.

**Self-efficacy**

Self-efficacy theory originally was a framework “for analyzing changes achieved in fearful and avoidant behavior” (Bandura, 1977, p.193) like being able to avoid temptation or engage in difficult behavior. One of the central constructs of Bandura’s Social Cognitive Theory is perceived self-efficacy, also known as simply, self-efficacy. It is defined as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses” (Bandura, 1982, p.391).

Self-efficacy is developed and maintained based on a combination of information sources: performance accomplishments known as mastery experience, vicarious experience known as modeling, verbal persuasion known as social persuasion, and physiological information, known as somatic/emotional states (Bandura, 1986; van der Bijl & Shortridge-Baggett, 2002). Performance accomplishment or mastery depends not only on the person’s ability to practice tasks but on their experiences from earlier behavior attempts. Bandura (1986) felt that this was the most important source of self-efficacy as it is based on a person’s own experience. One’s experiences of success enhance self-efficacy, while regular failure decreases self-efficacy.

The second source that influences self-efficacy is vicarious experience or modeling. Bandura (1986) suggests that seeing others perform successfully greatly
affects one’s own decision to attempt a behavior. This underscores the importance of role models when new behaviors are contemplated. A third source of self-efficacy is verbal/social persuasion. Bandura (1986) observed that verbal persuasion is often the most used source of self-efficacy because it is very easy to use. It is the most common mode used by health professionals who give directions, suggestions, and advice in attempts to convince patients that they are capable of succeeding at difficult tasks.

The fourth source of self-efficacy is somatic/emotional states. Bandura (1986) proposed that individuals expect to be successful when they are feeling well. People are complex beings made up of emotions, feelings and thoughts. When one’s emotions are out of balance such as in states of depression, anxiety and tension, it becomes very difficult to face new challenges with a positive attitude. Conversely, when one is emotionally balanced, he/she confidently takes on activities with enthusiasm and energy.

Self-efficacy theory suggests that self-referent thinking, which is the process through which people appraise and evaluate their progress toward valued goals (Cervone, 2000), is the core element of perceived control and that people are unlikely to take action to control events if they doubt their own capability to execute requisite behaviors. Literature has been generated (Bandura et al, 1977; Lenz & Shortridge-Baggett, 2002; Sallis, Pinsky & Patterson, 1988; Stretcher et al, 1986) relevant to self-efficacy theory yielding support for the hypothesis that changes in perceived self-efficacy mediate the change brought about by psychosocial interventions. Self-efficacy was assessed in this study by use of the Weight Efficacy Life-Style Questionnaire (WEL) (Clark, Abrams, Niaura, 1991).
Significance

The issue of bariatric surgical patients’ ability to maintain weight loss is of great significance to nursing research for three reasons. First, consequences of the obesity epidemic are encountered by nurses on a daily basis in hospitals and primary care practices. Obesity is now a leading cause of preventable death in the United States, second only to smoking. Growing numbers of obese patients are opting for bariatric surgery as a last resort to lose weight and regain a better quality of life. As was previously noted, bariatric surgery has about a 20% failure rate (Benotti & Forse, 1995), in other words, despite the surgical intervention, the patient either does not lose the prescribed weight or regains a significant amount that was lost. The consequences of weight regain are both physical and psychological. This study aims to explore if self-efficacy mediates the patient’s ability to perform specific behaviors (eating restraint, exercise adherence and attendance at follow-up appointments and participation in support groups) that lead to maintenance of weight loss.

The nurse is in a key position to help the patient deal with these issues and offer support throughout the process. The bariatric surgery patient encounters a myriad of health professionals on his/her journey through this difficult procedure, but it is the nurse who is in the pivotal position to assess and diagnose learning needs and then implement teaching strategies relevant to self-efficacy. Where self-esteem has been shown to be a trait that is resistant to change (Mailbach & Murphy, 1995), self-efficacy can be enhanced through specific interventions. Findings from Dennis and Goldberg’s (1996) study suggest that self-efficacy beliefs may be central to individualizing interventions for weight loss and that targeted interventions that are matched to clients’ intrinsic needs
may strengthen self-efficacy beliefs and foster positive affective states while promoting weight loss. If this present study shows that self-efficacy mediates the behavior changes that influence weight loss maintenance, then specific programs can be developed in the post-operative period that are designed to enhance self-efficacy.

Secondly, this issue has significance to nursing because despite the seriousness of bariatric surgery and its outcomes (The National Institutes of Health, (2002) reports that following bariatric surgery, 10-20% of patients require further operations to correct complications, the most common being abdominal hernia; nearly 30% of patients will develop nutritional deficiencies such as anemia, osteoporosis and metabolic bone disease), very little research on this topic can be found in the nursing literature. Several studies (Bocchieri, et al, 2002; Elfhag & Rossner, 2005; Greenberg, 2003; McDonald, 2003; Tsushima, Bridenstine, & Balfour, 2004) in other disciplines have identified the urgent need for further research on the long-term effects of bariatric surgery and speak to the scarcity of long-term data related to outcomes of these procedures. The majority of the research on this topic has been done in other areas, such as medicine, psychology and sociology. Studies in the medical literature focus on the procedure itself or on problems the patient may encounter in the post-operative period. A more rigorous review of the literature will be presented in Chapter Two. The nursing literature is virtually silent on the topic of bariatric surgery and weight loss maintenance, with the exception of one review article by Woodward (2003) that speaks to statistics of failed outcomes and how patients themselves can sabotage their own success.

Finally, this study is significant because although studies have been done relating self-efficacy to weight loss and weight loss maintenance, the focus has been on medical
weight loss studies (Bernier & Avard, 1986; Clark, Abrams, Niaura, Eaton, & Rossi, 1991). To date no studies have been conducted which focus on self-efficacy in bariatric surgical patients’ ability to maintain weight loss.
CHAPTER II

REVIEW OF LITERATURE

Introduction

Social Cognitive Theory provides the theoretical underpinnings for this study of the relationship between bariatric surgical patients’ self-efficacy and maintenance of weight loss. In this chapter, a brief review of the obesity epidemic and bariatric surgery is first presented, followed by a review of the literature that pertains to the study variables. This review first addresses the literature regarding the outcome variable of weight loss maintenance, followed by a review of the literature on the study predictor variables: eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups. Lastly, the literature pertaining to the mediating variable of self-efficacy is presented.

The Obesity Epidemic and Bariatric Surgery

The increasing prevalence of obesity and morbid obesity in the population has prompted the U.S. Department of Health and Human Services to label morbid obesity “the first epidemic of the 21st century” (Grindel & Grindel, 2006, p.129). Morbidly obese patients have greater difficulty losing weight and a harder time maintaining weight loss using conventional methods such as dietary restriction and exercise (Adami, Ramberti, Weiss, Carlini, Murelli, & Scopinaro, 2005; Larsen, 2004). The growing medical opinion is that morbid obesity can rarely be treated successfully without surgical intervention.
Bariatric surgery has been developed to meet the needs of morbidly obese patients who are unable to lose weight.

The history of the bariatric surgical procedure dates to the 1950’s and has evolved to the current procedures which can be divided into two basic categories: (a) techniques that limit stomach size to induce satiety, such as gastric banding (LapBand), and (b) techniques that re-route anatomical structures to cause reduction in stomach size and malabsorption of food, such as the gastric bypass or Roux-en-Y procedure (Karmali & Shaffer, 2005). Both procedures result in significant weight loss, with a post-operative weight loss of 55% to 65% of excess body weight being a typical outcome (Herpetz, Kielmann, Wolf, Senf, & Hedebrand, 2004). These significant changes in body weight are accompanied by substantial improvements in co-morbid medical conditions, improved quality of life, and reduced risk of premature death (Brethauer, Chand, & Schauer, 2006; Choban et al, 2002; Flegal, Graubard, Williamson, & Gail, 2005).

Despite the initial success reported as a result of bariatric surgery, the benefits are not sustained unless maintenance of weight loss is established. To ensure a long-term remedy for the current obesity epidemic, it is necessary to identify factors influencing weight loss maintenance in this patient population. The following section addresses the factors identified in the literature that influence weight loss maintenance in bariatric patients.
Weight Loss Maintenance

Weight loss maintenance is essential to ensure that the positive benefits of bariatric surgery are sustained. Bariatric clinics encourage all post-operative patients to engage in behavioral modification efforts combined with the surgery to insure successful weight loss. Post-operative recommendations include modifying the diet, taking prescribed vitamins and supplements, eating small meals until feeling full, reducing simple carbohydrates and eliminating sugar, eating high protein foods first, not drinking fluids with meals, eliminating carbonated beverages and alcohol, exercise adherence (exercising five times a week for at least 30 minutes) and taking personal responsibility for oneself (weighing self daily, keeping all follow-up appointments, participating in support groups) (Cook & Edward, 1999; Dowd, 2005; Warde-Kamar et al., 2004).

Despite favorable outcomes in the majority of bariatric patients, a significant number, estimated at 20%, fail to lose substantial amounts of weight or regain lost weight and tend to revert to preoperative eating and exercise habits (Benotti & Forse, 1995; Karlsson et al., 1998; MacLean, Rhode, & Forse, 1990). The American Society for Bariatric Surgery, Standards Committee (2005) has established parameters used for weight calculations following bariatric surgery. The accepted method of measurement of post-operative bariatric weight loss is percent excess body weight loss (%EBWL). This is a calculation which is a percentage of the weight the patient has lost, relative to the operative weight (Oria, 2005). The formula for calculating %EBWL is weight loss (the operative weight minus follow-up weight) divided by the excess weight (the operative weight minus the ideal weight) multiplied by 100 (American Society for Bariatric
Surgery, Standards Committee, 2005). For example, a 350 pound patient who has an ideal body weight of 150 pounds and loses 100 pounds will achieve a 50% EBWL.

\[
\text{Weight loss} = (\text{operative weight}) \frac{350\text{lbs} - (\text{follow-up weight}) 250\text{lbs}}{100} = 50\% \text{ EBWL}
\]

\[
\text{Excess Weight} = (\text{operative weight}) \frac{350\text{lbs} - (\text{ideal weight}) 150\text{lbs}}{200}
\]

Further, the benchmark for long-term successful outcome following bariatric surgery is maintenance of ≥ 50% of the excess body weight lost at 2 years following the procedure and longer (American Society for Bariatric Surgery, Standards Committee, 2005; Brolin, 2005).

The literature related to bariatric surgery is voluminous. However, literature related to long-term outcomes, especially what would be considered ‘failed outcomes,’ in other words, patients who regain weight, is sparse. In searching the literature, the search terms ‘bariatric surgery’ and ‘failed outcomes’ were entered into MEDLINE, CINAHL, PsychINFO, COCHRANE and Social Sciences Citation Index databases and produced zero hits. To glean information related to weight regain following bariatric procedures, search terms included ‘long-term outcomes,’ ‘maladaptive eating patterns following bariatric surgery,’ ‘compliance with post-operative care’ or ‘revision of bariatric procedures.’ Thus, there is a limited number of articles dealing with the subject matter and the majority of these plead for further research on the topic of long-term outcomes.

Four previous studies were reviewed on the subject of surgical procedures to remedy morbid obesity to provide a background of the state of current knowledge related to bariatric surgery and weight loss maintenance. McDonald (2003) concluded that there is a need for better standardization and reporting of long-term follow-up in bariatric patients. Further, analysis of results of surgical procedures has been hindered by lack of comprehensive data collection and poor long-term patient follow-up. In a meta-analysis
by Elfhag and Rossner (2005), the authors posed the question, ‘Who succeeds in maintaining weight loss following bariatric surgery?’ They reviewed 57 articles in the literature published between 1980 and 2004, and concluded that research findings in this area were ‘sparse’ and many instruments used in the studies lacked sensitivity.

A non-experimental retrospective review by Tsushima et al. (2004) of 52 patients who underwent bariatric surgery was designed to evaluate the value of the Minnesota Multi-phasic Personality Index (MMPI-2), (a common tool used in medicine and psychology to diagnose psychological issues), to predict who would regain weight after surgery. The MMPI-2 responses were hand-scored to obtain the t-scores and raw scores of content scales. Using SPSS (Statistical Package for the Social Sciences), t-test comparisons of groups revealed insignificant differences between groups in terms of age, education, and initial BMI. Results further indicated that those who did not keep weight off scored higher on Hysteria, Paranoia and Health Concerns scales of the MMPI-2. However, it also concluded that satisfactory reporting of bariatric surgery outcomes has been a continuing dilemma. Studies in the extant literature lacked consensus as to treatment success criteria, such as satisfactory weight loss and weight maintenance.

Lastly, Bocchieri et al. (2002) reviewed the extant literature on psychosocial outcomes of gastric bypass patients from 1974 to 2000. The authors found a need for more follow-up in the post-2 year period and concluded that the scarcity of long-term data can be attributed in part to difficulty tracking patients who are lost to follow-up and some who are not lost, but seem to refuse to come for follow-up visits, possibly from embarrassment of having regained weight.
As previously noted, the literature on failed outcomes in bariatric surgery is sparse. In this section, the literature related to weight loss maintenance in bariatric patients is reviewed. A review of the non-nursing literature is first presented, followed by a review of the nursing literature related to weight loss maintenance in bariatric patients.

**Non-Nursing Literature Related to Weight Loss Maintenance in Bariatric Patients**

Several reports in the literature address factors influencing weight loss maintenance in bariatric patients. Specific factors linked to weight loss maintenance include post-operative compliance with behavioral recommendations (Elkins et al., 2005), and post-operative eating patterns (Bocchierie et al., 2002; Halverson & Koehler, 1993; deZwann et al., 2003; Hsu et al., 1998; Rusch & Andris, 2007).

It has been documented that decreased compliance with behavioral recommendations is prevalent among post-operative gastric bypass patients. In a retrospective study of 100 consecutive patients who underwent gastric bypass surgery, Elkins et al. (2005) reported that a majority of patients reported noncompliance with at least one behavioral recommendation. Most patients cited noncompliance with exercise (43%) and snacking (37%) as the most common behaviors. Other areas of noncompliance included irregular attendance at follow-up appointments and excessive use of carbonated beverages. Thus, compliance with behavioral recommendations is a crucial factor influencing weight loss maintenance among post-operative gastric bypass patients.

A second factor documented that influences weight loss maintenance is the eating patterns of patients post-operatively. Patients who were able to substantially change their pre-operative eating patterns, specifically the amount, frequency, and choice of food, were more likely to maintain weight loss after gastric bypass (Bocchierie et al., 2002).
However, the ability of patients to conform to these new eating patterns is difficult. Many studies cite a return to binge eating as a factor negatively influencing weight loss maintenance in post operative gastric bypass patients (deZwann et al., 2003; Hsu et al., 1998; Rusch & Andris, 2007).

Binge eating is defined as eating substantially large amounts of food during short periods of time with a sense of loss of control (Rusch & Andris, 2007). While the prevalence of a diagnosed binge eating disorder (BED) pre-operatively is low (deZwaan et al., 2003), there is often radiographic evidence of binge eating post operatively. Halverson and Koehler (1993) concluded that patients unsuccessful at maintaining weight loss had radiographic evidence of dilation of the proximal gastric pouch that coincided with histories of increased oral intake and non-adherence to strict post-operative dietary guidelines. Other studies have concluded that binge eating behavior, which is common in the morbidly obese, may recur after surgery and is associated with weight regain (Hsu et al., 1998; Rusch & Andris, 2007).

Although the bariatric procedure mechanically prevents binge eating, the dynamics for binge eating typically survive. However, this is not evident immediately after the surgery due to the restrictive nature of the procedure and the inevitable consequence of vomiting in response to overconsumption. In time, however, some patients will start snacking which contributes to their ability to over-consume and eventual stretching of the pouch. Thus, bariatric procedures may initially mechanically prevent binge eating due to decreased stomach volume, but the authors suggest that the dynamics responsible for binge eating typically survive and may lead to patients experimenting with larger volumes of food.
Reflecting on their own bariatric surgical practice, Rusch and Andris (2007) observe that the typical surgical weight loss patient reports a history of many failed weight loss attempts and a failure mentality for losing weight. Patients view this surgical procedure as a ‘magic bullet’ (Welch et al., 2008) offering definite and substantial weight loss. Surgical candidates for the surgery are informed that they will experience vomiting or dumping syndrome (Elliot, 2003) if they deviate from the prescribed diet. Dumping syndrome is an unpleasant side effect of eating foods high in refined sugar resulting in the stomach emptying too quickly into the small intestine. The partially digested food draws excess fluid into the small intestine causing nausea, cramping, diarrhea, sweating, faintness, and palpitations. The authors suggest that most patients, in fact, count on these undesirable consequences to function as highly effective dietary controls.

However, over time, most patients will eventually ‘test their limits’ and will experiment with forbidden foods. This will be especially true for patients who had long histories of snacking preoperatively. At some point, patients will realize that the surgically induced controls no longer work and they are regaining weight. The gastrointestinal distress that they had come to depend on is gone and now the ‘ball is back in their court.’ (Rusch & Andris, 2007, p.45).

Of the articles found dealing with weight regain following bariatric surgery, researchers (Bocchieri et al., 2002; Frangou, 2008; Greenberg, 2003; Hsu et al., 1998; Warde-Kamar et al., 2004) suggest that the time period since the procedure appears to play a key role in the process of weight regain. Post-operative patients generally lose the majority of the desired weight by 24 months following the procedure. Of those approximately 20% of patients who fall into the category of failed outcome, it appears
that they begin to regain post-operative weight loss at 2 years following the procedure. Although the researchers draw no cause and effect relationship, they suggest that the practice of frequent snacking on high calorie foods and abandonment of exercise routines may contribute to the regain of weight. Future research on the subject is urged.

This review of the literature has shown that there is limited non-nursing research documenting factors influencing failed outcomes among these patients. The following section examines relevant information related to weight loss maintenance in post-operative bariatric patients found in the nursing literature.

*Nursing Literature Related to Weight Loss Maintenance in Bariatric Patients*

Research from the nursing literature relevant to this issue is scant. Prior to the publication of the journal, "Bariatric Nursing and Surgical Patient Care" in 2006, there were few articles in the nursing literature focusing on bariatric patients. With the publication of this journal by the National Association of Bariatric Nurses, articles and beginning research are now offered to nurses that address the multitude of problems unique to this patient population. However, the vast majority of these beginning articles focus on various aspects of the patient’s post-operative recovery and how nurses impact the quality of care for the bariatric surgical patient. Examples of topics published in recent journals are: “Nursing Care of the Bariatric Patient” (Camden, 2006), “Ergonomics and the Bariatric Patient” (Wilson, 2006), and “Safe Bariatric Patient Handling” (Liebert, 2007).

The single article in the nursing literature by Woodward (2003) dealing with weight loss maintenance in bariatric patients is a review of post-operative bariatric patients that revealed approximately half of all failures (defined as patients who regained
lost weight), were due to patient self-sabotage. Patients chose to consume foods high in calories with high sugar content which quickly liquefy, passing through the small pouch, leaving them hungry and not satisfied, thus, defeating the purpose of the restrictive diet.

As was previously mentioned, the non-nursing literature relevant to bariatric surgery is rich with most research studies dealing with the procedure itself and post-operative complications such as infections and development of hernias and fistulas. A limited number of articles from the medical, sociology, and psychology literature that dealt with the issue of weight maintenance following the surgical procedure were uncovered. Further, only one relevant article (Woodward, 2003) was found in the nursing literature. This gap underscores the definite need for more nursing research on this important topic.

In summary, the number of research articles in the non-nursing literature is limited, the majority of articles suggest that non-compliance with post-operative recommendations is a common finding in bariatric patients and that this behavior often leads to difficulty with weight loss maintenance. Similarly, there is scant research regarding the topic in the nursing literature, which supports the need for further research on this important issue.

Most authors conclude that the actual surgery is merely a tool to be used as part of a patient’s total arsenal toward ultimate success. This surgery is not a panacea and its long-term success is highly dependent on the individual patient’s ability to make lifestyle and behavioral changes. Several variables of behavior change have been identified in the literature as potentially contributing to weight loss maintenance after bariatric surgery.
The next section will outline those predictor variables of behavior changes which have appeared in studies that have been identified as having the greatest impact on successful outcomes for patients following bariatric surgery (Flegal et al, 2005; Herpetz et al, 2004). These behavior changes are relevant to this study because the bariatric clinic nurse is in a pivotal position to assist the patients to adopt these behavior changes.

**Predictor Variables of Behavior Change Necessary for Successful Outcomes Following Bariatric Surgery**

As has been previously noted, active participation of the bariatric patient is crucial to reaching a successful outcome in maintaining weight loss following the actual surgery. Research has shown (Flegal et al, 2005; Herpetz et al, 2004) that bariatric surgery can result in significant weight loss and maintenance, increased quality of life, and improvements in psychosocial functioning; however, there is one caveat. The process requires significant changes in lifestyle habits that patients must understand and commit to early in the pre-operative period. Most bariatric surgeons employ a multidisciplinary approach as a key component of the bariatric practice. The multidisciplinary team is comprised of bariatric surgeons, nurses, registered dietitians and nutritionists, psychologists, and exercise physiologists (Mehran et al., 2005). The goal of the team is to prepare the patient not only for the surgical procedure, but also for what life will be like in the post-operative period, which includes significant lifestyle changes. These changes are: eating restraint (adherence to dietary changes), exercise adherence, attendance at follow-up appointments, and participation in support groups. The following sections will address each of these predictor variables of behavior changes in more detail.
The cornerstone of a successful bariatric post-operative regimen is adherence to prescribed dietary changes. Eating restraint (defined as a person’s tendency to eat less than desired; (Gorman & Allison, 1995)) is the key lifestyle change that ultimately leads to weight loss following bariatric procedures (Dowd, 2005). The diet regimen for patients is very specific and must be followed fastidiously. Dietary requirements include changes in the amounts and types of food eaten, when and how much fluids can be consumed, and ingestion of vitamins and supplements (Dowd, 2005; Ray, Nickels, Sayeed, & Sax, 2003).

In studies reviewed that focused on successful habits of post-operative bariatric patients, authors identified eating restraint, as a habit that contributed to success. In a descriptive study by Cook and Edwards (1999) dietary restraint was identified by 79% of the respondents as contributing to successful weight loss maintenance. In another study (Poole et al., 2007), researchers aimed to determine what differentiated successful bariatric patients from non-successful patients. Nine fully compliant controls were compared with nine poor compliers. Case notes were analyzed retrospectively. Results revealed that compliers were significantly more likely to engage in strict dietary adherence, whereas, the poor compliers were found eat more in response to negative emotional situations.

Although the majority of researchers identify benefits related to dietary adherence including weight loss, decreased hunger (Lang, Hauser, Buddeberg, & Klaghofer, 2002; Rand, MacGregor & Hankins, 1987), and decreased binge eating (Boan et al., 2004, Lang et al, 2002), other studies suggest that pre-operative eating problems persist after the
surgery with patients showing a return to loss of control over eating (Kalarchian, Marcus, Wilson, Labouvie, Brolin & Lamarca, 2002) or the return to the previous snacking pattern of ‘grazing’ defined as constantly eating small amounts of calorie rich foods throughout the day (Saunders, 2004).

In summary, although the literature that addresses eating restraint in post-operative bariatric patients is limited, the majority of research points to the critical importance that this particular behavior change contributes to patients’ overall ability to maintain weight loss. The next section addresses the behavior change of exercise adherence.

*Exercise Adherence*

Engaging in regular exercise is another key factor in helping the bariatric patient lose and maintain weight. A regular exercise regimen of walking, cycling or other aerobic activity performed for 30 minutes a day, 5 days per week, is a recommendation of the American Heart Association (Haskell, Lee, Pate, Powell, et al., 2007) and is an expectation of bariatric patients (Howe, 2005). Bariatric clinic professionals take into consideration that morbidly obese patients have most likely been living a sedentary life prior to the surgery, and therefore, emphasize the key role that exercise plays in the patient’s overall success.

Exercise adherence, defined as a consistent pattern of exercise behavior that coincides with that prescribed by a health professional (Baker, Nelson, Felson, Layne, Sarno, & Roubenoff, 2001; Wilber, Chandler, Miller, 2001), has been studied in a variety of interest areas, among these cardiac rehabilitation and pulmonary rehabilitation. A study of cardiac rehabilitation patients by Bassett, Crouter, Schneider & Karabulut, (2000)
tested the difference in exercise adherence of two groups; one using an exercise log and one using a pedometer. Another study (Donesky-Cuenco, Janson, & Nehaus, 2007) was designed to describe exercise adherence to a home-walking program in patients with chronic obstructive pulmonary disease. Exercise behavior and adherence were measured by a paper and pencil exercise/dyspnea log, which served as the primary source of exercise adherence data. Adherence was calculated as a percentage score by comparing the actual exercise behavior with the frequency and duration prescribed.

Although non-adherence with exercise following bariatric surgery is common, limited research related to this topic was found. The research reviewed for this study that focuses on exercise adherence in bariatric patients consists of three studies.

In a descriptive, retrospective study by Elkins, et al. (2005), the authors studied non-adherence with behavioral recommendations following bariatric surgery. The records of 100 consecutive patients who underwent gastric bypass surgery were reviewed. The authors concluded that non-adherence with behavioral recommendations was pervasive with the lack of exercise being the most likely area of non-adherence. A study by Cook and Edward (1999), examined the success habits of long-term gastric bypass patients. This descriptive retrospective study examined 100 gastric bypass patients who had undergone the procedure from 1979 to 1995 and found that one of the most common findings in unsuccessful patients was not following the prescribed exercise regimen.

In a descriptive, prospective study of 1,585 bariatric patients post-surgery from 1988 to 2001 (Bond et al. 2004), data was gathered using a comprehensive author-made questionnaire. The surveys were completed in person, by phone, or in writing. Participants were asked to answer questions regarding their eating, drinking, sleeping,
exercise, and personal habits. Data analysis suggested that bariatric patients who reported engaging in physical activity during the 2-year post-surgical period lost a greater proportion of their excess weight and had a more pronounced reduction in BMI than their sedentary bariatric patient counterparts.

In all of the preceding studies, measurement of exercise adherence was measured prospectively through exercise logs and/or journals (Bond et al., 2004). Retrospectively, measurement of exercise was conducted through chart reviews (Cook & Edward, 1999; Elkins et al., 2005) or by self-report through structured questions which gathered data related to whether the patient adhered to prescribed exercise. This review of the literature revealed that the issue of measurement of exercise adherence is challenging. Buckworth and Dishman (2002) suggest the use of questions that measure the percentage of adherence by the patient (i.e. 20%, 50%, 80%). They state, “the lack of clear adherence standard leaves it up to the investigator to explicitly state the criteria for adherence and makes comparing different studies more difficult” (p.59). Rand and Weeks (1998) identify measurement of exercise adherence as a common problem in the exercise adherence literature and suggest that it is very difficult to find specific criteria to provide the “gold standard” for determining adherence. What is acceptable adherence in one study or for one exerciser might be non-adherence in another study or for someone else. Physical activity, which is a very complex behavior that varies day-to-day and season-to-season, can be difficult to measure.

Self-report is the most frequently used method to measure physical activity, with the most common methods being interview, structured questionnaire, and log/diary (Burke & Dunbar-Jacob, 1995). These measures expect the subject to recall their
activities during a specified time period (Sallis & Owen, 1999). There are advantages and disadvantages with this method of data collection. The advantages of self-report include flexibility in administration, low cost, and ability to measure different levels of detail. However, self-report measures may be subject to bias and inaccurate recall, especially, overestimation of performance (Sallis & Owen, 1999). Since this research study is a descriptive, cross-sectional design, which precludes the use of collecting longitudinal data via log/diary or pedometer, the self-report method of physical activity was ultimately chosen for its applicability to this design. Results will be interpreted carefully keeping in mind potential disadvantages previously mentioned.

In summary, research that identifies specific behaviors that contribute to successful weight loss maintenance in bariatric patients consistently points to the ability of the patient to adhere to the prescribed exercise set forth by the bariatric clinic. This behavior in combination with eating restraint assists the patient on his/her journey of success. However, the literature suggests that these behaviors alone are not enough to insure that the patient will succeed in weight loss maintenance. Another important behavior, identified in the literature is attendance at follow-up appointments. This is addressed in the next section.

*Attendance at Follow-up Appointments*

Along with dietary restraint and exercise adherence, attendance at follow-up appointments is another integral component in the bariatric patients’ prescription for successful weight loss maintenance. Because the post-operative regimen is very complex, follow-up appointments serve as a major mechanism of patient education for bariatric surgical patients (Dowd, 2005).
Most general surgical patients are scheduled to follow-up in the office 10 days to 14 days following the procedure (Mehran et al, 2005), and barring any complications, will only have to see the doctor on an as needed basis. Bariatric patients, on the other hand, must commit to a strict schedule of follow-up appointments: 6 weeks after the procedure, every 3 months for the first year, every 6 months for the following year, and annually for the rest of their lives.

The literature regarding attendance at follow-up appointments and bariatric surgical patients is limited. Three studies were found that dealt with the issue. While no studies were uncovered that focused specifically on attendance at follow-up appointments, information was found within the studies that contribute to the understanding of this concept. In the previously cited study by Poole et al. (2005), the researchers retrospectively studied a cohort of patients to identify those who were ‘poor compliers’ (p. 262) to enhance candidate selection and to target specific interventions. Nine poor compliers were compared with 9 fully compliant controls. It was concluded that the poor compliers were significantly more likely to persistently consume calorie-dense liquid foods and fail to attend follow-up appointments.

In a study previously cited by Rusch and Andris (2007), relevant literature was reviewed on non-compliant patients following bariatric surgery to study patients from the researchers’ bariatric practice. They reviewed records of 289 bariatric patients ranging from several weeks to 28 months post-procedure. Findings revealed that the majority of patients (69%) were successful in losing and maintaining weight; however, those who were not successful had developed maladaptive eating behavior and demonstrated lapses in attendance of follow-up appointments.
Lastly, a retrospective study by Warde-Kamar et al. (2004) focused on calorie intake and meal patterns up to four years following bariatric surgery. A purposive sample of 69 patients who had undergone bariatric surgery at least 18 months prior to the study was selected. Findings from the study revealed that follow-up with the clinic after the surgery was relatively poor, with only 38% of patients returning at 18 months and only 10% at 3 years. Additionally, the time since the procedure was significantly longer for the subgroup that had gained greater than 50% of their weight back, supporting previous studies (Bocchieri et al, 2002; Frangou, 2008; Greenberg, 2003; Hsu et al, 1998) that found time from procedure to be of significance in weight regain.

In summary, while no studies directly studied the relationship between attendance at follow-up appointments and maintenance of weight loss, information relevant to this relationship was indirectly uncovered during the literature review. Of the three studies reviewed, findings supported the importance of regular attendance at follow-up appointments towards patients’ overall success in maintaining weight loss.

Another behavior that appears in studies of successful bariatric patients is participation in support groups. This behavior is addressed in the next section.

*Participation in Support Groups*

The final lifestyle change to be examined in post-operative bariatric patients is participation in support groups. The foundational concept of the self-help support group is developing positive and healthy supportive relationships with others who share the same or similar challenges in life (Kessler, Mickelson, & Zhao, 1997). Bariatric patients face unique problems related to the nature of the surgical procedure and the nutritional requirements necessary for a successful outcome. The milieu of the support group
provides people with others who can relate to them and understand from first hand experience the challenges this surgery poses (Sheipe, 2006). Further, the support group atmosphere promotes non-judgmental attitudes where members are willing to share experiences of success as well as failure.

While many articles in the literature advocate that bariatric patients attend support groups, few are research-based. It has been suggested that routine attendance at a support group offers the patient the opportunity to work on life issues that may have contributed to weight problems as well as focusing on the actual weight loss (Woodward, 2003). Bradley (2007) contends that patients should be referred to an on-going support group beginning pre-operatively and continuing through at least the first five years post-operatively. Further, the author suggests that being part of a group of individuals that have undergone bariatric surgery with its dramatic lifestyle changes can be very helpful for the patient to sustain new self-management practices and to recognize certain symptoms that may portend a negative outcome.

This literature review uncovered only two research articles related to support groups and bariatric patients. In the first, Song, Reinhardt, Buzdon & Liao (2007), described the association between support group attendance and weight loss after bariatric surgery. This retrospective quantitative study reviewed weight loss data and support group attendance of 78 consecutive bariatric surgical patients. The sample was divided into two groups: those who attended more than 5 monthly support group meetings (group A) and those who went to less than 5 support group meetings (group B). Data from the first 12 months after surgery were analyzed. Results of mean percentage of weight loss are shown in Table 1. There was a statistically significant difference between
the 2 groups at 9 and 12 months revealing that those who attended more than 5 support
groups lost more weight than those that attended less than 5 support groups.

Table 1

*Weight-Loss by Study Group*

<table>
<thead>
<tr>
<th>% Weight Loss</th>
<th>2 weeks</th>
<th>6 weeks</th>
<th>3 months</th>
<th>6 months</th>
<th>9 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>10.5%</td>
<td>21.4%</td>
<td>30.9%</td>
<td>45.4%</td>
<td>53.6%</td>
<td>55.5%</td>
</tr>
<tr>
<td>Group B</td>
<td>11.3%</td>
<td>21.8%</td>
<td>31.8%</td>
<td>41.3%</td>
<td>45.9%</td>
<td>47.1%</td>
</tr>
</tbody>
</table>

Song, et al. (2007) concluded that support groups were important for maintaining
weight loss throughout the first year after surgery. Further, they found that the amount of
post-operative weight loss was greater than, or comparable to, the published data.

The second study (Hildebrandt, 1998), examined the effects of participation in
bariatric support groups after Roux-en-Y gastric bypass surgery. A sample of 102 post-
operative bariatric patients answered self-report questionnaires that were designed to
investigate weight loss, mood, post-surgical problems, and the reasons patients chose not
to attend the support group meetings. Analysis of data revealed that there was a statistical
trend for greater weight loss (\( p = .08 \)) in group attenders than in non-attenders. The
authors concluded that in this study, mean weight loss was as good as, or better than
reported in the literature. Further, patients who attended group meetings regularly tended
to lose more weight, and increased frequency of attendance was associated with greater
weight loss (Hildebrandt, 1998).

In summary, limited research exists regarding the relationship between attendance
at support groups and maintenance of weight loss in post-operative bariatric patients. The
two research studies reviewed concluded that regular attendance at a support group was associated with greater weight loss maintenance bariatric patients. Since no studies were found in the nursing literature addressing this issue, the present study seeks to fill this gap and provide information relevant to this topic.

As evidenced in this review of literature, behavior change is necessary to ensure weight loss maintenance in bariatric patients. Specifically, behaviors such as eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups have been identified as positive behavior changes needed in order to achieve weight loss maintenance. What is less described in the literature, however, is the role of intrinsic or cognitive factors that influence the ability of the bariatric patient to engage in these necessary behavior changes. Specifically, the role of self-efficacy as a mediating variable in ensuring weight loss maintenance has not been explored. The following section of this chapter will review the literature on self-efficacy as it relates to health related behaviors and weight loss.

The Construct of Self-efficacy

First introduced in 1977, Bandura’s Social Learning Theory (SLT) suggests that behavior is determined by expectancies and incentives. It incorporates motivational, affective, cognitive, and selective processes to promote behavior adherence. In this section, an overview of self-efficacy theory will first be described. The literature on self-efficacy pertaining to health related behaviors and weight loss is then reviewed.

Overview of Self-efficacy

According to the theory, a person has “efficacy expectations” about his or her ability to engage in or execute a behavior, as well as “outcome expectations” consisting
of beliefs about whether a given behavior will lead to a given outcome. A central construct of Bandura’s theory is perceived self-efficacy (hereafter referred to as self-efficacy) which is described as judgments that individuals have of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has, but with judgments of what one can do with whatever skills one possesses (Bandura, 1982). Further, it has been suggested (Bandura, 1977; Lenz & Shortridge-Baggett, 2002) that this description shows that the individual’s self-efficacy is not of a general nature, but related to specific situations. In other words, people can find themselves to be competent in one domain and less competent in another. Thus, self-efficacy is related to specific situations and tasks, which is not the case for related concepts like self-esteem, self-confidence, and locus of control (Mailbach & Murphy, 1995) and therefore, is not a personality trait, but a temporary and situation-related characteristic.

Self-efficacy has been identified as a core element of perceived control and a cognitive mechanism underlying behavioral change (Cervone, 2000). Individuals who are undertaking behavior change are unlikely to take action to control events if they doubt their own capability to execute requisite behaviors. Therefore, self-efficacy would be expected to play an important part in bariatric patients’ ability to adopt behavior changes necessary to maintain weight loss.

A review of the literature reveals that across diverse disciplines, psychosocial influences change behavior by increasing perceptions of personal efficacy (Bandura, 1977). Research related to health promotion and recovery from physical setbacks (Bandura, 1991; Ewart, 1995; O’Leary, 1985), performance in work settings (Locke &
Latham, 1990; Bandura & Wood, 1989), the control of eating (Glynn & Ruderman, 1986), resistance to addictive substances (DiClemente, Fairhurst, & Piotrowski, 1995; Haaga & Stewart, 1992; Shadel & Mermelstein, 1996), educational achievement (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996), and success in athletic pursuits (Feltz, 1982), underscores the utility and pervasive impact of self-efficacy appraisal on human achievement (Cervone, 2000).

According to Bandura (1977), self-efficacy expectations are the most powerful determinants of behavioral change, determining the initial decision to perform a behavior, the effort expended, and persistence in adversity. Further, it has been observed that in most social and professional activities, success requires the persistent application of effort despite occasional setbacks (Cervone, 2000). Bandura (1977) argued that perceived self-efficacy influences all aspects of human behavior, including acquisition of new behavior, inhibition of existing behavior and disinhibition of certain behaviors. Therefore, it would be prudent to evaluate the obese patients’ expectations, knowledge, skills, and expected outcomes associated with maintaining weight loss.

_Self-efficacy and Health Related Behaviors_

A growing body of literature supports the concept of self-efficacy in helping to account for initiation and maintenance of health behavior change. Empirical research by Bandura and others (Bandura, 1977; Bandura et al., 1977; Stretcher et al, 1986) has demonstrated support for self-efficacy theory after strong associations were found between self-efficacy and progress in health behavior change. Pender (1987) and Weitzel (1989) suggested that individuals with positive perceptions of their health promotion
skills would be more likely to participate in activities that enhance health, and indeed, the
completed research provided support for their positions.

A review of the literature identifies self-efficacy as an underlying mechanism in a
wide range of health related behaviors including smoking cessation, weight control,
exercise, nutrition, alcohol use, contraception and AIDS prevention (Bandura, 1991; McCauley, 1993; O’Leary, 1985; Strecher et al., 1986; Yallow & Collins, 1989). Self-
efficacy has been increasingly used in explanations of health related behavior. O’Leary
(1985) found evidence that individual’s perceptions of their efficacy are related to
different forms of health behavior. Further, a meta-analysis (Stretcher, 1986) of literature
that examined self-efficacy in relation to health behaviors found a consistently positive
relationship between self-efficacy and change in behaviors.

Holden’s meta-analysis of quantitative correlation studies published in 1991
studied the relationship between perceived self-efficacy and subsequent health-related
outcomes. The study reviewed 56 studies from 1981 to 1989. Criterion categories in the
final sample included: smoking (32.1%), pain related (25%), weight loss (14.3%), and
physical activity/exercise (8.9%). There were no studies of post-operative bariatric
patients and only 6 studies of patients with obesity. The samples in these studies (3200
subjects) were obese patients being studied for their self-efficacy on weight loss. The
across study unadjusted effect size of the relationship between self-efficacy and health
related outcomes was significant (adjusted effect size $r = .26$ and $p < 0.00001$). A
statistically significant effect size was found in people engaged in weight loss behaviors
($r = .16; p < .005$). The author concluded that throughout previously conducted
analyses, a statistically significant relationship between self-efficacy and health related
outcomes was observed with post-hoc analyses revealing extremely high power for these tests. The next section focuses more specifically on the health related behavior of interest to this study, that of weight loss.

Self-efficacy Related to Weight Loss

Predicting who will or will not be successful in surgical weight-loss programs has the potential for impacting treatment practices, service provision, and health promotion by bariatric centers (Fontaine & Cheskin, 1997). Several studies were found that examined the relationship of self-efficacy to weight loss in medical weight loss programs. No literature was uncovered that examined the relationship of self-efficacy to weight loss maintenance in bariatric surgical patients.

Glynn and Ruderman (1986) posit that assessing patient’s levels of self-efficacy should facilitate the prediction of weight loss during treatment and post-treatment. They defined eating self-efficacy as one’s confidence in controlling overeating, which should not be confused with one’s overall perception of self-confidence. Their research showed that many obese patients perceive that they have so little control over their eating (low eating self-efficacy) that successful treatment may first involve convincing them that they can control their weight. Failure to do so can result in total treatment failure.

Bernier and Avard (1986) investigated the relationship between self-efficacy and weight change at baseline and during treatment for 62 women enrolled in a 10-week weight loss program. In this prospective pre-test, post-test design, participants were randomly assigned to one of 5 groups that met for 10 weeks. The groups, led by a therapist, received information on nutrition, exercise and rehearsal of cognitive self-
control strategies. Data analysis revealed that higher self-efficacy at the end of the program was associated with greater weight loss at a 6-week follow-up assessment.

In another study (Jefferey, Bjornson-Benson, & Rosenthal, 1984), investigators examined self-efficacy, weight loss, and weight maintenance in 89 participants enrolled in a 15-week weight loss program. They found that higher pretreatment emotional and situational self-efficacy was associated with group weight loss at the end of treatment and at one-year follow-up. In several other studies (Chamblis & Murray, 1979; Edell et al., 1987; Jeffery et al., 1984; Jeffery et al., 2000) positive associations between self-efficacy and weight loss were evident during the weight loss intervention phase and at 1- and 2-year follow-ups.

A study by Kinsantas (2000), focused on the role of self-regulation strategies and self-efficacy perceptions in successful weight loss maintenance. This prospective correlational study included 33 undergraduate students divided into 3 groups based on past weight loss experience and BMI. All participants were interviewed using a structured questionnaire. Path analysis revealed that participants who reported high self-efficacy beliefs were able to lose more weight than those reporting low self-efficacy. Further, it found that participants with low self-efficacy perceptions failed to implement the self-regulated strategies thought to be an essential part of their weight maintenance routines.

In a prospective study by Dennis and Goldberg (1996), 54 women were involved in a nine-month behavioral weight loss program. The study was conducted to test the hypothesis that Q methodology would identify distinct types of weight control self-efficacy beliefs. Based on the Q sort technique, two major self-efficacy categories
emerged: Assureds and Disbelievers. Participants were classified as either Assureds or Disbelievers based on their degree of self-efficacy. Groups of 10-12 women met weekly for 6 months, then biweekly for 3 more months. Treatment involved instruction in behavior modification, dietary intake, and walking. Behavior modification techniques included stimulus control and response as well as strategies designed to strengthen self-efficacy beliefs. Analysis revealed that Assureds were seen as goal directed, persistent, and self-confident regarding weight control. Disbelievers were described as not being able to control their body weight and as having a tendency to give up easily. Not only did obese women with Assured weight control self-efficacy have the strongest self-efficacy beliefs, but by the post-treatment phase they had lost significantly more weight than the Disbelievers.

Findings from Dennis and Goldberg’s (1996) study suggest that self-efficacy beliefs may be central to individualizing interventions for weight loss and that targeted interventions that are matched to clients’ intrinsic needs may strengthen self-efficacy beliefs, build self-esteem, and foster positive affective states while promoting weight loss. Additionally, Cervone (2000) observed that self-efficacy theory not only analyzes mechanisms underlying the power of existing interventions, it also provides guidelines for designing maximally effective treatments.

Lastly, a study by Linde et al. (2006), examined relationships between self-efficacy beliefs, weight control behaviors, and weight change among individuals participating in a weight loss trial. A sample of 349 participants was recruited through public advertisements to participate in a randomized clinical trial designed to evaluate the effects of cognitive interventions that influence outcome expectations for weight loss.
Treatment consisted of 8 weekly 1-hour group sessions led by a trained facilitator. Participants completed questionnaires at baseline and at weekly intervals during the treatment period and monthly beyond week 8.

Data analysis revealed that by the end of treatment, greater engagement in all weight control behaviors (avoidance of high calorie foods, adoption of healthy eating behaviors, and control of snacking) was associated with greater weight loss, even after controlling for differences in initial weight. All effect sizes were in the medium to large range (\(ds = .41-.96\), and all results but one (for days following an exercise plan, \(p = .07\)) were statistically significant (\(p < .05\)) (Linde et al., 2006). The authors concluded that findings from the study show that self-efficacy mediates the impact of weight loss behaviors in the context of a cognitive-behavioral weight loss intervention and that self-efficacy is an important predictor of successful weight loss behaviors.

In summary, several studies were found that examined the relationship of self-efficacy to weight loss in medical weight loss programs (Bernier & Avard, 1986; Chamblis & Murray, 1979; Edell, et al.,1987; Glynn & Ruderman, 1986; Jefferey et al., 1984; Jefferey et al., 2000). However, no literature was uncovered that specifically examined the relationship of self-efficacy to weight loss maintenance in bariatric surgical patients.

Summary

The studies discussed in this chapter present background information necessary to support rationale for this current study. Obesity has reached epidemic proportions in the United States. Consequently, the number of bariatric surgeries performed has increased drastically over the past five years and shows no signs of decreasing. Although research
is being conducted relevant to bariatric surgery, very little focuses on the issues of patients who have difficulty with weight loss maintenance. Further, several authors point to the immediate need for more research into the long-term outcomes of bariatric patients, citing the amount of current research as inadequate. There is, however, literature to support the fact that certain behavior changes (dietary restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups) are related to the maintenance of weight loss in post-operative bariatric patients. What is less described in the literature, however, is the role of intrinsic or cognitive factors that influence the ability of the bariatric patient to engage in these necessary behavior changes. Specifically, the role of self-efficacy as a mediating variable in ensuring weight loss maintenance has not been explored.

While some studies have examined the relationship of self-efficacy to successful outcomes in behavior change, especially, weight loss in medical weight loss programs, no studies to date have focused on the relationship of self-efficacy to weight loss maintenance in bariatric surgical patients. With the increasing numbers of patients electing to undergo this procedure and an estimated 20% of those patients regaining their weight (Benotti & Forse, 1995), there is a definite need for more research on the subject of weight maintenance. Authors have suggested that the key to successful weight loss after this surgery is behavior change. Self-efficacy has been shown to be a powerful cognitive mechanism underlying behavior change. Yet, no studies to date have examined the relationship between bariatric patients’ level of self-efficacy and their ability to make behavior changes that result in positive weight maintenance outcomes. This current study
seeks to fill this gap about how self-efficacy can help to mediate specific behavior
changes that will lead to weight loss maintenance in bariatric surgical patients.

Hypotheses

Based on the previous review of literature relevant to bariatric patients’ weight
loss maintenance and the theoretical framework of self-efficacy theory, the following
hypotheses will be tested in this study:

Hypothesis One: There is a positive relationship between behavior change (eating
restraint, exercise adherence, attendance at follow-up appointments, and participation in
support groups) and weight loss maintenance in post-operative bariatric patients.

1.1: There is a positive relationship between eating restraint and weight loss
maintenance in post-operative bariatric patients.

1.2: There is a positive relationship between exercise adherence and weight loss
maintenance in post-operative bariatric patients.

1.3: There is a positive relationship between attendance at follow-up
appointments and weight loss maintenance in post-operative bariatric patients.

1.4: There is a positive relationship between participation in support groups and
weight loss maintenance in post-operative bariatric patients.

Hypothesis Two: There is a positive relationship between level of self-efficacy and
behavior change in post-operative bariatric patients.

2.1: There is a positive relationship between level of self-efficacy and eating
restraint in post-operative bariatric patients.

2.2: There is a positive relationship between level of self-efficacy and exercise adherence in post-operative bariatric patients.

2.3: There is a positive relationship between level of self-efficacy and attendance at follow-up appointments in post-operative bariatric patients.

2.4: There is a positive relationship between level of self-efficacy and participation in support groups in post-operative bariatric patients.

The definitions for the independent, mediator, and dependent variables are listed in Appendix 1. In the next chapter, Methods, the following topics will be addressed: population, sampling criteria, instrumentation, data collection procedures, data analysis and protection of human subjects.
CHAPTER III

METHODS

Introduction

The purpose of this study was to examine the role of self-efficacy on weight loss maintenance in post-operative bariatric surgical patients. This chapter provides the methodology used to answer the following proposed research questions: 1) What is the relationship between eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups and the outcome variable of weight loss maintenance among bariatric surgical patients? and, 2) How does self-efficacy influence exercise restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups among bariatric surgical patients?

This chapter first presents a description of the research design that was implemented in this study. The study sample, setting, instruments, and procedures are then presented. Finally, data handling and analysis as well as protection of human subjects are described.

Research Design

A descriptive, correlational design was used to determine whether specific behaviors (eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups) are associated with weight loss maintenance in bariatric patients and how self-efficacy mediates this relationship. Demographic variables were
included primarily to describe the sample and to determine if any relationships existed between these and the study variables of self-efficacy and weight loss maintenance.

Setting

This study took place at two bariatric surgical weight loss centers. Both centers have been approved by the American College of Bariatric Surgeons (ACBS) to perform bariatric surgeries at their centers and are guided by specific practice guidelines outlined by the ACBS. The first, a large community, teaching hospital located in Northeast Ohio, was the first hospital in the state of Ohio to be designated as a Magnet Hospital by the American Nurses Credentialing Center, which certifies excellence in nursing care and patient outcomes. Over 600 patients have received bariatric surgery in the form of gastric bypass surgery or the LapBand procedure at this center. The second study site, also located in Northeast Ohio, is affiliated with a large community hospital that has performed over 5,000 procedures. Both centers are nationally recognized as Centers of Excellence (COE) by the Surgical Review Corporation.

Sample

A non-probability convenience sampling technique was used in this study. Criteria for inclusion were: (a) patient had bariatric surgery prior to July 1, 2006; (b) patient could understand English; (c) patient could give informed consent, read, and complete the survey.

A power analysis was conducted using SamplePower 1.0 (SPSS) to determine the sample size with a medium effect size, a power of .80, and a significance level of .05. The power analysis yielded a sample of N = 90 for the independent variables of eating
restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups, and the mediating variable of self-efficacy.

Instruments

In Chapter I, the tools were introduced briefly. This section will present a more detailed description of the instruments’ psychometrics, and relevance to this study. A study questionnaire comprised of three parts was used. This consisted of *The Weight-Efficacy Life-Style Questionnaire (WEL)* (Clark, Abrams, Niaura, 1991) (Appendix B), *The Eating Restraint Scale (ERS)* (Stunkard & Messick, 1988) (Appendix C), and the *Background Survey* (Appendix D). The *Background Survey*, a demographic questionnaire, includes questions about age, race, gender, marital status, level of education, and type of bariatric surgery. Information related to the study variables of weight loss maintenance, exercise adherence, attendance at follow-up appointments, and participation in support groups, was also collected. It is noteworthy that one of the tools chosen for this research study (*The Weight-Efficacy Life-Style Questionnaire (WEL)*) (Clark et al, 1991) was previously used in unpublished research with bariatric patients at one of the study sites.

*The Weight-Efficacy Life-Style Questionnaire (WEL)*

The Weight-Efficacy Life-Style Questionnaire (WEL) developed by Clark et al, (1991) is a 20-item self-report measure designed to assess an individual’s confidence to abstain from eating in a variety of situations. It has been used in research with overweight diabetics (Delahanty, Meigs, Hayden, Williamson, & Nathan, 2002) and with obese individuals (Richman, Loughnan, Droulers, Steinbeck, & Caterson, 2001). A structural analysis conducted by Clark et al. (1991) revealed a five factor hierarchal model that
provided the best fit for the data. The five hypothesized dimensions of efficacy for weight management include: negative emotions, availability, social pressure, physical discomfort, and positive activities. Factor loadings for the 20 items ranged from .62 to .92 (mean = .76).

Each of the five dimensions of the WEL has four items that are scored using a 10-point Likert-type scale. Respondents are asked to rate their confidence in resisting overeating ranging from 0 (not confident) to 9 (very confident). Higher scores indicate greater confidence in being able to resist eating. A score is obtained by summing the responses across all five dimensions. The potential range of scores is from 0 to 180, with higher scores indicating higher self-efficacy. In a study by Clark et al. (1991), WEL scores in obese patients increased from a mean of 125 to a mean of 144 following a 17-session cognitive-behavioral treatment program.

Reliability for the WEL has been established (Clark et al., 1991) with Cronbach alpha coefficients for internal consistency ranging from .70 to .90 with a median of .83 in two studies (Clark et al., 1991; Pinto, Clark, & Cruess, 1999). Subscales measured variables organized around the central construct of eating self-efficacy. Subscale correlations ranged from .37 to .65, with a median of .51.

Validity of the WEL demonstrated an independent cross-validation (Clark et al., 1991) and convergent validity was demonstrated with the use of the Eating Self-Efficacy Scale (ESES) (Glynn & Ruderman, 1986). The WEL total score correlated .67 with the total score of the ESES.
The WEL was determined to be the best match for measuring self-efficacy in this study. The ability of patients to resist eating in tempting situations is of particular relevance to this study as discussed in Chapter I. The WEL was selected for its practicality and ease in administration and scoring. Determination of scale scores involved simple unit weighting of the items to produce either a total or a mean scale score. Permission to use this instrument was obtained from the author (Clark et al, 1991) (See Appendix E for WEL Author Permission).

**Eating Restraint Scale**

The Eating Restraint Scale (ERS), a subscale of the Eating Inventory (EI) (Stunkard & Messick, 1988), is a self-report instrument intended to measure the level of eating restraint. It consists of a 21-item scale that assesses the construct of eating restraint. The scale is comprised of 9 forced-choice items and 12 true/false items. A sample item from the dietary restraint scale is, ‘I count calories as a conscious means of controlling my weight.’ Scoring of the Eating Restraint Scale was facilitated by the use of the ReadyScore™ Answer Sheet (Appendix F) that provides a built-in scoring system for the researcher. The answer sheet allowed for the calculation of scores for the scale. Items contributing to the score for the factor are coded on the reverse side of the Answer Sheet. The possible scores for this tool are 0 to 21, with higher scores indicating stronger eating restraint.

In a study by Van Loan and Keim (2000) that used the ERS, women were classified as having normal eating restraint if the score on the eating restraint factor was greater than 9. This score was selected because it was the median score for the data set. In another study (Allison, Kalensky, & Gorman, 1992), a group of 900 college students was
studied and, similarly, the median score on the eating restraint scale was 9. Lastly, in a study by Womble, Williamson, Greenway and Redmann (2001), the ERS was used in a sample of 349 participants in a clinical weight loss program. The study results showed that participants with higher eating restraint had higher weight loss in a 12-month medically supervised weight loss program.

Reliability has been established for this factor on samples consisting of dieters adhering to a rigid food program, acquaintances of those dieters selected as those who ‘ate freely,’ and a group selected based on the geographical proximity to the dieters. Coefficient alpha reliabilities measuring the internal consistency for eating restraint was 0.93 (Stunkard & Messick, 1988). Lastly, a study by Karlsson, et al. (1998), designed to evaluate the construct validity of the ERS in men and women, concluded that the eating restraint factor was consistently reproduced and scaling analyses demonstrated strong item-scale discriminant validity.

The ERS was determined to be the best conceptual match for the measurement of eating restraint in this study. Several research studies (Allison, et al., 1992; Karlsson et al., 2000; Stunkard & Messick, 1988; Van Loan & Keim, 2000) attest to the usefulness of the tool in measuring eating restraint. The ERS is appropriate for use in this study which seeks to determine the relationship of eating restraint and maintenance of weight loss in bariatric surgical patients. The ERS was selected for its practicality and ease in administration and scoring.
A demographic survey (Background Survey) consisting of 15 questions was used to obtain descriptive sample characteristics and to determine possible relationships between the demographic variables and the primary study variables.

Information obtained related to participants’ age, race, gender, marital status, level of education, socioeconomic status, work status, and type of bariatric surgery. Several questions provided information pertinent to the following study variables: weight loss maintenance (questions 5 and 6) exercise adherence (question 13), attendance at follow-up appointments (question 14), and participation in support groups (question 15).

Protection of Human Subjects

After obtaining appropriate IRB approval, study participants received a letter explaining the purpose of the study. Since this was a descriptive study without an intervention, there was no interference in the normal care provided to participants. Participants were advised that they may choose to participate or not participate and that participation in the study was voluntary. They were informed of their rights as research participants and that they would not be exposed to any physical or psychological risks beyond those normally encountered in everyday life. The signed informed consent indicated their permission to participate in the study.

Surveys were number-coded for the purpose of maintaining confidentiality and facilitating organization of data entry upon return to the researcher. Data were entered into a database by the researcher and stored on a jumpdrive that will be kept in a locked file in the office of the researcher. Only the researcher has access to the locked office. To insure that the database contains no information that can be associated with specific
participants, the researcher kept a log book with subjects’ names and study identification numbers; this is stored in a locked location separate from the study records.

**Procedures**

Approval to conduct this study was obtained from the Institutional Review Boards (IRB) of both bariatric centers, (Appendix G & H), and Kent State University (Appendix I). IRB approvals were received in June and July of 2008 and data collection began.

**Participant Selection**

Permission was obtained from the Medical Directors of both bariatric centers to send query letters to clinic patients informing them of the opportunity to participate in a research study. Both centers have language in pre-operative patient materials informing patients that they may be contacted to participate in future research studies. A member of the clinic staff of both bariatric centers mailed the letters to all patients that had bariatric surgery prior to July 2006. The cost of the mailing was paid for by the researcher.

The time period (prior to July 1, 2006) was selected because it included patients who had surgery performed 24 months ago and longer. As previously discussed, this time period has been identified by several authors as potentially relevant, in that, this is the time that patients may begin to regain weight (Bocchieri et al, 2002; Frangou, 2008; Greenberg, 2003; Hsu et al, 1998; Warde-Kamar et al, 2004). The letter included a description and goals of the study and information that provided full disclosure and protection of human subjects. Information related to number of surveys, time necessary to complete the surveys, confidentiality, potential risks and benefits, and voluntary participation was included. Potential participants were asked to respond to the letter within two weeks by contacting the researcher by phone at the number provided (1-800-
or by email. During the initial phone call, prospective subjects were given information about the nature of the study, their level of involvement and were asked to participate in the study. Participants were screened for study inclusion criteria. If they agreed to participate, they were sent a study packet in the mail.

*Data Collection Techniques*

Once the interested subject contacted the researcher, was given information about the study, and was screened for meeting study criteria, a survey packet was mailed to each participant’s home. The survey packet (Appendix J) contained a cover letter, the informed consent, the Background Survey, the Weight Self-efficacy Questionnaire (WEL), the Eating Restraint Scale (ERS), and a return addressed stamped envelope. Participants were informed that they could contact the researcher at the phone number provided on the cover letter if any questions arose related to completing the surveys. They were asked to complete the surveys and return these in a postage paid envelope within two weeks. After a three-week period, participants who did not return their completed surveys received a follow-up reminder call, requesting that they complete and return the packet as soon as possible.

The signed informed consent contained language that permitted the principal investigator to collect limited data from the participant’s medical record, if needed. Data of interest include: pre-surgery and current weight, percentage of excess body weight lost (%EBWL), participation in support groups, and information, if available, on attendance at follow-up appointments.
Compensation

It was estimated that it would require 10-15 minutes for participants to complete the study questionnaire. Individuals who agreed to receive a study packet received a five-dollar store gift card thanking them for participating in the study.

Data Analysis

Demographic data and survey results were coded for tracking purposes, but kept confidential. Data collection occurred between July and October 2008 until the sample, determined by power analysis, (N=90), was attained. Descriptive statistics including frequency, range, mean and standard deviation were used to describe demographics of the sample, self-efficacy, eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups, and weight loss maintenance. Correlation and multiple regression were used to test relationships and explain variances among variables. The most recent version of SPSS -16.0 was used for data entry and analysis.

Data Analysis Preparation

Study data were entered, cleaned, and analyzed using SPSS 16.0. Data from individual surveys were coded and entered into the SPSS database by the researcher. Data were then visually rechecked to determine missing values, outliers, and values outside of potential range. Finally, logic checks and frequency checks were performed on the data set. Descriptive statistics such as measures of central tendency were calculated on interval and ratio level data, and frequencies and percentages were calculated for nominal and ordinal level data. There were no missing data in this data set.
Psychometric Analysis

The following section presents information relevant to psychometric analysis. Reliability testing of the study instruments as well as the scoring of the scales is discussed.

Reliability Testing

The instruments used in this study were shown to be reliable. Both the Weight Efficacy Lifestyle Questionnaire (WEL) and the Eating Restraint Scale (ERS) were very reliable with internal reliability estimated at .97 and .74, respectively. The reliability for the WEL was higher in this study compared to previous studies (Clark et al., 1991; Pinto et al., 1999) where it was reported as ranging from .70 to .90 with a median of .83. The reliability for the ERS was slightly lower than a previous study (Stunkard & Messick, 1988) that placed the internal reliability at .93. The samples in these previous studies were post-menopausal women, college students, and overweight patients in a medically-managed weight loss program.

Scoring of Scales

Self-efficacy was measured by summing the responses to 20 questions on the WEL. Each question was answered using a 10-point Likert-type scale with a possible range of 0 to 180. Higher scores indicated a higher degree of self-efficacy. In this study, the WEL scores ranged from 34 to 180 with a mean of 131. In a study by Clark et al. (1991), WEL scores in obese patients increased from a mean of 125 to a mean of 144 following a 17-session cognitive-behavioral treatment program. However, no studies
focusing on self-efficacy in post-operative bariatric patients were found in the literature with which to compare these current study findings.

The construct of eating restraint was measured by the ERS that consisted of a 21-item scale. The scale is comprised of 9 forced-choice items and 12 true/false items. Scoring of the Eating Restraint Scale is facilitated by the use of the ReadyScore™ Answer Sheet (Appendix F) that provides a built-in scoring system for the researcher. The answer sheet facilitates the calculation of scores for the scale. Items contributing to the score for the factor are coded on the reverse side of the Answer Sheet. The possible scores for this tool are 0 to 21, with higher scores indicating stronger eating restraint.

Individual surveys were hand scored by the researcher and the total score was entered into the database. In this study, ERS scores ranged from 5 to 21 with a mean of 13, which was higher than previous studies reported in the literature.
CHAPTER IV
RESULTS

Introduction

The purpose of this study was to examine the role of self-efficacy on weight loss maintenance in bariatric surgical patients. Although much has been written about weight loss maintenance in medically managed programs, less can be found regarding maintenance of weight loss following bariatric surgery. No studies were uncovered that examined the role of self-efficacy on weight loss maintenance following bariatric surgery. Therefore, this study aimed to explore these unanswered questions:

1) What is the relationship between eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups and the outcome variable of weight loss maintenance among bariatric surgical patients? and, 2) How does self-efficacy influence eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups among bariatric surgical patients?

This study used quantitative methods incorporating a descriptive correlational design to answer the research questions. Instruments used in the study were *The Weight-Efficacy Life-Style Questionnaire (WEL)* (Clark et al, 1991), *The Eating Restraint Scale (ERS)* (Stunkard & Messick, 1988), and the *Background Survey*. The *Background Survey*, a demographic questionnaire, included questions about age, race, gender, marital status, work status, level of education and clinical variables (height, pre-
surgery weight, current weight, and time since operation). The Background Survey also collected information related to the study variables of exercise adherence, attendance at follow-up appointments, and participation in support groups. The survey was administered to 91 post-operative bariatric patients who were two years post-operative and longer, from two bariatric centers in Northeast Ohio. Data collection was conducted from July through October of 2008.

Results of the research are presented in this chapter, which is organized into the following sections: descriptive statistics, hypotheses testing, examination of self-efficacy as mediator in the study model, and correlation of demographic variables to weight loss maintenance.

Descriptive Statistics

The participants in this study were post-operative bariatric patients from two bariatric surgical centers in Northeast Ohio. Inclusion criteria included: (a) patient had bariatric surgery prior to July of 2006; (b) patient could understand English; and (c) patient could give informed consent, read, and complete the survey. Bariatric patients were contacted via letter by the individual bariatric centers to invite them to participate in the research study. A total of 94 subjects responded to the researcher by telephone or email. Once participants contacted the researcher, they were screened for eligibility into the study. Of 94 survey packets sent out, 91 completed packets were returned, representing a 96.8% return rate. Of the 91 participants, four requested a second mailing of the survey packet due to misplacing the original mailing.

Table 2 provides a summary of the sample demographic characteristics used in data analysis. The sample for this study was predominantly married, Caucasian females
who reported working and being comfortable with their financial incomes. Participants ranged in age from 28 to 68. Mean age was 50.24 years with a standard deviation of plus or minus 9.145 years.

Table 2

Summary of Demographic Data

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>12.1%</td>
</tr>
<tr>
<td>Female</td>
<td>80</td>
<td>87.9%</td>
</tr>
<tr>
<td><strong>Racial Identification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>4</td>
<td>4.4%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>85</td>
<td>93.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>2.1%</td>
</tr>
<tr>
<td><strong>Financial Comfort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never comfortable</td>
<td>5</td>
<td>5.5%</td>
</tr>
<tr>
<td>Very uncomfortable</td>
<td>6</td>
<td>6.5%</td>
</tr>
<tr>
<td>Less than comfortable</td>
<td>14</td>
<td>15.4%</td>
</tr>
<tr>
<td>Comfortable</td>
<td>51</td>
<td>56.2%</td>
</tr>
<tr>
<td>Very comfortable</td>
<td>15</td>
<td>16.4%</td>
</tr>
<tr>
<td><strong>Work Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full/part-time</td>
<td>61</td>
<td>67.0%</td>
</tr>
<tr>
<td>Demographic Characteristic (cont)</td>
<td>N</td>
<td>Percent</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----</td>
<td>---------</td>
</tr>
<tr>
<td>Unemployed</td>
<td>6</td>
<td>6.6%</td>
</tr>
<tr>
<td>Sick leave/disability</td>
<td>9</td>
<td>9.9%</td>
</tr>
<tr>
<td>Homemaker</td>
<td>8</td>
<td>8.8%</td>
</tr>
<tr>
<td>Retired</td>
<td>7</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

Marital Status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>16</td>
<td>17.6%</td>
</tr>
<tr>
<td>Married</td>
<td>55</td>
<td>60.4%</td>
</tr>
<tr>
<td>Divorced</td>
<td>15</td>
<td>16.5%</td>
</tr>
<tr>
<td>Widowed</td>
<td>5</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

Education

<table>
<thead>
<tr>
<th>Education</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school</td>
<td>3</td>
<td>3.3%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>37</td>
<td>40.7%</td>
</tr>
<tr>
<td>Business school</td>
<td>7</td>
<td>7.7%</td>
</tr>
<tr>
<td>Two-year degree</td>
<td>18</td>
<td>19.8%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>20</td>
<td>21.9%</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>6</td>
<td>6.6%</td>
</tr>
</tbody>
</table>

The majority of patients (84.6%) reported attending follow-up appointments and exercising regularly (72.5%). However, even though a majority of the patients participated in support groups, over one-third (36.3%) reported never attending a support group.
Regarding clinical variables for this sample (Table 3), the average patient had a pre-operative weight of 305 pounds, a current weight of 194 pounds, and a percent excess body weight loss of 63.10. The mean time since the bariatric surgery was 45.22 months or 3.75 years.

Table 3

Clinical Variables used in Data Analysis

<table>
<thead>
<tr>
<th>Clinical Variable</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N = 91</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-operative Weight (pounds)</td>
<td>305</td>
<td>207 – 473</td>
</tr>
<tr>
<td>Current Weight (pounds)</td>
<td>194</td>
<td>125 – 290</td>
</tr>
<tr>
<td>Months since surgery</td>
<td>44.22</td>
<td>26 – 73</td>
</tr>
<tr>
<td>% EBWL</td>
<td>63.10</td>
<td>18 – 118</td>
</tr>
</tbody>
</table>

Hypotheses Testing

The discussion of hypotheses testing is organized in the next section. First, preliminary tests for multicollinearity and correlational analysis will be presented, followed by a discussion of testing of each individual study hypothesis.

Preliminary Tests for Multicollinearity and Correlational Analysis

A correlation matrix was computed to investigate first order relationships between all of the relevant variables. Multicollinearity is a statistical concept that describes the association between two independent variables that are highly correlated, where $r$ is $\geq 0.80$ (Tabachnick & Fidell, 2001). When independent variables are multicollinear or
highly correlated, there is redundancy in the amount of variance measured by each variable (Lewis-Beck, 1995). As shown in Table 4, there were no independent variables that had a bivariate correlation of ≥ .80.

Table 4

Correlation Matrix for Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exercise</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Appointments</td>
<td>-.048</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Support Groups</td>
<td>.150</td>
<td>-.192</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. % EBWL</td>
<td>.334**</td>
<td>.172</td>
<td>.001</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. ERS Score</td>
<td>.391**</td>
<td>.261*</td>
<td>-.183</td>
<td>.352**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>6. WEL Score</td>
<td>.351**</td>
<td>.190</td>
<td>-.016</td>
<td>.627**</td>
<td>.567**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

** Correlation significant at the 0.01 level (2-tailed)
* Correlation significant at the 0.05 level (2-tailed)

A Pearson $r$ was used to examine the relationships between main study variables. The strength of the relationships was interpreted using the following scale: <.30 = weak; .30 - .50 = moderate; and > .50 = strong (Cohen, 1988). The level of significance was set at $p < .01$ for all relationships. Of the 21 correlations, there was a strong positive relationship between the WEL Score and % excess body weight loss ($r = .627$ at $p < .01$) and between ERS Score and WEL Score ($r = .567$ at $p < .01$). A moderate correlation was found between exercise and ERS Score ($r = .391$ at $p < .01$), % excess body weight loss ($r = .334$ at $p < .01$) and WEL Score ($r = .351$ at $p < .01$). A moderate correlation was also found between ERS Score and % excess body weight loss ($r = .352$ at $p < .01$). A weak relationship was evident between all the remaining study variables. While 6 of the 21
correlations were either strong or moderate, they did not reach the level of .80 which indicates multicollinearity among variables (Tabachnick & Fidell, 2001). Therefore, it was decided to include the 6 correlations in the regression models.

Discussion of Hypotheses

The purpose of this study was to examine the role of self-efficacy on weight loss maintenance in bariatric surgical patients. In this section, study hypotheses are first stated followed by data analysis. Prior to conducting statistical analysis for hypotheses the following statistical assumptions of multiple regression were analyzed and met: linearity, normality, and homoscedasticity (Tabachnick & Fidell, 2001). Level of significance was set at \( p < .05 \) for all relationships.

Research Question One

The following section summarizes the results of data analysis regarding research question #1: There is a positive relationship between behavior change (eating restraint, exercise adherence, attendance at follow-up appointments, participation in support groups) and weight loss maintenance in post-operative bariatric patients.

Hypothesis 1.1: There is a positive relationship between eating restraint and weight loss maintenance in post-operative bariatric patients.

This hypothesis was tested using a linear regression equation. There was a statistically significant and positive relationship between eating restraint and % excess body weight loss. As the ERS scores (eating restraint) increased, % excess body weight loss (weight loss maintenance) also increased \( (F = 12.615, p = 0.001) \). The linear regression model for predicted % excess body weight loss was \( Y \) \[ \text{percent excess body weight loss} = 1.428 \times \text{eating restraint} + 43.922 \]. Hypothesis testing for coefficients for the model were all
significant \( (p < 0.05) \). The variable eating restraint explained 12.4 percent of the variance in % excess body weight loss. Hypothesis 1.1 was supported.

Hypothesis 1.2: There is a positive relationship between exercise adherence and weight loss maintenance in post-operative bariatric patients.

To test this hypothesis ANOVA was used. Results indicated as exercise adherence increased, % excess body weight loss (weight loss maintenance) also increased. When bariatric patients reported “never exercising,” the % excess body weight loss was 53.4 ± 19.6 percent. When patients reported “exercising more than 3 times per week,” % excess body weight loss increased to 71.6 ± 13.9 percent. One-way ANOVA \( (F= 5.237) \) revealed that mean % excess body weight loss by exercise adherence was not equal across the group response categories \( (p=0.002) \). Bonferroni’s (Sankoh, Huque & Dubey, 1997) test of multiple comparisons done post hoc ANOVA, suggested no statistical difference in % excess body weight loss between “never” and “1-2 times per week” and no statistical difference between “3 times per week” and “more than 3 times per week.” However, statistically significant differences between “1-2 times per week” and “3 times per week” were suggested by the analysis. Hypothesis 1.2 was supported.

Hypothesis 1.3: There is a positive relationship between attendance at follow-up appointments and weight loss maintenance in post-operative bariatric patients.

This hypothesis was tested using ANOVA. Results of testing showed that there was no relationship between attendance at follow-up appointments and % excess body weight loss (weight loss maintenance). When patients reported “keeping all appointments” the % excess body weight loss was 65.4 ± 17.76. Comparing this to “rarely missed appointments” (61.64 ± 11.93), “occasionally missed appointments”
(59.88± 21.76), and “frequently missed appointments” (56.50± 19.81), there was no statistical significance. One-way ANOVA (F = 1.070) revealed that mean % excess body weight loss by appointment keeping was fairly equal across the group response categories (p=0.366). Hence, hypothesis 1.3 was not supported.

Hypothesis 1.4: There is a positive relationship between participation in support groups and weight loss maintenance in post-operative bariatric patients.

ANOVA was used to test this hypothesis which revealed there was no relationship between participation in support groups and % excess body weight loss (weight loss maintenance) in post-operative bariatric patients. One-way ANOVA (F = 0.042) revealed that mean % excess body weight loss by support group attendance was fairly equal across the group response categories (p=0.989). There was no statistical difference between individuals who reported “no support group attendance” (63.12± 20.22), “attended 1 to 3 support groups” (63.46± 14.34), “attended 4 to 5 support groups” (64.44± 14.54), and “attended more than 5 support groups” (62.13± 20.10). Hypothesis 1.4 was not supported.

A regression model (Model 1, Table 6) was created using the independent variables of behavior change (eating restraint, exercise adherence, appointment keeping, participation in support groups) to explain the dependent variable of weight loss maintenance. Only eating restraint (p = 0.029) and exercise (p = 0.021) were statistically significantly associated with percent excess body weight loss (weight loss maintenance). Consistent with the univariate analysis, appointment keeping and support group attendance were not associated with percent excess body weight loss (weight loss maintenance). Comparison of the behavior change variables standardized beta
coefficients, \( \beta \), revealed that eating restraint scores and exercise adherence were similar in their contribution to explaining \% excess body weight loss, both \( \beta = 0.24 \). Overall, one-way ANOVA was significant (\( F = 5.019, p = 0.001 \)). Almost 19 percent of the variance in explaining \% excess body weight loss (weight loss maintenance) can be explained by these behavior change variables. (Table 6).

**Research Question Two**

The following section summarizes the results of data analysis regarding research question #2: There is a positive relationship between level of self-efficacy and behavior change in post-operative bariatric patients.

**Hypothesis 2.1**: There is a positive relationship between level of self-efficacy and eating restraint in post-operative bariatric patients.

Hypothesis 2.1 was tested using a linear regression equation. There was a statistically significant and positive relationship found between level of self-efficacy and eating restraint. As WEL scores (self-efficacy) increased, the eating restraint scores increased (\( F = 42.182, p < 0.001 \)). The linear regression model for predicted self-efficacy was \( Y_{\text{self-efficacy}} = 4.535X_{\text{eating restraint}} + 62.736 \). Hypothesis testing for coefficients for the model were all significant (\( p < 0.05 \)). The variable eating restraint explained 32.2 \% of the variance in self-efficacy. Hypothesis 2.1 was supported.

**Hypothesis 2.2**: There is a positive relationship between level of self-efficacy and exercise adherence in post-operative bariatric patients.

ANOVA was used to test this hypothesis. Data analysis revealed that as the WEL score (self-efficacy) increased, exercise adherence also increased. When bariatric patients reported “never exercising”, the WEL score was 103.\( \pm \) 39.18. However, the WEL score
increased to 142.36± 18.76 when patients reported exercising more than 3 times per week. There was a positive statistically significant relationship between the variables, \( R = 0.352 \) with a \( p = 0.001 \). Hypothesis 2.2 was supported.

Hypothesis 2.3: There is a positive relationship between level of self-efficacy and attendance at follow-up appointments in post-operative bariatric patients.

This hypothesis was tested using ANOVA which revealed no relationship between self-efficacy (the WEL score) and attendance at follow-up appointments. When patients reported “keeping all appointments” the WEL score was 128.67±32.45. Comparing this to “rarely missed appointments” (115.09± 32.49), “occasionally missed appointments” (131± 36.50), and “frequently missed appointments” (105.07± 43.74), there was no statistical significance. Hence, self-efficacy by attendance at follow-up appointments was fairly equal across the group response categories as revealed by one-way ANOVA (\( F = 2.098, p = 0.106 \)). Hypothesis, 2.3 was not supported.

Hypothesis 2.4: There is a positive relationship between level of self-efficacy and participation in support groups in post-operative bariatric patients.

This hypothesis was tested using ANOVA which revealed there was no relationship between self-efficacy (the WEL score) and participation in support groups. There was no statistical difference between bariatric patients who reported “no support group attendance” (122.91±35.68), “attended 1 to 3 support groups” (127.92±34.12), “attended 4 to 5 support groups” (118.44± 30.30), and “attended more than 5 support groups” (121.87± 39.43). A one-way ANOVA (\( F = 0.211 \)) revealed that WEL scores were fairly equal across group response categories (\( p = .889 \)). Therefore, hypothesis 2.4 was not supported. All hypotheses are summarized in Table 5.
### Table 5

**Summary of Hypotheses Testing**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1.1 There is a positive relationship between eating restraint and weight loss maintenance (%EBWL) in post-operative bariatric patients.</td>
<td>There was a statistically significant and positive relationship between eating restraint and weight loss maintenance (%EBWL). As the eating restraint scores increased, % excess body weight loss also increased. Hypothesis supported.</td>
</tr>
<tr>
<td>H1.2 There is a positive relationship between exercise adherence and weight loss maintenance (%EBWL) in post-operative bariatric patients.</td>
<td>There was a positive relationship between exercise adherence and weight loss maintenance. As exercise adherence increased, weight loss maintenance (%EBWL) also increased. Hypothesis supported.</td>
</tr>
<tr>
<td>H1.3 There is a positive relationship between attendance at follow-up appointments and weight loss maintenance (%EBWL) in post-operative bariatric patients.</td>
<td>There was no relationship between attendance at follow-up appointments and weight loss maintenance (%EBWL). Hypothesis not supported.</td>
</tr>
<tr>
<td>H1.4 There is a positive relationship between participation in support groups and weight loss maintenance (%EBWL) in post-operative bariatric patients.</td>
<td>There was no relationship between participation in support groups and weight loss maintenance (%EBWL) in post-operative bariatric patients. Hypothesis not supported.</td>
</tr>
<tr>
<td>H2.1 There is a positive relationship between level of self-efficacy and eating restraint in post-operative bariatric patients.</td>
<td>There was a statistically significant and positive relationship between level of self-efficacy and eating restraint. As self-efficacy scores increased, the eating restraint scores increased. Hypothesis supported.</td>
</tr>
<tr>
<td>H2.2 There is a positive relationship between level of self-efficacy and exercise adherence in post-operative bariatric patients.</td>
<td>There was a positive statistically significant relationship between level of self-efficacy and exercise adherence. Hypothesis supported.</td>
</tr>
</tbody>
</table>
Table 5, cont.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2.3 There is a positive relationship between level of self-efficacy and attendance at follow-up appointments in post-operative bariatric patients.</td>
<td>There was no relationship between self-efficacy scores and attendance at follow-up appointments. Hypothesis not supported.</td>
</tr>
<tr>
<td>H2.4 There is a positive relationship between level of self-efficacy and participation in support groups in post-operative bariatric patients.</td>
<td>There was no relationship between self-efficacy scores and participation in support groups. Hypothesis not supported.</td>
</tr>
</tbody>
</table>

When multivariate regression (Regression Model 2, Table 6) was similarly used to explain self-efficacy (WEL score) with the behavior change variables as independent variables, data analysis revealed that only eating restraint ($p < 0.001$) was statistically significantly associated with self-efficacy. Consistent with the univariate analysis, eating restraint was associated with the WEL score. However, exercise adherence, significant in univariate analysis, was not significantly associated with self-efficacy (the WEL score) in multivariate analysis. Both support group attendance and appointment-keeping were not associated with self-efficacy (the WEL score) in both univariate and multivariate analyses. The behavior change variables’ standardized beta coefficients ($\beta$), demonstrated the impact of eating restraint ($\beta = 0.504$) on self-efficacy (the WEL score.) Overall, one-way ANOVA was significant ($F = 11.914$, $p < 0.001$). Almost 36 percent of the variance (Table 6) in explaining self-efficacy (the WEL score) was explained by the behavior change variables, however, the variable that was most significant was eating restraint.
Examination of Self-efficacy as Mediator in the Model

To assess the role of self efficacy (the WEL score) as a mediator on weight loss maintenance (percent excess body weight loss- %EBWL), multivariate regression (Regression Model 3, Table 6) was conducted with both the behavior change variables and the WEL score treated as independent variables in causing the dependent variable. Results are shown in Table 6. In contrast to the regression model of the behavior change variables explaining weight loss maintenance (% EBWL) in which eating restraint and exercise frequency were statistically significantly associated with the dependent variable, no behavior change variables were significantly associated with weight loss maintenance (% EBWL). Only self-efficacy (the WEL score) was associated with weight loss maintenance (% EBWL) in multivariate regression ($p < 0.001$). Standardized beta coefficients, $\beta$, revealed that the WEL score was a strong contributor in explaining % EBWL ($\beta = 0.591$). Overall, one-way ANOVA was significant ($F = 12.022$, $p < 0.001$). Forty-one percent of the variance in explaining weight loss maintenance can be explained by the multivariate regression model of both the behavior change variables and the self-efficacy (the WEL score) (Table 6).
Table 6

Summary of Regression Models

<table>
<thead>
<tr>
<th></th>
<th>Regression Model 1</th>
<th>Regression Model 2</th>
<th>Regression Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Excess Body Weight Loss (% EBWL)</td>
<td>Self-efficacy (WEL)</td>
<td>% Excess Body Weight Loss (%EBWL) with Self-efficacy (WEL)</td>
</tr>
<tr>
<td>B</td>
<td>β</td>
<td>B</td>
<td>β</td>
</tr>
<tr>
<td>Constant</td>
<td>48.374***</td>
<td>66.742***</td>
<td>28.374***</td>
</tr>
<tr>
<td>Eating Restraint</td>
<td>.988</td>
<td>.244*</td>
<td>4.027</td>
</tr>
<tr>
<td>Exercise</td>
<td>9.925</td>
<td>.249*</td>
<td>13.237</td>
</tr>
<tr>
<td>Appointment Keeping</td>
<td>4.334</td>
<td>.117</td>
<td>5.317</td>
</tr>
<tr>
<td>Support Groups</td>
<td>3.902</td>
<td>.105</td>
<td>8.452</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Model F</td>
<td>5.019**</td>
<td>11.914***</td>
<td>12.022***</td>
</tr>
<tr>
<td>R²</td>
<td>0.189</td>
<td>0.357</td>
<td>0.414</td>
</tr>
</tbody>
</table>

* = p<0.05  ** = p<0.01  *** = p<0.001
Sobel Test of Mediation

In order to evaluate the role of self-efficacy as a mediator, the Sobel (1982) test was calculated using an on-line statistical calculator (http://www.markwebtest.netfirms.com/RDE_bonus_articles/SobelTestForKasser.doc). Mediation modeling has been utilized to explain the nature of the relationship among three or more variables. The Sobel test, developed in 1982, provides a statistical method for determining the influence of a mediator on an outcome.

The unstandardized regression coefficient for eating restraint (B = 4.027), the only significant variable in the multivariate regression model to be associated with self-efficacy (WEL score), as well as its standardized error (SE = 0.782) was utilized. In addition, the unstandardized regression coefficient for self-efficacy (B = 0.300), the only significant variable in the multivariate regression model to be associated with weight loss maintenance (percent EBWL), as well as its standardized error (SE = 0.052) was employed. The mediator variable, self-efficacy (WEL score), revealed a statistically significant ability to influence weight loss maintenance (% EBWL) (Sobel = 3.842, \( p = 0.0001 \)) and supported the mediating role of self-efficacy in the study model (Figure 3).
Figure 3

Mediating Role of Self-efficacy

A = 4.027: The regression weight (regression coefficient) for the relationship between the independent variable (IV) and the mediator (M).

SE\textsubscript{a} = 0.782: The standard error of the relationship between the independent variable (IV) and the mediator (M).

B = 0.300: The regression weight (regression coefficient) for the relationship between the mediator (M) and the dependent variable (DV).

SE\textsubscript{b} = 0.052: The standard error of the relationship between the mediator variable (M) and the dependent variable (DV).
Correlation of Demographic Variables to Weight Loss Maintenance

Demographic questions were included in the Background Survey to obtain data to describe the sample. However, because some of the demographic variables might have a relationship to the dependent variable (weight loss maintenance), a correlation matrix was computed correlating demographic variables of age, gender, race, marital status, comfort level with income, work status, pre-surgical weight and current weight to % EBWL (weight loss maintenance). The following scale was used to interpret the strength of the relationships: < .30 = weak; .30 - .50 = moderate; and > .50 = strong. The level of significance was set at \( p < 0.01 \) for all relationships. A strong negative relationship was found between current weight and %EBWL (\( r = -.607, p = .01 \)). No significant relationships were found between age, gender, race, marital status, comfort level with income, work status or pre-surgical weight.

Summary

The sample in this study consisted of 91 post-operative bariatric patients from two bariatric surgical centers in Northeast Ohio who met the following inclusion criteria: (a) patient had bariatric surgery prior to July of 2006; (b) patient could understand English; and (c) patient could give informed consent, read, and complete the survey. The bariatric centers sent out letters announcing the research study to patients who were at least 2 years post-surgery. A total of 94 patients contacted the researcher via telephone or email. A total of 91 surveys were completed with an outstanding return rate of 96.8%. Participants ranged in age from 28 to 68 years old. The majority of respondents were married, Caucasian females who reported working and being comfortable with their financial incomes.
A Pearson $r$ was used to examine the relationships between study variables. Significant positive relationships were found between self-efficacy and weight loss maintenance and between eating restraint and self-efficacy. A moderate correlation was found between exercise and eating restraint. A moderate correlation was also found between eating restraint and weight loss maintenance. Lastly, a weak relationship was evident between all the remaining study variables.

Regression was used to test Hypotheses 1.1-1.4 and 2.1-2.4. Hypothesis 1.1, (relationship between eating restraint and weight loss maintenance in post-operative bariatric patients), Hypothesis 1.2. (relationship between exercise adherence and weight loss maintenance in post-operative bariatric patients), Hypothesis 2.1 (relationship between level of self-efficacy and eating restraint in post-operative bariatric patients), and Hypothesis 2.2 (relationship between level of self-efficacy and exercise adherence in post-operative bariatric patients) were supported. All other hypotheses (1.3, 1.4, 2.3, and 2.4) were not supported. Eating restraint and exercise adherence were significant predictors of weight loss maintenance. Similarly, self-efficacy was significantly related to eating restraint and exercise adherence.

A Pearson Product-moment correlation coefficient was used to examine the relationships between demographic variables and main study variables. The only significant correlation found was strong negative relationship was found between current weight and %EBWL ($r = -.607, p = .01$).

To answer the question of whether self-efficacy acted as a mediator in the study model, the Sobel test of mediation was employed. The mediator variable, self-efficacy
revealed a statistically significant ability to influence the dependent variable of weight loss maintenance, thereby, supporting the mediating role of self-efficacy in the model.
CHAPTER V
DISCUSSION

This chapter focuses on analysis of the results of this study and is divided into four sections: discussion of the findings, significance, limitations, and implications. The purpose of this study was to examine the role of self-efficacy on weight loss maintenance in bariatric surgical patients. Participants were post-operative bariatric patients from two bariatric surgical centers in Northeast Ohio. Data were collected between July and October, 2008. A three-part study questionnaire comprised of the following instruments was used to collect data: a) the Weight-efficacy Lifestyle Questionnaire (WEL) (Clark, Abrams, & Niaura, 1991); b) the Eating Restraint Scale (ERS) (Stunkard & Messick, 1988); c) and the Background Survey, a researcher-developed demographic questionnaire, that included questions about age, race, gender, marital status, work status, and level of education. The Background Survey included information related to the study variables of weight loss maintenance, exercise adherence, attendance at follow-up appointments, and participation in support groups. A response rate of 96.8% was obtained.
Discussion of Findings

In this study, the ability of bariatric surgical patients to make behavior changes that lead to weight loss maintenance was hypothesized to be influenced by the person’s perceived level of self-efficacy. This study was guided by Bandura’s (1977) Social Cognitive Theory of which, self-efficacy is a major construct. Self-efficacy has been used in previous research studies of weight loss, eating behaviors, and weight loss maintenance in obese, non-surgical populations. To date no studies have been published that focus on self-efficacy in bariatric surgical patients’ ability to maintain weight loss. Therefore, this study examined unanswered questions related to identifying variables that correlate with successful weight loss maintenance following bariatric surgery.

The study model for this research proposed behavior change (eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups) as the independent variables with weight loss maintenance as the dependent variable. The model included self-efficacy as a mediating variable between the independent and dependent variables. The following section includes a discussion of the findings in regard to measurement findings, hypotheses findings, and the role of self-efficacy as a mediator in the model.

Measurement Findings

The following section includes a discussion of the findings as measured on the WEL and the ERS. The WEL scores reported in this study ranged from 34 to 180 with a
mean of 131. In previous research, Clark et al. (1991) reported WEL scores in obese patients increased from a mean of 125 to a mean of 144 following a 17-session cognitive-behavioral treatment program for weight loss. However, no studies focusing on self-efficacy in post-operative bariatric patients were found in the literature with which to compare these current study findings.

In this study, ERS scores ranged from 5 to 21 with a mean of 13, which was higher than previous studies reported in the literature. In a study by Van Loan and Keim (2000) that used the ERS, pre-menopausal women aged 18-50 years, who had a body weight of 90 to 150% of ideal weight for height on the basis of the Metropolitan Height and Weight Table (http://www.bcbst.com/MPManual/HW.htm), were classified as having normal eating restraint if the score on the eating restraint scale was greater than 9. This score was selected because it was the median score for the data set. In another study by Allison et al, (1992), a group of 989 college students comprised the sample of a study to compare psychometric properties of eating restraint measures. Similarly, the median score on the eating restraint scale was 9. A possible explanation for the higher mean score of 13 in this current study could be that this tool has not been used previously in a sample of post-operative bariatric patients, a cohort that represents a very homogeneous group in regard to post-operative eating guidelines. Considering the fact that carefully monitoring eating habits is a major focus of post-operative teaching at clinic visits, it is not surprising that this cohort of patients would show a somewhat higher mean ERS score.

This is the first known use of the ERS with post-operative bariatric patients in nursing research. This study is noteworthy in that the ERS was shown to be reliable ($\alpha = .74$) in representing the construct of eating restraint with a reliability similar to or better
than that found in previous studies. Future nurse researchers may consider the use of the ERS for bariatric patients based on the findings of this study.

Discussion of Hypothesis Findings

Of the eight hypotheses, four were supported and four were not. The following section is organized by a discussion of each of the eight hypotheses and the two research questions.

Hypothesis 1.1, which was tested using regression, predicted that there would be a positive relationship between eating restraint and weight loss maintenance in post-operative bariatric patients. This hypothesis was supported. In this study, as the score on the ERS (eating restraint) increased, so did %EBWL (weight loss maintenance). The variable, eating restraint, explained 12.4% of the variance in % excess body weight loss. This finding is consistent with previous research in medically managed obese patients, which found a positive relationship between eating restraint and weight loss maintenance (Cook & Edwards, 1999; Poole, 2007). However, there is no literature describing the relationship between eating restraint and weight loss maintenance in the bariatric surgical population with which to compare the results of this study. This is an important finding that provides much needed information on how cognitive factors, such as self-efficacy, can influence weight loss maintenance in bariatric patients. Although, research from previous studies in other areas besides nursing has identified a relationship between eating restraint and weight loss maintenance, this is the first nursing study to find a similar relationship. This finding underscores the importance of assessing and reinforcing eating restraint as a key behavior for bariatric patients’ long-term weight loss.
maintenance. Further, eating restraint may be practically assessed pre- and post-operatively through the use of the ERS, which is easily administered and scored.

Hypothesis 1.2, which was tested using ANOVA, predicted that there would be a positive relationship between exercise adherence and weight loss maintenance in post-operative bariatric patients. This hypothesis was supported. As exercise adherence increased, % excess body weight loss also increased. When bariatric patients reported “never exercising,” the % excess body weight loss was 53.4 ± 19.6 %. When patients reported exercising “more than 3 times per week,” % excess body weight loss increased to 71.6 ± 13.9 %. The findings from this study support previous research (Bond, et al, 2004; Cook & Edwards, 1999; Elkins, et al, 2005) showing exercise adherence increased weight loss maintenance in bariatric post-operative patients. Exercise is an activity that all individuals should engage in for optimal health, especially bariatric patients who must make healthy life-style changes to maintain the weight they have lost. A regular program of exercise is a key feature of the post-operative regimen taught by bariatric nurse clinicians. Nurses who work with bariatric patients can use the results of this study as evidence that exercise has been associated with greater weight loss maintenance in a prior nursing study.

As was previously stated, ANOVA revealed a positive relationship between exercise and % excess body weight loss. However, what was not clear from the original ANOVA was which relationship among the group response categories was most significant. To answer this, Bonferonni’s (Sankoh, Huque, & Dubey, 1997) test of multiple comparisons was used post hoc ANOVA which revealed a statistically significant difference between “1-2 times per week” and “3 times per week.” This finding would
suggest that the post-operative teaching plan for bariatric patients should include specific protocols with definitive guidelines for the amount of exercise that maximizes weight loss maintenance.

Hypothesis 1.3, tested using ANOVA, predicted that there would be a positive relationship between attendance at follow-up appointments and weight loss maintenance in post-operative bariatric patients. This hypothesis was not supported. There was no significant relationship ($F = 1.170, p = .366$) between the variables. Limited previous findings relevant to this relationship appear in the literature. However, what was found suggested that patients who had problems with weight loss maintenance had a higher degree of non-compliance with follow-up appointments (Poole et al, 2005; Rusch & Andris, 2007). In this study, only 63.7% of participants reported “keeping all appointments,” 12.1% reported “rarely missing,” and 24.2% reported missing “occasionally or frequently.” These results revealed no correlation between attendance at follow-up appointments with the patients’ ability to maintain weight loss.

The findings from this study relevant to attendance at follow-up appointments contradict those from limited previous research in the literature. A study by Poole et al. (2005) concluded that appointment-keeping in post-operative bariatric patients was related to successful weight loss maintenance. However, the conclusion was based on findings from a small retrospective study of 18 patients which may limit the generalizability of the conclusion.

Relevant literature was reviewed by Rusch and Andris (2007), on non-compliant patients following bariatric surgery. Records of 289 bariatric patients ranging from several weeks to 28 months post-procedure were reviewed. Findings revealed that the
majority of patients (69%) lost and maintained weight; however, those who were not successful demonstrated lapses in attendance of follow-up appointments. It is noteworthy that Rusch and Andris (2007) studied patients from time of procedure to 28 months out, whereas, the current study focused on patients who were at least 24 months post-operative and longer. The mean time since surgery in this study sample was 45.22 months, nearly double the time from the Rusch and Andris (2007) study. This is significant because, as previous literature suggests (Bocchieri et al, 2002; Frangou, 2008; Greenberg, 2003; Hsu et al, 1998; Warde-Kamar et al, 2004), bariatric patients are much more compliant with all aspects of post-operative guidelines during the first year following surgery. This compliance begins to wane at 24 months which coincides with reports of patients beginning to regain lost weight. It is plausible that Rusch and Andris (2007) reported on a sample of patients who had not yet begun to experience issues with weight regain. They may have come to a different conclusion had they included patients whose time since surgery was longer than 28 months. Future research could include patients who have had surgery in this time period, i.e. longer than 28 months.

Despite the findings related to this hypothesis, the importance of follow-up appointments should not be diminished. Developing a consistent pattern of follow-up appointments is of key importance to post-operative bariatric patients who face major changes in their previous lifestyles. The relationship developed between the bariatric nurse and the patient significantly contributes to the patient’s overall success in managing a new way of living.

Hypothesis 1.4, tested using ANOVA, predicted that there would be a positive relationship between participation in support groups and weight loss maintenance in post-
operative bariatric patients. This hypothesis was not supported. There was no significant relationship between the variables of interest (\( F = 0.042; p = 0.989 \)). This finding is contrary to results found in previous studies that examined the effect of support group attendance on weight loss maintenance. In a quantitative study by Song et al. (2007) the researchers reviewed weight loss data and support group attendance of 78 consecutive bariatric surgical patients. The sample was divided into two groups: those who attended more than 5 monthly support group meetings and those who went to less than 5 support group meetings. Data from the first 12 months after surgery were analyzed which showed a statistical difference between the 2 groups at 9 and 12 months.

One possible reason for the different outcome in this study could be the fact that Song, et al (2007) studied bariatric patients who had only been 12 months out from the surgery date. As previously described in Chapter 2, research suggests that bariatric patients are more compliant during the first post-operative year and do not start to develop problems with weight loss maintenance until they are 24 months out from surgery. The patients in this current study were at least 24 months post-operative which may partially explain the difference in support group attendance. Findings from the current research also differ from research done by Hildebrandt (1998) which showed that patients who attended group meetings regularly tended to lose more weight, and increased frequency of attendance was associated with greater weight loss.

While support groups remain an integral part of the bariatric patient’s total health care regimen by offering an atmosphere that fosters positive and healthy supportive relationships with others who share the same or similar challenges in life (Kessler,
Mickelson, & Zhao, 1997), this study did not find a statistically significant relationship between attendance at support groups and the ability to maintain weight loss.

Following the testing of each hypothesis related to research question 1, a regression model was created to answer the research question using the independent variables of behavior change to explain the dependent variable of weight loss maintenance. Only eating restraint and exercise were statistically associated with weight loss maintenance and contributed to almost 19% of the variance in the regression model.

Hypothesis 2.1, tested using regression, predicted that there would be a positive relationship between eating restraint and level of self-efficacy in post-operative bariatric patients. This hypothesis was supported. In this study, as eating restraint scores increased, so did self-efficacy scores. The regression model explained 32.2 % of the variance in self-efficacy; the only variable of significance was eating restraint.

Although previous limited research supports the concept of eating restraint as positively contributing to weight loss maintenance in bariatric patients (Cook & Edwards, 1999) and self-efficacy positively relating to weight loss maintenance (Chamblis & Murray, 1979; Edell et al, 1987; Jeffery et al.,1984; Jeffery et al., 2000) no known literature has previously linked the construct of eating restraint and self-efficacy. This is an important finding that suggests that a relationship exists between these variables. Although limited bariatric research suggests that making dietary changes is a key factor in successful weight loss outcomes, this research is the first to measure bariatric patients’ eating restraint through the use of the Eating Restraint Scale and demonstrated a positive relationship between eating restraint and self-efficacy.
Hypothesis 2.2, tested using ANOVA, predicted that there would be a positive relationship between exercise adherence and level of self-efficacy in post-operative bariatric patients. This hypothesis was supported. As exercise adherence increased, self-efficacy also increased. There was a positive statistically significant relationship between the variables. Previous research has supported the relationship between exercise and self-efficacy (McCauley, 1993), however, this is the first known research to link self-efficacy and exercise adherence in post-operative bariatric patients.

Hypothesis 2.3, tested using ANOVA, predicted that there would be a positive relationship between attendance at follow-up appointments and level of self-efficacy in post-operative bariatric patients. This hypothesis was not supported. There was no significant relationship ($F = 2.098, p = .106$) between the variables. There is no literature comparing self-efficacy and attendance at follow-up appointments with which to compare these current findings.

Although the findings of this study found no relationship between amount of follow-up appointment attendance and level of self-efficacy, it would seem reasonable that the more contact patients have with the bariatric clinic, the more tools would be available to them to enhance self-efficacy. A possible explanation for the opposite finding in this study may lie in the current manner in which follow-up appointments for bariatric patients are structured. As was previously stated, the pre-operative preparation of the bariatric patient is highly structured and extensive. Most bariatric surgeons insist that patients demonstrate compliance in attending all pre-op visits and undergoing required screenings.
On the other hand, the post-operative care of patients seems to be less regimented and less closely managed as compared to pre-operative strategies. As previously presented, the schedule for post-operative follow-up appointments is 6 weeks after the procedure, every 3 months for the first year, every 6 months for the following year, and annually for the rest of their lives. While this schedule represents many more visits than that of the typical surgical patient, it does not allow opportunities for patients to get frequent feedback and positive reinforcement that is needed at a time when bariatric patients experience major lifestyle changes. If bariatric patients were able to come to the clinic weekly or on an as-needed basis, to participate in structured individualized teaching-learning sessions, their level of self-efficacy may be enhanced.

Additionally, it appears that there is a lack of an organizing framework for the post-op care of bariatric patients. Currently, patients are scheduled for follow-up and meet with the surgeon for routine follow-up issues such as monitoring weight loss and checking for vitamin and mineral deficiencies. If they have other questions regarding diet, exercise, or personal issues then they may be referred to speak to either the nurse or the dietician. However, it seems like this practice places the responsibility to seek such guidance on the patient, rather than the facility. The bariatric clinic’s focus in the post-operative phase could be directed toward a specific program of tailored interventions designed to enhance patient self-management, as well as the typical surgical follow-up care.

It is possible that the patients in this study may be representative of bariatric clinics that have yet to place needed emphasis on post-operative care, hence the lack of a
relationship between follow-up appointments and self-efficacy and weight loss maintenance.

Hypothesis 2.4, tested using ANOVA, predicted that there would be a positive relationship between participation in support groups and level of self-efficacy in post-operative bariatric patients. Data revealed no significant relationship (F=0.211, \( p = .889 \)) between the variables. While there is no known literature related to support group participation and patients’ levels of self-efficacy, it might be speculated that post-operative bariatric patients who possess higher levels of self-efficacy may feel empowered and capable to manage their issues independently and may not need the specific environment of the support group to maintain successful management of their new lifestyle.

Following the testing of each hypothesis related to research question two, a regression model was created to answer the research question using the independent variables of behavior change to explain the dependent variable of self-efficacy. Regression showed that only eating restraint (\( p< 0.001 \)) was statistically significantly associated with self-efficacy. Exercise adherence, that had been significant in univariate analysis, was not significantly associated with self-efficacy in multivariate analysis. Both support group attendance and appointment-keeping were not associated with self-efficacy. Almost 36% of the variance in explaining self-efficacy was explained by the behavior change variables, of which eating restraint was the only significant contributor.

Therefore, if eating restraint has a relationship to self-efficacy, then it needs to be more critically examined in the pre-operative and post-operative phases of care. With knowledge of the patient’s level of eating restraint, the bariatric nurse can design
interventions specifically tailored to the patient that can enhance eating restraint and self-efficacy.

In summary, four hypotheses were supported and four were not supported. The next section discusses the role of self-efficacy as a mediator in the model.

*The Role of Self-efficacy as a Mediator in the Model*

The purpose of this study was to examine the role of self-efficacy on weight loss maintenance in bariatric surgical patients. The ability of bariatric surgical patients to make behavior changes that lead to weight loss maintenance was thought to be influenced by the person’s perceived level of self-efficacy. In the study model *(Figure 1)* self-efficacy was viewed as exerting a mediating effect upon the dependent variable, weight loss maintenance.

To test the mediation effect, the Sobel test of mediation was used. First, multiple regression was conducted with both the behavior change variables and self-efficacy treated as independent variables in causing the dependent variable. Only self-efficacy was found to be associated with weight loss maintenance in multivariate regression *(p > 0.001)*. Forty-one percent of the variance in explaining weight loss maintenance can be explained by the behavior change variables and self-efficacy. Next, the Sobel test was calculated which demonstrated that self-efficacy, acting as the mediator in the model, revealed a statistically significant ability to influence the dependent variable, weight loss maintenance. This is an important finding in that no published literature links self-efficacy to post-operative bariatric patients’ ability to maintain weight loss. As previously noted, many researchers have suggested an association between self-efficacy and behavior change *(Bandura, 1991; Cervone, 2000; DiClemente, Fairhurst, & Piotrowski,)*
1995; Ewart, 1995; Glynn & Ruderman, 1986; Locke & Latham, 1990; O’Leary, 1985),
but none have examined the mediating effect self-efficacy plays on the relationship
between behavior change and weight loss maintenance in post-operative bariatric
patients.

Significance

This study is significant for its contribution to nursing knowledge and research,
and to the substantive areas of bariatric nursing practice, and policy. It also has
significance to the social cognitive theory and other disciplines. Therefore, the discussion
of the significance of the study findings is organized as follows. First, significance to
nursing knowledge and research, bariatric nursing practice, and policy will be addressed,
followed by a discussion of significance to social cognitive theory and other related
disciplines involved in the care of bariatric patients.

Nursing

Nursing Knowledge and Research

This study has significance to nursing knowledge and nursing research. Regarding
nursing knowledge, this study provides research to begin to fill the gap in the nursing
literature addressing the topic of weight loss maintenance in post-operative bariatric
patients. As a review of the literature demonstrated, a lack of nursing research exists that
focuses on bariatric patients and the myriad issues they must deal with on their journey to
a healthier life. Of the limited nursing research found, most deals specifically with
aspects of patients’ post-operative care routines (patient safety, skin care, surgical
complications). The nursing literature is virtually silent related to the equally challenging
issue of what happens to patients after the initial post-operative period when they may
begin to regain lost weight. This study revealed a significant relationship between patients’ levels of self-efficacy and their ability to maintain weight loss.

Further, this study contributes to nursing research in that no previously published studies have utilized the Weight-efficacy Lifestyle Questionnaire (WEL) and the Eating Restraint Scale (ERS) to study post-operative bariatric patients. This study demonstrated that both instruments were reliable with this population with internal reliabilities of .96 for the WEL and .74 for the ERS. Future nurse researchers with similar hypotheses can now refer to a previous study where these specific tools were used with good reliability. 

**Bariatric Nursing Practice**

Bariatric nursing is a relatively new area of specialty nursing practice. It has evolved to meet the needs of a very unique population of patients with complex physical and emotional issues. The National Association of Bariatric Nurses was formed in 2004 out of a recognized need for the nursing profession to dedicate resources, knowledge, and research towards improving the life and nursing care of obese patients. A major goal of the organization is to advance the health and quality of life of individuals and families experiencing obesity and to promote best practices of holistic nursing care for bariatric patients and their families. The results of this study provide evidence that higher self-efficacy is associated with greater weight loss maintenance in this cohort of patients. Assessment of self-efficacy, both pre- and post-surgery, should be added to the list of bariatric clinical best practices.

Another area of significance to bariatric nurses is the weight loss and maintenance statistics uncovered in the demographic survey. The literature suggests that up to 20% of post-operative bariatric patients maintain less than 50% EBWL. This study revealed that
the mean %EBWL in this sample was 63.10% and that 28% of the sample fell into the category of maintaining less than 50%EBWL which would be considered a ‘failure’ as defined by previous authors (Deitel, 2001; Halverson, 1981). Bariatric nurses are keenly interested in the ability of patients to maintain weight loss and consider low failure rates as evidence of the effectiveness of their bariatric programs. The information from this study gives a snapshot of the overall success/failure of the current structure of bariatric programs utilized in this study and may be used as part of a larger systematic evaluation plan for the specific organizations.

Bariatric Nursing Policy

Findings from this study may have implications for bariatric nursing policy at the study sites. Specifically, it seems that although the pre-operative phase of care is specific and inclusive, the post-operative phase of bariatric patient care receives less emphasis. Results of this study show that attendance at follow-up appointments had no relationship to the patient’s level of self-efficacy and weight loss maintenance. This finding has significance for bariatric nurses who are instrumental in collaborating with bariatric surgeons in developing bariatric clinic programs. A recent study of bariatric surgeons found that nearly half had received no education on follow-up care as part of their surgical training or fellowship (Johnston, 2008). Bariatric nurses, therefore, must take the lead in developing post-operative programs that are specific, relevant, and based on an organizing framework. Further, the National Association of Bariatric Nurses must include improved post-operative care as one of their best practice initiatives.
Significance to Bariatric Nursing Education

Dennis and Goldberg (1996) suggest that self-efficacy beliefs may be central to individualizing interventions for weight loss and that targeted interventions that are matched to clients’ intrinsic needs may strengthen self-efficacy beliefs and foster positive affective states while promoting weight loss. In this study, self-efficacy was found to be significantly related to weight loss maintenance which has significance to bariatric nursing education.

Self-efficacy development is proposed to be related to a combination of information sources: performance accomplishments known as mastery experience, vicarious experience known as modeling, verbal persuasion known as social persuasion, and physiological information, known as somatic/emotional states (Bandura, 1986; van der Bijl & Shortridge-Baggett, 2002). With knowledge gleaned from this study, bariatric nurses can now consider designing specific educational programs built around these four information sources to enhance self-efficacy that may lead to better outcomes for bariatric patients and their families.

Of special interest would be educational programs that are designed to increase functional knowledge that focus on increasing capacity for the learner to function effectively and develop meaningful self-management strategies. Additionally, new approaches advocated by the Center for Disease Control (2008) include new health education curricula that reflect the growing body of research that emphasizes teaching functional health concepts. This approach aims to provide patients with necessary skill sets to change behaviors rather than teaching based mainly on facts and information.
Social Cognitive Theory

Since its introduction by Bandura in 1977, Social Cognitive Theory (SCT) has played a prominent role in research related to behavior change. Self-efficacy, a main construct of SCT has been previously shown to be an underlying mechanism in a wide range of health behaviors including smoking cessation, medical weight control, exercise, nutrition, alcohol use, contraception, and AIDS prevention. While several studies were found that examined the relationship of self-efficacy to weight loss in medical weight loss programs (Bernier & Avard, 1986; Chamblis & Murray, 1979; Edell, et al.,1987; Glynn & Ruderman, 1986; Jefferey et al., 1984; Jefferey et al., 2000) none were identified that found that focused on self-efficacy and surgical weight loss patients. Now as a result of this study, weight loss maintenance in bariatric patients can be added to this list of potential applications.

This study is the first to find a significant relationship between level of self-efficacy and a bariatric patient’s ability to maintain weight loss. Findings from this study can lay the groundwork for future studies investigating manipulation of factors that can influence self-efficacy and weight loss maintenance.

Other Health Disciplines

A successful outcome for bariatric patients is dependent upon the collaboration of a dedicated health care team. A bariatric surgical center staff is comprised of surgeons, nurses, social workers, clinical dietitians, psychologists, and exercise physiologists all working toward the same goal of assisting the patient to achieve weight loss and
maintenance goals. While this study has application to nursing, it may also be of interest to these other disciplines involved in the care of bariatric patients.

Of particular interest to the dietician might be the relationship between eating restraint and self-efficacy. Findings from this study supported the idea that patients with higher self-efficacy demonstrated higher eating restraint, which is a key behavior in reaching weight loss goals. Exercise physiologists may want to explore the findings of the study which showed that exercising more than three times per week was more beneficial than exercising less than three times per week. Lastly, psychologists may wish to collaborate with the nurse clinician to develop assessment tools which include the WEL for the purpose of measuring self-efficacy, pre-operatively and in the post-operative period.

Limitations

This study has several limitations. First, this study utilized a cross-sectional design limited to a one time survey of bariatric patients. Perhaps, a longitudinal study of bariatric patients at various points (pre-operative, 3 months post-op, 6 months post-op, 12 months post-op, etc.) on a continuum of weight loss could create a clearer picture of the trajectory of self-efficacy and weight loss maintenance and provide insight into specific challenges that occur in relation to time.

Figure 1, depicting the study model proposed that behavior change influences self-efficacy, but did not allow for any interaction effect between the two variables. It may be plausible that there could exist a multidirectional effect between the behaviors of interest in this study and self-efficacy (i.e. as the individual engages in the behaviors, he/she enhances his/her self-efficacy; and as the individual gains more self-efficacy,
he/she would be encouraged to further engage in the behaviors of interest). A longitudinal study, could possibly more clearly capture the back and forth flow from the participant behaviors to self-efficacy.

Study participants were recruited from just two bariatric clinics in Northeast Ohio. While the population of post-operative bariatric patients represents a highly homogeneous group, geographic diversity would add cultural and socioeconomic nuances that were perhaps not captured in this very specific part of the United States. A multi-site study would likely provide a richer data set. This study used a convenience sample, therefore, findings are not generalizable. Use of a random sample from various geographical and cultural backgrounds should be considered in future research.

Lastly, the data from this study was collected from subjects exclusively by the self-report method of answering a questionnaire. Therefore, consideration must be given to the possibility of response bias as a result of self-report.

Implications for Future Research

This study provides support for a relationship between self-efficacy and weight loss maintenance in post-operative patients in a cross-sectional sample of patients from two bariatric centers in Northeast Ohio. Further research is recommended to understand the development of self-efficacy in this population. A longitudinal study examining a group of patients pre-surgery and post-surgery at multiple time frames could provide more specific data relevant to study variables. Future nurse researchers should consider an experimental design to include an intervention based on the four information sources (performance accomplishments, vicarious experience, verbal persuasion, and
physiological information) to increase self-efficacy. Findings from an experimental
design would add rigor to bariatric research findings.

This study provided significant data related to self-efficacy and weight loss
maintenance. Future studies should be designed to include multi-site bariatric centers
using a larger random sample of bariatric patients from across the United States.

Finally, this study used quantitative methods incorporating a descriptive
correlational design to answer the research questions. Future nurse researchers should
consider including qualitative methods to the study of the relationship of self-efficacy to
weight loss maintenance. Qualitative methods incorporating focus groups could provide
richer data from the patient’s perspective and uncover personal and emotional
components of weight loss maintenance that could be explored on a deeper level.
Findings from qualitative methods could contribute to the development of tailored
interventions previously mentioned.

Conclusion

The current study advances nursing knowledge in several ways. First, this study
begins to fills the void in the nursing research literature focusing on the importance of
cognitive factors on weight loss maintenance, an area often overlooked in the traditional
care of bariatric surgical patients. This study is the first to find a significant relationship
between level of self-efficacy and a bariatric patient’s ability to maintain weight loss.
Findings from this study can lay the groundwork for future intervention studies
investigating manipulation of factors that can influence self-efficacy and weight loss
maintenance.
Second, the results of the study provide new knowledge which has the potential to significantly impact bariatric nursing practice, as measurements of self-efficacy can be done pre-operatively and post-operatively. The WEL is easily administered and scored and can be readily included as an assessment tool at clinic visits. Information gleaned from the WEL may then lead to tailored nursing interventions that may enhance self-efficacy, which in turn, could have the potential to improve patient outcomes and weight loss maintenance.

Study findings suggest that follow-up appointments did not have a significant relationship to self-efficacy or weight loss maintenance. It would be helpful for bariatric nurses to direct future research toward answering questions related to patients’ perception of the quality and value of the post-operative follow-up appointments. Further, bariatric nurse specialists can implement program planning that includes post-operative management that is specific and meaningful which may ultimately empower patients to develop self-management skills.

In conclusion, the purpose of the study was to examine the role of self-efficacy on weight loss maintenance in post-operative bariatric surgical patients. Study findings revealed that self-efficacy, indeed, did play a major role in weight loss maintenance in this sample of post-operative bariatric patients. Further, this study has added to the bariatric weight loss literature and the results can open the door for future nurse researchers to identify areas for targeted nursing interventions, which have the potential to improve patient outcomes.
REFERENCES


Appendix A

Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Conceptual Definition</th>
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<th>Tool Name</th>
<th>Tool Description</th>
<th>Rationale</th>
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<tbody>
<tr>
<td>Weight Loss Maintenance</td>
<td>The ability to maintain loss of ≥50% of excess Body weight (EBW) as determined by bariatric surgeon. (American Society for Bariatric Surgery Standards, 2005; Halverson, 1981; Oria, 2005).</td>
<td>%EBWL (Excess Body Weight Lost): A numerical value arrived at by using formula: Weight loss ÷ excess weight x 100. Weight loss = operative weight – follow-up weight. Excess weight = operative weight – ideal weight. %EBWL indicates percentage of excess weight patient has lost/gained relative to 1983 Metropolitan Height/Weight Table for person of medium frame (American Society for Bariatric Surgery Standards, 2005).</td>
<td>Background Survey (questions #5 &amp; 6)</td>
<td>Weight Loss Maintenance: (See operational definition)</td>
<td>Although majority of patients lose weight and maintain it, up to 20% gain weight back. More research is needed on this sub-group of patients. (Benotti &amp; Forse, 1995; Rusch &amp; Andris, 2007).</td>
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<tr>
<td>Variable</td>
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<td>Tool Name</td>
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<tr>
<td>Self-efficacy</td>
<td>People’s perceived judgments of their capabilities to organize and execute courses of action required to attain designated types of performances (Bandura, 1977).</td>
<td>Numerical value obtained from administering the Weight Efficacy Life-style Questionnaire.</td>
<td>Weight Efficacy Life-style Questionnaire (Clark, Abrams, Niura, Eaton, &amp; Rossi, 1991).</td>
<td>Likert-type survey of statements that directly assess level of perceived self-efficacy for eating: 20-item scale designed to assess global and situational eating self-efficacy.</td>
<td>Proposed mediator of ability to engage in behaviors that lead to weight loss maintenance. Literature supports concept that self-efficacy accounts for initiation and maintenance of health behavior change (Bandura, 1991; Bernier &amp; Avard, 1986).</td>
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<td>Tool Name</td>
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<tr>
<td>Eating Restraint</td>
<td>A person’s tendency to eat less than desired (Gorman &amp; Allison, 1995).</td>
<td>Numerical value obtained from administering the Eating Restraint Scale (ERS).</td>
<td>Eating Restraint Scale (ERS), (Stunkard &amp; Messick, 1988).</td>
<td>Survey of statements that directly assess level of person’s dietary restraint; scale consists of a 21 questions designed to measure cognitive restraint of eating or the tendency to restrict food intake to control body weight; scale is comprised of 9 forced-choice items and 12 true/false items.</td>
<td>Identified in the literature as behavior that is related to successful weight loss maintenance (Cook &amp; Edwards, 1999; Poole et al. 2007)</td>
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<tr>
<td>Exercise Adherence</td>
<td>Consistent pattern of exercise behavior that coincides with that prescribed by the health professional (Baker et al. 2001; Wilber et al. 2001).</td>
<td>Self-identified by individual on Background Survey (question #13) Regarding the recommended exercise the bariatric clinic suggested, how often do you do it? Exercise Adherence: a = &gt; 3 times/week b = 3 times/week c = 1-2 times/week d = never</td>
<td>Background Survey</td>
<td></td>
<td>Identified in literature as behavior related to successful weight loss maintenance (Cook &amp; Edwards, 1999; Elkins et al. 2005).</td>
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### Appendix A, cont.

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<tr>
<td><strong>Attendance at Follow-up Appointments</strong></td>
<td>Refers to individual’s ability to regularly attend follow-up appointments</td>
<td>Self-identified by individual on Background Survey</td>
<td>Background Survey</td>
<td>Attendance:</td>
<td>Identified in literature as behavior related to successful weight loss maintenance (Poole et al. 2005; Rusch &amp; Andris, 2007; Warde-Kamar et al. 2004).</td>
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<td>(question #14): How many follow-up appointments have you been able to keep since your surgery?</td>
<td>a = kept all appts b = rarely missed c = occasionally missed d = frequently missed</td>
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<td><strong>Participation in Support Groups</strong></td>
<td>Refers to individual’s ability to regularly participate in a bariatric support group.</td>
<td>Self-identified by individual on Background Survey</td>
<td>Background Survey</td>
<td>Participation:</td>
<td>Identified in literature as behavior related to successful weight loss maintenance (Hildebrandt, 1998; Song et al. 2007).</td>
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<td></td>
<td>(question #15): How many support groups did you attend since your surgery?</td>
<td>a = &gt; 5 b = 4 – 5 c = 1 – 3 d = none</td>
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### Demographic Variables

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<td>Age in years</td>
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<tr>
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<td>Gender: see operational</td>
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<td>Marital Status</td>
<td>Marital Status:</td>
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<td>Marital Status:</td>
<td>Provide data relative to marital status for sample description.</td>
<td></td>
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- **Race:**
  - a = African-american
  - b = Asian
  - c = Caucasian
  - d = Hispanic
  - e = Other

- **Gender:**
  - Male/female

- **Marital Status:**
  - a = Single
  - b = Married
  - c = Divorced
  - d = Widowed
Appendix A (continued)

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<th>Tool Description</th>
<th>Rationale</th>
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<td>Educational Level</td>
<td>Educational Level: a = some high school, b = high school graduate, c = business school, d = 2-yr degree, e = 4-yr degree, f = graduate degree</td>
<td>Background Survey (question #10)</td>
<td>Educational Level: see operational definition</td>
<td>Provide data relative to educational level for sample description.</td>
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<td>Comfort Level With Income</td>
<td>Comfort Level with Income: a = never comfortable, b = very uncomfortable, c = less than comfortable, d = comfortable, e = very comfortable</td>
<td>Background Survey (question #11)</td>
<td>Comfort Level with Income: see operational definition</td>
<td>Provide data relative to comfort level with income for sample description.</td>
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<td>Work Status</td>
<td>Work Status: a = full/part time, b = unemployed, c = sick leave/disability, d = homemaker, e = student, f = retired, g = other</td>
<td>Background Survey (question #12)</td>
<td>Work Status: see operational definition</td>
<td>Provide data relative to work status for sample description.</td>
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Appendix B

Weight Efficacy Life-Style Questionnaire (WEL)

Listed below are a number of situations that lead some people to eat. We would like to know how confident you are that you would not eat in each situation.

**Directions**: Circle the number that best describes your feelings of confidence to eat food in each situation according to the following scale:

0          1          2          3          4          5          6          7          8          9
NOT CONFIDENT                                       VERY CONFIDENT

1. I can resist eating when I am anxious (nervous).
   0   1   2   3   4   5   6   7   8   9

2. I can control my eating on the weekends.
   0   1   2   3   4   5   6   7   8   9

3. I can resist eating even when I have to say “No” to others.
   0   1   2   3   4   5   6   7   8   9

4. I can resist eating when I feel physically run down.
   0   1   2   3   4   5   6   7   8   9

5. I can resist eating when I am watching TV.
   0   1   2   3   4   5   6   7   8   9

6. I can resist eating when I am depressed or down.
   0   1   2   3   4   5   6   7   8   9
7. I can resist eating when there are many different kinds of food available.

0 1 2 3 4 5 6 7 8 9

8. I can resist eating even when I feel it's impolite to refuse a second helping.

0 1 2 3 4 5 6 7 8 9

9. I can resist eating even when I have a headache.

0 1 2 3 4 5 6 7 8 9

10. I can resist eating when I am reading.

0 1 2 3 4 5 6 7 8 9

11. I can resist eating when I am angry or irritable.

0 1 2 3 4 5 6 7 8 9

12. I can resist eating even when I am at a party.

0 1 2 3 4 5 6 7 8 9

13. I can resist eating even when others are pressuring me to eat.

0 1 2 3 4 5 6 7 8 9

14. I can resist eating when I am in pain.

0 1 2 3 4 5 6 7 8 9
15. I can resist eating just before going to bed.
   0  1  2  3  4  5  6  7  8  9

16. I can resist eating when I have experienced failure.
   0  1  2  3  4  5  6  7  8  9

17. I can resist eating even when high-calorie foods are available.
   0  1  2  3  4  5  6  7  8  9

18. I can resist eating even when I think others will be upset if I don’t eat.
   0  1  2  3  4  5  6  7  8  9

19. I can resist eating when I feel uncomfortable.
   0  1  2  3  4  5  6  7  8  9

20. I can resist eating when I am happy.
   0  1  2  3  4  5  6  7  8  9
Appendix C

The Eating Restraint Scale (ERS)

Part I
Read each of the following _ statements carefully. If you agree with the statement, or feel that it is true as applied to you, answer true by circling ‘true’ after the question. If you disagree with the statement, or feel that it is false as applied to you, answer false by circling ‘false’ after the question.

<table>
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<tr>
<th></th>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When I have eaten my quota of calories, I am usually good about not eating any more.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I deliberately take small helpings as a means of controlling my weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Life is too short to worry about dieting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I have a pretty good idea of the number of calories in common foods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>While on a diet, if I eat a food that is not allowed, I consciously eat less for a period of time to make up for it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I enjoy eating too much to spoil it by counting calories or watching my weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I often stop eating when I am not really full, as a conscious means of limiting the amount that I eat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I consciously hold back at meals in order not to gain weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I eat anything I want, anytime I want.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I count calories as a conscious means of controlling my weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I do not eat some foods because they make me fat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I pay a great deal of attention to changes in my figure.</td>
<td></td>
<td></td>
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</table>
### Part II

Each question in this section is followed by a number of answer options. After reading each question carefully, choose the option which most applies to you, by **circling** the appropriate answer.

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<tbody>
<tr>
<td>13. How often are you dieting in a conscious effort to control your weight?</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Usually</td>
<td>Always</td>
</tr>
<tr>
<td>14. Would a weight fluctuation of 5 pounds affect the way you live your life?</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Very Much</td>
</tr>
<tr>
<td>15. Do your feelings of guilt about overeating help you to control your food intake?</td>
<td>Never</td>
<td>Rarely</td>
<td>Often</td>
<td>Always</td>
</tr>
<tr>
<td>16. How conscious are you of what you are eating?</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Extremely</td>
</tr>
<tr>
<td>17. How frequently do you avoid ‘stocking up’ on tempting foods?</td>
<td>Almost Never</td>
<td>Seldom</td>
<td>Usually</td>
<td>Almost Always</td>
</tr>
<tr>
<td>18. How likely are you to shop for low calorie foods?</td>
<td>Unlikely</td>
<td>Slightly Likely</td>
<td>Moderately Likely</td>
<td>Very Likely</td>
</tr>
<tr>
<td>19. How likely are you to consciously eat slowly in order to cut down on how much you eat?</td>
<td>Unlikely</td>
<td>Slightly Likely</td>
<td>Moderately Likely</td>
<td>Very Likely</td>
</tr>
<tr>
<td>20. How likely are you to consciously eat less than you want?</td>
<td>Unlikely</td>
<td>Slightly Likely</td>
<td>Moderately Likely</td>
<td>Very Likely</td>
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21. On a scale of 1 to 6, where 1 means no restraint in eating (eat whatever you want, whenever you want it) and 6 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself. (Please circle one answer):

1. eat whatever you want, whenever you want it
2. usually eat whatever you want, whenever you want it
3. often eat whatever you want, whenever you want it
4. often limit food intake, but often “give in”
5. usually limit food intake, rarely “give in”
6. constantly limiting food intake, never “giving in”
Appendix D

The Background Survey

**Directions:** Please answer the following questions as closely as they relate to your personal history:

1. What is your current age? ____

2. How tall are you? ___ ft ___ in

3. What is your gender? (place a √) ___ male ___ female

4. What was the date of your surgery? ___ / ___ / ____

5. What is your current weight today? _____

6. What was your weight before you had your surgery? _____

7. Type of bariatric surgery:
   Place check mark ( √ ) in front of one that you had.
   a. ____ Open Gastric Bypass
   b. ____ Laparoscopic Gastric Bypass
   c. ____ Laparoscopic Gastric Banding (LapBand)
   d. ____ Other

8. What is your race?
   Please indicate with a check mark ( √ ).
   a. ____ African -American
   b. ____ Asian
   c. ____ Caucasian
   d. ____ Hispanic
   e. ____ Other

9. What is your marital status?
   Please indicate with a check mark ( √ ).
   a. _____ Single
   b. _____ Married
   c. _____ Divorced
   d. _____ Widowed
10. What is the highest level of education you have completed? (please skip this question, if answering it makes you feel uncomfortable)
   Please indicate with a check mark (√).
   a. _____ Some high school
   b. _____ High school graduate
   c. _____ Business school
   d. _____ Associate's degree (2 year college degree)
   e. _____ Bachelor’s degree (4 year college degree)
   f. _____ Graduate degree

11. Consider how well your household lives on its income. Financially, would you say you are: (please skip this question, if answering it makes you feel uncomfortable) Please indicate with a check mark (√).
   a. _____ Never comfortable in making ends meet; have to depend on others to help financially
   b. _____ Very uncomfortable; rarely have enough to make ends meet
   c. _____ Less than comfortable; sometimes do not have enough to make ends meet
   d. _____ Comfortable; have enough to make ends meet
   e. _____ Very comfortable; have more than enough to make ends meet.

12. What is your work status? Please indicate with a check mark (√).
   a. _____ Work full or part time
   b. _____ Unemployed
   c. _____ Sick leave or disability
   d. _____ Homemaker
   e. _____ Student
   f. _____ Retired
   g. _____ Other

13. Regarding the recommended exercise the bariatric clinic suggested, how often do you exercise (walk, run, bike, use exercise equipment) and follow their suggestions? Please indicate with a check mark (√).
   a. _____ Never
   b. _____ 1 to 2 times per week
   c. _____ 3 times per week
   d. _____ More than 3 times per week
14. How many follow-up appointments at the bariatric center have you been able to keep since the surgery? Please indicate with a check mark (√).

   a. _____ Kept all my appointments
   b. _____ Rarely missed appointments
   c. _____ Occasionally missed appointments
   d. _____ Frequently missed appointments

15. How many Support Groups did you attend since your surgery? Please indicate with a check mark (√).

   a. _____ None
   b. _____ 1 – 3
   c. _____ 4 – 5
   d. _____ More than 5
Appendix E - Permission letter from author

MAYO CLINIC

November 12, 2007
Patricia A. McAllen, RN, MSN, CCRN
780 Blueberry Hill Drive
Canfield, OH 44406

Dear Ms. McAllen:

You have my written permission to use the Weight Efficacy Lifestyle Questionnaire in your research. I have enclosed a copy of the 1991 validation article and a copy of the scale.

Sincerely,

Matthew M. Clark, Ph.D.

MMC/srm
Enclosures
Appendix F - Ready Score Answer Sheet

EATING INVENTORY

NAME: ___________________________ DATE: ___________________________

OCCUPATION: ___________________________ EDUCATION: ___________________________

MARRITAL STATUS: ___________________________ AGE: ________, SEX: ________, HEIGHT: ________, WEIGHT: ________

**PART I**

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<td>51</td>
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</tbody>
</table>

**Directions for Marking the Answer Sheet**

1. You may use a pencil or a ball point pen. Press firmly to make dark, heavy marks. Keep the marks inside the circles.

2. If you make a mistake or wish to change an answer, do not erase your mark. Make an × on the wrong mark like this: × and then mark the space you want. If you later decide your first choice was correct, cross out the second answer with an ×. Then circle your first mark, like this: ◊

**Marking Examples**

1 is correct: ◊ × × ×

2 is correct: × ◊ × ×

3 is correct: × ◊ × ◊
Appendix G- Humility of Mary Health Partners IRB Approval

HUMILITY OF MARY HEALTH PARTNERS  
Youngstown, Ohio  
INSTITUTIONAL REVIEW BOARD (IRB)  

APPLICATION FOR EXPEDITED APPROVAL  

IRB APPROVAL #: 08-007  
IRB ORIGINAL APPROVAL DATE: 5/15/08  

PROJECT TITLE: “The Relationship Between Self-efficacy and Weight Loss Maintenance in Bariatric Patients”  
PRINCIPAL INVESTIGATOR: Patricia McAllen, RN, MSN, PhD(c)  
Co-Investigator: N/A  

1. Brief Description of Study: This is a descriptive, correlational design, the purpose of which is to examine possible relationships between self-efficacy and weight loss maintenance in post-operative bariatric patients. Study participants will be patients of the Center for Comprehensive Weight Loss who are at least two-years post-op. The design utilizes a confidential mail survey packet sent to the sample. Additionally, limited information from the patient record will be collected, i.e. pre-operative weight, current weight, and attendance at follow-up appointments. Data will be analyzed using correlation and multiple regression.

2. Under which expedited review category does this study fall?  
#9 and #11  

3. Attach a copy of the complete research study protocol, informed consent document, pertinent bibliography or references, all data collection forms, current vitae of each investigator and any other appropriate documents.  

May 14, 2008  
Patricia McAllen  
Principal Investigator:  

DECISION REGARDING PROPOSED STUDY  
RECEIVED  
May 14, 2008  

On the basis of the information presented, this study:

✓ New study/protocol has been granted approval and will be reported to the IRB at their next meeting on 6/18/08. Approval # 08-007 must be used on all future correspondence.

If this study extends beyond one year, a renewal application is due to the IRB on 5/15/09.

☐ has been granted approval and will be reported to the IRB at their next meeting on:  

Does not qualify for expedited approval. The attached documentation will be presented to the IRB for board review and approval at their next meeting on  

FORMS - EXPEDITED REVIEW  
REVISED: 1/24/02  
Date 5/15/08  
Signature  
IRB Chair
Appendix H - St. Vincent's IRB Approval

INSTITUTIONAL REVIEW BOARD

INVESTIGATOR: Patricia A. McAllen, PhD(c), RN, MSN
780 Blueberry Hill Drive
Canfield, OH 44406

PROTOCOL: The Relationship of Self-Efficacy on Weight Loss
Maintenance in Post-Operative Bariatric Patients

IRB #332

DATE: July 23, 2008

NOTIFICATION OF IRB ACTION

<table>
<thead>
<tr>
<th>DOCUMENT</th>
<th>VERSION</th>
<th>IRB ACTION</th>
</tr>
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<tbody>
<tr>
<td>Protocol</td>
<td></td>
<td>Approved 7/22/08</td>
</tr>
<tr>
<td>Informed Consent</td>
<td></td>
<td>Approved 7/22/08</td>
</tr>
<tr>
<td>Letter to Patient from Bariatric Center</td>
<td></td>
<td>Approved 7/22/08</td>
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<tr>
<td>Introduction Letter</td>
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<td>Approved 7/22/08</td>
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</table>

This study has received full Board approval at the July 22, 2008 IRB meeting. This study will require a continuing review in 12 months.

This study has been given approval for the period 7/22/08 to 7/21/09.

Changes to this approved research may not be initiated without IRB review. A continuing review application must be submitted to the IRB prior to the date of study expiration. All reporting requirements of this study must be adhered to.

If, during the course of this study, any unanticipated problems involving risks to subjects or others are encountered, they must be promptly reported to the IRB on a Adverse Event Report form.

Please note that the IRB will terminate any protocol that has not completed the requirements of the Board, and no activity may be carried out under a protocol that does not have current approval, including submission of a continuing review.

John Marshall, M.D.
Chairman, Institutional Review Board
Appendix I - Kent State University IRB Approval

KENT STATE.

September 8, 2008

Patricia McAllen, R.N.
College of Nursing

Re: 08-569: “The Relationship of Self-Efficacy to Weight Loss Maintenance in Post-operative Bariatric Patients”

Dear Ms. McAllen:

I am pleased to inform you that the Kent State University Institutional Review Board reviewed and approved your project change requesting to add additional language to the informed consent document. This modification was approved on August 27, 2008.

HHS regulations and Kent State University Institutional Review Board guidelines require that any changes in research methodology, protocol design or principal investigator have the prior approval of the IRB before implementation and continuation of the protocol. The IRB further requests an annual progress report and a final report at the conclusion of the study.

Kent State University has a Federal Wide Assurance on file with the Office for Human Research Protections (OHRP), FWA Number 00001853.

If you have any questions or concerns, please contact me at 330-672-2704 or tfreder2@kent.edu.

Sincerely,

Tonya Frederick, R.N., B.S.N.
Research Compliance Administrator

Cc: Carol Sedlak, Ph.D.
Bariatric Research Study

Questionnaire Packet

Contains:

1. Introduction/Informed Consent
2. Study Survey – 3 questionnaires
3. $ 5 Gift Card
4. Self-addressed stamped envelope
INTRODUCTION LETTER
[Kent State University Letterhead]

Dear _____:

I recently spoke with you about taking part in a research study to be conducted at The Center for Comprehensive Weight Loss. I am a graduate student at Kent State University working on a doctoral dissertation. The purpose of this study is to see if certain behaviors of patients (eating restraint, exercise adherence, attendance at follow-up appointments, and participation in support groups) affect their ability to maintain weight loss after bariatric surgery. The results of this study could be used to design educational programs that could help patients be more successful in their weight loss efforts.

If you decide to participate in this study you will be asked to complete a study packet consisting of three brief questionnaires with a total of 56 items that should less than 30 minutes to complete. Just complete the study packet and mail them back to me in the postage paid envelope provided.

All information will be coded to guarantee confidentiality and your questionnaires will be assigned a code number. Please read, sign, and put your name and date on the consent form if you wish to participate and complete the questionnaires. Please return the study packet with the completed questionnaires and the consent form in the postage paid envelope within the next two weeks. After three weeks, if you have not returned your survey, you may receive a call from the researcher to remind you about sending the packet back.

If you have any questions regarding this study, please contact the researcher, Patricia McAllen at 1-866-441-7799. Thank you for your time and participation in this study.

Thank you,
Patricia McAllen
Informed Consent

[Kent State University Letterhead]

**Statement of Research**
You are being offered an opportunity to participate in a research study. You were selected because you have had surgical treatment for weight loss and have indicated that you are interested in participating in this study. Participation in this study is voluntary and in no relationship with your past, present, or future care at [The Center for Comprehensive Weight Loss] or [The Center for Bariatric Surgery].

**Information on the Research**
The purpose of this research study is to learn more about possible factors that contribute to long-term weight loss maintenance following bariatric surgery. Specifically, we want to learn more about a patient’s ability to stay with their restricted diet, keep up with their suggested exercise, attend follow-up clinic visits, and participate in bariatric support groups. We are asking 100 individuals who are at least 18 months or longer post-bariatric surgery to participate in this study. This specific group was selected as some previous research has suggested that this is the time when bariatric patients begin to regain some of their weight.

**Procedures**
If you decide to take part in the study, you will be asked to complete 3 study questionnaires. The questionnaires ask you questions about how difficult it is to resist eating in specific circumstances, and what you think about eating and weight gain or loss. It will take approximately 30 minutes of your time to complete all three questionnaires. You are asked to return the completed questionnaires in the pre-addressed postage-paid envelope within two weeks of receiving the study packet. The answers you provide will be kept confidential and will not become part of your medical record, since this research is separate from your medical care.

**Potential Risks**
The risks involved in this research are minimal. However, you may find that answering some questions related to your eating patterns and issues related to your weight loss may make you feel mildly uncomfortable. Should you experience any negative feelings, please contact the [The Center for Comprehensive Weight Loss] or [The Center for Bariatric Surgery] and/or consider attending one of the ongoing support groups held regularly for post bariatric patients.

**Potential Benefits**
If you choose to participate in the study, there may not be a direct benefit to you. However, we hope that findings learned from this study will benefit all bariatric post-operative patients who are struggling with the issue of regaining lost weight.
**Compensation and Costs**
There is no cost to you or your insurance company for taking part in this study. Simply by asking to receive a study packet in the mail, you will receive a $5 gift card to a local shopping center. This is a way of saying ‘thank you’ for taking time to participate.

**Privacy and Confidentiality**
Confidentiality will be maintained to the limits of the law. [Humility of Mary Health Partners] or [St. Vincent Charity Hospital] complies with all legal requirements that mandate disclosure of information. The Health Insurance Portability and Accountability Act (HIPAA) protects your individually identifiable information (PHI, protected health information.). The law requires you to sign an authorization in order for researchers to be able to use or disclose your PHI for research purposes. By signing this consent, you agree to permit [Humility of Mary Health Partners] or [St. Vincent Charity Hospital] to disclose your PHI to the researcher, Patricia McAllen, RN, for the purposes of this study only. Examples of PHI includes information like your date of birth, height, pre-operative weight, lowest post-operative weight, current weight and surgery date.

If you choose to participate in this study, you must sign the last page of this form. A summary of the results of this research study may be provided to the medical staff of [The Center for Comprehensive Weight Loss] or [The Center for Bariatric Surgery], so that the information provided can help improve services for other bariatric patients. Your individual information will not be shared with the clinic staff, and your particular information will not be identifiable in the summary.

All questionnaires are coded with a number to assure confidentiality. Your name will not be used, only the code that has been individually assigned to your study packet.

**Voluntary Participation**
Your participation in this study is voluntary. You may choose to take part in the study or not participate. You may refuse to answer any questions or withdraw from the study at any time. Whether you decide to participate in the study or not participate will not affect the type of care you receive from [The Center for Comprehensive Weight Loss] or [The Center for Bariatric Surgery]. This study is completely separate from your medical treatment and the information will in no way become part of your medical record.

If you agree to participate in this study, you will need to sign at the end of this form to indicate your agreement. When you sign, you are saying that you have been informed of the research in which you voluntarily agree to participate; that your questions have been answered to your satisfaction; and that the information provided to you has made you informed and allowed you to make a voluntary decision to participate in this study.
For Questions or Concerns

If you have additional questions about this particular study, please contact me (Patricia McAllen) at 1-800-XXX-XXXX or email me at pmcallen@kent.edu. This proposal has been reviewed by the institutional review boards at Humility of Mary Health Partners(HMHP), St. Vincent Charity Hospital, and Kent State University. If you have questions about your rights as a research participant, you may contact the Institutional Review Board at HMHP at 330-480-2452, or at St. Vincent’s at 216-XXX-XXXX. If you have questions about Kent State University’s rules for research, you may contact my advisors, Dr. Ruth Ludwick (330-672-8820), or Carol Sedlak (330-672-8836), or Dr. John West, Vice-President and Dean, Division of Research and Graduate Studies (330-672-2581).

If you have a health question related to your bariatric surgery, please call [The Center for Comprehensive Weight Loss] or [The Center for Bariatric Surgery] (list phone numbers).

Consent to Participate in the Study

I agree to take part in this study. I have read this consent form, and the study has been explained to my satisfaction. I agree that the researcher can access my protected health information (PHI) in my medical record as stated in this consent as listed under the Confidentiality section.

_____________________________________
Name of Participant

_____________________________________
Signature of Participant                      Date: __________________________

_____________________________________
Name of Principal Investigator

_____________________________________
Signature of Principal Investigator                      Date: __________________________
Thank you for agreeing to answer my survey. I am very interested in bariatric patients and the struggles they encounter losing their excess weight and keeping it off. This survey will help me in gathering information that I will use in my study. Your answers will help me understand specific information about you. The survey has 3 sections.

Section #1
Weight Efficacy Life-Style Questionnaire (WEL)

Listed below are a number of situations that lead some people to eat. We would like to know how confident you are that you would not eat in each situation.

Directions: Circle the number that best describes your feelings of confidence to eat food in each situation according to the following scale:

0  1  2  3  4  5  6  7  8  9
NOT CONFIDENT         VERY CONFIDENT

1. I can resist eating when I am anxious (nervous).
   0  1  2  3  4  5  6  7  8  9

2. I can control my eating on the weekends.
   0  1  2  3  4  5  6  7  8  9

3. I can resist eating even when I have to say “No” to others.
   0  1  2  3  4  5  6  7  8  9

4. I can resist eating when I feel physically run down.
   0  1  2  3  4  5  6  7  8  9

Go to the next page
5. I can resist eating when I am watching TV.

   0  1  2  3  4  5  6  7  8  9

6. I can resist eating when I am depressed or down.

   0  1  2  3  4  5  6  7  8  9

7. I can resist eating when there are many different kinds of food available.

   0  1  2  3  4  5  6  7  8  9

8. I can resist eating even when I feel it’s impolite to refuse a second helping.

   0  1  2  3  4  5  6  7  8  9

9. I can resist eating even when I have a headache.

   0  1  2  3  4  5  6  7  8  9

10. I can resist eating when I am reading.

    0  1  2  3  4  5  6  7  8  9

11. I can resist eating when I am angry or irritable.

    0  1  2  3  4  5  6  7  8  9

12. I can resist eating even when I am at a party.

    0  1  2  3  4  5  6  7  8  9

Go to the next page
13. I can resist eating even when others are pressuring me to eat.
   0 1 2 3 4 5 6 7 8 9

14. I can resist eating when I am in pain.
   0 1 2 3 4 5 6 7 8 9

15. I can resist eating just before going to bed.
   0 1 2 3 4 5 6 7 8 9

16. I can resist eating when I have experienced failure.
   0 1 2 3 4 5 6 7 8 9

17. I can resist eating even when high-calorie foods are available.
   0 1 2 3 4 5 6 7 8 9

18. I can resist eating even when I think others will be upset if I don’t eat.
   0 1 2 3 4 5 6 7 8 9

19. I can resist eating when I feel uncomfortable.
   0 1 2 3 4 5 6 7 8 9

20. I can resist eating when I am happy.
   0 1 2 3 4 5 6 7 8 9

This concludes Section #1, please proceed to Section #2, on the next page.
Section #2
The Eating Restraint Scale (ERS)

Part I
Read each of the following _ statements carefully. If you agree with the statement, or feel that it is true as applied to you, answer true by circling ‘true’ after the question. If you disagree with the statement, or feel that it is false as applied to you, answer false by circling ‘false’ after the question.

<table>
<thead>
<tr>
<th></th>
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<th>True</th>
<th>False</th>
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<tbody>
<tr>
<td>1</td>
<td>When I have eaten my quota of calories, I am usually good about not eating any more.</td>
<td></td>
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<td>2</td>
<td>I deliberately take small helpings as a means of controlling my weight.</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Life is too short to worry about dieting.</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>I have a pretty good idea of the number of calories in common foods.</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>While on a diet, if I eat a food that is not allowed, I consciously eat less for a period of time to make up for it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I enjoy eating too much to spoil it by counting calories or watching my weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I often stop eating when I am not really full, as a conscious means of limiting the amount that I eat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I consciously hold back at meals in order not to gain weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I eat anything I want, anytime I want.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I count calories as a conscious means of controlling my weight.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I do not eat some foods because they make me fat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I pay a great deal of attention to changes in my figure.</td>
<td></td>
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Part II
Each question in this section is followed by a number of answer options. After reading each question carefully, choose the option which most applies to you, by circling the appropriate answer.

<table>
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<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>13.</td>
<td>How often are you dieting in a conscious effort to control your weight?</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Usually</td>
</tr>
<tr>
<td>14.</td>
<td>Would a weight fluctuation of 5 pounds affect the way you live your life?</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
</tr>
<tr>
<td>15.</td>
<td>Do your feelings of guilt about overeating help you to control your food intake?</td>
<td>Never</td>
<td>Rarely</td>
<td>Often</td>
</tr>
<tr>
<td>16.</td>
<td>How conscious are you of what you are eating?</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
</tr>
<tr>
<td>17.</td>
<td>How frequently do you avoid 'stocking up' on tempting foods?</td>
<td>Almost Never</td>
<td>Seldom</td>
<td>Usually</td>
</tr>
<tr>
<td>18.</td>
<td>How likely are you to shop for low calorie foods?</td>
<td>Unlikely</td>
<td>Slightly</td>
<td>Moderately Likely</td>
</tr>
<tr>
<td>19.</td>
<td>How likely are you to consciously eat slowly in order to cut down on how much you eat?</td>
<td>Unlikely</td>
<td>Slightly</td>
<td>Moderately Likely</td>
</tr>
<tr>
<td>20.</td>
<td>How likely are you to consciously eat less than you want?</td>
<td>Unlikely</td>
<td>Slightly</td>
<td>Moderately Likely</td>
</tr>
</tbody>
</table>

21. On a scale of 1 to 6, where 1 means no restraint in eating (eat whatever you want, whenever you want it) and 6 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself. (Please circle one answer):

7. eat whatever you want, whenever you want it
8. usually eat whatever you want, whenever you want it
9. often eat whatever you want, whenever you want it
10. often limit food intake, but often “give in”
11. usually limit food intake, rarely “give in”
12. constantly limiting food intake, never “giving in”

This concludes Section #2. Please go to the next page for Section #3.
Section #3
Background Survey

**Directions:** Please answer the following questions as closely as they relate to your personal history:

1. What is your current age? ____
2. How tall are you? ___ft ___in
3. What is your gender? (place a \(\checkmark\)) ___ male ___ female
4. What was the date of your surgery? ___/___/____
5. What is your current weight today? _____
6. What was your weight before you had your surgery? _____
7. Type of bariatric surgery:
   Place check mark (\(\checkmark\)) in front of one that you had.
   a. ____ Open Gastric Bypass
   b. ____ Laparoscopic Gastric Bypass
   c. ____ Laparoscopic Gastric Banding (LapBand)
   d. ____ Other
8. What is your race?
   Please indicate with a check mark (\(\checkmark\)).
   a. ____ African-American
   b. ____ Asian
   c. ____ Caucasian
   d. ____ Hispanic
   e. ____ Other
9. What is your marital status?
   Please indicate with a check mark (\(\checkmark\)).
   a. ____ Single
   b. ____ Married
   c. ____ Divorced
   d. ____ Widowed
10. What is the highest level of education you have completed? (please skip this question, if answering it makes you feel uncomfortable) Please indicate with a check mark (√).
   g. _____ Some high school
   h. _____ High school graduate
   i. _____ Business school
   j. _____ Associate’s degree (2 year college degree)
   k. _____ Bachelor’s degree (4 year college degree)
   l. _____ Graduate degree

11. Consider how well your household lives on its income. Financially, would you say you are: (please skip this question, if answering it makes you feel uncomfortable) Please indicate with a check mark (√).
   a. _____ Never comfortable in making ends meet; have to depend on others to help financially
   b. _____ Very uncomfortable; rarely have enough to make ends meet
   c. _____ Less than comfortable; sometimes do not have enough to make ends meet
   d. _____ Comfortable; have enough to make ends meet
   e. _____ Very comfortable; have more than enough to make ends meet.

12. What is your work status? Please indicate with a check mark (√).
   a. ______ Work full or part time
   b. ______ Unemployed
   c. ______ Sick leave or disability
   d. ______ Homemaker
   e. ______ Student
   f. ______ Retired
   g. ______ Other

Go to the next page
13. Regarding the recommended exercise the bariatric clinic suggested, how often do you exercise (walk, run, bike, use exercise equipment) and follow their suggestions? Please indicate with a check mark (√).

   a. _____ Never
   b. _____ 1 to 2 times per week
   c. _____ 3 times per week
   d. _____ More than 3 times per week

14. How many follow-up appointments at the bariatric center have you been able to keep since the surgery? Please indicate with a check mark (√).

   a. _____ Kept all my appointments
   b. _____ Rarely missed appointments
   c. _____ Occasionally missed appointments
   d. _____ Frequently missed appointments

15. How many Support Groups did you attend since your surgery?
   Please indicate with a check mark (√).

   e. _____ None
   f. _____ 1 – 3
   g. _____ 4 – 5
   h. _____ More than 5

This concludes the survey. Thank you for taking time to complete it. Your help is greatly appreciated!