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Predictors of Successful Weight Loss Following Bariatric Surgery

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PREDICTORS OF SUCCESSFUL WEIGHT LOSS FOLLOWING BARIATRIC SURGERY

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Dissertation Approval

This is to certify that the thesis presented to us by Francine Broder on the 11th day of March, 2013, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

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Abstract

Obesity is a major public health problem involving both medical and quality-of-life issues. During the past 20 years, obesity has dramatically increased and is currently at an all-time high (Centers for Disease Control and Prevention, 2011). More than two thirds of the adult population in the United States is estimated to be overweight, with over one third of the population classified as obese (National Institute of Health, 2009). While attempting to lose weight is common, calorie reduction combined with physical activity typically results in 5 to 10 % reduction of body weight over a 6-month period, yet these moderate losses are rarely sustained (Tsai & Wadden, 2005; Yanovski & Yanovski, 2002). Consequently, bariatric surgery has increased in popularity. Unfortunately, the surgical treatment for morbid obesity can fail with unchanged lifestyle or eating behaviors, and thus a better understanding of the factors that lead to postsurgical weight loss success is important. This study investigates three variables of weight loss outcomes following bariatric surgery: a) support group attendance, b) age of onset of obesity, and c) preoperative weight loss. Results indicate that individuals with greater support group attendance had greater excess weight loss at 12 months following bariatric surgery. Neither age of onset of obesity nor preoperative weight loss was correlated with weight loss success following surgery. Recommendations for future research are made to understand further the life-long weight management needs of the obese individual following bariatric surgery.

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Chapter 1: Introduction

Statement of the Problem

Obesity is a major public health problem involving both medical and psychosocial issues. Epidemiologic evidence suggests it is a chronic condition and a major cause of morbidity and mortality in the United States (Flegal, Graubard, Williamson, & Gail, 2005). Obesity in the United States is at an all-time high (Centers for Disease Control, 2011), with more than two thirds of the adult population estimated to be overweight and approximately one third of the population classified as obese (National Institute of Health, 2009). Of great concern are the serious comorbid health conditions associated with obesity, which include type 2 diabetes, coronary heart disease, hypertension, and sleep apnea, among others.

While attempting to lose weight is common, doing so is not easy, and maintaining weight loss is difficult. In their comprehensive review of the long-term outcomes of calorie-restricting diets, Mann et al. (2007) found that one to two thirds of dieters regained more than they lost on their diets. In addition, the authors suggested the studies did not provide consistent evidence that dieting results in significant improvements in health. In contrast, bariatric surgery has been demonstrated to be a highly effective treatment of obesity and has proved to reduce the serious health consequences associated with morbid and moderate obesity. About 15 million people in the United States are morbidly obese, with approximately 220,000 Americans undergoing bariatric surgery for treatment of obesity in 2008 (American Society for Metabolic & Bariatric Surgery

[ASMBS] Fact Sheet). Although surgery is the most effective treatment for morbid obesity, weight loss success and improved health are tenuous without lifestyle adjustments or change in postoperative eating behavior (Elakkary, Elhorr, Aziz, Gazayerli, & Silva, 2006).

The onset of obesity may be a factor in postsurgical weight loss success. Research suggests childhood and adolescent obesity is a risk factor for adult overweight or obesity (Guo, Wu, Chumlea, & Roche, 2002). Likewise, parental history of obesity is a known risk factor for individual obesity (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997), but the time of onset and the implication for weight loss after bariatric surgery have been poorly studied. While there is better understanding of the risk factors leading to obesity, weight loss success factors following bariatric surgery are not fully understood.

The study of outcomes post weight loss surgery is essential to understanding the factors for success in the first 12 months after surgery. Studies reveal some patients undergoing bariatric surgery fare better than others (van Hout, Verschure, & van Heck, 2005). Many individual biological, medical, psychosocial, and environmental factors influence a patient's weight loss success. A key factor of interest is pre - and postoperative support group attendance in which the group's focus is behavioral change and nutrition education to support weight loss. Use of a group approach to behavioral change has been supported by the literature, with support group meetings demonstrated to be an integral part of the success after gastric bypass surgery (Orth, Madan, Taddeucci, Coday, & Tichansky, 2008). Similarly, Kaiser, Franks, and Smith (2011) examined

support group attendance and postoperative weight loss, and they found a significant relationship between percentage of excess body weight loss (%EWL) at 12 months post surgery and support group attendance. Another study demonstrated postoperative follow-up increased weight loss in patients after laparoscopic adjustable gastric banding (AGB), but not after laparoscopic Roux-en-Y gastric bypass (Shen et al., 2004).

Another area of inquiry has been the onset of obesity and postsurgical weight change; however, the literature in this area is sparse. In their study of psychosocial predictors of success following bariatric surgery, van Hout et al. (2005) found that greater success following weight loss surgery appeared to occur in patients who were obese before the age of 18 years. Conversely, research findings by Pekkarinen, Koskela, and Huikuri (1994) suggest adult onset of obesity was correlated with greater weight loss success than was childhood onset of obesity.

Weight lost during the preoperative period continues to be a controversial predictor of weight loss post surgery. Some research suggests preoperative weight loss may help to identify patients who will have better adherence after surgery. A meta-analysis by Livhits et al. (2009) assessed the effect of preoperative weight loss on the 12-month postoperative %EWL and found preoperative weight loss was associated with greater weight loss following laparoscopic RYGB, and open RYGB. Conversely, a study by Carlin, O'Connor, Genaw, and Kawar (2008) suggested preoperative weight loss did not predict postoperative weight loss following laparoscopic RYGB. A greater understanding of preoperative weight loss and other factors leading to postoperative weight loss success requires further study.

Purpose of the Study

Given the development of bariatric surgery as a more commonplace procedure for weight loss and the current differential findings in the literature, it is important to examine further the role support groups, age of onset of obesity, and preoperative weight loss play in postsurgical weight loss. The purpose of this study is to investigate (a) the relation between support group attendance and weight loss in patients who have undergone Roux-en-Y gastric bypass and laparoscopic adjustable lap band surgery, (b) the relation between age of onset of obesity and success post weight loss surgery, and (c) the relation between preoperative weight loss and success post weight loss surgery.

Chapter 2: Literature Review

During the past 20 years, obesity has increased dramatically and it is currently at an all-time high (Centers for Disease Control, and Prevention, 2011). A major public health problem involving both medical and quality-of-life issues, it is considered a worldwide health epidemic (York et al., 2004). Defined as an excessive amount of adipose tissue, obesity is often a life-threatening illness affecting about one third of the population in the United States (ASMBS, 2010). Results from the Centers for Disease Control, National Health and Nutrition Examination Survey (NHANES) indicate 64% of adults in the United States are overweight or obese, with approximately half of this group being obese and 5.7% being extremely obese (Centers for Disease Control, 2010). Obesity is defined as a Body Mass Index (BMI) of 30 or greater and is calculated as weight in kilograms divided by the square of the height in meters. Approximately only one third of adult Americans have a BMI below 30 (Olshansky et al., 2005). After remaining relatively stable in the 1960s and 1970s, obesity rates in the United States dramatically increased by 50% per decade throughout the 1980s and 1990s (Olshansky et al., 2005). Rates of overweight and obesity continue to increase (National Institutes of Health, 2010).

Mortality Associated with Obesity

Mortality associated with obesity has been widely studied. According to the Office of the Surgeon General (2007), an estimated 300,000 deaths per year may be attributable to obesity. Obesity is considered the second leading cause of preventable death in the United States, with the annual number of deaths attributed to obesity-related health problems approaching that of deaths related to tobacco use (Ray, Nickels, Sayeed, & Sax,

2003). The patterns of findings of years of life lost owing to obesity vary by sex and race (Fontaine, Redden, Wang, Westfall, & Allison, 2003). These findings speak to the seriousness of the problem. Obesity markedly lessens life expectancy for all, putting obese individuals at risk for earlier death, losing years of life compared to the number of years expected to live if a person were not obese (Olshansky et al., 2005). The researchers suggest close attention be paid to the increased rate of childhood obesity because overweight in childhood not only increases the likelihood of adult obesity (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997) but also increases the risk of death from cardiovascular disease, particularly among men (Olshansky et al., 2005). Olshansky et al. (2005) caution that unless obesity interventions are developed, the steady rise in life expectancy observed in our modern era may soon come to an end, and the youth of today may live shorter lives than their parents as a result of their excessive weight.

Comorbid Conditions Associated with Obesity

Obesity is associated with excessive morbidity as well as mortality in the United States and much of the developed world. Epidemiologic evidence suggests an association between obesity and several diseases (Kopelman, 2007). Morbid obesity is associated with more than 30 illnesses and medical conditions, including diabetes mellitus type 2, sleep apnea, liver disease, hypertension, hypercholesterolemia, coronary heart disease, gall bladder syndrome, osteoarthritis and urinary incontinence, among others (ASMBS, 2010). Most recently, research also has suggested a relationship between obesity and migraine (Bond, Vithiananthan, Nash, Thomas, & Wing, 2011) and obesity and neurocognitive functioning (Gunstad et al., 2010).

Coronary Heart Disease

The American Obesity Association defines comorbidity as any condition associated with obesity that worsens as the degree of obesity increases and improves as the condition is treated (Oria & Moorehead, 1998). Obesity's effect on coronary heart disease and type 2 diabetes are salient comorbidities that have deleterious effects on health for both men and women (Olshansky et al., 2005). The ill health effects of adipose tissue are owing in part to quantity, with particular focus on metabolically active adipose tissue. Increased cardiac output results from metabolically active adipose tissue. Increased in cardiac output is the result of blood volume increasing in proportion to body weight, which contributes to left ventricular stress and resting cardiac output (Kopelman, 2007). The increase in cardiac output is understood to lead to structural changes in the heart that compromise the heart's integrity and place an individual at increased risk of cardiac illness. Batsis et al. (2006) assessed the effect of bariatric surgery on cardiovascular risks and found weight loss post bariatric surgery was associated with improvements in cardiac risk in patients with Class II and Class III obesity (World Health Organization Obesity Classification System, 1995). Along with the positive effects of significant weight loss on cardiac health is the need for caution when treating obese cardiac patients with surgery. Aggressive weight loss intervention could be harmful to patients who have had a recent myocardial infarction. Bariatric surgery should not be considered until the patient is medically stable (Klein et al., 2004).

Diabetes Type 2

Similar to coronary heart disease, diabetes is a major comorbidity linked to obesity (Haslam, 2007) and was the sixth leading cause of death listed on United States death certificates in 2000 (Rogers & Still, 2011). Obesity is consistently identified as a major risk factor in type 2 diabetes, and a high percentage of adults diagnosed with diabetes are overweight or obese (CDC, 2010; Mokdad et al., 2001). Currently, several studies link bariatric surgery to reduction in diabetes status (Adams et al., 2007; Sjostrom, et al., 2007; Vetter, Cardillo, Rickels, & Iqbel, 2009). Bariatric surgery is understood to increase glycemic control through calorie restriction and through stomach peptide secretion caused by altering the secretion of stomach hormones, resulting in enhanced insulin secretion (Vetter et al., 2009).

Psychosocial Consequences Associated with Obesity

Depression

Obese individuals suffer emotional consequences of obesity as well physical comorbidities. The deleterious effects of obesity are associated with debilitating psychosocial consequences, such as low self-esteem and depression (van Hout, van Oudheusden, & van Heck, 2004). Research focused on the relationship between obesity and depression supports the hypotheses that severe obesity causes or aggravates depression (Dixon, Dixon, & O'Brien, 2003). Recent studies have shown that individuals with extreme obesity may be at increased risk of depression (Fabricatore,

Wadden, & Sarwer, & Faith, 2005). In an earlier report, Onyike, Crum, Lee, Lyketsos, & Eaton (2003) used data from the Third National Health Examination Study (1988-1994) to examine the relationship between obesity and depression and found obesity to be associated with increased depression, mainly among persons with severe obesity.

Stigmatization

Stigmatization of obese individuals has been documented for decades. A variety of studies have found that people discriminate against obese individuals. Richardson, Goodman, Hastorf, and Dornbusch (1961) conducted a landmark study in which 10 to11-year-olds were given drawings of children and then asked to rank them according to how well they liked each child. Four of the drawings had children with various physical disabilities or disfigurements, and one drawing had an obese child. Results demonstrated that the obese child was reliably ranked last, even lower than the children with major physical disabilities, not only by children from different socioeconomic and ethnic backgrounds, but also by children who themselves had physical disabilities. Obese adults from various ethnic and racial backgrounds demonstrated the same aversion to drawings of obese individuals (Maddox, Back, & Liederman, 1968). Similar studies were conducted with slightly younger children (Goldfield & Chrisler, 1995; Kraig & Keel, 2001). These studies looked at weight-based stigmatization with 7 to 9-year-olds and found that children hold more negative views of children who are overweight. Similar to the earlier study, a child's weight status did not impact the pattern of their ratings. The existence of negative attitudes toward overweight children was also demonstrated in preschool children as young as 3 to 5 years of age (Cramer & Steinwert, 1998).

Stigmatization of overweight and obesity has implications across the lifespan. Overweight adolescents suffer important social and economic consequences, which are greater than those for adolescents with many other chronic physical conditions, according to Gortmaker, Must, Perrin, Sobol, and Dietz (1993). In their longitudinal study, women and men who had been overweight adolescents, were less likely as adults to be married, had lower household incomes, and completed fewer years of school as compared to nonoverweight subjects with other chronic conditions. In a more recent review of published literature on weight bias against overweight and obese adults, Puhl and Heuer (2009) documented bias and stigma in domains of employment, education, and healthcare. The authors noted the vulnerability of obese persons to unfair treatment in many arenas. These studies suggest the interaction among obesity, stigma, and future psychosocial consequences.

Obesity Treatment

The prevalence of obesity has been increasing for decades and evidence is consistent that obesity increases the risk of mortality and morbidity and reduces quality of life (TOS Obesity Writing Group, 2008). Research focused on treatment suggests that some approaches are more efficacious than others. Losing weight is difficult for most obese individuals, and long-term maintenance of a reduced weight is even more challenging (Tsai & Wadden, 2005; Yanovski & Yanovski, 2002). In their review of long-term outcomes of calorie-restricting diets, Mann et al. (2007) found that as many as two thirds of the dieters weighed more than when they had started dieting 2 years earlier. As a

result of limited weight loss success and high rates of attrition and regain, additional research in obesity treatment is needed.

Treatment for obesity usually begins with a trial of lifestyle changes, also known as behavior modification, which typically combines diet, exercise, and behavioral change. Lifestyle change is conducted individually or in groups. Additionally, although a number of weight-loss drugs are currently on the market, there is no evidence of enduring results from pharmacological treatment once discontinued. Increasingly, obese individuals are seeking bariatric surgery for weight loss.

Behavioral Treatment

The most common and initial treatment for obesity are behavioral interventions, including psychoeducation about nutrition and focus on lifestyle change, also known as a behavioral approach to weight loss. Behavioral treatments help overweight persons develop eating and exercise habits that enable them to lose weight. Individuals who combine calorie reduction and exercise with behavioral treatment may expect to lose 5 to 10% of excess body weight over a period of 4 to 6 months (Wadden & Foster, 2000). Manualized behavioral treatments developed by psychologists incorporate a cognitive focus along with changes in behavior (Beck, 2007; Brownell, 2004; Cooper, Fairburn, & Hawker, 2003; Wadden, Butryn, & Byrne, 2004; Wadden & Foster, 2000). Some empirically supported practices seem to be more promising than others. While behavioral treatment can be effective in the short run, weight loss is often not sustained and there exists a significant relapse rate (Yanovski & Yanovski, 2002). Dieters

typically end up regaining one third of their lost weight within the first 6 months post treatment and return to their baseline weight after 5 years (Wadden & Butryn, 2003).

Pharmacotherapy for Obesity

The pharmaceutical industry is actively investigating treatment approaches to reduce obesity (Kopelman, 2007). In their efforts to lose weight, Americans spend over 30 billion dollars a year on dieting and diet-related products (Cogan, 2000). Unfortunately, short-term treatments for obesity generally do not lead to sustained weight loss, perhaps because many patients are unwilling or unable to continue behavioral treatments for the long term (Wadden et al., 2004; Wadden & Foster, 2000), with long-term weight loss results in weight loss programs being generally modest (Jeffrey et al., 2000). Most patients regain the weight they lose (Elfhag & Rossner, 2005).

The development of weight loss medications followed the limited success of behavioral treatments. Weight loss drugs were proposed as an adjunct to dietary and lifestyle changes necessary to sustain weight loss; however, problems are noted. Medications approved for weight loss in the United States fall into two broad categories. One class of pharmacotherapy agents decreases food intake by reducing appetite or increasing satiety, and the other class is comprised of medications that decrease nutrient absorption (Yanovski & Yanovski, 2002). In a double blind, randomly controlled study, subjects who took pharmacotherapy agents showed weight loss of 2 to 10 kg (4.45 lbs. to 22.24 lbs.) as compared to subjects who took a placebo (Yanovski & Yanovski, 2002) with steady regain upon discontinuation of the medication. More recently, the Food and

Drug Administration (FDA) approved two new drugs as adjuncts to reduced-calorie diet and increased physical activity for weight loss in obese adults with BMI of greater than or equal to 30, or BMI greater than or equal to 27 with at least one weight-related comorbid condition (Colman et al., 2012). In 1-year placebo-controlled clinical trials, all participants received instruction for lifestyle modification, along with lorcaserin and phentermine-topiramate. Results suggest that drug treatment was associated with FDA criteria for meaningful weight loss (Colman et al., 2012), yet there were some potentially serious safety concerns, such as elevated resting heart rate and possible birth defects if taken by women during pregnancy.

Surgical Intervention

The intractable nature of obesity is reflected in its 75 to 95% recidivism rate (Tsai & Wadden, 2005). In the 1980s, the National Institutes of Health (NIH) brought together a Consensus Conference, which proposed bariatric surgery should be considered for individuals with a BMI of 40 or of more than 35 in patients with coexisting illnesses. The conference group also stated that bariatric surgery was appropriate only if other forms of obesity treatment had failed. These opinions have been the primary guidelines for bariatric surgery since being published in 1991 (Consensus Development Conference Panel, 1991).

During the last 30 years, surgery for morbid obesity has been a widely used intervention for weight loss that reduces capacity for food intake and absorption, or both. It has become a popular approach to manage obesity, with 220,000 bariatric surgeries performed in 2008 (ASMBS, 2010). Notable is the paradigm shift in general surgery

(Pierce et al., 2010). The researchers examined medical coding and billing data from fiscal year 2008 compiled from 85 academic institutions in the United States. Findings suggest laparoscopic gastric bypass surgery was the second most frequently performed procedure by general surgeons, with cholecystectomy the most frequently performed procedure. Until now, individuals with Class III obesity (BMI of 40 or greater) or Class II (BMI of 35 or greater) with co-morbid medical conditions, who have prior unsuccessful weight loss attempts, were considered for surgical treatment of obesity. Recently, a change was made in the consideration of candidacy for weight loss surgery. After reviewing studies on the results of lap band surgery, the FDA lowered the minimum BMI to be eligible for bariatric surgery from 35 to 30, if the patient has a comorbid obesity-related condition (U.S. Department of Human Services, 2011). Health insurance companies are predicted to follow suit, lowering the BMI eligible for bariatric surgery.

Obesity Surgery Weight Loss Outcomes and Reduction of Comorbid Health Conditions

Obesity is a complex disease for which traditional treatment has limited success. On average, individuals who have bariatric surgery lose approximately 25% of excess body weight within the first 12 months postoperatively (Bond, Phelan, Leahey, Hill, & Wing, 2009), yet review of the literature suggests success is not universally defined. In a study examining the weight loss of 148 patients undergoing gastric bypass surgery, success was defined as weight loss greater than or equal to 50% excess body weight at 40 months post surgery (Livhits et al., 2010). In another study examining the weight loss of 260

morbidly obese patients undergoing adjustable band surgery, success was defined as losing greater than 50% of excess body weight at 3 years post surgery (Bussetto et al., 2002).

Outcomes of weight loss surgery, with regard to comorbid conditions is notable. A number of medical conditions improve or resolve with substantial weight loss. Weight loss following obesity surgery results in improvement or resolution of type 2 diabetes, hypertension, sleep apnea, degenerative joint disease, and lower extremity venous stasis (Elder & Wolfe, 2007). As mentioned earlier, recent research shows immediate improvement or resolution of type 2 diabetes following gastric bypass surgery.

Dixon et al. (2008) conducted a randomized controlled trial of 60 obese patients with recently diagnosed type 2 diabetes. Half the group received conventional diabetes therapy with a focus on weight loss by lifestyle change, and half the group received laparoscopic adjustable gastric banding (AGB) with conventional diabetes care. Results indicated that remission of type 2 diabetes was achieved by 73% in the surgical group and 13% in the conventional-therapy group. During the recent Second World Congress on Interventional Therapies for type 2 diabetes (2011), new correlations between bariatric surgery and management of patients with diabetes were debated. The position statement recommended bariatric surgery as an appropriate treatment for people with type 2 diabetes and a BMI between 30 and 35 when diabetes cannot be adequately controlled by traditional medical regimen, especially in the presence of major cardiovascular disease.

The effect that weight loss following bariatric surgery had on the predicted risk of coronary heart disease has been noted (Batsis et al., 2006; Vogel et al., 2006). Vogel et

al. (2006) conducted a retrospective chart review of patients who underwent laparoscopic Roux-en-Y gastric bypass (RYGB) surgery. Patients underwent a comprehensive medical evaluation by a cardiologist inclusive of blood chemistry testing and a 12-lead electrocardiogram at rest. The results suggested a decrease in coronary heart disease risk after substantial and sustained weight loss secondary to bariatric surgery. In other research, Buchwald et al. (2004) surveyed all articles on bariatric surgery published between 1990 and 2003. Findings suggested a substantial majority of patients with hyperlipidemia, hypertension, and obstructive sleep apnea experienced improvement or complete resolution following bariatric surgery.

Roux-en-Y Gastric Bypass Outcomes

Weight loss outcomes vary, and several studies report less than satisfactory success following bariatric surgery. Weight regain was observed within 24 months in approximately 50% of patients in a longitudinal, prospective study conducted on 782 obese individuals (Magro et al., 2008). Ray et al. (2003) reported 40% of patients in their study did not lose 50% or more of their excess weight at 12 months follow-up to RYGB surgery. In an earlier study, Hildebrandt (1998) reported a 63.3% mean loss of excess body weight among their subjects studied at 15 months post surgery. Likewise, Livhits et al. (2010) reported 52.7 % of patients losing greater than 50% excess body weight at 40 months post surgery.

Laparoscopic Adjustable Gastric Band Outcomes

Weight loss outcomes vary for AGB surgery as well. Dixon, Dixon, and O'Brien (2004) found percentage of excess weight loss (% EWL) was 53% at 2 years and 57% at

6 years post AGB surgery for 709 patients treated at their bariatric center. Aarts, Janssen, Aufenacker, and Berends (2010) found unsatisfactory results after laparoscopic AGB. Examining 10-year AGB outcomes of 200 patients, they found that two thirds of patients reached an EWL of greater than 50% at some point after the operation. However, eventually, one third of all patients underwent removal of the AGB as result of insufficient weight loss or complications. An additional one third had disappointing results (EWL 9.4%), and only one third of the participants had a functioning band at 10 years after surgery, with an EWL of 60.3%. Similarly, Suter, Calmes, Paroz, and Giusti (2006) studied 317 subjects and found high long-term complication and failure rates 10 years post laparoscopic AGB. While AGB appeared to have a positive effect on weight reduction and overall health the first few years after surgery, results were not consistent in the long term. Despite improvements in operative technique and material, results worsened over time. About 60% of patients without major complications maintained an acceptable EWL (EWL >50%) at 10 years post surgery. Each year added 3 to 5% complication rate, which added to the overall failure rate.

Psychosocial Outcomes

Studies reviewed in this section might have had either a RYGB or an AGB surgery procedure. No literature could be located discussing psychosocial outcomes that differed by type of bariatric surgery. In their review of outcomes of psychosocial functioning, psychopathology, and general quality of life, Herpertz et al. (2003) concluded that mental health and psychosocial status improve for the majority of people after bariatric surgery. Dixon et al. (2003) paired preoperative and 1-year data from 262 patients who completed

questionnaires to predict changes in depression scores with weight loss following bariatric surgery. Study results supported their hypothesis that weight loss predicted depression scores following weight loss surgery. Similarly, Finks et al. (2011) reported results from the Michigan Bariatric Surgery Collaborative. Findings suggest for patients with depression who underwent bariatric surgery, use of antidepressant medication dropped from 70 to 60% 1 year after surgery and remained after 3 years of follow-up.

Predictors of Positive Long -Term Outcome

Obesity is a leading health issue in the United States, and the number of individuals choosing bariatric surgery is increasing (Hood, Corsica, & Azarbad, 2010; Song, Reinhardt, Buzdon, & Liao, 2008). Although some predictors of success after surgery are understood, there are still gaps in our knowledge. Many bariatric surgery programs set a weight loss goal of 50% of a patient's excess body weight (Ray et al., 2003). Researchers continue to study patient attributes that may be predictive of reaching and maintaining this goal. Some health insurance companies require weight loss surgery candidates to attend pre-surgery programs, although it is unknown whether mandated medical weight loss programs before surgery affect pre and postoperative weight loss. Harnisch et al. (2008) performed a retrospective analysis of 1,629 patients undergoing laparoscopic RYGB. At 12 months post surgery, they found no difference in weight loss between patients who had preoperative weight gain and those who did not.

Factors associated with successful weight maintenance may include successful weight loss early on in treatment (Elfhag & Rossner, 2005). Follow-up appointments with the surgeon were found to be predictive of weight loss success following AGB surgery but

not following RYGB (Shen et al., 2004). In a longitudinal cohort study of 216 patients who underwent AGB surgery and 139 patients who underwent RYGB surgery, EWL% was noted as 44.5% and 66.1%, respectively. Additional examination of the data suggested the patients who returned more than six times within the first 12 months of surgery lost significantly more weight than did the patients who returned fewer than six times to see the surgeon in the first year.

Ray et al. (2003) found that patients who fared better at one-year post procedure had greater success with previous dieting. Other research suggests however, no correlation between postoperative weight loss success and the number of past weight loss attempts (Jantz, Larson, Mathiason, Kallies & Kothari, 2009). Increased understanding of variables that are predictive of success post weight loss surgery could improve selection of appropriate candidates and help identify which patients are at higher risk for not doing well with surgical interventions.

Support Groups

Yalom (1975) discussed factors in groups that facilitate change. The same psychosocial forces of installation of hope, universality, advice giving, and imitative behaviors are factors also present in support groups (Hildebrandt, 1998). Studies of patients with health problems other than obesity who attend support groups have suggested positive results (Docherty, 2004). For example, individuals with cardiovascular disease who participated in group sessions had significant improvement in heart functioning as well as positive changes in coronary heart disease (Ornish, 1990). Likewise, patients with breast cancer who participated in support groups survived twice

as long (18 months vs. 9 months) as those who did not attend (Spiegel, Kraemer, Bloom, & Gotthell, 1989). Research suggests that participants in nonsurgical weight loss programs benefit from the social support inherent in support groups (Wing & Jeffrey, 1999).

Support group meetings are assumed to be an integral part of a successful bariatric support program and are, in fact, a required component of bariatric programs striving for or maintaining Bariatric Centers of Excellence (BCOE) designation, as established by The American Society for Metabolic and Bariatric Surgery (Orth et al., 2008). Support groups provide patients with a sense of connection that may help them adhere to weight loss programs and facilitate weight loss (Song et al., 2008), making support group attendance a promising predictor of weight loss. While studies link support group attendance with postoperative weight loss success, limited knowledge exists regarding differing relations by type of weight loss surgery with support group attendance and weight loss.

A review of the literature yielded studies that examined the role support groups play for patients who had bariatric surgery. The studies AGB surgery will be discussed separately from the studies that examine RYGB surgery. Research concerning individuals who underwent laparoscopic RYGB surgery indicate that support groups are useful (Hildebrandt, 1998; Livhits et al., 2010; Orth et al., 2008; Song et al., 2008). Findings from these studies suggest that patients who attended support group meetings lost more weight than did patients who did not attend support group meetings. This was

particularly true 6 months after surgery, when the rate of weight loss begins to naturally decline (Song et al., 2008).

Findings from the literature on support group attendance and AGB surgery suggest that support group attendance as a predictor in postsurgical weight loss is inconclusive. A recent study suggests support group attendance is useful for weight loss success (Kaiser et al., 2011). However, in a primarily Medicaid population undergoing laparoscopic AGB surgery, no significant differences in % EWL were found between patients who attended postoperative support groups and patients who did not (Navie, Samaroo, Saunders, & Parikh, 2009). Conversely, in a similar population, Talarico, Torquati, McCarthy, Bonomo, & Lutfi (2010) found that implementation of a preoperative bariatric support program resulted in significant improvement in the short-term weight loss following AGB surgery. Previously, Jamal et al. (2006) found that mandatory preoperative dietary counseling had no positive effect on weight loss outcomes, with patients actually demonstrating a significantly lower % EWL than those who did not attend mandatory preoperative dietary counseling. The current study will add to the inconclusive literature.

Preoperative Weight Loss

Research that examines weight loss during the preoperative period for patients undergoing bariatric surgery is inconclusive. Some research associates weight loss during the preoperative period with salutatory medical effects and recommend it for patients undergoing bariatric surgery. The large amount of intra-abdominal fat in morbidly obese patients may cause increased difficulty for laparoscopic surgeons. This is

caused in part to a fibrofatty liver, which can bleed easily during the laparoscopic procedure (Fris, 2004). Liu, Sabnis, Forsyth, and Chand (2005) found that acute preoperative weight loss was associated with less intraoperative blood loss. Additionally, placing patients on a very low calorie diet 2 weeks prior to surgery was associated with a highly significant reduction in liver size and intra-abdominal adipose tissue (Fris, 2004). It was also found that preoperative weight loss was correlated with shorter operative times (Alvarado et al., 2005) for the patient undergoing laparoscopic RYGB**,** adding another positive outcome to preoperative weight loss. However, more recent research found that preoperative weight loss did not decrease the operative times for the same weight loss procedure (Riess, Baker, Lambert, Mathiason, & Kothari, 2008).

Furthermore, research on preoperative weight loss and postsurgical weight loss is also inconclusive. Sarwer et al. (2008) found a positive association between a patient's ability to restrict food intake before surgery and the ability to adhere to the rigorous postsurgical diet. Alvarado et al. (2005) also found evidence of association between preoperative weight loss and postoperative weight loss success. Conversely, Reiss et al. (2008) did not find an increase in weight loss at 1 year post surgery in patients who lost weight prior to surgery. Research examining the longer term implications of preoperative weight loss found a positive relationship between preoperative weight loss and sustained weight loss at 3 to 4 years post surgery (Alger-Mayer, Polimeni, & Malone, 2008). A systematic review of studies examining preoperative weight loss and postoperative weight loss suggested preoperative weight loss is associated with greater weight loss postoperatively and may help to identify patients who have greater compliance post surgery (Livhits et

al., 2009). Confusing matters further is a more recent study, which compared 94 patients who were required by their insurance company to participate in a presurgical support group focused on weight loss with 59 patients who were not required by their insurance companies to participate in a presurgical weight loss regimen (Ochner, Puma, Raevuori, Teixeira, & Geliebter, 2010). Findings from that study suggested most patients with pre-surgical weight loss requirements did not fare better postsurgically, and surprisingly, weight gain during the preoperative period was associated with better post surgical weight loss outcomes. A review of studies reveals apparently no identifiable difference that would account for the variation in preoperative weight loss and postsurgery weight loss results.

Requiring presurgery weight loss remains a point of debate among patients, bariatric support programs, surgeons, and third-party payers. On one hand, a patient's inability to lose weight prior to surgery may confirm his or her need for surgical intervention for weight loss. On the other hand, lack of preoperative weight loss or weight gain may put into question the bariatric candidate's readiness for change, motivation for surgery, and ability to sustain weight loss (Alami et al., 2007). Only one study to date examined both patients who had laparoscopic RYGB and those who had AGB surgery, and found no significant difference between the two groups on preoperative weight loss and post-surgical weight change (Ochner et al., 2010). There appears to be a dearth of studies examining the implication of weight loss presurgically for the patient undergoing AGB surgery. The current study purports to add to the existing literature on the patient who has undergone laparoscopic RYGB and examine the impact presurgical weight loss has

on the post surgery weight loss success of the patient who has undergone laparoscopic AGB surgery.

Age of Onset of Obesity

While it is understood that childhood onset of obesity is a risk factor for the development of obesity in adulthood (Bray, 2002; Guo, Chumlea, & Roche, 2002; Whitaker et al., 1997), little is known about the relationship between the age of onset of obesity and the implication for weight loss success post bariatric surgery. In a systematic review of the literature, van Hout et al. (2005) noted that existing research about potential predictors of success after bariatric surgery are not conclusive. A few studies suggested that individuals who became obese before the age of 18 years were likely to lose more weight than those who reported adult onset obesity. In a study by Rowe, Downey, Faust, and Horn (2000) it was found that patients who were obese before age 18 years showed more postoperative weight loss than did patients who became obese in adulthood. Similarly, Horn's (2000) findings suggested childhood onset may be a predictor of weight loss success following bariatric surgery. Other obesity studies found no correlation or did not examine the relationship between age of onset of obesity and postoperative weight loss. Pekkarinen, et al. (1994) found that subjects with adult onset obesity lost significantly more weight post surgery than did the subjects with childhood onset obesity. Crerand et al. (2006) compared weight histories of women with Class III (BMI >40) versus Class I (BMI >30) and Class II (BMI >35) obesity and found that women with extreme obesity (Class III) had a significantly younger age of onset of obesity.

Age of onset of obesity is generally attained through the subject's self reported weight recall. While accuracy of participants' self-reports has been questioned, several groups of researchers (Brunner & Cutter, 1997; Klipstein-Grobusch, Kroke, & Boeing, 1998; Olivarius, Andreasen, & Loken, 1997) studied weight recall and found that participants recalled body weights with satisfactory accuracy. Some studies utilized The Weight and Lifestyle Inventory (WALI) developed by Wadden and Foster (2006). This self-report instrument assesses age of onset of obesity, which was found to be a satisfactory measure of recalled weights (Crerand et al., 2006). For individuals with Class III obesity, the availability of a scale which measures weights over 300 pounds may be unavailable to them, thus putting self-reported weight history into question.

Chapter 3: Hypotheses

The researcher in this study identified predictor variables of postsurgical weight loss success based on previous literature in the field of obesity and surgical intervention in an effort to better identify individuals at risk for poor weight loss success following bariatric surgery. Three individual variables were selected: (1) attendance at support group meetings, (2) age of onset of obesity, and (3) preoperative weight loss. Each variable was correlated with percentage of excess weight loss at 6 months and 12 months post surgery. Excess weight was calculated by subtracting the patient's theoretical normal weight, as listed on the Metropolitan Life Insurance Weight Table (1983), from the patient's presurgical weight. Percentage of excess weight loss (%EWL) was calculated by dividing actual weight loss by total excess weight.

Hypothesis 1

The first hypothesis examined rates of support group attendance and %EWL post bariatric surgery. The researcher hypothesized that higher rates of support group attendance would lead to significantly greater %EWL at 6 and 12 months post bariatric surgery for patients undergoing Roux-en-Y gastric bypass and adjustable gastric band surgeries, as compared to patients with low attendance rates.

Hypothesis 2

The second hypothesis examined the relation between age of onset of obesity and postsurgical weight loss. The researcher hypothesized that individuals with childhood onset of obesity would lose significantly less excess weight at 6 months and 12 months,

as compared to patients with adult onset obesity, following Roux-en-Y gastric bypass and adjustable gastric band surgery.

Hypothesis 3

All subjects in the study were requested to lose 10% of their excess body weight during the preoperative period; however, adherence was variable. The third hypothesis examined the relation between weight loss prior to surgery and postsurgical weight loss at 6 and 12 months. The researcher hypothesized that subjects who lost weight prior to surgery would lose a greater percentage of excess body weight after surgery than patients who did not lose or who gained weight before surgery.

Chapter Four: Methodology

Overview

Given the development of bariatric surgery as an increasingly more commonplace procedure for weight loss and the current differential findings in the literature, it was important to examine further the role support groups play in weight loss success post bariatric surgery. This study investigated the relation between support group attendance and weight loss in patients who underwent Roux-en-Y gastric bypass (RYGB) or laparoscopic adjustable gastric band (ABG) surgeries 6 and 12 months. It also examined the relation between age of onset of obesity and post surgical weight loss; specifically, it was hypothesized that early-onset obesity is more resistant to change than is adult onset obesity. Lastly, the study examined the relation between weight loss immediately prior to weight loss surgery and postsurgery weight loss success.

Design and Design Justification

A retrospective study was conducted using the results of 477 patients who underwent laparoscopic RYGB surgery (63.7%) or laparoscopic AGB surgery (36.3%) at the Virtua Health System from July 2001 to July 2010. Archival data were utilized to assess the relation between percent of excess weight loss (%EWL) at 6 and 12 months post RYGB and AGB surgery and number of bariatric support groups attended; %EWL at 6 and 12 months post RYGB and AGB surgery and age at onset of obesity; and immediate pre-surgery weight loss and %EWL at 6 and 12 months post RYGB and AGB surgery. An archival study facilitates patient anonymity and confidentiality, as a longitudinal design would require following participants by name to report bariatric outcomes. This research

design allowed the examination of data while maintaining the privacy of the participants. The use of archival data eliminated the reliance on subject's self-reported memory, thus ensuring reliability and validity of study data.

Participants

A professionally run bariatric support program within a medical fitness center in southern New Jersey provided archival data of 477 bariatric surgical patients. The existing database included presurgical and follow-up data at 6 and 12 months post bariatric surgery. The bariatric support program served self-paying, mainly middle class, Caucasian and African American individuals who sought medically supervised weight loss. All patients participated in a 3 to 6 month medically supervised presurgery weight loss program run by registered nurses, registered dieticians, and licensed professional counselors. Data were extracted for patients who had either laparoscopic RYGB surgery or laparoscopic AGB surgery from July 2001 through July 2010.

Preoperatively, all patients met with one of two surgeons for an evaluation at the surgeon's office. The surgeon described the bariatric procedure to be performed, discussed the benefits as well as the risks associated with bariatric surgery, explained expected outcomes, and gave the recommendation to lose 5 to10 % of current body weight prior to surgery. Presurgery medical requirements included obtaining a letter of support from the patient's primary care physician, blood tests as ordered, barium swallow to rule out hiatal hernia, nutrition consultation, psychological evaluation, pulmonary clearance (a sleep apnea test was required), cardiology clearance, gastroenterology

clearance including esophagogastroduodenoscopy (EGD) with H. pylori biopsy, and esophageal manometry with letter of support from endocrinologist.

Additional preoperative activities included attendance at a mandatory, 2-hour, group orientation session for education about the bariatric procedures offered, how to prepare for surgery, self-care issues specific to bariatric surgery, and what to expect following surgery. At this orientation and throughout the course of treatment, patients were encouraged to attend bariatric support group meetings. All patients signed a contract committing to smoking cessation, weight loss of 5 to 10% of current body weight, attending two support groups and two nutrition education groups per month prior to surgery, and accepted partial responsibility for their obesity.

Inclusion and Exclusion Criteria

Of the 1,205 participants in the New Beginnings bariatric support program between July 2001 and July 2010, patients who had a body Mass Index (BMI) of 35 or greater and underwent planned laparoscopic RYGB or ABG surgery were considered eligible for this study. Next, only those patients who completed the comprehensive, 6-month post-surgery assessment were included. Of the available 1,205 participants, 39% met the aforementioned criteria, leaving 61% of the participants excluded from the study.

Measures

Data were abstracted from the de-identified medical records; including demographic and medical information and support group attendance. The chart reviews of 304 (63.7%) patients who underwent RYGB and 173 (36.3%) patients who underwent laparoscopic AGB were conducted from a single bariatric support practice, where a

weekly, professionally led support group was offered. The following data were collected: demographic variables (partial list), sex, age at time of surgery, age of onset of obesity, marital status, ethnicity, education, employment status, and psychiatric and medical comorbidities. The age of onset of obesity was self-reported as the age at which the participant was first overweight by 10 pounds or more (Crerand et al., 2006) or the age at which the participant was told she/he had a weight problem. The data were organized into three age categories. Childhood obesity was defined as onset at ages 1-12 years; teenage obesity was defined as onset at ages 13-18 years (Stunkard & Burt, 1967), and adult obesity was defined as onset over18 years. Medical information utilized in this study included %EWL before surgery, %EWL at 6 and 12 months post surgery, and medical comorbidities. Preoperative weight loss was recorded at the time of surgery.

Data were analyzed for clinical outcomes using the Statistical Package for Social Sciences (SPSS) version 20.0. Weight loss and age of onset of obesity were collected by chart review. Support group attendance was documented with attendance sheets at each meeting. Patients were weighed without shoes using *Tanita Body Composition Analyzer 300* electronic scales, and a wall tape measure was used to measure heights.

The dependent variable of interest is %EWL at 6 and 12 months after surgery. The independent variables are the number of support groups attended, preoperative weight loss, and age of onset of obesity.

Licensed professional mental health counselors facilitated the support groups. Both preoperative and postoperative participants attended. The meetings were loosely structured, with participants discussing success stories and challenges associated with changes in behavior, thinking patterns, and lifestyle to support weight loss. Group participation was voluntary. A sample support group agenda is shown in Appendix. A didactic-style nutrition group, led by a registered dietician followed the support group, which presurgery participants were expected to attend.

Procedures

This was an archival study. Following Institutional Review Board approval, data on all patients was collected from the medical records, inclusive of demographic information, body weight before surgery, preoperative weight loss, body weight at 6 and 12 months post surgery, and attendance at support group meetings. Once data were compiled into a database, the patient records were de-identified by the office manager prior to the statistical analysis.

Chapter 5: Results

Demographics and Clinical Characteristics of Study Participants

A total of 477 patients comprised the study population. Of the 477 patients, 304 patients had Roux-en-Y gastric bypass (RYGB) surgery, and 173 patients had laparoscopic adjustable gastric band (AGB) surgery. Demographic characteristics of the total study sample are shown in table 1.

Of the sample (N = 421), 88% reported comorbid diagnoses at intake (see Table 2). Of participants, 52.5% had sleep apnea, 50.4% had hypertension, and 38.3% had hypercholesterolemia. More than 36% reported depression, 31.4% reported gastroesophageal reflux disease (GERD), and 28.3% had diabetes mellitus. Of the sample, 28% reported having osteoarthritis, 27.1% had back/joint pain, and 20% had gallbladder disease. Of the study population, 15% reported carpal tunnel syndrome, 13.1% had thyroid dysfunction, 12.8 % had stress incontinence, 12.6% had asthma, and 12.1% reported anxiety. Two of the health-related characteristics reported by the participants in this study were markedly greater than reported prevalence in the general population. Of the study participants, 15% had carpal tunnel syndrome as compared to approximately 3 to 6% of adults in the general population (LeBlanc & Cestia, 2011), and 12.6% had asthma as compared to 8.2 % of the population in the United States (Akinbami, Moorman, & Liu, 2011).

Table 1

Participant Characteristics		RYGB	AGB
Number of patients studied	477	304	173
Female gender	85.1%	254	152
Male gender	14.9%	50	21
Positive family history of obesity*	86.8%	234	101
Mean age (yrs)	44.4	44.2	44.8
Ethnicity*			
Caucasian	86.9%	226	120
Ethnic	13.1%	45	7
Mean education (yrs)*	14.3		
12 yrs or less	38.4%	81	42
13-16 yrs	45.8%	86	61
17 yrs or more	15.8%	23	28
Employment			
Employed	83.1%	230	120
Unemployed	16.9%	53	18
Relationship status			
Married/partnered	61.3%	170	91
Single	25.3%	75	33
Divorced	10.1%	31	12
Widowed	3.3%	10	4

Note. RYGB = Roux-en-Y gastric bypass surgery; AGB = laparoscopic adjustable gastric band surgery.
*Statistically significant difference based on surgery type

Table 2

Comorbid Conditions

Characteristic	*N*	%
Sleep Apnea	221	52.5
Hypertension	212	50.4
Hypercholesterolemia	161	38.2
Depression	154	36.4
GERD	132	31.4
Diabetes mellitus	119	28.3
Osteoarthritis	118	28.0
Back/joint pain	114	27.1
Gallbladder disease	84	20.0
Carpal tunnel	63	15.0
Thyroid dysfunction	55	13.1
Stress incontinence	54	12.8
Asthma	53	12.6
Anxiety	51	12.1

Note. GERD = gastroesophageal reflux disease

Statistical Analysis

The researcher in this study identified potential variables in weight loss success following bariatric surgery based on clinical observation and previous literature in the field of obesity surgery. Three factors were selected: (a) attendance at bariatric support group meetings, (b) age of onset of obesity, and (c) preoperative weight loss. Subjects were assessed on an outcome measure of percentage of excess weight loss (%EWL) at 6 and 12 months following bariatric surgery.

In order to identify relations between rates of support group attendance and %EWL at 6 and 12 months post bariatric surgery (Hypothesis 1), a 2 x 4 analysis of variance (ANOVA) with a repeated measure on one factor was conducted. Results suggest there was no significant difference between %EWL excess weight and number of support groups attended at 6 months post weight loss surgery $F(3, 413) = 1.996$, $p = .114$. Of the active number of participants at 12 months, results suggest there was a significant difference in %EWL, $F(3, 253) = 4.131$, $p = .007$. To control for multiple comparison error rate (type 1 error), Tukey Honestly Significant Difference (HSD) test was conducted 12 months post surgery. Post-hoc test at 12 months post surgery suggests there was a significant difference between frequent (10 or more) and infrequent (1-4) support group attenders, $p = .037$

Results are shown in Table 3.

Table 3

Support Group Attendance

Support Group Attendance	% EWL 6 mos RYGB	% EWL 6 mos AGB	% EWL 12mos RYGB	% EWL 12mos AGB
Non-attenders	*N* = 11 51.5	*N* = 12 35.2	*N* = 8 63.5	*N* = 7 47.7
Infrequent (1-4)	*N* = 62 53.4	*N* = 34 33.7	*N* = 38 66.9	*N* = 17 35.3
Moderate (5-9)	*N* = 62 53	*N* = 32 33.2	*N* = 41 66.1	*N* = 15 39.5
Frequent (10+)	*N* = 128 55	*N* = 80 38.1	*N* = 98 69.2	*N* = 37 50.8

Note. %EWL = percent excess weight loss; RYGB = Roux-en-Y gastric bypass surgery; *AGB* = laparoscopic adjustable gastric band surgery.

A one-way ANOVA with a repeated measure on one factor was conducted to determine whether there was a significant relation between the age of onset of obesity and postsurgical weight loss (Hypothesis 2). Results suggest there was no significant difference in %EWL across the three age groups at 6 months post weight loss surgery, $F(2, 389) = 1.928$, $p = .15$. Likewise, results suggest there was not a significant difference between the three age groups at 12 months post surgery, $F(2, 254) = 2.604$, $p = .076$. Results are shown in Table 4.

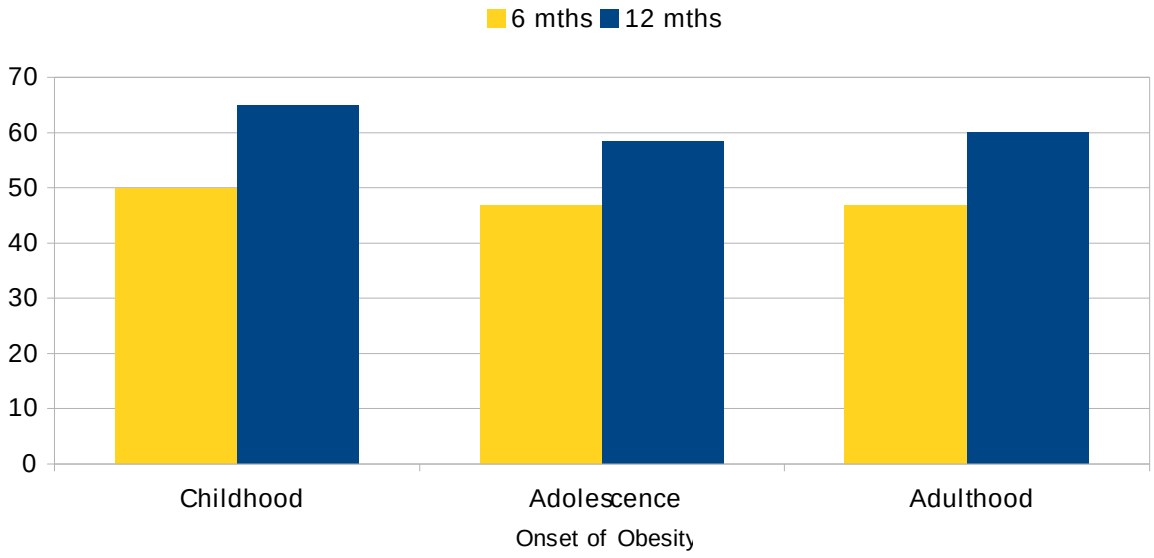
Table 4

Age of Onset of Obesity and %EWL at 6 and 12 months

Age of Onset of Obesity	% EWL at 6 mos post WLS	% EWL at 12 mos post WLS
Childhood	49.9	64.9
Adolescence	46.9	58.4
Adult	46.9	60.1

Note. %EWL = percent excess weight loss; WLS = weight loss surgery.

Figure 1. Age of onset of obesity and mean %EWL following surgery at 6 and 12 months



A 2 x 2 ANOVA with a repeated measure on one factor was conducted in order to identify if there was a significant relation between preoperative weight loss and post-surgical weight loss (Hypothesis 3). Results suggest that the amount of preoperative weight loss had no relation to weight loss at 6 months post bariatric surgery, $F(1, 300) = 2.541$, $p = .112$. Likewise, results suggest that the amount of preoperative weight loss had no relation to weight loss at 12 months post surgery, $F(1, 174) = .106$, $p = .745$. Preoperative weight status was available for 319 participants (66% of the sample population.) Near equal numbers of subjects gained or lost weight prior to surgery; 32% of the sample lost weight prior to surgery, and 34% stayed the same or gained weight prior to surgery. Results are shown in Table 5.

Table 5

Preoperative Weight Loss for Both Surgeries Combined

	Frequency	Percent	Cumulative Percent
Valid	158	33.1	33.1
Pre-op weight loss	158	32.7	65.8
No pre-op weight loss	163	34.2	100.0

Greater weight loss was observed at both postoperative time periods for individuals who had RYGB surgery than for those who had AGB surgery. Results are shown in Table 6.

Table 6

Percent Excess Weight Loss by Surgery Type

Percent excess weight loss	6 months post surgery	12 months post surgery
AGB Surgery	36.3	45.7
RYGB Surgery	55.7	70.5

Note. AGB = laparoscopic adjustable gastric band surgery; RYGB = Roux-en-Y gastric bypass surgery.

Chapter 6: Discussion

Summary of Findings

Bariatric surgery has become a highly effective intervention for moderate to extreme obesity and has proved to reduce some of the serious health and psychosocial consequences associated with it. Unfortunately, studies reveal some patients undergoing bariatric surgery are less successful than others, and reasons for the disparity in weight loss continue to be studied. Identifying patient characteristics that may help discover who will be at risk for poor outcomes is important.

This study examined three predictor variables of postsurgical weight loss success based on previous literature in the field of obesity and surgical intervention in an effort to better identify individuals at risk for poor weight loss success following bariatric surgery. Three individual variables were selected: (a) attendance at support group meetings, (b) age of onset of obesity, and (c) preoperative weight loss. Each variable was examined with percentage of excess weight loss at 6 and 12 months post surgery.

Findings suggest attendance at support group meetings did not predict weight loss for either type of bariatric surgery at 6 months postoperatively. Study participants who had Roux-en-Y gastric bypass (RYGB) surgery lost 55.7 % EWL and participants who had adjustable gastric band (AGB) surgery lost 36.3 % EWL at 6 months. No significant differences in EWL were observed with regard to support group attendance. At 12 months post surgery, however, a relationship between number of support group sessions attended and weight loss was noted. There was a statistically significant difference between frequent attenders (10 or more sessions) and infrequent attenders (1 - 4

sessions). Patients who attended 10 or more support group meetings had an average of 60% EWL at 12 months compared with 51.4% EWL in patients who attended 1 to 4 support group meetings. This finding may reflect the benefit of the support group's focus on the cognitive, behavioral, and lifestyle changes and the skills necessary for initiating and maintaining weight loss during the postoperative year. Social support inherent in the group may also have helped patients who were frequent attenders to achieve more weight loss than patients who attended fewer support groups. Given that patients who have bariatric surgery report increased energy intake at or around 12 months postoperatively (Shaw, Simha, & Garg, 2006), support group attendance may serve an important role in weight loss success, particularly at 12 months post surgery.

While there was a statistically significant difference between frequent support group attenders and infrequent attenders, the group of nonattenders in this sample population did not differ significantly from participants who attended support group meetings. This finding suggests there may be other participant characteristics that affect overall weight loss, such as self-reported exercise and social supports, which were not considered for this study.

There was a significant difference in weight loss by surgery type at 12 months post surgery. This is likely the result of differences in physiological effects of the procedures. The AGB procedure (45.7% EWL) is a purely restrictive bariatric surgery, limiting amount of food intake by reducing the size of the stomach. RYGB surgery (70.5% EWL) combines limiting the amount of food intake by reducing the size of the stomach and by creating malabsorption of nutrients in the intestinal tract by bypassing a portion of the

small intestine (Johns Hopkins Medicine, 2012), rendering RYGB surgery a more robust procedure. The dual processes of malabsorption of nutrients and food restriction lead to more rapid weight loss within the first 12 months following weight loss surgery.

It was expected that significant differences in EWL would be found relative to age of onset of obesity, based on clinical observation by the researcher. Statistical analysis revealed, however, that the age of onset of obesity and postsurgical weight loss were not related for the participants in this study. This lack of correlation is very good news in that onset of obesity is not generally in the control of children and adolescents. While there are a number of psychosocial predictors of postsurgical weight loss success and failure, weight management clinicians do not need to view age of onset of obesity as a risk factor for poor weight loss outcomes.

All subjects in the study were requested to lose 10% of their excess body weight during the preoperative period; however adherence was variable. While it was expected that participants who lost weight prior to surgery would have greater weight loss success postoperatively, with the assumption that such preoperative weight loss reflected participants' motivation and readiness to change (Prochaska & DiClemente, 1982), this was not found. Approximately half the participants in this study lost weight prior to surgery, and half maintained or gained weight in the weeks before surgery. There was no significant difference between the two groups; both did equally well at 6 and 12 months following surgery. These results add to the emerging literature showing that lack of preoperative weight loss does not impede postoperative weight loss success (Becouarn, Topart, & Ritz, 2010; Brethauer, 2011; Carlin et al., 2008).

The importance of providing objective information about requiring preoperative weight loss for patients seeking bariatric surgery is great, as such a requirement may serve as a barrier to needed treatment. Medicare requires a period of preoperative dietary treatment for severe obesity before a patient is approved for bariatric surgery (Centers for Medicare and Medicaid Services, 2012). Likewise, many health insurers require 6 months or more of documentation of diet attempts before authorization is granted for provision of bariatric surgery services (American Society for Metabolic & Bariatric Surgery, 2012). Given the variable and often poor outcomes of dieting, as previously discussed in this study, such requirements could penalize patients who do not lose weight preoperatively and ignore the presence of potentially life-threatening comorbid health conditions that bariatric surgery can ameliorate. Preoperative weight loss that is recommended by the bariatric surgeon and/or multidisciplinary bariatric treatment team in response to individual patient's needs may have value for the purposes of reducing surgical risk or evaluating patient postsurgical diet and lifestyle adherence, but such recommendations should not be an insurance-mandated requirement.

Limitations and Strengths of the Current Study

This study has limitations. This retrospective study used a nonexperimental research design, and results should be interpreted with caution. External validity may be limited to mainly middle class, suburban obese women. Male bariatric patients are underrepresented in this study, as they are in the bariatric literature in general. Of this study's population, 83% were employed at the preoperative intake period, which may have been an unexamined factor in postoperative weight loss, as positive socioeconomic

status has previously been noted to be a predictor of postoperative weight loss success (Sarwer et al., 2005).

Another study limitation is the validity of the age of onset of obesity. While literature discusses the acceptability of self-reported age of onset of obesity, patient self-report could be strengthened by obtaining collateral information from family members and healthcare records at the time of the initial presurgical evaluation.

In this group of patients, greater weight loss was observed in patients who attended support group meetings more frequently. While these findings may be suggestive of the power inherent in support groups in general (sense of community, hope, and other factors discussed earlier in this study) or of factors specific to the population studied, individual weigh-ins may be an overlooked factor in this study. Patients in this study were routinely weighed prior to or immediately following support group meetings. Weight-taking provides accountability, close contact with the clinician obtaining the weight, and immediate reinforcement for the patient; factors that may have confounded the relationship between support group meeting attendance and weight loss, as support group occurred simultaneously for the participants in this study. Future studies would benefit from examining the relation and frequency of pre - and postoperative weigh-ins separately from support group attendance.

The time frame of postoperative study is another important issue and limitation of this study. This study focused on variables predictive of weight loss at 6 and 12 months post surgery. The American Society of Bariatric Surgeons recommends a 5-year follow-up for postoperative studies (American Society for Bariatric Surgery, 2000) and further

suggests results fewer than 2years be considered "preliminary" and that studies with outcomes from 2 to 5 years be considered "intermediate." Studies that examine weight loss following bariatric surgery up to 5 years postoperatively are not always realistic but underscore the importance of understanding what longer term follow-up looks like for the bariatric patient. Researchers, and ultimately clinicians and patients would benefit from studying individuals 10 to 15 years after bariatric surgery to better understand the life-long weight management needs of the obese individual.

This study has a number of key strengths, and results of this study may have important implications for practitioners who treat patients with obesity. The sample size of this study is large, reflecting a vibrant bariatric program and allowing for cautious generalizations of the findings. Since self-reported weights in individuals with obesity are typically under-reported (Compher, Hanlon, Kang, Elkin, & Williams, 2012), the use of measured weights is a clear strength of this study. There was a dearth of research for two of the predictor variables examined: age of onset of obesity and preoperative weight loss. While understanding what may predict weight loss success is important, it is just as essential to understand factors that do not put patients at risk for poor outcomes. Age of onset of obesity and preoperative weight loss status were not risk factors for poor outcomes in this study population.

Conclusion

The present research study adds the following to the body of literature on weight loss success after bariatric surgery: (a) support group attendance may be an important factor in postoperative weight loss, (b) age of onset of obesity does not have an important

relation to postoperative weight loss success, and (c) while preoperative weight loss may have clear advantages for surgical outcomes (Alvarado et al., 2005; Fris, 2004), it should not be a mandatory preoperative weight loss requirement but, instead, a recommendation by the bariatric treatment team based on individual patient needs.

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Appendix

New Beginnings Bariatric Support Group
Date
Facilitator: Francine Broder, M.S., M.Ed.

Welcome!

Group Expectations: Confidentiality

News and Announcements:

- *Walk From Obesity*
- *Clothing Exchange*

Review from last week:

Make the healthy choice, the easy choice: setting your environment up for success

Tonight's Topic:

*Navigating through food landmines**

- *Recognizing environmental triggers*
- *Recognizing cognitive (thoughts) triggers*
- *Recognizing emotional triggers (feelings can be triggers too)*
- *200 pleasurable things to do instead of eating**

Next week's topic:

Self-compassion

"You, yourself, as much as anybody in the universe, deserve your love and affection."
-Buddha

Have a wonderful and healthy week!

**Exodus From Obesity: The Guide to Long-term Success After Weight Loss Surgery*
Paula F. Peck, RN