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Psychosocial Predictors of Successful Bariatric Surgery

Rodney D. Grim
Walden University

Walden University

College of Social and Behavioral Sciences

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Rodney Grim

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Review Committee
Dr. Martha Giles, Committee Chairperson, Psychology Faculty
Dr. Cameron John, Committee Member, Psychology Faculty
Dr. Jesus Tanguma, University Reviewer, Psychology Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

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Rodney D. Grim

MA, Radford University, 2003

BS, York College of Pennsylvania, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Obesity is an epidemic that can lead to a wide range of physical and mental problems. When traditional weight-loss methods are not effective, bariatric surgery is a viable weight-loss option. While previous researchers have investigated the role of psychological factors in relation to obesity, few have investigated psychological factors as predictors of weight loss and complications after bariatric surgery. The purpose of this study was to determine the prevalence of psychological disorders/conditions (e.g., depression and abuse) in the study population, evaluate weight and psychosocial variables before and 6 months after weight-loss surgery, and identify psychosocial factors that are predictors of weight loss and complications at 5 years post surgery. Three theoretical foundations were important to the present study: the transtheoretical model of behavior change, interpersonal processes, and protection motivation theory. Methods included a retrospective review of archival data of 93 individuals who elected to undergo bariatric surgery, were age 18+, had a BMI > 40kg/m^2, and had obesity-related medical conditions Paired sample *t* tests were used to determine statistically significant changes before and after surgery. Multiple regression was used to predict success of bariatric surgery (measured by weight loss and no or few postsurgical complications). Results indicated that a high proportion (66.7%) of this sample had a behavioral health condition. Weight, depression, and obesity-related quality of life improved at 6 months post surgery. Poor obesity-related quality of life was significant at predicting more weight loss at 5 years postsurgery. Potential social changes may include future development of generalizable methods/tools to determine proper candidates for bariatric surgery, leading to a healthier community and lower healthcare costs.

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Dedication

This dissertation is dedicated to Dakota, Darcy, Sheena, and Clara Grim.

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Chapter 1: Introduction to the Study

Introduction

"To win, we have to lose" is the tag line from an HBO Documentary entitled *Weight of the Nation* (Hoffman & Chaykin, 2012). The premise of this documentary is that America has much to gain, such as better health, overall improvement of quality of life, and decreased medical costs, by losing excess weight. *Weight of the Nation* uncovers facts, such as in the United States, over 63% of people are overweight or obese. Type II diabetes is largely caused by obesity and, between 1987 and the present, the number of Americans diagnosed with diabetes almost tripled to 20.9 million with obese people also being 83% more likely to develop kidney disease compared to normal-weight people (Hoffman & Chaykin, 2012).

Obesity costs the American workforce an estimated $73.1 billion per year. Overall, obesity has been observed to have a relationship with many comorbidities and has a detrimental impact on physical health (Eliassen, Colditz, & Rosner, 2006; Mendis, 2010; Ogden, Carroll, Kit, & Flegal, 2012; Pischon, Nothlings, & Boeing, 2008; Wolin, Carson, & Colditz, 2010), mental health (Greenberg, Perna, Kaplan, & Sullivan, 2005; Kinder, Walfish,Young, & Fairweather, 2008; Sanderson, Patton, McKercher, Dwyer, & Venn 2011; Sarwer, Wadden, & Fabricatore, 2005), and overall quality of life (Han, Tijhuis, Lean, & Seidel, 1998; Mathias et al., 1997). Given the fact that obesity negatively impacts many aspects of life, the epidemiology of obesity and potential methods to reduce obesity have become important topics of study (Ogden et al., 2012).

Traditional nonsurgical and surgical approaches to weight loss have become a topic of debate (Hager, 2007). Traditional weight-loss methods have included diet, exercise, and diet pills. These traditional weight-loss methods have shown limited long-term effectiveness for those with moderate to severe obesity. While traditional weight-loss approaches using diet and exercise work for some, those with chronic obesity are less likely to have long-term success with this approach (Buchwald et al., 2004; Karmali et al., 2010; Kendrick & Dakin, 2006; Steinbrook, 2004).

For the people who do not respond to traditional weight-loss approaches, the most successful treatment is bariatric surgery such as the Roux-en-Y procedure (Hagar, 2007; Woodward, 2003). While surgical management of obesity is becoming recognized as the most effective treatment of obesity and associated comorbidities, it is not without its own complexities and complications (Schernthaner & Morton, 2008; van Gement, Severeijns, Greve, Groenman, & Soeters, 1998). For weight-loss surgery to be successful and yield long-term sustained weight loss, and to avoid complications with the surgery, the bariatric surgery patient must make a lifelong commitment to a new lifestyle (Peacock & Zizzi, 2011; Woodward, 2003). Surgery for obesity is not just a passive procedure simply done to the patient. The patient must make significant dietary and physical changes after the surgery.

To increase the chances of a sustained lifestyle change, a multidisciplinary healthcare approach must be implemented (Collazao-Clavell, Clark, McAlpine, & Jensen, 2006; Owers, Abbas, Ackroyd, Barron, & Khan, 2012). Emerging as one of the most important members of this multidisciplinary healthcare team is the behavioral health

specialist, who can support and facilitate the importance of social support and caring relationships. Assessment of the bariatric surgery candidate by a behavioral health specialist is becoming standard, and has been put in place to make sure there are no psychological issues that could impede the success of surgery (Garza, 2003). For example, individuals with schizophrenia (Coallazo-Clavell, Clark, McAlpine, & Jensen et al., 2006), drug and alcohol abuse, severe mental retardation, or an inability to understand all aspects of the surgery are typically eliminated as bariatric surgery candidates (Bauchowitz, Gonder-Frederick, & Olbrish, 2005, as cited in Sockalingham, Hawa, Wnuk, Strimas, & Kennedy, 2011). However, not all characteristics are as straightforward, and research shows, with mixed results, that psychological variables are associated with bariatric surgery outcomes (Livhits et al., 2012). As research continues to support the contention that obesity is a problem associated with physical, social, and psychological issues that result in a degraded quality of life, it is important to evaluate predictors of successful weight loss (Ogden et al., 2012).

A new lifestyle requires change. Prochaska, Norcross, and DiClemente (1982) interviewed thousands of people who experienced change and found that there were five main themes. To this end, Prochaska et al. (1982) developed the Five Stages of Change (Figure 1). The Five Stages of Change consist of precontemplation, contemplation, preparation, action, and maintenance. The action and maintenance stage rely heavily on social support and caring relationships.

Stage of Change	Characteristics	Techniques
Pre-contemplation	Not currently considering change: "Ignorance is bliss"	Validate lack of readiness Clarify: decision is theirs Encourage re-evaluation of current behavior Encourage self-exploration, not action Explain and personalize the risk
Contemplation	Ambivalent about change: "Sitting on the fence" Not considering change within the next month	Validate lack of readiness Clarify: decision is theirs Encourage evaluation of pros and cons of behavior change Identify and promote new, positive outcome expectations
Preparation	Some experience with change and are trying to change: "Testing the waters" Planning to act within 1month	Identify and assist in problem solving re: obstacles Help patient identify social support Verify that patient has underlying skills for behavior change Encourage small initial steps
Action	Practicing new behavior for 3-6 months	Focus on restructuring cues and social support Bolster self-efficacy for dealing with obstacles Combat feelings of loss and reiterate long-term benefits
Maintenance	Continued commitment to sustaining new behavior Post-6 months to 5 years	Plan for follow-up support Reinforce internal rewards Discuss coping with relapse
Relapse	Resumption of old behaviors: "Fall from grace"	Evaluate trigger for relapse Reassess motivation and barriers Plan stronger coping strategies

Figure 1. Prochaska and DiClemente's stages of change model. From "Stages of Change," by J. Prochaska and J. Norcross, 2001, *Psychotherapy, 38*(4), 443-448. Reprinted with permission.

Background of the Problem

Using data collected between 1970 and 2004, Wang, Beydoun, Liang, Caballero, and Kumanyika (2008) conducted a projection study. Statistically speaking, this study illustrated that if current trends continue, 86.3% of adults could be overweight and 51.1%

of adults could be obese by 2030. Projections also contended that African American women (96.9%) and Mexican-American men (91.1%) could be the most affected. While in reality not all individuals will be obese, the statistical projections indicated that by 2048, all American adults could become overweight or obese. As a result, total healthcare costs attributable to overweight/obesity would nearly double every decade to $860.7-$956.9 billion U.S. dollars by the year 2030. This value would account for approximately 17% of total U.S. healthcare costs. To this end, "timely, dramatic, and effective development and implementation of corrective programs/policies are needed to avoid the otherwise inevitable health and societal consequences implied by [these] projections" (Wang et al., 2008, p. 2323).

Many nonsurgical weight-loss programs and treatments exist, such as medications, lifestyle changes, psychotherapeutic techniques, acupuncture, hypnosis, and nutrition programs; however, very few can match the effectiveness that bariatric surgery has on long-term weight loss and the resolution of obesity-related comorbidities (Hagar, 2007). While bariatric surgery has become a relatively safe and effective approach to weight loss (Brolin, 2002; Peacock & Zizzi, 2011; Woodward, 2003), it is not without risk. It is a serious surgery. Some people do not lose weight, have major complications, experience new stressors in their life, and/or sometimes die from the surgery (Ballantyne, 2003; Bocchieri, Meana, & Fisher, 2002; Buchwald et al., 2004; Ray, Nickels, Sayeed, & Sax, 2003). For these reasons, it is important to assess who are "good" and "poor" candidates for this surgery.

Empirical researchers have found some psychosocial variables are often associated with bariatric surgery outcomes; however, the research has not uncovered any consistently reliable psychosocial predictors of successful bariatric surgery (van Hout, Verschure, & van Heck, 2005). While some variables, such as social support (Sockalingham et al., 2011), have been investigated as predictors of bariatric surgery outcomes, and variables like quality of life have been investigated before and after surgery, more specific versions of these variables have not (e.g., healthy family function and obesity-related quality of life; Beavers, 1977; Butler et al., 1999, respectively), which presents a gap in the literature. To this end, it is important to determine who should and should not have this surgical procedure. It would be beneficial if healthcare professionals could predict which patients will do well and which patients will have complications or fail to lose weight with bariatric surgery (Frank, 2006).

Statement of the Problem

The research problems addressed in this study are obesity, psychosocial variables, and weight-loss surgery. Obesity can negatively impact many aspects of a person's life (e.g., overall health, mental health, quality of life) and society as a whole due to increased medical costs and less productivity at work (Han et al., 1998; Ogden et al., 2012; Sanderson et al., 2011). There are many nonsurgical weight-loss strategies, including diet and exercise, but for those who are obese, many of these are not effective in the long run (Buchwald, et al., 2004; Hartmann, personal communication, November 21, 2012; Karmali et al., 2010; Kendrick & Dakin, 2006; Steinbrook, 2004). When an individual has tried nonsurgical strategies and cannot achieve weight loss, surgical weight-loss

procedures, such as Roux-en-Y, are an option. Surgical weight-loss procedures are considered to be among the most effective weight-loss procedures, and outcomes are typically positive (Buchwald et al., 2004; Karmali et al., 2010; Kendrick & Dakin, 2006; Steinbrook, 2004). Surgical weight-loss procedures are associated not only with weight reduction, but also decreases in general health problems, mental health issues, increases in quality of life, improved performance at work, and less time off work (Hartmann, personal communication, November 21, 2012).

However, despite the benefits that surgical weight-loss procedures can achieve, the process is not without risks, and outcomes can be negative (Hartmann, personal communication, November 21, 2012; Pories, 2008). A patient may go through bariatric surgery and not lose weight, or he or she could experience complications. Risks associated with weight-loss procedures range from busted stitches, gastrointestinal leaks, pulmonary embolism, respiratory failure, obstructions, internal and external bleeding, to death (Pories, 2008; Steinbrook, 2004). There are known physical/medical predictors of outcomes, especially complications. These physical/medical predictors of complications mainly relate to comorbidities (Steinbrook, 2004), for example, a prior history of deep venous thrombosis (DVT), which increases risks of postoperative DVT. While these causes of complications will not be the focus of this study, it is important to acknowledge them (Hartmann, personal communication, November 21, 2012). However, there are psychosocial predictors of surgery outcomes (Livhits et al., 2012), and determining which psychosical predictors lead to positive or negative surgery outcomes will be one of the objectives of this study.

Based on the previous research and associated gaps in the literature, the following question arises: Are there psychosocial variables that can predict the outcome of bariatric surgery? Evidence exists that suggests that there is consensus that the problem is current, relevant, and significant to the discipline (Livhits, et al., 2012; Ray et al., 2003; Sockalingham et al., 2011; van Hout et al., 2005). Assessment of the literature indicates that research investigating psychosocial predictors of bariatric surgery started becoming more prevalent in the early 2000s, and has since maintained its importance for healthcare providers and researchers. Livhits et al. (2012) found 1,007 research articles that used preoperative factors to predict bariatric surgery success or failure. Researchers who conducted a literature review evaluating psychosocial variables and their relationship to postsurgical weight loss over the last 10 years found that the literature evaluating psychosocial variables as predictors of weight loss is conflicting and represents a dissent in the literature (Sockalingham et al., 2011).

While many psychosocial variables have been evaluated as predictors of successful bariatric surgery, family functioning has not. To this end, a specific question in the present research study has to do with the role of family functioning (e.g., husband and wife, sibling and sibling, and parents and children) as one type of psychosocial variable that may predict successful bariatric surgery. Assessing family functioning as a predictor of outcomes is novel. If certain psychosocial variables can be identified as predictors of bariatric surgery outcomes, behavioral health specialists may be able to develop practical methods to evaluate bariatric surgery patients rather than using pure theory (Hartmann, personal communication, November 21, 2012).

Purpose of the Study

The purpose of this quantitative study is threefold: (a) To determine the prevalence of certain psychological disorders (e.g., depression, bipolar, anxiety disorder, eating disorder, personality disorder, attention deficit hyperactivity disorder (ADHD) or attention deficit disorder (ADD), schizophrenia, drug and alcohol addiction, and sexual, verbal/emotional, or physical abuse) in the study population; (b) To evaluate weight and psychosocial variables (i.e., depression, family functioning, and obesity-related quality of life) before and after weight-loss surgery (i.e., the Roux-en-Y procedure); and (c) To identify psychosocial factors that are predictors of weight loss and complications after Roux-en-Y bariatric surgery. In terms of prediction, the primary purpose of this research is to explore whether certain tested psychosocial variables (e.g., depression; Averbukh et al., 2003; Clark et al., 2003; Livhits et al., 2012; Ray et al., 2003; Sockalingham et al., 2011; van Hout et al., 2005) and untested psychosocial variables (i.e., healthy family functioning, obesity-related quality of life) are predictive of bariatric surgery patients' ability to lose and maintain weight loss, and avoid noncompliance complications following Roux-en-Y bypass surgery. The independent variables are psychosocial variables (i.e., depression, obesity-related quality of life, healthy family functioning) and the dependent variables are weight and complications.

Research Questions and Hypotheses

The present study was designed to evaluate the prevalence of psychological disorders in a sample of bariatric surgery patients, to evaluate psychosocial variables before and after bariatric surgery, and to identify any significant psychosocial predictors

of weight loss and complications up to five years after surgery. The study's research questions and hypotheses are as follows:

Research Question and Hypothesis 1

Is there a high prevalence of at least one psychological disorder/issue in the study's sample of bariatric surgery candidates? Psychological issues include a diagnosis of: depression, bipolar disorder, anxiety disorder, eating disorder, personality disorder, ADHD, schizophrenia, addiction, and sexual, physical or verbal abuse. Addressing this question will utilize descriptive statistics by determining the percentage of the sample that has one or more psychological disorders.

H_{O1}. There is not a high prevalence of psychological disorders/issues in a sample of bariatric surgery candidates compared to the general population. Published studies report that about 25% of all U.S. adults have a mental illness and that nearly 50% of U.S. adults will develop at least one mental illness during their lifetime (Center for Disease Control [CDC], 2011b).

H_{A1}. There is a high prevalence of psychological issues in a sample of bariatric surgery candidates compared to the general population.

Research Question and Hypothesis 2

Do weight and scores of depression, obesity-related quality of life, and family function change after bariatric surgery?

H_{O2}. Weight and scores of depression, obesity-related quality of life, and family function do not change at six months after bariatric surgery.

H_{A2}. At 6 months, weight and scores of depression, obesity-related quality of life, and family function change in a positive way after bariatric surgery.

Research Question and Hypothesis 3

Can depression, obesity-related quality of life, and family functioning (independent variables) predict successful bariatric surgery, as defined by weight loss and absence of complications (dependent variables)? Secondarily, can other putative psychosocial factors, such as history of sexual abuse or having an eating disorder, predict outcomes of surgery?

H_{O3}. Depression, obesity-related quality of life, and family functioning are not statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

H_{A3}. Depression, obesity-related quality of life, and family functioning are statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

Theoretical Foundation

The overall theories that ground this study have to do with psychological variables that affect physical health and health-related behaviors, especially compliance with treatment. There are three theoretical foundations that are important to the present study: (a) the Transtheoretical Model (TTM) of behavior change (Prochaska et al., 1994a; Prochaska & Norcross, 1982, 2001; Ruggiero & Prochaska, 1993); (b) interpersonal processes (Andrews, 1996; Sherif, 1936); and (c) protection motivation theory (Cialdini & Trost, 1998).

Change is paramount for any kind of weight loss (Prochaska & DiClemente, 1982). If a bariatric surgery patient is not willing or able to make lifelong commitments to lifestyle changes, the surgery may be a failure via unsustained or no weight loss, and postsurgical complications (Woodward, 2003). Social support is important for overall wellbeing and successful change. In essence, one could think about it as determining people who have healthy social support at the familial level and/or are able to make the changes necessary for successful weight loss and limit complications.

Several researchers (Prochaska & DiClemente, 1982; Prochaska & Norcross, 2001; Prochaska, Norcross, & DiClemente, 1994a; Ruggiero & Prochaska, 1993) developed one of the most dominant theoretical models for change, which is the main theoretical base for the present study. Their model is called the Transtheoretical Model (TTM), but is often referred to as stages of change (Armitage, 2009). TTM focuses on a person's readiness to act on a new behavior, and then acting on the new behavior and maintaining it. When a person is in the readiness stage, they are considered to be precontemplating, contemplating, and planning. Overall, TTM consist of five stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1994a). TTM is generalizable across a multitude of behaviors, including diet, exercise, smoking, drug use, adolescent delinquency, safe sex, and sunscreen use (Prochaska et al., 1994b).

The precontemplation stage is when others around a person are aware of an issue, but the individual is not aware. At this stage a person may say something like, "As far as I'm concerned, I don't have any problems that need changing" (Prochaska & Norcross,

2001, p. 443). In the contemplation stage, the individual becomes aware a problem exists, but there is no commitment. In this stage, a person might think things like, “I have a problem and I really think I should work on it.” From here, the person enters the preparation stage and gets ready to change by setting goals and taking baby steps towards their goal. In the action stage, they modify their behavior on a daily basis and commit time and energy. They are working hard to change. In the maintenance stage, a person continues with the modified behavior and tries to prevent relapse. In the action and maintenance stage, fostering social support and caring relationships is very important (Prochaska & Norcross, 2001).

Endorsing the importance of social support for change, Andrews (1996) offered a theoretical framework for the postsurgical treatment of bariatric patients that can help the patient succeed. Andrews (1996) contends that it is imperative that psychologists use interpersonal processes to get patients to engage in long-term multidisciplinary support. Her theory emphasizes that people interact with others on a daily basis, almost repetitively, to develop a sense of self and personality as well as adapting to the many aspects of social interactions. The culmination of these developments leads to appropriate intimate connections with others as well as appropriate boundaries, which can lead to trust in human encounters (Andrews, 1996).

Compliance is a key factor for the change necessary to have successful bariatric surgery. Boeka, Prentice-Dunn, and Lokken (2010) studied the relationship between psychosocial variables before surgery and compliance with postsurgical instructions. Results indicated that having high self-efficacy and perceiving that something threatening

could happen if postsurgical instructions were not followed was associated with compliance after surgery. The theoretical framework for perceiving that something threatening could happen if postsurgical instructions were not followed comes from protection motivation theory (Prentice-Dunn & Rogers, 1986; Rogers & Prentice Dunn, 1997, as cited in Boeka et al., 2010). This is similar to Sherif's (1936) and Cialdini and Frost's (1998) theory that people are motivated to act in ways that help them achieve their goals and will therefore comply with recommendations that promote their survival.

Similar to social support being important for change, family functioning can also be considered important for change. Samuel-Hodge et al. (2010) found that there was a gap in the literature assessing relationships between family interpersonal factors and change or, more specifically, a change for weight loss. With the majority of research dedicated to successful weight loss in families who diet together, Samuel-Hodge et al. (2010) investigated the association between family functioning and weight loss. Their results indicate that family functioning does influence weight loss. The results indicated that scores related to family cohesion (togetherness, asking each other for help, feelings of closeness, valuing family) were associated with more weight loss.

Beavers and Hamspon (2000) offered a widely accepted theoretical foundation for family functioning. Their model is known as the Beavers Systems Model (BSM) and assesses the competence and style of families. Once a family's competence and style are evaluated, the health of the family's functioning can be assessed, which ranges from optimal to severely dysfunctional. A comprehensive review of the literature uncovered no articles that investigated direct links between the BSM and weight loss. This supports

Samuel-Hodge et al.'s (2010) contention that there is a gap in the literature assessing relationships between social support/family factors and change related to weight loss. It also supports that looking at family function as a predictor of weight loss after bariatric surgery is novel.

This paper attempted to offer logical connections among key elements of the framework, with a more thorough explanation in Chapter 2. Management of obesity has become both a clinical and research problem that needs to be addressed. It is important that we find ways to achieve weight loss and to maintain weight loss for those who suffer from obesity (Perri, McAllister, Gange, Jordan, McAdoo, & Nezu, 1988). Many nonsurgical weight-loss programs and treatments exist, but for the morbidly obese, very few can match the long-term weight loss and resolution of obesity-related comorbidities of bariatric surgery (Hagar, 2007).

This surgery is not without risks, and adherence to postsurgical lifestyle changes is essential for sustained weight loss and reduction of potentially harmful complications (Butler et al., 1999). To this end, not everyone makes a good bariatric surgery candidate. As the behavioral health specialist is becoming a mandatory and important part of the screening process, it is important to determine if there are psychosocial variables that can predict the outcome of bariatric surgery.

While it is important to simply determine psychosocial predictors of bariatric surgery outcomes, it is also important to keep in mind that no weight loss can take place without change. This concept is especially true for the bariatric patient who must make lifelong commitments to lifestyle changes (Woodward, 2003). One of the most important

aspects of change is social support (Prochaska et al., 1994a). Therefore, it is reasonable to contend that those with healthier family functioning have the tools needed for the change necessary to have successful bariatric surgery.

Scope of the Study

This study was confined to a convenience sample of adult male and female participants who were patients of a Community Teaching Hospital's Clinical Weight-Loss Center and underwent standard Roux-en-Y gastric bypass surgery. Baseline data are derived from a questionnaire packet. The packet included a Gastric Bypass Surgery Questionnaire, Beck Depression Inventory-II, Self-Report Family Instrument, and Obesity Adjustment Survey.

The Gastric Bypass Questionnaire assesses demographic characteristics, diet history, mental health history, and expectations of surgery. The Beck Depression Inventory-II measures levels of depression from none to severe (Beck, 1979; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The Self-Report Family Instrument measures perceptions of family members about their families' competence and style, ranging from healthy to unhealthy (Beavers & Hampson, 2000; Beavers, Hampson, & Hulgus, 1990; Halvorsen, 1991). The Obesity-Adjustment Survey gauges how obesity impacts a person's quality of life and includes things like physical intimacy and daily physical activities (Butler et al., 1999). Completed surveys were mailed via inner-office mail to the Community Teaching Hospital's Research Department and entered into IBM Statistical Package for the Social Sciences (SPSS, Version 21; Armonk, NY). Excluding the Gastric Bypass Questionnaire, data from this questionnaire packet also existed at six months

postsurgery. Weight and complication data were assessed through retrospective review of electronic health records, deidentified, and forwarded to the researcher. The resultant convenience sample was analyzed by the researcher and did not include any identifiable information.

The rationale for the selection of the study design was based on determining prevalence of psychological issues in a sample of bariatric patients (descriptive statistics), determining weight and psychological variables before and after surgery (paired-sample *t* test), and using psychosocial variables as predictors of weight loss and complications (multiple linear regression). These methods were used in previous studies with the primary purpose of investigating psychosocial predictors of bariatric surgery outcomes (Averbukh et al., 2003; Clark, et al., 2003; Livhits et al., 2012; Ray et al., 2003; Sockalingham, Hawa, Wnuk, Strimas, & Kennedy, 2011; van Hout et al., 2005).

A paired-sample *t* test is used when data are collected on the same individual at two points in time; data are obtained by repeating the measurement on the same individual. The mean difference between the pre- and postscores is given and the corresponding p-value is used to determine if the difference between these two means is statistically significant. In addition, an *r* is sometimes reported to show the correlation between the pre- and postscores (Gravetter & Wallnue, 2007). The person is measured more than once on the same dependent variable. For the present study, some participants filled out a packet of questionnaires (e.g., Beck Depression II, dependent variable) before and after bariatric surgery (independent variable). Because only 12% (11/93) of the participants supplied any postsurgical Beck II, SFI, or OAS data at one year, which does

not yield adequate power, only six-month data was analyzed; thus, a paired-sample *t* test was utilized.

Multiple regression is used when a dependent variable (e.g., weight loss) is predicted from a combination of independent variables (depression, obesity-related quality of life, family functioning). This type of analysis helps explain relationships among variables, and how much the group of variables contributes to this relationship, as well as how much each individual variable contributes to this relationship (Mertler & Vannatta, 2010). The scope and delimitations of this type of research have been described by Glinski, Wetzler, and Goodman (2001):

> Unfortunately, studies that assess the predictive validity of psychosocial factors are sparse, and, with a few exceptions, these studies tend to measure outcome by weight loss only. Other important outcome measures include medical and psychological complications, satisfaction with surgery, nutritional intake, exercise level, measures of self-esteem, interpersonal functioning, and work functioning. More studies are needed to further clarify which psychological factors play a role in these outcome variables. (p. 587)

Glinski et al. (2001) further stated that using psychosocial predictors of weight-loss surgery outcomes research to develop tools to help behavioral health specialists evaluate bariatric surgery candidates is important. More specifically, the validity of having a surgeon use a simple psychiatric screening tool will probably not be an accurate measure of psychopathology due to the sensitive nature of the information and denial issues. For more valid data to be obtained, bariatric surgery candidates should be assessed

by trained mental health professionals (Glinski et al., 2001). A rationale for the current study and potentially for future research is that if certain psychosocial variables can be identified as predictors of bariatric surgery outcomes, behavioral health specialists may be able to develop practical and generalizable methods to evaluate bariatric surgery patients rather than using pure theory (Glinski et al., 2001; Hartmann, personal communication, November 21, 2012).

In the end, it is hoped that this research can bring about social change. For example, the study can continue to draw attention to the epidemic of obesity and how truly harmful it can be. Also, it may help develop a generalizable method, or even tool, that behavioral health specialists can use to determine proper candidates for bariatric surgery. Thus, improving positive outcomes and reducing negative outcomes should equate to a healthier community, which will lead to lower healthcare costs.

Assumptions

It is assumed that the information provided by the participants on all of the surveys is truthful and accurate. For example, current weight, history of mental illness, depression, family interactions, and how obesity impacts the individual's life needs to be answered truthfully. It was also assumed that results obtained by utilizing the Beck Depression Inventory-II, Self-Report Family Instrument, and Obesity Adjustment Survey are effective and will yield valid and reliable results.

Limitations of the Study

Using archival data introduces potential problems that can occur at the initial stages of data collection. Socially desirable answers is one, since the data collection tool

asks about information related to obesity, family functioning and quality of life, people might be biased to answer more positively and give socially desirable answers. Assurance that data will be deidentified and confidential will be used as a countermeasure. A second limitation is that complications can be a medical issue, rather than a psychosocial issue. This retrospective data do not have the capacity to distinguish between the two. In addition, time and resource restraints could be a limitation. For example, the retrospective data containing postsurgical weight and complications are stored at the community teaching hospital's clinical weight loss program facility. While they agreed to supply me with this data, how fast they retrieved the data is based on their time and resources.

Definition of Terms

Bariatric Surgery/Roux-En-Y: Bariatric surgery is the medical term for operations that promote weight loss (Torpy, Burke, & Glass, 2005). The surgeries require manipulation of the gastrointestinal systems in the body. In simplest terms, bariatric surgeries are done to limit food intake, minimize caloric absorption, or both. Roux-en-Y is a bariatric procedure designed to do both and is considered the gold standard of weight-loss surgery (Hagar, 2007; Woodward, 2003).

Body Mass Index (BMI): BMI is an indicator of weight and obesity. BMI is calculated using a person's height and weight. BMI is calculated using a person's height and weight. The calculation is a person's weight in pounds divided by height in inches squared. This number is then multiplied by 703 (Ward-Smith, 2010). BMI categorizes weight as follows: Below 18.5 = Underweight; 18.5-24.9 = Normal; 25.0-29.9 = Overweight; 30.0-39.9 = Obese; 40 and above = Morbidly Obese (CDC, 2011).

Compliance: Compliance refers to adhering or acquiescing to a request (Cialdini & Goldstein, 2004).

Complications: Complications are negative things (e.g., bursting of stitches) that occur during or after bariatric surgery.

Healthy Family Functioning: For the purposes of this study, healthy family functioning will be based on the Beavers System Model (BSM; Beavers, 1977; Beavers & Hampson, 2000). The BSM stated that a family's health is based on their competence (optimal to severely dysfunctional) and style, which ranges from centripetal (bonded families that rely on each other) to centrifugal (unbounded families that have to rely on structures outside the family). Beavers and Hampson (2000) developed the Self-Report Family Inventory, which will be the data collection tool to ascertain family functioning health for the present study. The Self-Report Family Inventory is designed to uncover five family domains: (a) health/competence, (b) conflict, (c) cohesion, (d) leadership, and (e) emotional expressiveness (Beavers & Hampson, 2000).

Obesity: An increase of 20% more fat cells in relation to a person's ideal weight is considered obese (National Institute of Health, 1985). Obesity is also defined by a BMI of at least 30 kg/m^2. Morbid obesity is the extreme form of obesity and is generally defined as a BMI of >40 kg/m^2 or a BMI of >35 kg/m^2 with associated medical problems, such as diabetes and heart disease (Papageorgiou, Papakonstantinou, Mamplekou, Terziz, & Melissas, 2002).

Obesity-Related Quality of Life: For the present study, obesity-related quality of life is based on concepts developed by Butler et al. (1999). Obesity causes distress and

has an impact on a person's feelings, relationships, self/body image, and activities, which impacts the person's overall quality of life. To this end, Butler et al. (1999) developed the Obesity Adjustment Survey, which assesses how a person is feeling about how obesity impacts their life. For example, the survey asks questions about how a person is feeling about showing their body to a close friend or partner, avoiding public situations, walking and moving without discomfort, avoiding looking at one's own body, and how obesity impacts their sex life (Butler et al., 1999).

Prevalence of Mental Illness (or Psychiatric Disorder): On September 2, 2011, the Center for Disease Control (CDC) released mental illness surveillance among adults in the U.S., a document that summarized current data from the above surveillance and information systems. Published studies report that about 25% of all U.S. adults have a mental illness and that nearly 50% of U.S. adults will develop at least one mental illness during their lifetime (CDC, 2011b).

Psychosocial: Psychosocial refers to the interaction between psychological and social factors. Psychosocial factors range from age, education, and marital status to behavioral aspects of a person's history like depression and anxiety (Pugh, 2000).

Successful Weight Loss: Successful weight loss is defined as a loss of more than 5% of bodyweight during a 30-day period or more than 10% of bodyweight during a 180-day period. Weight-loss success is defined as the maintenance of greater than or equal to 50% of excess BMI loss (EBL) after a period of 2.5 to 11 years postsurgery (Choban et al., 2002; O'Brien et al., 2006).

Significance of the Study

"Obesity has evolved into one of the nation's most insidious health problems. America is getting heavier and the consequences of the weight gain are tremendous" (Indiana State Nurses Association, 2012, p. 9). Obesity has been linked to medical problems, such as diabetes mellitus, hypertension, heart failure, sleep apnea, high cholesterol (hyperlipidemia), and respiratory problems, including asthma (Ballantyne, 2003; Kral, 1995; Wei & Wu, 2012). Obesity has also been linked to stress urinary incontinence, erectile dysfunction, infertility, stone formation, and renal disease (Ward-Smith, 2010). There also appears to be a strong link between obesity and cancer (Polednak, 2008; Roberts, Dive & Renehan, 2010; Wolin et al., 2010). As a result, obesity is the protagonist for approximately 300,000 deaths in the U.S. per year (Coleman, Toussi, & Fujioka, 2010).

Beyond the impact on the body, obesity can create psychological and social problems (Greenberg et al., 2005; Kinder et al., 2008; Sanderson et al., 2011; Sarwer et al., 2005). Obesity has been linked to mood disorders, poor body image, decreased social activity, low self-esteem, anxiety disorders, attention disorders, addiction disorders, psychotic disorders, and personality disorders (Ballantyne, 2003; de Zwaan, Lancaster, & Mitchell, 2002; Dymek, le Grange, Neven, & Alverdy, 2001; Sharma, 2012; van Gement et al., 1998). When obesity impacts any physical and psychological aspects of a person's life, it often results in diminished quality of life (Han et al., 1998; Mathias et al., 1997).

For many obese individuals, traditional weight-loss programs like diet and exercise do not work. For these people, weight-loss surgery may be a viable option

(Butler et al., 1999). Unfortunately, this surgery is not without risks, including death, and adherence to postsurgical eating and lifestyle changes are needed for successful weight loss and reduction of the risk of complications (Butler et al., 1999).

It is important to determine who are "good" and who are "poor" candidates for this surgery. The significance of the present study is threefold. The most current review of literature regarding psychosocial variables as predictors of weight loss following bariatric surgery was conducted by Sockalingham et al. (2011). While some psychosocial variables did seem to predict successful weight-loss surgery, Sockalingham et al. support previous reviews that contend that the literature evaluating psychosocial variables as predictors of weight loss is conflicting. Therefore, the present study can help narrow the dissent in the literature pertaining to psychosocial predictors of successful bariatric surgery.

This study is important because it assesses novel psychosocial predictors of successful bariatric surgery, which include healthy family functioning that goes beyond the husband-wife relationship. The researcher contends that when a behavioral health specialist assesses a bariatric surgery candidate on many psychological domains, it is often cumbersome. Family functioning is something that individuals often wish to discuss and this may allow for easier transition to the assessment of family functioning through the self-report family inventory. If this study yields results that support family functioning as a predictor of successful bariatric surgery, not only will it uncover a new predictor, but a potentially easier predictor to evaluate. The third important aspect of this study is that if certain psychosocial variables can be identified as predictors of bariatric

surgery outcomes, behavioral health specialists may be able to develop practical methods to evaluate bariatric surgery patients rather than using pure theory (Hartmann, personal communication, November 21, 2012).

Summary

Obesity is becoming one of the biggest health threats in the U.S., as it has been linked to a wide range of physical and psychological problems and a diminished quality of life. Treatment of obesity is vital for not only improved health and wellbeing of the individual, but the U.S. as a whole. For those individuals who range from obese to morbidly obese, traditional weight-loss methods typically do not work. The development of weight-loss surgery has given medicine a relatively safe and effective way to treat obesity. However, weight-loss surgery is not without risks and patient dedication to comply with postsurgical instructions is paramount to successful treatment. One cannot simply have the surgery and resume a sedentary lifestyle with the same diet. The outcomes of weight-loss surgery are not the same for everyone; some people do not lose a significant amount of weight, or sustain weight loss, and some people develop complications.

Psychological evaluation prior to surgery has nearly become a standard of care with the behavioral health specialist becoming a key component of the pre and postsurgical interdisciplinary teams needed to make this surgery a success. With mixed results, previous research has attempted to demonstrate that various psychosocial variables do predict bariatric surgery-outcomes. To this end, it is important to further investigate psychosocial predictors of bariatric surgery outcomes to narrow the dissent in

the literature. Moreover, it is important to investigate new variables for predicting bariatric surgery outcomes.

Social support, especially between spouses, is associated with many positive outcomes. However, there appears to be a gap in the literature investigating healthy family functioning as a predictor of bariatric surgery success. One of the main objectives of this study is to investigate if healthy family function is predictive of weight loss and fewer complications postsurgery.

Chapter 2 is a detailed review of the literature, including an introduction to the issue of obesity and its impact on physical and psychological health, as well as quality of life. It also includes a literature review of nonsurgical and surgical management of obesity, bariatric surgery outcomes (i.e., weight loss and complications) and psychosocial predictors of bariatric surgery. Healthy family functioning as a factor associated with bariatric surgery success is also discussed.

Chapter 2: Literature Review

Introduction

The purpose of this study is threefold: (a) To determine the prevalence of certain psychological disorders (e.g., depression, bipolar, anxiety disorder, eating disorder, personality disorder, ADHD or ADD, schizophrenia, drug and alcohol addiction, and sexual, verbal/emotional, or physical abuse) in the study population, (b) To evaluate weight and psychosocial variables (i.e., depression, family functioning, obesity-related quality of life) before and after weight-loss surgery (i.e., the Roux-en-Y procedure), and (c) To identify psychosocial factors that are predictors of weight loss and complications after Roux-en-Y bariatric surgery. In terms of prediction, the primary purpose of this research is to explore whether certain tested (e.g., depression) and untested (i.e., healthy family functioning, obesity-related quality of life) psychosocial variables are predictive of a bariatric surgery patient's ability to lose and maintain weight loss and avoid noncompliance complications following Roux-en-Y bypass surgery.

This chapter provides a basis for the study by reviewing literature related to the impact of obesity on physical health, mental health, and quality of life. It also reviews literature pertaining to nonsurgical management of obesity, surgical management of obesity (bariatric surgery) and associated complications, perioperative care, compliance with perioperative surgical instructions, outcomes of bariatric surgery, and predictors of outcomes of bariatric surgery. This will provide the context for investigating gaps in the literature; specifically, investigating untested predictors of bariatric surgery outcomes such as healthy family functioning.

This dissertation was written from literature obtained from databases throughout WellSpan Health York Hospital and Walden University. For pivotal historical studies, no year restrictions were put on the search. Since the obesity epidemic has an accepted start date of 1997, articles slightly before the year 1995 until 2013 were included in the literature searches. Databases used included PubMed, Biomedical Reference Collection: Comprehensive, MEDLINE, Psychology and Behavioral Sciences Collection, and PsycEXTRA. Google Scholar was also used. Search terms included singular or any combination of the following terms: *obesity, weight, BMI, weight loss, bariatric surgery, weight-loss surgery, Roux-en-Y, complications, physical health, behavioral and mental health, quality of life, perioperative care, predictors, psychosocial, successful surgery outcomes, and healthy family functioning.*

Issues of Obesity Overview

Adipose tissue, or body fat, is essential to the human body; it stores energy as fat so that when the body's metabolism requires more energy, it is available. However, energy imbalance, or taking in more calories than one burns, can lead to obesity (National Institute of Health, 1985). "Obesity results from a chronic disruption of the energy balance. . . . When energy intake chronically exceeds energy expenditure . . . , the resulting imbalances causes expansion of fat cells and increased number of cells" (Loos & Bouchard, 2003, p. 254).

Haslam (2007) stated that energy imbalance leading to excessive weight and its subsequent impact on the body has been a topic of medical and philosophical debate as far back as 400 B.C.E. Hippocrates (400 B.C.E.) said, "It is very injurious to health to

take in more food than the constitution will bear, when, at the same time one uses no exercise to carry off this excess" (p. 32). Research further states that this energy imbalance is often the result of social, environmental, cultural, and genetic factors (Gerbrand et al., 2003).

While there are many benefits of the many social, environmental, and cultural advances men and women have made, Hensrud and Klein (2006) stated that the life of early men and women has changed a great deal compared to the life of modern men and women, and so has caloric balance. Compared to current times, during the early years of mankind, people lived in an environment where trying to obtain food was a physical activity and a major challenge. Essentially, physical activity was unavoidable if one wanted to live, but food was scarce, which led to weight reduction as there was more caloric burning than intake. Technological advances in modern society have made it easier to obtain food without physical activity. If a person is hungry, that person will go to the kitchen, the grocery store, or any number of dining out options. There is no need to go hunt or gather food for survival (Hensrud & Klein, 2006).

This theory of the increasing prevalence of obesity coincides with McAllister et al.'s (2009) concept that as technology has changed, so has America's weight. For example, the thermal neutral zone is a range of ambient temperatures where the body does not have to expend energy to maintain a steady body temperature. Over time, our current society has developed heating and air conditioning systems that help maintain the thermal neutral zone. In 1923, the average home was set at 64 degrees Fahrenheit for home heating. By 1986, the average home heating reached a set temperature of 76

degrees Fahrenheit (McAllister et al., 2009). Some modern cultural advances have taken us farther away from energy expenditure without us truly being aware of it.

Genetically speaking, obesity occurs when there is an impairment of the metabolic and/or endocrine system (Gerbrand et al., 2003). In this case, because the metabolic or endocrine system is not functioning correctly, caloric burning is less than caloric intake despite the physical and dietary efforts of the individual. Even a person who exercises and eats healthy may suffer from obesity. However, some metabolic and endocrine disorders are a result of obesity. The potential cause and effect relationship between genetics and obesity is debatable (Jankovic et al., 2012). Also, genetic causes of obesity are rare (Loos & Bouchard, 2003). In addition, physiological contributors to obesity are less common than behavioral contributors to obesity (Hartmann, personal communication, November 21, 2012).

An increase of 20% more fat cells in relation to a person's ideal weight is considered obesity (National Institute of Health, 1985). Obesity is also defined by a BMI of at least 30 kg/m^2. Morbid obesity is the extreme form of obesity that is associated with significant medical and psychological morbidity and mortality. Morbid obesity is generally defined as a BMI of >40 kg/m^2 or a BMI of >35 kg/m^2 with associated medical problems (Papageorgiou et al., 2002). BMI is calculated using a person's height and weight. The calculation is a person's weight in pounds divided by height in inches squared. This number is then multiplied by 703 (Ward-Smith, 2010). BMI is typically categorized as follows (see Table 1): Below 18.5 = Underweight; 18.5 – 24.9 = Normal; 25.0 – 29.9 = Overweight; 30.0-39.9 = Obese; 40 and above = Morbidly Obese (Center

Table 1

Body Mass (BMI) Categories

BMI	Weight Category
< 18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
30.0-39.9	Obese
> 40	Morbidly Obese

for Disease Control, 2011). The various categories indicate that while obesity is a diagnosis unto itself, it can range in severity.

In 1993, obesity was becoming more prevalent in the U.S., affecting 22.3% of the adult population (Ballantyne, 2003). The obesity epidemic was then recognized by the World Health Organization in 1997. Given the breadth of information that the World Health Organization was collecting on obesity and its epidemiology, as well as its recognition of it as an epidemic, the start year of the obesity epidemic is typically accepted as 1997 (James, Leach, Kalamara, & Shayeghi, 2001).

Nearly a decade before this, Reaven, an endocrinologist at Standford University, coined a term called *Syndrome X*, which referred to a clustering together of illnesses like heart disease, stroke, diabetes and dyslipidemia, which all seemed to be related to obesity (Haslam, 2007). Over time, obesity continued to be recognized as a risk factor for many illnesses, such as hypertension, high cholesterol, and diabetes (Ogden et al., 2012), as well as Axis I psychiatric disorders like depression, dysthymia, and anxiety (Sarwer et al., 2005). When the National Institute of Health (1985) described obesity, it took into consideration the impact it can have on health and therefore described it as an excess of

body fat that impairs health. Given the health risks of obesity, it is regarded as an important and worthy topic of study (Ogden et al., 2012).

The most recent data on obesity prevalence in U.S. adults showed that over the decades of the 20th century, obesity has steadily increased, with 36% of adults meeting the criteria for obesity in 2009-2010 (Ogden et al., 2012). Breaking this percentage down by gender, an estimated 41 million women and 37 million men aged 20 and older are characterized as being obese (Ogden et al., 2012).

In another report, the Trust for America's Health and the Robert Wood Johnson Foundation (2009) reported that two-thirds of Americans are overweight or obese (as cited in Stewart, 2009). By 2020, the majority of Americans will be obese and have diabetes. Specifically, it is estimated that by the year 2020, 83% of men and 72% of women will be overweight or obese. Furthermore, 77% of men and 53% of women will have either diabetes or prediabetes (White, 2011).

The impact of obesity goes beyond the impact on the body. Finkelstein, Trogdon, Cohen, and Deitz (2009) suggested that the link between the rising rate of obesity and the rising rates of medical costs are undeniable. Obesity-related medical costs include hospitalization for obesity-induced illnesses, medications for obesity-induced illnesses, diagnostic services, treatment services, and mortality costs (Stewart, 2009). In 2002, weight-loss drugs averaged $300 per user and total weight-loss surgery costs were approximately $948 million U.S. dollars (Encinosa, Bernard, Steiner, & Chen, 2002). In addition, compared to nonobese individuals, obese men take about six more sick days per year and women take about nine more sick days per year (Begley, 2012). Even when

obese individuals are present at work, shortness of breath and pain can impact productivity. Current assessments indicate that an additional $190 billion U.S. dollars, or 21% of medical cost is attributed to obesity (Begley, 2012). To reduce the effects that obesity may have on health and economics, losing weight through diet and exercise is paramount.

When traditional diet and exercise programs fail, bariatric surgery is one of the most successful ways to treat obesity and its related problems (Hager, 2007). However, not all people have a successful bariatric surgery experience. Some people do not lose weight, have major complications, experience new stressors in their life, and sometimes die from the surgery (Ballantyne, 2003; Bocchieri et al., 2002; Buchwald et al., 2004; Ray et al., 2003). For this reason, it is important to evaluate who are "good" and "poor" candidates for bariatric surgery. As one author put it, "Who should, and perhaps more importantly, who should not have this surgical procedure?" (Frank, 2006, p. 1335). With mixed results, previous researchers have investigated a host of physical and psychological markers for predicting successful bariatric surgery. Since bariatric surgery has risks, it is important to assess the bariatric surgery candidate and the potential pros and cons of surgery for that particular patient. A part of assessing the bariatric surgery candidate and the pros and cons of bariatric surgery is to understand the severe total impact that obesity can have on physical health, mental health, and quality of life.

Physical Health

In the mid-1700s, Cheyne was considered one of the most respected and accomplished physicians in Scotland (Haslam, 2007). He suffered from obesity and

noticed chronic shortness of breath, stiff joints, and a rash. Because he was obese and had these conditions, he started to pay close attention to other obese individuals and noticed many of them had the same problems, and postulated that obesity was linked to other medical conditions. In the late 1700s, through the dissection of obese human cadavers, Morgagani investigated the link further and found that adipose tissue puts immense pressure on organs and pushes some of them out of place (Haslam, 2007). The impact of obesity on various conditions has been documented throughout history. Obesity was documented as being linked to sleep apnea in 4th century B.C.E., diabetes in 1552, coronary heart disease in 1609, and women's health in 1795 (Haslam, 2007).

While earlier historical documentation of obesity and health was a topic for philosophical and medical debate, current researchers analyze the subject much more seriously, as it is realized that there is more to weight than just anthropometry, or the assessment of height, weight, and shape (Wei & Wu, 2012). Instead, the assessment of what weight does to an individual's physical health has become the more important topic. Obese patients can experience associated medical problems such as diabetes mellitus, hypertension, heart failure, sleep apnea, hyperlipidemia, and asthma (Ballantyne, 2003; Kral, 1995; Wei &Wu, 2012). Obesity has also been linked to stress urinary incontinence, erectile dysfunction, infertility, stone formation, and renal disease (Ward-Smith, 2010). As a result, obesity is the protagonist for approximately 300,000 deaths in the U.S. per year (Toussi et al., 2009).

One of the organs that obesity has a very large and negative impact on is the heart. Trailblazing in the field of cardiovascular epidemiology was the Framingham Heart

Study (1951). For five decades, the Framingham Heart Study has been collecting scientific data regarding predictive factors for cardiovascular disease (CVD; Mendis, 2010). The Framingham Heart Study (1951) was started to identify common factors associated with CVD over a long period of time. The initial study was started in 1948 and data are still collected to this day. The original study enrolled 5,209 residents (men and women) from Framingham, Massachusetts who were given extensive physical examinations and lifestyle interviews at the onset of the study and then every two years. The study is now on its third generation of the original participants and a new cohort was enrolled in 1994. To this date, approximately 1,200 articles have been published using the Framingham Heart Study data (Framingham Heart Study, 2012).

Over the decades, major risk factors for CVD have emerged: high blood pressure, physical inactivity, smoking, cholesterol, and diabetes. The Framingham Heart Study has also pinpointed obesity as a major risk factor for CVD (Framingham Heart Study, 2012). This predictor of CVD was not widely known and accepted in the 1940s, but after the Framingham Heart Study pointed to obesity as a predictor of heart disease, many other studies followed (Mendis, 2010).

With the establishment that obesity is a predictor of heart disease, Wannamethee, Shaper, Whincup, Lennon, and Sattar (2011) investigated why obesity might be associated with heart failure. Wannamethee et al. (2011) based their study on research conducted by Nia, Hojjati, and Soltani (2009), which proposed that leptin, a hormone associated with metabolism and heart failure, was linked to obesity and heart failure. These researchers found high levels of leptin in people with increased BMI and with

heart disease (Nia et al., 2009). Wannamethee et al. (2011) followed obese males with and without a history of heart failure over the course of eight years. Their results found that obese individuals, who did not have any pre-existing heart conditions, but later developed heart conditions, had an increase in leptin levels. In its simplest form, fat is the major source of leptin and large quantities of leptin can have negative metabolic and inflammatory impacts on the heart (Nia et al., 2009).

As evidenced by an enormous amount of research conducted on obesity and a wide range of cancers, there also appears to be a strong link between obesity and cancer (Polednak, 2008; Roberts et al., 2010; Wolin et al., 2010). A study by the American Cancer Society investigated the epidemiology of cancer in over one million men and women (National Institute of Health, 1985). Of the 93% that could be categorized as alive or dead at the time of follow-up, obesity in males was linked to colon, rectal, and prostate cancer, regardless of a history of smoking. Obese women had a higher mortality for ovarian, uterine, breast, and gallbladder cancer. Overall, obese women were 5.4 times more likely to die from cancer than nonobese women (National Institute of Health, 1985).

In 2008, Pischon et al. conducted a review of the literature pertaining to obesity and cancer. Their findings suggest that obesity is a risk factor for cancers of the colon and rectum (colo-rectal), breast, uterus, kidney, esophagus, pancreas, prostate, gallbladder, and liver. The link between obesity and cancer goes beyond the mere fact that carcinogens are often stored in fat cells (Hartmann, personal communication, November 21, 2012). Pischon et al. (2008) state that not all of the mechanisms of how obesity

causes certain cancers are definitively known, and that these mechanisms can vary by cancer type, fat location, gender, and many other variables.

For example, the obesity and colo-rectal cancer link is more prevalent in men than women (Pischon et al., 2008). It was thought that this is because men store most of their fat in the stomach area whereas women's fat storage is more distributed throughout the body. Additional research found that this is not definitively true and the most likely link between obesity and colo-rectal cancer is metabolic disturbances with insulin and that insulin has some growth promoting effects of cancers in the colo-rectal region. These speculations are supported by the fact that Type 2 diabetes is a major risk factor for colo-rectal cancer. In essence, obesity is a risk factor for Type 2 diabetes, which increases the risk of colo-rectal cancers, especially in men (Pischon et al., 2008). This obesity-diabetes-colo-rectal cancer link is further supported by research by Wolin et al. (2010).

Obesity and breast cancer offer another example of how there are varying mechanisms and variables that are involved in the pathogenesis of certain cancers (Eliassen et al., 2006). Obese postmenopausal women are at a higher risk of breast cancer than obese premenopausal women (Pischon et al., 2008; Wolin et al., 2010). However, breast cancer risk in postmenopausal women is reduced by 50% when 20 or more pounds of weight are lost (Aeliassen et al., 2006). Additionally, obese postmenopausal women who take hormone replacement are less likely to develop breast cancer than obese women who do not take hormone replacement. Before menopause, adipose tissues express sex steroids that promote oestrogen. After menopause, oestrogen production is suspended and adipose tissues become the major source of oestradiol, which is a sex hormone associated

with breast development and maintenance, but is associated with breast cancer when produced in large quantities. Therefore, the more adipose tissue a woman has after menopause, the more oestradiol will be produced, which is evidenced to lead to breast cancer (Pischon et al., 2008; Wolin et al., 2010).

A final example of how obesity affects varying mechanisms that may cause cancer pertains to the esophagus (Eliassen et al., 2006). Inflammation of the esophagus, also known as acid reflux disease, is caused when stomach contents come back from the stomach into the esophagus. One study found that increasing BMI is associated with more acid reflux (Jacobson, Somers, & Fuchs, 2006, as cited in Eliassen et al., 2006). Patients who gained weight had increased occurrence and severity of acid reflux while those who lost weight decreased occurrence and severity of acid reflux (Jacobson et al., 2006, as cited in Eliassen et al., 2006). Over the last 20 years, there has been a rapid rise in esophagus cancer. It is surmised that this may be due to rising rates of obesity, which results in more severe acid reflux, which is associated with increased risk of cancer (Wolin et al., 2010).

Another aspect of physical health that is impacted by obesity relates to the musculoskeletal system (Anandacoomarasy, Caterson, Sambook, Fransen, & March, 2008; Chan & Chen, 2009; Lementowski & Zelicof, 2008; Makk, 2007). Osteoarthritis is a form of arthritis, which is caused by wear-and-tear that typically occurs in the spine, hip, knee, and ankle. Osteoarthritis is more common and severe in people who are overweight and obese (Lementowski & Zelicof, 2008; Makk, 2007). This is because weight compounds the pressure that is put on the joints. On average, about three times a

person's body weight is placed on the joints while walking. So, a 200-pound person will put about 600 pounds of pressure on the knee when walking. This pressure becomes even higher when people accelerate their activities to things like squatting, climbing, and running (Makk, 2007).

According to Lementowski and Zelicof (2008), osteoarthritis can impair daily movement functioning and is one of the leading causes of disability. Those with osteoarthritis are reported to take longer performing daily living activities, have less time for leisure activity, depend more on friends and family for help, and spend more money on healthcare than do those of the same age and gender without osteoarthritis (Lementowski & Zelicof, 2008). In addition to osteoarthritis, obesity is implicated in lower back pain, gait disturbance, carpal tunnel syndrome, gout, fibromyalgia, rheumatoid arthritis (Anandacoomarasy et al., 2008), and flat feet (Hartmann, personal communication, November, 21, 2012).

Mental Health

In addition to the medical illnesses associated with obesity, there are a variety of psychological and social (or psychosocial) illnesses (Greenberg et al., 2005; Kinder et al., 2008; Sanderson et al., 2011; Sarwer, et al., 2005). "Obesity creates an enormous psychological burden. . . . In terms of suffering, this burden may be the greatest adverse effect of obesity" (National Institute of Health, 1985, p. 524, as cited in Stunkard & Wadden, 1992). For many years, mental health was thought to be a cause of obesity due to lack of willpower. However, recent research has changed our understanding of obesity and mental health. Psychological problems are predominantly viewed as a consequence

of obesity rather than a cause (Stunkard & Wadden, 1993, as cited in Van Gemert, Severeijns, Greve, Groenman & Soeters, 1998; Wadden & Stunkard, 1985).

Sanderson, Patton, McKercher, Dwyer, and Venn (2011) investigated if obesity was more of the "cause" or "effect" of mental health issues. In this study, BMI was evaluated in 8,494 school children who were between the ages of 7 and 15 years old. The following psychological variables were also assessed: mood disorder (major depression and dysthymia), anxiety disorder (panic/agoraphobia, social phobia, generalized anxiety disorder, and specific phobia), and substance use (alcohol abuse or dependence, drug abuse, and dependence). While some participants were lost to attrition, a 20-year postevaluation of the remaining participants revealed that overweight or obesity in children aged 7-15 years predicted an increased risk of mood disorder when the person was an adult. The investigator's results suggest that obesity is more of a precursor to mental health issues, rather than the result of mental health issues (Sanderson et al., 2011).

Other mental health issues that result from obesity, in addition to mood disorders, include poor body image, decreased social activity, low self-esteem, anxiety disorders, attention disorders, addiction disorders, psychotic disorders, and personality disorders (Ballantyne, 2003; de Zwaan, et al. , 2002; Dymek, et al., 2001; Sharma, 2012; van Gement et al., 1998). Furthermore, this link between obesity and mental health creates societal, cognitive, and behavioral issues that continue to exacerbate weight and physical issues (Sharma, 2012).

A study by Maddi, Khoshaba, Persico, Bleeker and VanArsdall (1997) regarding psychopathology in obese patients seeking weight-loss surgery was replicated by Kinder et al. (2008). Both studies used the Minnesota Multiphasic Personality Inventory (MMPI-2) to assess psychopathology in this sample. Kinder et al. (2008) added the Beck Depression Inventory (BDI) and the State-Trait Anger Expression Inventory-2 (STAXI-2) to the evaluation process. Both studies found elevated MMPI-2 scores for hypochondriasis, depression, hysteria, psychopathic deviance, paranoia, and schizophrenia. Kinder et al. (2008) found that 10% of the depression cases fell into the extreme category. Also, 9% of patients scored high on anger expression (i.e., rebellious, nonconforming, hostile, stubborn, and familial conflict).

Sockalingham et al. (2011) reviewed studies pertaining to psychosocial variables that predict weight loss after surgical management of obesity. Similar to results published by Kalarchian, Marcus, and Levine (2007), and Muhlhans, Horbach, and de Zwaan (2009). Sockalingham et al. (2011) found that prior to surgery, approximately 70% of these patients met the criteria for at least one Axis I psychiatric disorder (see Figure 2). These included mood, anxiety, eating and personality disorders, as well as substance abuse issues (Sockalingham et al., 2011).

There are indications that these psychosocial issues associated with obesity can improve after successful bariatric surgery (Ballantyne, 2003; van Hout et al., 2003). However, it is important to keep in mind that the relationship is a complex one, and there is evidence that at least some patients do not improve and may even develop new

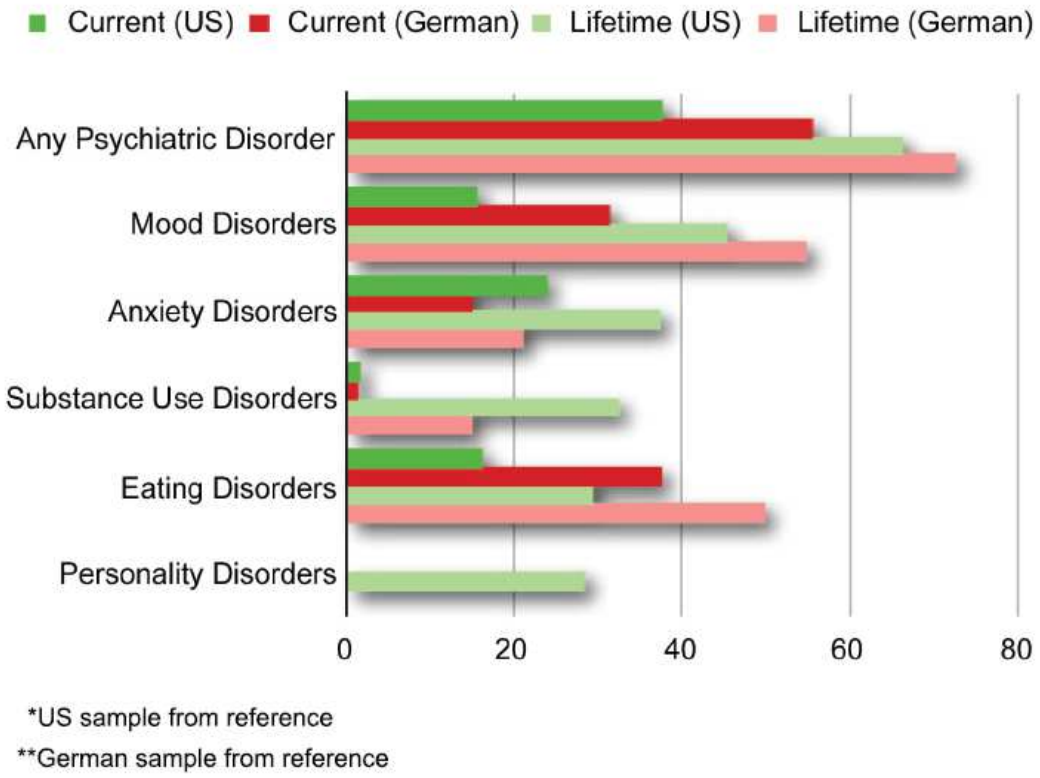

Figure 2. Axis I diagnoses statistics. From "Psychocosial Predictors of Bariatric Surgery," by Sockalingham et al., 2011, *Current Psychiatric Reviews, 7*, p. 227. Reprinted with permission.

psychiatric conditions that they did not have before surgery. This is most likely due to new social situations and interactions, including those with the opposite sex, as well as new stressors and responsibilities (Ballantyne, 2003; Bocchieri et al., 2002).

Quality of Life

Many of the obesity-related aspects of health and mental health have been investigated separately and may overlap with each other, but it is of benefit to look at the whole being and determine if obesity is related to diminished quality of life. According to Livingston and Fink (2003), "An individual's quality of life represents their happiness and satisfaction with the physical, mental, emotional, social and spiritual aspects of their

life. Every imaginable aspect of one's existence contributes to quality of life" (p. 383). Quality of life encompasses "standard of living, quality of housing and neighborhood, job satisfaction, family relationships, health and other factors; Quality of life is the individual's overall satisfaction with his life, based on his own values, goals, abilities and needs" (Kushner & Foster, 2000, p. 947). In essence, it is the whole of several domains, like the physical, psychological, and social aspects of one's existence that make up the quality of one's life (Felce & Perry, 1995; Sullivan, Sullivan, & Kral, 1987, as cited in Mannucci, Ricca, Barciulli, Di Bernardo, Vaglini, Cabras, & Rotella, 1999). Therefore, if obesity can negatively impact one or more aspects of a person's life, it is fair to contend that obesity affects a person's quality of life (Mathias et al., 1997).

Mathias et al. (1997) assessed quality of life between normal weight and obese individuals. Overall, the obesity group scored significantly worse on measures of general health, feelings of distress regarding their weight, depression, self-esteem, and assessment of physical appearance. The authors propose that obesity's impact on quality of life is circular in nature. For example, obesity impacts how one feels, consequently impacting their behavior, which then impacts their activity level and weight, and so on (Mathias et al., 1997). If obesity's impact on quality of life is as great as research indicates it is, one could think of a wheel and spoke diagram with obesity representing the center of the wheel and the various aspects of one's life, such as physical health, mental health, and social health, representing the spokes. The whole system makes up the entire wheel, but if the center of the wheel is not working properly, it could affect the spokes in a negative way, impairing the whole system.

Han et al. (1998) investigated daily functioning, an important aspect of quality of life, in relation to weight and body fat distribution. The researchers collected anthropometry measurements and data related to wellbeing derived from daily functioning scales from 1,885 men and 2,156 women. To make sure that mental, social, and emotional problems were not influencing daily functioning and wellbeing, the investigators controlled for variables related to mental health, social functioning, and emotional problems. Results indicated that participants with the largest waist circumferences and BMIs had the most physical difficulties with basic living activities. These difficulties included bending, kneeling, stooping, walking, and carrying items such as groceries (Han et al., 1998).

Kolotkin, Head, Hamilton, and Tse (1995) discuss similar, as well as other aspects of impaired quality of life, as a result of obesity. For example, many obese individuals have general feelings of physical uncomfortableness (e.g., feeling uncomfortable in their own skin), can experience skin rash, and may need to use the bathroom frequently. Obese individuals can be afraid of intimacy as well as participating in public and social gatherings. Since obesity can cause fatigue and lethargy, people may feel less motivated, more tired, and less productive in the work setting. In addition, because of stereotyping, they may not be rewarded with well-deserved recognition for areas in which they excel. Trouble using stairs, tying shoes, crossing legs, and putting on and taking off clothes are daily activities that may be impacted by obesity. Obesity may result in an inability to have fun, difficulty being assertive, and not liking oneself. Furthermore, obese

individuals can have issues finding clothes that fit, finding chairs that hold their weight, and difficulty with daily hygiene (Kolotkin et al., 1995).

Given the impact obesity has on physical health, mental health, and overall quality of life, plus the fact that it is becoming an epidemic, management of obesity has become both a clinical and research problem that needs to be addressed. It is important that we find ways to not only achieve weight loss, but also to maintain weight loss. However, maintaining weight loss is often considered the most challenging aspect (Perri et al., 1988).

Nonsurgical Management of Obesity

Over the decades, many different nonsurgical weight-loss methods have been designed and used (see Table 2). For example, hypnosis has been used for weight loss with variable effects (Allison, Fontaine, Heshka, Mentore & Heymsfield, 2001; Mott & Roberts, 1979). In 2005, Sony created a weight-loss tool in Tokyo in the form of a robotic dog called Aibo (Haslam, 2007). Aibo had various stages ranging from happy and tail-wagging to lying inactive and resting. Aibo was wirelessly connected to scales, pedometers, and personal organizers. The goal of this weight-loss strategy was to keep Aibo happy and avoid having him in a morose inactive state, which also played dirge-type music during this state (Haslam, 2007).

The Fitbit (www.fitbit.com) is a new device that people can buy to help them lose weight. This is a small device, about the size of a jump drive, which is placed in the pocket and keeps track of steps taken, miles walked, steps climbed, and calories burned.

Table 2

Sample of Nonsurgical Weight-Management Techniques

Technique	Example
Psychotherapy	Hypnosis
Technology	Aibo, Fitbit, online support groups
Diet and Exercise	Self-initiated, supervised, and unsupervised
Pharmacology	Sibutramine, Phentermine, Diethylpropion, and Phendimetrazine

This information is automatically linked to a Fitbit profile, which you set up online. On this site profile, a person has a record of their Fitbit activity, and the person can manually register weight, BMI, body fat, weight-loss goals, food intake, and calories. As a person achieves certain milestones, he/she receives "badges" as rewards. In addition, users can "friend" others who have Fitbit profiles to promote interaction with others and be supportive and competitive. The goal is for an individual to continually beat old records and achieve new milestones in activity and weight.

Collinson et al. (2010) supports that Internet-based weight-loss programs can reach a wide audience and be successful. Seventy participants, after attrition, participated in a study that was similar to online educational degree programs. Participants completed demographic questionnaires to obtain baseline information. Participants then received online instruction about weight loss, physical activity, low-sugar dieting, record keeping, and good health from a dietician. This instruction took place weekly as a group, and once a month on a one-to-one basis. For example, the dietician would give the participant individual feedback every month via personal e-mail. In the meantime, participants were

to take part of the weekly group session with the dietician, log their daily food intake and activity, and encourage and support one another in a chat room.

After six months, results indicated a stasticial variance of eight pounds in weight, three BMI points, and two inches on the waist. The authors contend that the success of this program may be due to the social support and personalized monthly e-mails making a person more likely to comply knowing that a dietician, or a knowledgeable person, was going to offer positive or constructive negative feedback. Also, record keeping is known to enhance compliance as the person can see their progress.

The authors' contention for why this online program worked is based on a theoretical framework from historical social science research. Cialdini (1998, 1999, 2001, 2004) studied the concept of why people comply and follow through. For example, Cialdini (1998, 2004) stated that people conform to instructions from legitimate authority. So, when one goes to the doctor and the doctor says to lose weight, one might follow the directive of this authoritative figure. Cialdini (1998, 2004) also stated that people follow the lead similar to others, and try to accommodate the requests of friends. According to Cialdini's theory, if a person were to use an online weight-loss program where people work together as a group and are led by a dietician (Collinson et al., 2010), the person might comply with the program by following the lead similar to others, and try to accommodate the requests of people he or she knows and likes (e.g., fellow dieters, dietician).

While weight-loss technologies can be useful, and some technologies like Aibo have ended up in history's trash bin (Haslam, 2007), nonsurgical management of weight

typically starts with implementing lifestyle changes that are behavioral in nature such as diet (supervised and nonsupervised) and exercise (Wing, Crane, Thomas, Kumar & Weinberg, 2010). According to Kolasa, Collier, and Cable (2010), weight loss does not have to be extreme to be clinically helpful. Even a 5 to 10% weight loss can produce health benefits. The goal of any diet and exercise program is to burn more calories than are taken in. For many individuals, behavioral lifestyle changes do not require expensive exercise equipment, gym memberships, medications, "fad" diets, or much of anything other than eating healthier and getting more exercise. Something as simple as getting adequate sleep of six to eight hours per night is a behavioral modification that helps with weight loss. Inadequate sleep is thought to be associated with hormone disruption that can affect appetite. Additional small behavioral changes like parking further away from stores and taking the stairs instead of elevators are minor revisions that people can do to burn calories (Kolasa et al., 2010).

When weight loss cannot be achieved by self-initiated lifestyle changes, seeing a doctor is another way to achieve weight loss (Kolasa et al., 2010), as "evidence suggests that patients are considerably more likely to lose weight when they are advised to do so and supported by their primary care physician" (p. 387). The first thing a doctor will do is assess BMI and body fat, which will give the patient an idea of where they are at in terms of weight (e.g., overweight, obese, morbidly obese). From there, a doctor may get the patient's perspective on weight, weight loss, and determination to lose weight. A doctor should also discuss the potential risks associated with excess weight. After an initial evaluation, a game plan can be discussed on how the person can lose weight. This may

require a referral to a dietician, encouraging the use of an eating journal, or referring them to take part in an established diet program (Kolasa et al., 2010) such as Weight Watchers, Slim Fast, Jennie Craig, Mediterranean Diet, Atkins Diet, or South Beach Diet. Pharmacological interventions may also prove useful to those where traditional diet and exercise do not work or as a supplement to diet and exercise.

According to the U.S. Department of Health and Human Services (2007), there are several Federal Drug Administration-approved appetite suppressants that can be used for weight loss. These include Sibutramine, Phentermine, Diethylpropion, and Phendimetrazine. Sibutramine and Orlistat are two of the most widely prescribed medications for obesity (Hauner, 2001). Sibutramine is primarily a selective serotonin and noradrenaline reuptake inhibitor that also blocks reuptake of dopamine to a smaller degree. Through various mechanisms with these neurotransmitters, Sibutramine works via the central nervous pathways to reduce food intake and increase energy expenditure (Hauner, 2001). Sibutramine is a long-term weight-loss drug, whereas Phentermine, Diethylpropion, Phendimetrazine are short-term weight-loss drugs of up to 12 weeks (U.S. Department of Health and Human Services, 2007). Where Sibutramine works through central nervous system mechanisms, Orlistat works through gastrointestinal tract mechanisms (Hauner, 2001). “Orlistat is a specific inhibitor of gastric and pancreatic lipases, [which are produced by leptin] [that] reduce[s] gastrointestinal fat absorption by approximately 30%” (Hauner, 2001, p. S102). When fat absorption is reduced, a negative energy balance (caloric intake is less than caloric expenditure) is produced. Medications that are prescribed for other conditions, such as depression (Bupropion), seizures

(Topiramate, Zonisamide), and diabetes (Metformin) also have weight-loss properties (U.S. Department of Health and Human Services, 2007).

While weight-loss drugs are much safer than they used to be, they can have side effects such as increased blood pressure and heart rate, sleeplessness, nervousness, dizziness, and headache (Hauner, 2001; U.S. Department of Health and Human Services, 2007). In particular, Orlistat can cause excess gas, diarrhea, cramps due to undigested fat in the bowel, and decreased absorption of fat-soluble vitamins such as K, A, D and E. Phentermine with fenfluramine or dexfenfluramine, known as Fen-Phen, is associated with valvular heart disease, and has been taken off the market. Overall, diet pills rarely work in the long run (Hartmann, personal communication, November 21, 2012). When people do not respond to nonsurgical treatment of any kind, surgical management of obesity is an effective option (U.S. Department of Health and Human Services, 2007).

Surgical Management of Obesity and Associated Complications

The etiology of obesity, in its basic form, is straightforward. Obesity occurs when energy, or caloric intake, exceeds energy expenditure over a long period of time (Hensrud & Klein, 2003). Therefore, the purpose of bariatric surgery is to promote weight loss by providing a system that facilitates a change in energy balance (Woodward, 2003). For those who are morbidly obese, bariatric surgery has become generally accepted as the most effective long-term therapy for weight loss (Schernthaner & Morton, 2008; van Gement et al., 1998) and, subsequently, alleviation of weight-related illnesses (Perna, Byrne, & Pullattrana, 2012). Bariatric surgery is reserved for those who have a BMI greater than 35, have had extensive preoperative screening, and have tried other forms of

weight loss. In 2005, most insurance companies started covering bariatric surgery. While having obesity-related illnesses increase a person's candidacy for bariatric surgery, a person does not have to have obesity-related illnesses to qualify for bariatric surgery. More specifically, obesity surgery can be used as preventative medicine in the morbidly obese to avoid obesity-related illnesses (Hagar, 2007).

According to Hager (2007),

> The only effective treatment for morbid obesity and its comorbid conditions is bariatric surgery, such as the Roux-en-Y gastric bypass procedure. No medications, lifestyle changes, psychotherapeutic, acupuncture, hypnosis, or nutrition programs remotely approach the capacity of bariatric surgery to reduce or eliminate the diseases caused or exacerbated by obesity. (p. 768)

However, there are various complications associated with this effective surgical treatment for obesity. Certainly, there is less weight loss with noncompliance, especially with those who have a binge-eating disorder. Stomach pouch can be stretched by overeating to the point that pouch size is no longer a barrier to overeating. Failing to take necessary vitamins and minerals will result in micronutrient deficiencies. Not adhering to activity restrictions soon after surgery increases the risk of dehiscence and ventral hernias (Hartmann, personal communication, August, 23, 2012). Some common bariatric surgery complications include stomal obstruction, cardiac arrest, pancreatitis, atelectasis, kidney failure, splenic injury, vitamin deficiency, bleeding, leakage, deep venous thrombosis, pulmonary embolism, wound infection, wound dehiscence, C Diff, stricture, endoscopy, and gastric ulcer (Hartmann, personal communication, August, 23, 2012).

While there are risks to bariatric surgery, the risks have become fewer over time. Surgery for weight loss was developed in the 1950s (Dymek et al., 2001). Ever since its inception, bariatric surgery has been revised to attain and sustain weight loss while reducing the prevalence and severity of side effects. According to Woodward (2003), bariatric surgery is designed to either restrict the quantity of food a person can eat or interrupt the digestive process to avoid calorie absorption; however, some surgeries are designed to do both. Bariatric surgeries that are designed to restrict quantity of food are classified as restrictive procedures and those that are designed to disrupt the digestive process are classified as malabsorption procedures. Restriction procedures decrease the size of the stomach, which limits the amount of food a person can eat at one sitting. Restrictive bariatric surgery also combines a surgical method that delays the stomach's emptying of food, which results in feeling full for longer periods of time. Malabsorption bariatric surgeries reroute or bypass sections of the small intestine. Bypassing the small intestines causes food to be poorly digested or quickly passed into the large intestine, which prohibits excessive calorie absorption (Woodward, 2003).

An example of a restrictive bariatric surgery is vertical banded gastroplasty (VBG; Brolin, 2002; Buchwald, et al., 2004; Karmali, et al., 2010; Kendrick & Dakin, 2006; Woodward, 2003). This procedure is fairly effective and safe in the short-term. Typically, there is an initial weight loss of 30% to 60%, but a large portion of patients regain the weight at three to five years. The complication rate of VBG averages 1% to 10%. VBG also has a reoperation rate of 15% to 20% (Brolin, 2002).

This procedure does not bypass any sections of the digestive system or interfere with the stomach's ability to digest food (Woodward, 2003). A VBG procedure uses staples to create a small pouch at the top of the stomach. This is essentially a smaller stomach that starts out as one ounce and can extend to two to four ounces over time. A band is placed underneath the small upper pouch, about the diameter of a pencil eraser, which acts as an outlet to the stomach below. For this reason, food must be chewed thoroughly to an almost liquid consistency before being swallowed so the food can pass through this outlet (Woodward, 2003).

A person who undergoes VBG must give up the simple pleasure of eating and adapt to a healthier lifestyle (Woodward, 2003). A person who does not adhere to postoperative instructions can find themselves with many complications. For example, not chewing food thoroughly can result in reflux, discomfort, and regurgitation from a blocked pouch outlet. Removal of an obstruction in the outlet may require surgery. Other complications associated with VBG include staple line leak, which causes stomach acid leakage into the abdomen, infection, and the potential for corrective surgery. Repeated vomiting from overeating may cause staple disruption. Other complications include wound infection, incisional hernia, band erosion, pulmonary embolism/blot clots, splenectomy, and death (>1%; Woodward, 2003).

Another common restrictive bariatric surgery is the Lap-Band system (Buchwald et al., 2004; Karmal et al., 2010; Kendrick & Dakin, 2006; Woodward, 2003). This procedure uses an inflatable silicone band around the top portion of the stomach to turn the stomach into the shape of an hourglass. Because the band makes a narrow opening

between the upper and lower portions, food intake is decreased due to a feeling of fullness. This procedure does not involve any cutting, stapling, or any removal of portions of the stomach (Woodward, 2003). Complications of the Lap-Band system include the body's rejection of a foreign body, access port leak and infection, and possible movement of the silicone band (Woodward, 2003).

An example of malabsorption bariatric surgery is the distal gastric/long limb bypass (Woodward, 2003). This procedure uses a long distal intestinal bypass to shorten the intestine. This in turn decreases the absorption of calories. The procedure essentially uses a limb, which is attached to the top portion of the stomach and run over the stomach to the distal part of the intestines. Therefore, a large portion of the stomach is bypassed over. This surgery is reserved for those who are guaranteed to follow postsurgical instructions and make a lifelong commitment to vitamin supplement regimens. Not following postsurgical instructions can lead to nutritional deficiencies; more frequent, softer, and odorous stool; gas; and too much weight loss (Woodward, 2003). The most preferred and performed procedure has become The Roux-en-Y gastric bypass procedure, which is done both open and laparoscopically (Balsiger, Kennedy, & Abu-Lebdeh, as cited in Hagar, 2007) and is a combination of restrictive and malabsorption procedures (Woodward, 2003).

Roux-en-Y- Bariatric Surgery

The Roux-en-Y gastric procedure was developed by Mason and Ito (1967, as cited in Kendrick & Dakin, 2006; Woodward, 2003). It was the second surgical procedure to treat obesity and although it has gone through modifications for safety,

decreases in complications, and clinical efficacy, it has stood the test of time and is considered the "gold standard" of weight-loss surgery (Woodward, 2003). The Roux-en-Y is considered a "gold standard" because of its proven success in countless research studies that have followed its long-term outcomes (Woodward, 2003). The Roux-en-Y "procedure surgically alters the stomach's capacity, but differs from simple restrictive surgeries by rerouting or bypassing parts of the small intestine, causing slight malabsorption or more specifically, maldigestion" (Woodward, 2003, p. 93).

The Roux-en-Y (see Figure 3) is done by stapling the stomach into two parts. The top part, a small pouch, now makes up 10% of the stomach and the bottom part of the stomach, which no longer stores food, makes up the other 90% (Woodward, 2003). Both parts of the stomach still function, but the smaller portion now restricts food intake and the larger portion no longer stores food (Woodward, 2003). The small intestine is an important part of the Roux-en-Y procedure. The middle portion of the small intestine is the jejunum and the proximal portion of the small intestine is the duodenum (Williamson, Welch, & Malt, 1983).

> The surgeon then surgically divides the small intestine a short distance down its length. In order for the upper small stomach pouch to empty, one section of the divided intestine is connected to it. This connection of the intestine to the small stomach pouch is called an anastomosis and is purposely made smaller in diameter to delay food from emptying the pouch, causing longer satiety (feeling of fullness). The other intestinal end is then rejoined by connecting intestine to intestine, creating minimal malabsorption of food. Malabsorption reduces calorie

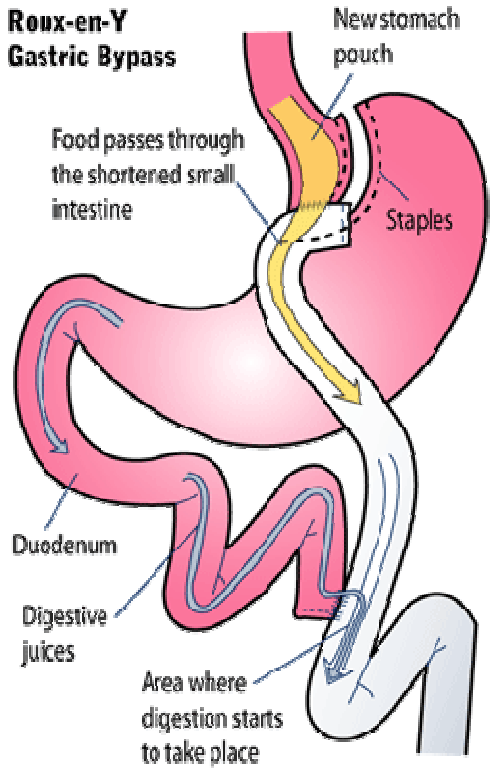

Figure 3. Overview of the Roux-en-Y gastric bypass. By Thomas Camarda, 2014.

> and nutrient absorption by causing a delay of digestive juices from mixing with food until further down at the intestine to intestine site. (Woodward, 2003, p. 94)

One common complication associated with Roux-en-Y is nutritional deficiencies in Vitamins A, B_{12}, D, E, and folic acid (Woodward, 2003). In addition, mineral uptake, such as that associated with calcium and iron, can be affected. A person must adhere to a vitamin and minerals supplement regimen for the rest of their lives to avoid this complication. Another complication is dumping syndrome. With Roux-en-Y, the pylorus sphincter, which acts like a gate keeper for food, is bypassed. Therefore, dumping can occur when poor food choices are consumed and/or food is eaten too quickly, and therefore rapidly passes into the intestine. This then results in an increase of water being

pulled into the intestine, propelling the food down the intestinal tract even faster. When this happens, a person can experience diarrhea, nausea, abdominal cramping, rapid heart rate, sweating, weakness, and dizziness. To avoid this complication, patients are advised to eat slowly and refrain from consuming sugar-rich foods like soft drinks, candy, and cake.

Other complications associated with Roux-en-Y are possible ventral incisional hernias, ulcers at the stomach to intestine connection, leaks at the staple line, Y-limb obstruction, and stomal stenosis. Complications, such as leaks, can be caused by nonadherence to dietary restrictions regarding the portion size of food that can now be eaten (Woodward, 2003). Gallstone formation can also be a complication of Roux-en-Y. Gallstones can occur when patients take Nonsteroidal anti-inflammatory drugs, which doctors of bariatric patients often precaution against. Gallstones can also occur if a person does not take prescribed postsurgical preventative medications, such as ursodiol (Higa, Boone, & Ho, 2000).

No matter what surgery is chosen, the patient must be compliant with the healthcare provider's postsurgical recommendations (Health Partners, 2004). In general, liquids are to be sipped 30 minutes before or after meals, but not during. Proteins are to be eaten first and as part of every meal. Meals must be balanced and carbohydrates should be limited. Only healthy carbohydrates, such as fruits, vegetables, and low-fat dairy, are recommended. Meals should be eaten slowly and chewed thoroughly. After bariatric surgery, the risks of vitamin deficiencies are increased. Therefore, the patient must take multivitamins, calcium, and vitamin B12 every day for the rest of their life.

Physical activity is also to be part of everyday life. The most important postsurgical direction is to avoid overeating (Health Partners, 2004). Failure to comply with these postsurgical recommendations or requirements can lead to a variety of physiological complications.

In summation, there are various complications associated with bariatric surgery (Hartmann, personal communication, August, 23, 2012). Certainly, there is less weight loss with noncompliance, especially with those who have a binge-eating disorder. The stomach pouch can be stretched by overeating to the point that pouch size is no longer a barrier to overeating. Failing to take the vitamins and minerals will result in micro-nutrient deficiencies. Not adhering to activity restrictions soon after surgery increases the risk of dehiscence and ventral hernias. Common bariatric surgery complications include stomal obstruction, cardiac arrest, pancreatitis, atelectasis, kidney failure, splenic injury, vitamin deficiency, bleeding, leakage, deep venous thrombosis, pulmonary embolism, wound infection, wound dehiscence, C. difficile, stricture, endoscopy, and gastrointestinal ulcer (Hartmann, personal communication, August, 23, 2012).

Perioperative Care of the Bariatric Surgery Patient

Perioperative care is important to avoid complications. Perioperative care encompasses all periods of the patient's health and welfare (e.g., preoperative care before surgery, intraoperative care during the surgery, and postoperative care after the surgery; McGlinch et al., 2006). Perioperative care of the bariatric surgery patient is paramount and in many respects, is the responsibility of both the healthcare provider and the patient. For example, if a patient does not comply with perioperative care instructions, many

complications can arise. Complications that arise from bariatric surgery are often considered to be an indicator for patient poor compliance (McGlinch et al., 2006).

Comprehensive perioperative care should be multidisciplinary, consisting of professionals from the fields of medicine, nutrition, psychiatry, surgery, nursing, and anesthesia (Buschwald, 2005, as cited in Collazao-Clavell et al., 2006; Owers et al., 2012). At all steps of care, there should be a welcoming, patient-friendly, safe, and dignified environment. This may require specially-built nursing units with handicap parking, armless chairs, portable hydraulic lifts, overhead lifts, weight-rated beds, and large gown sizes. An environment that makes the experience as easy as possible and does not draw attention to the person's weight should be created (Collazao-Clavell et al., 2006; McGlinch, et al., 2006).

In terms of preoperative care, the National Institute of Health's Consensus Development Conference Panel (1991, as cited in Collazao-Clavell et al., 2006) recommends four criteria for bariatric surgery. These criteria are: (1) BMI greater than or equal to 40 with comorbid conditions, (2) failure of nonsurgical weight-loss efforts, (3) absence of medical and psychological contraindications, and (4) well-informed, compliant, and motivated patients. The preoperative care that starts the evaluation of these four criteria often begins with a primary care physician or family doctor. Initial evaluation will entail a physical examination and routine laboratory tests. The physical should examine previous weight-loss attempts, pulse rate, blood pressure, height, weight, BMI, waist circumference (Collazao-Clavell et al., 2006), anesthetic and surgical histories, obstructive sleep apnea history, exercise tolerance, and stability or worsening of

pre-existing medical conditions such as diabetes, stroke, hyperlipidemia, heart failure, atrial flutter, and venous thrombosis (McGlinch et al., 2006; Owers et al., 2012).

Psychiatric and psychosocial assessment is standard for patients considering bariatric surgery (Callazo-Clavell, Clark, McAlpine, & Jensen, 2006). In a survey of 81 bariatric surgery programs, 86% required some sort of behavioral health screening (Bauchowitz, Gonder-Frederick, & Olbrish, 2005, as cited in Sockalingham et al., 2011). Assessment by a behavioral health specialist is put in place to make sure there are no potential or actual psychological issues that could impede the success of surgery (Garza, 2003). In some cases, bariatric surgery candidates are denied surgery outright or temporarily denied surgery until psychiatric issues are resolved. Psychiatric disorders that can delay or eliminate a person from bariatric surgery include drug and alcohol abuse, schizophrenia, severe mental retardation, or an inability to understand all aspects of the surgery (Bauchowitz, Gonder-Frederick, & Olbrish, 2005, as cited in Callazo-Clavell et al., 2006, and Sockalingham et al., 2011).

Physical and psychological assessment are not the only aspects of preoperative care. Garza (2003) states that "education is key to helping patients achieve optimal health and better overall quality of life as a result of having undergone weight-loss surgery" (p. 104). Proper education of patients is more than allowing patients to investigate bariatric surgery on the Internet, which can yield varying opinions, horror stories, conflicting information, and incorrect information. Instead, trained healthcare providers should supply the bariatric patient with accurate information so they can make informed decisions with which they are comfortable. This education can occur in one-to-one

sessions or in groups, and may use written materials and videos, but communication is the key. Unfortunately, this may require going over information that the patient is already familiar with, which consists of general information about what obesity is and its physical, psychological and social ramifications (Garza, 2003). The patient should also be educated in detail as to the type of surgery available such as restrictive, malabsorption, or a combination of the two. Descriptions of the surgery should include anatomy, rationale, and goals of each surgery. Moreover, the patient should be informed of every complication that can occur during and after the surgery (Garza, 2003).

During patient education, patients should be encouraged to lose weight before surgery (Owers et al.,2012). Any amount of weight loss simply makes the surgery easier, as there is less visceral fat to cut and work through. Presurgical weight loss is also an indicator that the patient can comply with healthcare instructions and may serve as a predictor of surgical success. It also instills an attitude of a healthy lifestyle prior to surgery, which may make the postsurgical lifestyle changes easier (Owers et al., 2012). Preoperative education is important because it gives the patient necessary information for making the surgery a success. A failure on the patient's part to adhere to the information given during educational sessions may lead to complications.

Intraoperative care differs from pre- and postoperative care in that it is primarily the healthcare provider's responsibility. Regarding intraoperative care, the bariatric patient is typically difficult to intubate because of a large neck circumference (Owers et al., 2012). However, appropriate positioning during the anesthetic process can reduce difficult intubations. Overall, positioning is one of the most important aspects of

intraoperative care, which can be difficult with morbidly obese patients. To make proper positioning possible, sufficient labor must be available in addition to tools such as inflatable mattresses and lifts. Because bariatric patients need various positioning to avoid various intraoperative problems, it is important that restraints are secure so that patients will not slip or fall. When it comes to transferring, positioning, and securing bariatric patients, these intraoperative concerns are just as important to staff safety as they are to patient safety (Owers et al., 2012)

Another major concern of intraoperative care of the bariatric patient deals with anesthesia (McGlinch et al., 2006). Obesity can delay the uptake of anesthesia and its relay to the brain, which may increase the risk of awareness of the surgery. The use of certain less-soluble anesthetics reduces the impact of fat tissue on anesthetic uptake by the lungs and relay to the brain, allowing for faster sedation times and reducing the chance a person may be aware of what's happening at the early stages of the surgery (McGlinch et al., 2006).

Another concern for intraoperative care is air in the abdomen, also known as pneumoperitoneum (McGlinch et al., 2006). Pneumoperitoneum causes increased vascular resistance, low cardiac index, and increased arterial pressure. These hemodynamic (i.e., amount and force of blood flow) changes are dangerous to the patient. During bariatric surgery, the abdomen must be inflated by having air blown into it. Severely obese people can experience pneumoperitoneum during the process of abdominal insufflation. The risk can be reduced by intravenous fluid therapy designed to moderate and maintain heart functioning and blood flow. If pneumoperitoneum occurs,

immediate release of abdominal pressure and putting a person in an upright position can help resolve the issue (McGlinch et al., 2006).

After surgery, it is imperative that perioperative education be reemphasized and teaching continues as care is provided (Garza, 2003). For example, at the time of discharge, written material that includes information about diet, diet progression, appropriate food choices, vitamin and protein supplements, hydration, and activity should be given to the patient (Garza, 2003). In addition, new education should be given to the patient, such as dealing with changes in bowel habits, medication instructions, wound care, and what signs and symptoms to look for that may indicate complications (Garza, 2003). It is also important to stress that the patient should continue care from their interdisciplinary team and that they must keep regular follow-up visits. Dietitians should be involved to reinforce dietary education, offer reassurance and support, assess how the patient is adapting to the new diet, discuss food choices and nutrients, and encourage the patient to join support groups that focus on weight loss and individual concerns. Physicians should be involved in postoperative care to assess how the healing process is going, give physical examinations, order follow-up laboratory work, and order x-rays when complications are suspected (Garza, 2003). It is also important that the bariatric patients meet with their behavioral health expert and discuss their experiences with adapting to new lifestyle changes (Garza, 2003). While it is primarily the patient's responsibility to follow postsurgical instructions to avoid negative outcomes of surgery (i.e., little or no weight loss, complications), social support is often a key component to that person's wellbeing (Abbey, Abramis, & Caplan, 1985) and success.

Andrews (1996) offered a theoretical framework for the postsurgical treatment of bariatric patients that can help the patient succeed. Her theory encourages the use of an interpersonal process that encourages postsurgical compliance, which contributes to bariatric surgery success. In her study, Andrews (1996) gave three psychological instruments to bariatric patients. No psychopathologies that would exclude the patient for surgery, such as psychotic disorders, mental retardation, and substance abuse, were found in the study population. However, secondary pathologies were present, which included body dissatisfaction, nervousness, depression, social phobias, hostility, and impulsivity. Andrews (1996) hypothesized that without treatment of these secondary pathologies, patients would have poor or negative success with their bariatric surgery.

Supportive social interaction is a key element to bariatric surgery. Feeling that a main contributor to bariatric surgery failure is that the patient often "disappears" after surgery, Andrews (1996) contended that it is imperative that psychologists use interpersonal processes to get patients to engage in long-term multidisciplinary support. The conceptual framework for the interpersonal process approach is based on the clinical theories of interpersonal theory, object relations theory, and family systems theory. "In very simplistic terms, these theories make the assumption that the primary motivation of the human being is to establish and maintain emotional ties with significant others" (Andrews, 1996, p. 427). As people interact with others on a daily basis, they develop a sense of self and personality, as well as adapting to family and cultural norms. Through this, people learn appropriate intimate connections with others, as well as appropriate boundaries, which can lead to trust in human encounters. To this end, people continue

growing and prevailing. The patient who has support from others, strong interpersonal relationships, and healthy family functioning is likely to comply with postsurgical instructions and have a better outcome from surgery (Andrews, 1996).

This is echoed in Prochaska's stages of change (Prochaska & DiClemente, 1982; Prochaska & Norcross, 2001; Prochaska et al., 1994a; Ruggiero & Prochaska, 1993), one of the most dominant models for change. Their model is called the TTM, but is often simply referred to as "stages of change" (Armitage, 2009). TTM focusses on three overall main stages: (1) a person's readiness to act on a new behavior, (2) acting on the new behavior, and (3) maintaining the new behavior. The first main stage of readiness is made up of three substages of precontemplating, contemplating, and planning. In total, TTM consists of five stages: readiness (precontemplation, contemplation, planning), action, and maintenance (Prochaska & DiClemente, 1982; Prochaska, et al., 1994a; Prochaska & Norcross, 2001; Ruggiero & Prochaska, 1993). Research supports that TTM is generalizable across a multitude of behaviors, including diet, exercise, smoking, drug use, adolescent delinquency, safe sex, and sunscreen use (Prochaska et al., 1994b).

The precontemplation stage is when others around a person are aware of an issue, but the individual is not aware. At this stage, a person will say things like, "As far as I'm concerned, I don't have any problems that need changing" (Prochaska & Norcross, 2001, p. 443). In the contemplation stage, the individual becomes aware a problem exists, but there is no plan to change. In this stage, a person acknowledges they have a problem that needs addressed. From here, the person enters the preparation stage and gets ready to change by setting goals and taking "baby steps" towards their goal. In the action stage,

the person modifies their behavior on a daily basis and commits time and energy to change. In the maintenance stage, a person continues with the modified behavior and tries to prevent relapse. Interestingly, fostering social support and caring relationships is one of the fundamental components of TTM. In other words, change very seldom happens without social support (Prochaska & Norcross, 2001).

A few studies have applied TTM to the field of weight management (Andrés, Saldaña, & Gómez-Benito, 2009; Johnson et al., 2008; Seals, 2007; Spencer, Wharton, Moyle, & Adams, 2007; Stoltz, Reysen, Wolff, & Kern, 2009). Stoltz et al. (2009) stated that understanding how TTM applies to weight loss can help practitioners help clients understand how lifestyle may either hinder or promote a person's ability to achieve weight-loss goals as well as the importance of social support.

While the literature is devoid of any articles related to TTM and bariatric surgery, a Walden University dissertation by Dykstra (2012) innovatively described how TTM can be applied to bariatric surgery. In the precontemplation stage, an individual may have previously tried to change but failed and at the current time has no intention to change behavior. In the contemplation stage, the individual starts evaluating the pros and cons of weight loss and weight-loss surgery. Moving onto the preparation stage, the person determines that the pros outweigh the cons and therefore plans to make a change in the near future. In the action stage, bariatric surgery is performed. In the maintenance stage, the person tries to deal with temptations and stressors of the changes required for successful bariatric surgery and works to prevent relapse (Dykstra, 2012).

To this end, the three theoretical foundations that are important to the present study are: (1) TTM of behavior change (Prochaska et al., 1994), (2) interpersonal processes (Andrews, 1996; Sherif, 1936), and (3) protection motivation theory (Cialdini & Trost, 1998). TTM simply states that change is important and people go through certain stages of change. In addition, social support is important to change. The interpersonal processes theory states that people are most successful with the change needed for weight-loss surgery when they have social support. The protection motivation theory states that we act in ways that protect us from harm. Therefore, to avoid harmful complication may be the reason that people comply with postsurgical instructions. While these theories have not been investigated together, they do not appear to be mutually exclusive and it can be contended that they relate to bariatric surgery outcomes. For these reasons, these concepts are used for the theoretical foundation of the present study.

Outcomes of Bariatric Surgery: Success or Failure

The weight loss experienced after bariatric surgery is largely due to the surgery, but significant changes in eating behavior following the surgery are also required (van Hout et al., 2003). Efforts have been made to identify psychological factors that can predict which patients will be successful. Putative factors predicting an unsuccessful outcome include: poor motivation, depression and other psychiatric disorders, low self-esteem, rigid personality, and eating disorders. However, there is evidence that these factors do not adequately predict outcome and should not be considered contraindications to surgery. In fact, there is good evidence that many of these, including depression and eating disorders, actually improve after bariatric surgery (Averbukh et al., 2003;

Bocchieri et al., 2002; Shiri, Gurevich, Feintuch & Beglaibter, 2007; van Hout et al., 2003).

To date, the studies on psychological outcomes of bariatric surgery have not revealed consistent results. Almost all show an overall improvement in quality of life, but there are some contradictory reports on the outcome of patients with depression and patients with eating disorders, particularly binge-eating disorder (Ballantyne, 2003; Dymek et al., 2001; Hsu, Betancourt, & Sullivan, 1996; Hsu, Sullivan, & Benotti, 1997; Kalarchian, Marcus, & Wilson, 2002).

There is also evidence that many patients develop new tensions in their lives following surgery (Bocchieri et al., 2002). While they have psychologically experienced a rebirth and transformation, these patients also experience the tension of becoming a full participant in a complex world with new demands. For example, they may come to feel more socially desirable and become dissatisfied with existing relationships that were accepted previously (Bocchieri et al., 2002).

At this time we cannot say for certain which psychological and social factors represent even relative contraindications for bariatric surgery. For the purposes of this study, successful bariatric surgery will be defined as sustained weight loss and few to no complications. Whether or not a person has any complications rely heavily on the patient's compliance to postsurgical instructions (Hartmann, personal communication, August, 23, 2012).

Sustained Weight Loss and Improvement of Obesity-related Illnesses

The goal of bariatric surgery is not simply weight loss, but sustained weight loss for the rest of the person's life. The goal of sustained weight loss is to prevent or eliminate obesity-related illnesses. An article published in the New England Journal of Medicine (2004) states that even

> over the short term (one to three years), lifestyle changes resulting in weight loss result in improvements in insulin resistance, diabetes, hypertension, and lipid disturbances or in the prevention of these conditions. In contrast, several (but not all) observational epidemiologic studies have suggested that weight loss is associated with increased overall mortality and mortality from cardiovascular causes, not only among thin and normal- weight subjects, but also among obese subjects. (Sjöström et al., 2004, p. 2684)

Sjöström et al. (2004) conducted a prospective study on 3,505 obese patients. Any patient who was receiving bariatric surgery was matched with a control group of patients who were not receiving bariatric surgery. There were 18 matching variables, including age, gender, BMI, blood pressure, cholesterol, and diabetes. The outcomes of interest were mortality, weight, and risk factors such as diabetes, cardiovascular disease, and lifestyle. Results showed that at two years the control group had significantly increased in weight by 1% while the bariatric surgery group decreased in weight by 23.4%. By 10 years, the control group increased in weight by 1.6% while the surgery group decreased by 16.1%. At both the two- and 10-year postsurgical time markers, recovery from diabetes, hypertriglyceridemia, unhealthy cholesterol levels, hypertension, and

hyperuricemia were higher in the surgery group than the control group. The surgery group also had lower overall prevalence of diabetes, hypertriglyceridemia, and hyperuricemia at two and ten years after surgery. In addition, those who had surgery had greater weight loss and reported a more physically-active lifestyle than those who did not receive surgery. This study supports the contention that successful bariatric surgery that results in sustained weight loss can subsequently reduce obesity-related illnesses.

Bariatric surgery is also associated with decreased mortality (Pontiroli & Morabito, 2011). A meta-analysis of over 44,000 obese patients found that bariatric surgery reduced long-term mortality. In other words, those who had bariatric surgery were less likely to die than controls who did not receive weight-loss surgery. This was especially true for cardiovascular-related deaths (Pontiroli & Morabito, 2011).

Psychosocial issues also appear to be improved by bariatric surgery. Herpertz et al. (2003) conducted a systematic review of the literature that investigated if obesity surgery improves psychosocial functioning. Results of the review indicated that poor psychosocial functioning after bariatric surgery was atypical: "On the contrary, there is substantial evidence to suggest that surgery is associated with an improvement of psychosocial status" (Herpertz et al., 2003, p. 1308). Specifically, after bariatric surgery, self-confidence, self-esteem, self-consciousness, liking oneself and being satisfied with one's appearance are observed to improve after bariatric surgery.

In addition, bariatric surgery has been observed to improve people's quality of life. Specifically, patients were observed to have better relationships with friends, family members, and significant others, as well as improved sex lives. According to Herpertz et

al. (2003), bariatric surgery has also been associated with increased education pursuits, gaining employment, improved work performance, fewer days off work, and advancement in the workplace. Furthermore, obesity surgery was also observed to have a positive effect on Axis I psychiatric disorders like anxiety and depression (Herpertz et al., 2003).

Chang et al. (2010) compared 102 obese patients who were scheduled to undergo bariatric surgery to 200 nonobese individuals. Results of a presurgical physical examination of all patients demonstrated that those who met the criteria for obesity had poorer health and more comorbidities than the nonobese group. In addition, those who were obese scored significantly lower on quality of life measures in the physical, social, and psychological domains. While those who had postsurgical complications had more difficulty maintaining improvements, there were significant decreases in obesity-related comorbidities and significant increases in physical, social, and psychological quality of life scores for those who had undergone bariatric surgery. At one year postsurgery, bariatric patients reached levels of physical, social, and psychological quality of life similar to the control group of healthy nonobese individuals (Chang et al., 2010).

Martinez, Lopez, Gimenez, Perez de la Cruz, and Orduna (2010) conducted a retrospective study on 100 bariatric patients. Patients were measured on various constructs before surgery, and again measured at three months, six months and one year after surgery. Variables of interest were sexual function, employment, self-esteem, everyday activities, energy, pain, emotional reactions, sleep, social isolation, and mobility. In addition, comorbidities including hypertension, diabetes, sleep apnea,

arthritis, cardiovascular disease, and hyperlipidemia were collected. At one year postsurgery, patients lost 25% to 49% of excess weight and 81% of the patients had resolution of major comorbidities. In addition, there were significant improvements in sexual and social relationships, employment, self-esteem, and physical activity (Martinez et al., 2010). Positive psychological impacts of bariatric surgery have also been observed in the realms of greater appreciation of life, greater sense of inner strength, and improved interpersonal capabilities (Shiri et al., 2007).

Research demonstrates that obesity surgery can be associated with sustained weight loss, decreases in obesity-related physical and psychosocial issues, improved quality of life, and decreased morbidity and mortality; however, the surgery is not without risks. These risks increase with noncompliance to postsurgical instructions regarding lifestyle changes.

Predictors of Bariatric Surgery Outcomes

Change

As mentioned earlier, change is important to weight loss and maintenance. With a complicated phenomenon such as weight change, many theories have been proposed as explanations. One of the most well-accepted theories is the Transtheoretical Model of change (TTM). While no research has investigated TTM and its relationship to bariatric surgery, a small body of research has investigated TTM as it applies to changes in weight. For example, Stoltz et al. (2009) found that people in the preparation stage of weight loss are more likely to make small behavior modifications, such as using less butter. These substitutions in the preparation stage will not achieve full behavior change,

but can serve as a catalyst to move through the remaining stages of change. Stoltz et al. (2009) conducted additional research on TTM and weight change. Their study found that those who made lifestyle changes that fit into TTM achieved weight loss. This was especially true for those who felt they had helping supportive relationships for the various stages of change.

Compliance

The seminal compliance research, conducted by Cialdini (1998, 1999, 2001, 2004), came from the fields of social science and business, which was based on the historical research of World War II persuasion programs used in the 1940s (Lewin, 1947).

> Compliance refers to a particular kind of response—acquiescence—to a particular kind of communication—a request. The request may be explicit, as in the direct solicitation of funds in a door-to-door campaign for charitable donations or it may be implicit, as in a political advertisement that touts the qualities of a candidate without directly asking for a vote. But in all cases, the target recognizes that he or she is being urged to respond in a desired way. (Cialdini & Goldstein, 2004, p. 591)

In the field of social science, Cialdini and Trost (1998) identified six psychological principles that can influence a person's decisions to comply with a request. One or more of these principles can apply to any situation. The six psychological principles are the tendencies to: (1) reciprocate a gift, favor, or service, (2) be consistent with prior commitments, (3) follow the lead similar to others, (4) accommodate the

requests of people we know and like, (5) conform to directives of legitimate authority, and (6) take advantage of rare opportunities.

Compliance is not only important to the field of business, sociology, and psychology, but to the field of medicine. It is reasonable to apply Cialdini and Trost's (1998) principles to the field of medicine, as well. For example, a medical patient may feel like they have to comply based on receiving a service from their healthcare provider. Or, a patient knows that taking part in their healthcare is a commitment and may feel the need to comply with a doctor's recommendations. In addition, patients often see their doctor as an authority figure and therefore comply with doctor's instructions. Finally, many medical procedures are designed to be conducted once. Therefore, a person knows that the opportunity is rare and needs to take advantage of the opportunity.

In 2003, the World Health Organization (WHO) published a pivotal 211-page report on adherence to medical advice. Over the years, adherence and compliance have been used interchangeably, with some debate as to whether there is a difference (Tilson, 2004). Medical compliance was initially described as the degree to which the patient's behaviors match that of the prescribers (Haynes, Taylor, & Sackett, 1979). WHO (2003) defines compliance as "the extent to which a person's behavior—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a healthcare provider" (p. 3).

The WHO (2003) report indicated the importance of compliance by referencing a landmark study by Morisky, Green, and Levine (1986). Morisky et al. (1986) investigated hypertension patients over a five-year period. Patients were randomly assigned to four

adherence-promoting interventions: (1) physician counseling, (2) group sessions with a social worker, (3) family support for medication taking, or (4) to a control group. The five-year analyses showed positive outcomes for those who complied with one of the three intervention groups and the intervention groups had a 57% less chance of dying than the control group (Morisky et al., 1986). Despite the benefits of medical compliance, the WHO (2003) report indicates that medical compliance is often low. For example, it was found that only 30% of diabetes Type 2 patients followed exercise instructions, while 52% of Type 2 patients followed dietary instructions.

For bariatric surgery, the overall theory of success has to do with psychological variables that affect physical health and health-related behaviors, especially compliance with treatment (Hartmann, personal communication, August, 23, 2012). Research by Coleman, Toussi ,and Fujoki (2010) retrospectively assessed 110 patients who had bariatric surgery and at least one year of follow-up data. Using outcome data of weight loss and complications (e.g., presence of dumping syndrome) two grouping variables were created: successful bariatric surgery and nonsuccessful bariatric surgery. Results indicated that exercise noncompliance, appointment noncompliance, and poor food choices were associated with unsuccessful bariatric surgery.

To understand why a patient would want to comply with postsurgical instructions, such as in bariatric surgery, it is important to understand why people seek weight-loss surgery. Wadden et al. (2001) state that normal weight people cannot imagine the prejudice, discrimination, and stigmatization that obese individuals face. In fact, research shows that even doctors succumb to this prejudice (Maddox, Blacker, & Liederman,

1968; Maddox & Liederman, 1969; Olson, Schumaker, & Yawn, 1994; Rand & MacGregor, 1990, as cited in Wadden et al., 2001). Furthermore, research found that college students picked drug users and thieves as more suitable spouses than obese people (Venes, Krupka, & Gerard, 1982, as cited in Wadden et al., 2001). Therefore, avoiding discrimination is one reason people seek bariatric surgery. In turn, complying with the medical instructions of the surgery is a way to increase the odds of successful outcomes, which could result in less discrimination.

Libeton, Dixon, Laurie, and O'Brian (2004) investigated motivators as to why patients were seeking bariatric surgery. These six motivators were: (1) appearance, (2) current medical conditions associated with obesity, (3) wanting more physical fitness in their life, (4) future obesity-related health concerns, (5) social embarrassment, and (6) physical limitations of day to day living. The results indicated that most of the 67 participants thought that all of the six motivators were major reasons for seeking surgery. However, both men and women rated improving health issues related to obesity as the primary motivator for wanting weight-loss surgery. Overall, men were more concerned about future obesity-related health problems and women were more concerned with body image and appearance (Libeton et al., 2004).

Compliance with surgical instructions can often be gauged from a person's previous and current compliance with their own healthcare (LeMont, Moorehead, Parish, Reto, & Ritz, 2004). Indicators of compliance revolve around how much a person is an active participant in their healthcare. A compliant person follows through with treatment recommendations for physical and mental health issues, when applicable. Also, this type

of person takes medication as prescribed, keeps appointments with healthcare providers, and participates in routine care like physicals and dental exams. Women who keep current on their breast and gynecological exams are often considered compliant (LeMont et al., 2004).

While it can be inferred why people comply with bariatric surgery instructions based on their reasons for wanting the surgery and how active they are in their own healthcare, only a few research studies have directly investigated presurgical psychosocial variables related to compliance. One study that focused on predicting compliance was conducted by Toussi et al. (2009). These researchers investigated the relationship between patient characteristics, weight loss from gastric bypass surgery, and compliance with physician's pre- and postsurgical instructions.

Toussi et al. (2009) hypothesized that psychosocial variables are not a key factor in predicting bariatric surgery compliance. Toussi et al. (2009) evaluated Readiness to Change (RTC) and reasons for wanting surgery in 200 bariatric surgery patients. RTC was assessed using the University of Rhode Island Change Assessment Scale developed by Sutton (2001), and the Major Reason for Bariatric Surgery questionnaire developed by Libeton et al. (2004). Reasons for seeking surgery included appearance, medical conditions, physical fitness, health concerns, physical limitation, employment, and advice from others. After controlling for other variables that can affect weight loss, a logistic regression was performed to determine which RTC and reasons for weight-loss surgery variables were predictive of weight-loss surgical outcomes, which included weight loss, complications, and compliance (Toussi et al., 2009).

Descriptive statistics were implemented and demonstrated that there were many reasons for patients wanting to have bariatric surgery: improved health (40%), improved medical conditions (29%), to improve appearance (18%), improved physical fitness (6%), to improve physical ability (5%), improvement of employment prospects (1%) and on advice from others (1%). Results indicated that RTC did not predict weight loss, complications, or compliance. However, women who wanted surgery for aesthetic reasons were associated with more weight loss two years after surgery. Toussi et al.'s (2009) study supports previous research (Douglas, Ford, & Munroe, 1981; Edell, Edington, Herd, O'Brien, & Witken, 1987; Fontaine, Cheskin, & Allison, 1997; Williams, Grow, Freedman, Ryan, & Deci, 1996) that contends that compliance is not affected by motivation or reasons for wanting surgery. Instead,

> the prime mechanism of action of adjustable gastric banding surgery is physiological and that the band is a tool causing sustained change that allows for changes in hunger, satiation, and satiety. It is this physiological change that allows for changed eating behavior and weight loss. (Toussi et al., 2009, p. 699)

While the Toussi et al.'s (2009) research supports that psychological variables are not associated with bariatric surgery compliance, a body of research indicates that they do predict compliance. Bannen et al. (2008, as cited in Downing, Bennett, & Gilbertson, 2011) found that depression, paranoia, and low coping strategies correlate with noncompliance. Coleman, Toussi, and Fujoki (2010) assessed patient characteristics before and after surgery, including five compliance categories of: (1) exercise adherence,

(2) weight-loss plan adherence, (3) medication adherence, (4) missed appointments, and (5) poor food choices.

Boeka et al. (2010) investigated psychosocial predictors of intentions to comply with bariatric surgery guidelines. They found that having high self-efficacy and perceiving that something threatening could happen if they didn't follow postsurgical instructions predicted compliance after surgery. The theoretical framework for perceiving that something threatening could happen if patients didn't follow postsurgical instructions comes from protection motivation theory (Prentice-Dunn & Rogers, 1986; Rogers & Prentice Dunn, 1997, as cited in Boeka et al., 2010). In this model, patients perceive something as a substantial threat to their health and then try to find effective ways to avoid that threat. A perceived threat may energize a person to protect themselves and follow through with recommendations. A person who has high self-efficacy is much more likely to apply the behavior changes that are needed to follow through with recommendations and avoid the threat. For example, adhering to something like postsurgical instructions will enable a patient to avoid negative health consequences and could make one more likely to comply with the dietary, behavioral, and lifestyle changes needed to have success with this surgery (Boeka et al., 2010). This is similar to Sherif's (1936) and Cialdini and Trost's (1998) theory that people are motivated to act in ways that help them achieve their goals and comply with recommendations that promote our survival. Overall, there appears to be a dissent in the literature investigating predicting complications with psychosocial variables. The current study focusses on three main psychosocial predictors of bariatric surgery: depression, obesity-related quality of life,

and healthy family function. However, because the bariatric surgery questionnaire used in this study assesses other psychosocial variables, such as history of abuse and eating disorders, they will be looked at as secondary predictors, but will not be the focus of the study or literature review. However, very few studies look at single psychosocial predictors, but instead look at a group of psychosocial predictors.

Regarding depression, Averbukh et al. (2003) was one study that looked solely at depression scores and their ability to predict weight loss following Roux-en-Y gastric bypass. Thus, the next section, which focuses on psychosocial predictors of bariatric surgery outcomes, is broken into three main sections: (1) depression and other psychosocial predictors, (2) obesity-related quality of life, and (3) healthy family functioning. Obesity-related quality of life and healthy family functioning appear to be novel predictors of bariatric surgery outcomes.

Depression and Other Psychosocial Variables

The concept or phenomenon of predicting bariatric surgery outcomes has been applied and articulated in previous research, which benefits the framework of the current study. In the early 2000s, there were very few empirical studies investigating the potential that psychosocial factors have an impact on weight loss after bariatric surgery (Clark et al., 2003). Believing that it is important to determine psychosocial factors that either enhance or limit successful bariatric surgery, Clark et al. (2003) undertook a retrospective chart review to examine pre and postsurgical psychosocial variables' impact on weight loss following Roux-en-Y surgery. Eighty bariatric patients were evaluated before surgery (baseline) and at increments up to two years after surgery. Baseline

evaluations included psychosocial stressors, depression, anxiety, and history of psychiatric treatment (Clark et al., 2003)

Results indicated that those who had successfully participated in mental health and substance abuse treatment programs before surgery were more successful at losing weight two years after surgery. The investigators suggest that this is due to previously taking an active role in a treatment program, which may indicate acknowledgment of needing a support system, interest in developing skills for lifestyle change, and having good communication skills. Clark et al. (2003) acknowledge that a caveat of their study is not investigating psychosocial variables such as marital dissatisfaction, which is an indicator of social support. Nonetheless, the investigators contend that the results indicate the importance of psychosocial variables in predicting bariatric surgery outcomes (Clark et al., 2003).

Ray et al. (2003) hypothesized that certain psychosocial characteristics are predictive of success after Roux-en-Y surgery. A prospective study was undertaken and a set of surveys were given to patients before surgery and then one year after surgery. Presurgical and postsurgical questions were posed that pertained to number of previous diets and outcomes of those diets, marital status, satisfaction with marriage, sexual satisfaction, history of behavioral health conditions (e.g., depression) and sexual abuse, number of people in the patient's support system, obesity-related health problems, social distress from obesity and amount of stress that surgical dietary restriction will produce.

Overall, 60% of patients lost half of their excess weight when evaluated one year after surgery (Ray et al., 2003). Of those who did not lose weight, noncompliance with

postsurgical diets was suspected. Psychosocial variables of intrinsic predictors of significant weight loss at one year postsurgery were: increased previous diet attempts, more weight loss during previous diet attempts, and anticipated stress with postsurgery diet changes. Depression scores were not a significant predictor of bariatric success. Extrinsic psychosocial factors associated with more weight loss postsurgery were those having a greater number of confidants in their social support system. Marital status did not predict weight loss after surgery. Those who had a history of sexual abuse lost significantly less weight at one year postsurgery (Ray et al., 2003).

Since intrinsic factors were more associated with weight loss, Ray et al. (2003) hypothesized that a sense of coherence and self-confidence is an attribute needed in the pursuit of weight loss. The more short-term successful diet attempts a person has, the more insight, desire, and discipline they may apply to weight-loss surgery. Also, those who have a high amount of stress towards the dietary changes that surgery requires, might be less ambivalent towards weight loss and understand the necessity to comply. Having a support system outside of marriage may help with the stressors that come with obesity surgery. Those with a history of sexual abuse typically have higher rates of psychiatric conditions, which can be a contributing factor for less weight loss (Ray et al., 2003). Research also indicates that for those who have a history of sexual abuse, weight is sometimes used as a defense mechanism to reduce susceptibility to future attacks (Felliti, 1991, 1993). While Ray et al.'s (2003) findings support previous research by King (1996) that past sexual abuse is associated with less weight loss in traditional weight loss programs, Buser, Dymek-Valentine, Hilburger, and Alverdy (2004) found

that sexual abuse does not appear to be a negative prognostic indicator for gastric bypass surgery and that females with a history of sexual abuse are just as successful with weight loss following bariatric surgery.

Averbukh et al. (2003) theorized that "a patient's psychological state may influence the outcome of surgery through the degree of adherence to postsurgical follow-up and compliance with medical and dietary guidelines" (p. 833). To this end, they investigated the severity of depression before Roux-en-Y surgery and its relationship to weight loss following surgery. A retrospective chart review was conducted on 43 patients who filled out a Beck Depression Inventory (BDI) prior to their bariatric surgery and were again evaluated one year after their surgery. Demographic information, use of psychiatric medications, self-reported diagnosis of eating disorders, and substance abuse information that was collected presurgery was also evaluated (Averbukh et al., 2003).

A linear regression demonstrated that BDI scores significantly predicted less weight loss at one year. Other variables of interest, such as demographic information, use of psychiatric medications, eating disorders, and substance abuse did not predict postsurgical weight loss. Averbukh et al. (2003) surmise that previous research has shown a significant relationship between binge eating and depression; therefore, those with higher depression scores may have had binge-eating issues that would contribute to their lack of weight loss. Previous studies support that binge eating is an indicator of poor outcome for obesity surgery (Mitchell, Lancaster, & Burgard, 2001; Pekkarinean, Koskela, Huikuri, & Mustajoki, 1994, as cited in Kielman, Wolf, Hebebrand, & Senf, 2004).

Knowing that equal results do not occur in every bariatric surgery patient, along with understanding that bariatric surgery has risks that require better patient selection, van Hout et al. (2005) conducted a literature review on the psychological variables that may influence a person's success with bariatric surgery. Van Hout et al. (2005) claim that the predictors are often unreliable in that what is a strong predictor in one study has little or no predictive power in another study, which is especially true for specific psychiatric disorders like depression. Nonetheless, van Hout et al. (2005) uncovered that greater success following bariatric surgery does seem to be commonly predicted by a number of variables. These variables include: age (being "young"), gender (female), high self-esteem, good mental health, satisfactory marriage, high socioeconomic status, self-critical, good coping mechanisms, not morbidly obese, were obese before the age of 18, have concerns about their obesity, and have realistic expectations (van Hout et al., 2005).

The recent review of literature regarding psychosocial variables as predictors of weight loss following Roux-en-Y surgery was conducted by Sockalingham et al. (2011). These investigators searched PubMed for prospective studies published between 2000 and 2010 that evaluated psychosocial variables and their relationship to postsurgical weight loss. Of 219 studies that met the investigator's initial search criteria, 20 studies were prospective and comprised their final literature review. Sockalingham et al. (2011) support previous reviews that contend that the literature evaluating psychosocial variables as predictors of weight loss is conflicting. While short-term studies suggest that having a mood disorder, like depression and anxiety for a long period of time, predicts limited success with weight loss after Roux-en-Y surgery, long-term studies have not uncovered

any links. It is possible that being depressed impairs the person's ability to adhere with postsurgical instructions and lifestyle changes. In addition, history of sexual abuse, personality disorders and eating disorders did not consistently predict weight loss after Roux-en-Y. In their literature review, sexual abuse, personality disorders, and eating disorders often remain a recurring issue for many people, which like depression, may interfere with postsurgical success. The authors suggest that future research may have to look at the treatment and resolution of certain psychosocial factors before surgery and evaluate that as a predictor of Roux-en-Y success (Sockalingham et al., 2011).

Clark et al. (2003) lend support to this notion, as they found that those who simply went to psychiatric and substance abuse treatment before surgery had significant postsurgical weight loss compared to those who were not seeking treatment for psychiatric and substance abuse issues. As posed by Socksalingham et al. (2011), future research may also want to look at the number of psychosocial risk factors as predictors of weight loss after Roux-en-Y. For example, are fewer psychological comorbidities more predictive of more weight loss and vice versa (Sockalingham et al., 2011)?

This type of study would most likely prove to be a valuable research endeavor, as Sockalingham et al.'s (2011) review found that psychiatric comorbidity showed a trend towards less weight loss after Roux-en-Y. In other words, as the number of diagnosed psychiatric disorders went up, weight loss after surgery went down. In their review, one variable that was a robust predictor of weight loss after Roux-en-Y was social support. Sockalingham et al. (2011) surmise that social support adds a consistent and naturally supportive relationship that can reduce outside stigma from others, as well as buffer the

psychosocial stress that comes with postsurgical lifestyle changes. Moreover, increased social support can result in bariatric patients having someone to go with them to follow-up appointments and encourage them to adhere to postsurgical instructions (Sockalingham et al., 2011). While social support appears to be a predictor of successful bariatric surgery, it does not take into consideration the quality or helpfulness of each person's social support network. Future research may benefit from studying the health of a person's immediate family and the impact this could have of successful bariatric surgery.

While research investigating psychosocial predictors of bariatric surgery outcomes did not become a "hot topic" until the early 2000s, it has since maintained its importance for healthcare providers and researchers. Livhits et al. (2012) found 1,007 research articles that used preoperative factors to predict bariatric surgery success or failure. From these 1,007 articles, Livhits et al. (2012) found 115 articles that used preoperative weight and weight management, eating disorders, and psychiatric/psychosocial conditions as predictors, which they used to conduct a systematic review of the literature. Their results found that mandatory weight loss of 10-20 pounds was the most common predictor of bariatric surgery success. Factors that were commonly found to be predictors for bariatric surgery failure were superobesity, and personality disorders. Despite the breadth of research looking at predictors of bariatric surgery outcomes, the authors state that the dissent in the literature requires "further studies are necessary to investigate whether preoperative factors can predict a clinically meaningful difference in weight loss after bariatric surgery" (Livhits et al., 2012, p. 71).

Novel Predictors of Bariatric Surgery Outcomes

Quality of Life

While research demonstrates that obesity is related to diminished quality of life (Ogden et al., 2012) and that quality of life often improves after bariatric surgery (Chang et al., 2010; Lier, Biringer, Hove, Stubhaug, & Tangen, 2011; McLoed, Beban, Sanderson, McKillop, & Jull, 2012), the present study was unable to uncover any studies that directly investigated quality of life as predictors of bariatric surgery. Furthermore, a review of the literature found no studies that directly investigated obesity-related quality of life as a predictor of bariatric surgery outcomes.

Healthy Family Functioning

While marital satisfaction and social support have been investigated as possible predictors of successful bariatric surgery (Sockalingham et al., 2011), a review of the literature uncovered no articles investigating the "whole" of family functioning as a predictor of successful bariatric surgery. Beavers (1977) was a key theorist in the field of family functioning. His work assessed healthy family functioning as a cross section of family competence and family style (see Figure 4). The horizontal axis is made up of a spectrum of family competencies that range from severe dysfunction, to borderline, to midrange, to adequate, and to optimal. The vertical axis represents family style and ranges from centripetal, to mixed, and to centrifugal. Centripetal family styles are healthier as they change and adapt to meet each family member's needs, and they are generally closer in nature. The more a family falls towards optimal competence and centripetal family style, the more likely they are to be healthy.

Conversely, a severely dysfunctional family competence is marked by poor boundaries, confused communication, cynicism, denial, and ambivalence. The impact of an unhealthy family competence is great. However, even if they have a healthy family style that is centripetal, the impact on the offspring is still negative, and can result in children with sociopathic and borderline disorders. An optimal family competence is marked by capable negotiation, individual choice, respect, warmth, intimacy, and humor (Beavers & Hampson, 2000).

Beavers, Hampson, and Hulgus (1990) developed the Self-Report Family Inventory (SFI). This inventory, based on the Beavers Systems Model (BSM) of family functioning, measures the perceptions of family members about their families' competence and style. The main purpose of this inventory is to identify high-risk families for researchers and to evaluate change in families' functioning following intervention for clinicians. Scores from the SFI identify 9 types of families, such as optimal families, adequate families, and severely disturbed families (Beavers et al., 1990).

A literature review of the present study found only one current and systematic review of the literature (Livhits et al., 2012) investigating social support and weight loss after bariatric surgery. This systematic review states that from 1988 to 2010, only 10 articles directly investigated social support and bariatric surgery weight outcomes. Results indicated that postsurgical support groups were most likely to predict weight loss after surgery. Other types of social support (e.g., marriage and close confidants) were limited in scope, had mixed results, and did not directly address the degree of family functioning and outcomes from bariatric surgery (Livhits et al., 2010).

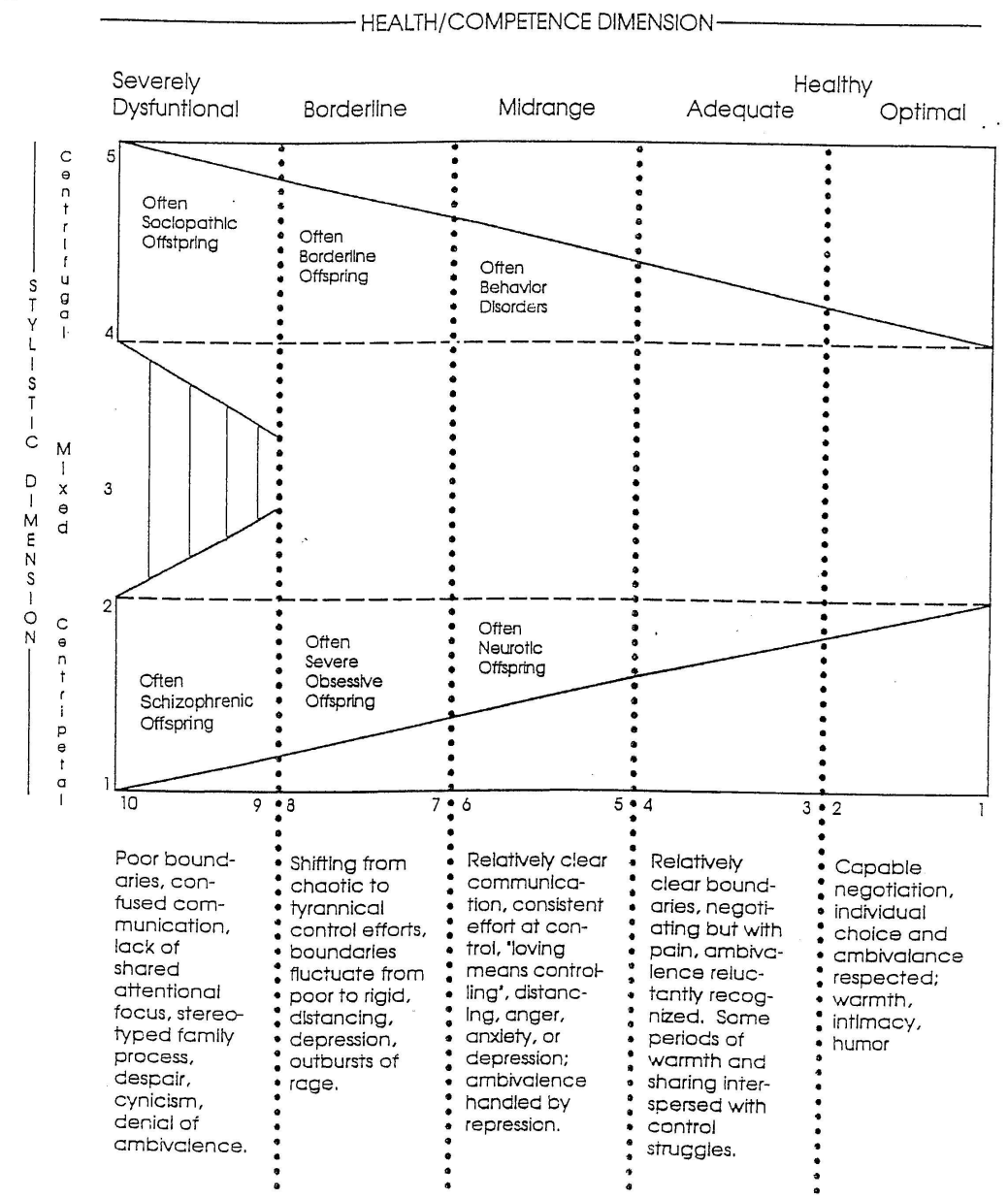

Figure 4. Diagram of family assessment schema. From " Beavers Systems Model Mannual," by R. Beavers, R. Hampson, and Y. Hulgus, 2000. Reprinted with permission.

For these reasons, the present study has a novel component: Is there a difference in outcomes from bariatric surgery depending on family functioning, and does family functioning change after bariatric surgery? The idea that positive family environments are important derives from the hypothesis that support before and after surgery impacts the outcome. One major potential source of support is the family (Hartmann, personal communication, August, 23, 2012). However, this raises the question as to whether superior family functioning results in better support and better weight outcomes. There is some evidence that certain forms of child abuse, especially sexual abuse, are associated with worse outcomes such as little to no weight loss. Families in which sexual abuse has taken place are more likely to be dysfunctional in a variety of ways, in comparison to those families where there is no sexual abuse history. For that reason, family functioning could also be a marker for different outcomes from bariatric surgery (Hartmann, personal communication, August, 23, 2012).

It is the contention of this research that higher scores on the SFI (Beavers, Hampson, & Hulgus, 1990), which identifies optimal and dysfunctional family styles, will be associated with more weight loss postsurgery, and that scores on the SFI will improve postsurgery.

However, this is not to neglect the awareness that weight loss can have some negative interpersonal consequences such as envious and competitive behavior (Sogg & Gorman, 2008). For example, stressors may be observed where only one member (e.g., the man) of a happily married and obese couple undergo successful bariatric surgery. This may cause new stressors in the relationship as the woman may feel less secure and

the man may be getting attention from the opposite sex that he had not experienced before. Essentially, the equilibrium is off and envious and competitive behavior can occur (Sogg & Gorman, 2008).

Hafner, Watts, and Rogers (1991, as cited in Herpetz et al., 2003) conducted a study on husbands' and wives' quality of life and satisfaction with their spouse after bariatric surgery. Results demonstrated an increase in self-image and self-satisfaction, as well as an increase in dissatisfaction with one's spouse. This may also be an indication that family functioning may not only be important to bariatric surgery outcomes, but also to weathering the lifestyle changes that come with bariatric surgery (Herpetz et al., 2003; Herpetz, Kielman, Wolf, Hebebrand, & Senf, 2004).

Conclusion

Research demonstrates that the health risks associated with obesity are numerous. As the above literature review summarizes, obesity can be linked to dozens of problems, such as premature death, diabetes, high cholesterol, sleep apnea, cardiovascular disease, high blood pressure, increased risk of cancers, reduction of quality of life, lifestyle hindrances, sexual complications, and many psychiatric disorders.

Many obese individuals do not respond to the thousands of traditional weight-loss treatments available. In these cases, weight-loss surgery has become an effective way for people who do respond to traditional weight-loss treatments to lose weight. Bariatric surgery, such as Roux-en-Y, has demonstrated physical benefits in the form of significant weight loss and improvement in a number of obesity-related medical conditions. There is also evidence that bariatric surgery has psychological benefits such as improved quality

of life and a reduction in depression. However, not all patients lose significant weight, obtain physical and psychological benefits, and some experience complications. Research estimates that 20-30% of bariatric surgery patients fail to reach their postoperative weight goal and 10-25% do not keep the weight off (Peacock & Zizzi, 2011). Though the surgery has become safer over time, it is still considered a surgery that has risks. If a patient is not willing or able to make a lifelong commitment to lifestyle changes, the surgery may be a failure, as weight loss is not obtained, weight loss is not maintained, and postsurgical complications occur. For these reasons, it is important to identify people who are "good" or "poor" candidates for the surgery.

There are limited consistent data on what factors the clinician should use in identifying who would be a "good" or "poor" bariatric surgery candidate. Furthermore, certain psychosocial variables, such as family functioning and obesity-related quality of life, have not been adequately evaluated as predictors of successful bariatric surgery. This research study is designed to identify psychological and social factors which are predictors of successful bariatric surgery, and to assess gaps in the literature such as family functioning as a predictor.

Chapter 3: Research Method

Introduction

Chapter 3 is a description of the research methodology used to address the research questions in this retrospective, quantitative, repeated measures, and correlational research study. The purpose of the study and a summary of the research questions and associated hypotheses will be reviewed. A description of the procedures of how the study was implemented will be outlined, which includes setting, research sample data, and instruments used. Measures taken to protect the confidentiality of research data will be explained.

"Scientific investigation [requires] the principles inspiring and governing scientific investigation (methodology), as well as technical issues regarding the practical implementation of a study (research methods)" (Gelo, Braakmann, & Benetka, 2008, p. 266). A quantitative design was chosen for this study because the study requires analysis that ranges from descriptive (i.e., prevalence of behavioral health issues in a sample of bariatric surgery patients) to inferential hypotheses-testing analysis (i.e., predictive relationships between psychosocial variables and bariatric surgery outcomes; Gelo et al., 2008). The design choice is consistent with research designs required to advance knowledge in the discipline and have been used in similar studies, which are discussed in a systematic review by Sockalingham et al., 2011. The present study required that the main variables of the study (i.e., depression, obesity-related quality of life, and healthy family functioning) be reduced to numerical values in order for data analyses to be carried out.

This study was based on new quantitative analyses of archival data collected from a study assessing psychosocial variables and weight-loss surgery, which took place between 2005 and 2009. Archival data were compiled in three phases. Phase 1 was baseline data (Gastric Bypass Surgery Questionnaire, Beck Depression Inventory II, Self-Report Family Inventory, and the Obesity Adjustment Survey), Phase 2 was the extraction of postsurgical data (Beck Depression Inventory II, Self-Report Family Inventory, and the Obesity Adjustment Survey) six months postsurgery, and Phase 3 was the review of records for weight and complication data up to five years postsurgery.

Purpose of the Study

The purpose of this study was threefold: (1) To determine the prevalence of certain psychological disorders (e.g., depression, bipolar, anxiety disorder, eating disorder, personality disorder, ADHD or ADD, schizophrenia, drug and alcohol addiction, and sexual, verbal/emotional or physical abuse) in the study population; (2) To evaluate weight and psychosocial variables (depression, family functioning, obesity-related quality of life) before and after weight-loss surgery (i.e., the Roux-en-Y procedure); and (3) To identify psychosocial factors that may be statistically significant predictors of weight loss and complications after Roux-en-Y bariatric surgery. In terms of prediction, the primary purpose of this research is to explore whether certain tested (i.e., depression) and untested (i.e., healthy family functioning, obesity-related quality of life) psychosocial variables are predictive of bariatric surgery patients' ability to lose and maintain weight loss and avoid noncompliance complications following Roux-en-Y bypass surgery. In addition, because the Bariatric Surgery Questionnaire asks questions

pertaining to reasons for wanting bariatric surgery, these variables were assessed for additional findings.

Understanding the relationship between psychosocial variables and successful bariatric surgery (e.g., sustained weight loss and no complications) will help multidisciplinary teams better prepare their patients for a successful outcome. Helping determine successful and unsuccessful bariatric surgery candidates will help determine if this surgery, which is not without risks, is the best course of action for an individual. If certain psychosocial variables are identified as affecting the outcome of surgery, appropriate training, education, and interventions can be implemented to improve the chances of success and avoid complications. A better understanding of predictors of bariatric surgery would also help behavioral health specialists, who evaluate surgery candidates, to have a practical and applicable tool rather than a theoretical one.

Given the dissent in the literature pertaining to psychosocial predictors and outcomes of bariatric surgery (Ballantyne, 2003; Bocchieri et al., 2002; Buchwald et al., 2004; Frank, 2006; Livhits et al., 2012; Ray et al., 2003; Sockalingham et al., 2011), it is difficult to say with certainty which psychological and social factors represent even relative contraindications for bariatric surgery. Furthermore, while it is clear that there is a general improvement in quality of life following bariatric surgery (Chang et al., 2010; Lier et al., 2011; McLoed et al., 2012), other important psychosocial consequences are less definitive. For example, it is not known whether symptoms of depression typically improve or worsen after surgery. It is not known if higher depression scores are associated with more weight loss or less. In addition, there appears to be a dearth of

research conducted using obesity-related quality of life and healthy family functioning as predictors of bariatric surgery outcomes. It is the intention of this study to investigate these issues among bariatric surgery patients treated at a community teaching hospital.

Research Questions and Hypotheses

The present study was designed to evaluate the prevalence of psychological disorders in a sample of bariatric surgery patients, evaluate psychosocial variables before and after bariatric surgery, and identify any significant psychosocial predictors of weight loss and complications up to five years after surgery.

Research Question and Hypothesis 1

Is there a high prevalence of at least one psychological disorder/issue in the study's sample of bariatric surgery candidates? Psychological issues include a diagnosis of: depression, bipolar disorder, anxiety disorder, eating disorder, personality disorder, ADHD, schizophrenia, addiction, and sexual, physical or verbal abuse. Addressing this question will utilize descriptive statistics by determining the percentage of the sample that has one or more psychological disorders.

H_{O1}. There is not a high prevalence of psychological disorders/issues in a sample of bariatric surgery candidates compared to the general population. Published studies report that about 25% of all U.S. adults have a mental illness and that nearly 50% of U.S. adults will develop at least one mental illness during their lifetime (Center for Disease Control [CDC], 2011b).

H_{A1}. There is a high prevalence of psychological issues in a sample of bariatric surgery candidates compared to the general population.

Research Question and Hypothesis 2

Do weight and scores of depression, obesity-related quality of life, and family function change after bariatric surgery?

H_{O2}. Weight and scores of depression, obesity-related quality of life, and family function do not change at six months after bariatric surgery.

H_{A2}. At 6 months, weight and scores of depression, obesity-related quality of life, and family function change in a positive way after bariatric surgery.

Research Question and Hypothesis 3

Can depression, obesity-related quality of life, and family functioning (independent variables) predict successful bariatric surgery, as defined by weight loss and absence of complications (dependent variables)? Secondarily, can other putative psychosocial factors, such as history of sexual abuse or having an eating disorder, predict outcomes of surgery?

H_{O3}. Depression, obesity-related quality of life, and family functioning are not statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

H_{A3}. Depression, obesity-related quality of life, and family functioning are statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

Research Design and Approach

This study was based on new quantitative analyses using archival data collected from a study assessing psychosocial variables and weight-loss surgery. This original

study took place between 2005 and 2009. The researcher was involved in the design and baseline data entry of this original study; however, he was not involved in the data collection process. Data collected were allowed to be utilized as archival data for the purpose of the current study, and a restricted data agreement was signed before data were accessed and assessed by the current researcher.

Archival data originated from two sources: (1) Participants filled out four questionnaires before surgery and six months after surgery (Note: Some participants filled out the four questionnaires/assessments at one year and up to three years postsurgery, but the majority was collected at six months); and (2) Medical records contained data to assess the participant's weight and presence of complications. Source 1 baseline data existed in a hard copy and was placed within locked research cabinets in the Emig Research Center at York Hospital, as well as in electronic form (i.e., SPSS spreadsheet). Source 2 data existed in electronic form in the medical records and Bariatric Surgery Data Base at York Hospital. Hard copy data was hand entered into SPSS whereas electronic data was exported into SPSS. Data were then merged. The research design of this study was a retrospective quantitative review of archival data. This study employed descriptive statistics, paired sample *t* tests, and regression analyses.

Setting and Sample

The archival data consisted of information from individuals who elected to undergo Roux-en-Y gastric bypass surgery. Data were collected from adult participants aged 18 and older, male and female, and who were patients of a clinical weight-loss program at a community teaching hospital in York, PA. Candidates for surgery were

those individuals with a BMI > 40kg/m^2 or a BMI > 35kg/m^2 with significant obesity-related medical conditions. For baseline data, patient inability or unwillingness to give consent or participate excluded them from the study. Other exclusion criteria include prior gastric bypass surgery.

A convenience sample was used as patients who were receiving presurgical psychological assessment were asked if they would like to participate in a study. These initial baseline data were collected between 2005 and 2009. Some participants filled out the four questionnaires/assessments at one year and up to three years postsurgery, but the majority of questionnaires/assessments were collected at six months. This is why there was a difference in sample sizes between some analyses. Given that the main analysis of the study was a multiple regression, appropriate sample size and statistical power were calculated. With an anticipated effect size of 0.25, a desired statistical power level of 0.8, three main predictors (depression, obesity-related quality of life, and family functioning), and an alpha of 0.05, the adequate minimal sample size was determined to be 48 (Statistics Calculator 3.0). The total sample size for the present study was 93.

Data Collection Procedures

Approval to conduct research was obtained from WellSpan Health's Institutional Review Board (248259-3) and Walden University's Institutional Review Board. Phase 1 involved extracting and entering baseline data (e.g., depression, bipolar depression, anxiety disorder, eating disorder, personality disorder, ADHD or ADD, schizophrenia, addiction, and sexual, physical or verbal abuse, healthy family functioning, depression, obesity-related quality of life) that were collected between 2005 and 2009.

Phase 2 involved extracting and entering six-month postsurgical data (i.e., healthy family functioning, depression, obesity-related quality of life) that were collected between 2005 and 2009. The six-month postsurgical archival data were collected during the participants' six-month follow-up visit where they were asked to fill out the Beck Depression Inventory-II, Self-Report Family Instrument, and Obesity Adjustment Survey.

Phase 3 involved extracting postsurgical data related to weight and complications from six months to five years postsurgery. Specifically, the research participant's chart and the Bariatric Surgery Database at the WellSpan Health Clinical Weight-Loss Program were reviewed to ascertain the patient's amount of weight loss, BMI, and the presence of medical or surgical complications. Permission to extract this data was given by the director of the Clinical Weight- Loss Program, as well as the Vice President of Medical Affairs.

Instrumentation

The following study used questionnaires, an inventory, an instrument, and a survey. For simplicity's sake, these four instruments, as a group, will be referred to as "questionnaires." The term questionnaires was chosen because questionnaires are between surveys and assessment in regards to measuring sensitive topics. Surveys are traditionally used to measure attitudes and opinions. Questionnaires are used to assess information that is more sensitive, while assessments are typically used to diagnose a condition (John, personal communication, April 8, 2013).

Four questionnaires were used in the present study. The Gastric Bypass Surgery Questionnaire, which was designed "in-house," is for evaluation of bariatric surgery candidates and is part of routine presurgical psychological assessment. This questionnaire is sufficient to answer necessary research questions, such as presence of behavioral health conditions, in this sample of bariatric surgery patients. The other three instruments (Beck Depression Inventory-II, Self-Report Family Instrument, and Obesity Adjustment Survey) are all standardized tests that have been used for research and clinical purposes for many years. These measures have established validity and reliability. Permission to use these measures was obtained from the developer and/or distributor of the instruments.

Gastric Bypass Surgery Questionnaire. This "in-house" questionnaire, developed for initial evaluation and education for gastric bypass surgery patients, gathers demographic information such as age, gender, race, relationship status, and education. This questionnaire also gathers information regarding an individual's psychiatric history, history of abuse (i.e., sexual, physical, drug, alcohol), prior history of eating disorders (e.g., binge eating, emotional eating), as well as an individual's level of realistic expectations of gastric bypass surgery. This questionnaire was developed as a general evaluation tool for bariatric surgery candidates at the study site and is used as part of the standard of care. This questionnaire has no psychometric properties available. Given this is a standard of care tool, is composed of many qualitative questions, and is designed for determining descriptive/demographic statistics, psychometric properties of this tool were not investigated.

Beck Depression Inventory II (BDI-II; Beck, 1979; Beck et al., 1961). The BDI-II is one of the most widely used depression inventories. This self-report questionnaire covers a wide range of depressive indicators, including affective, cognitive, and social symptoms. This inventory is easy to administer and takes about 10 minutes to complete. The results indicate whether the individual can be categorized as having no or minimal depression, mild depression, moderate depression, or severe depression. The investigation of 25 studies found that the internal consistency of the BDI-II is high and ranges from 0.81 to 0.86 (Beck, Steer, & Brown, 1996; Beck, Steer, & Garbin, 1988). A review of 10 studies found that the test-retest reliability of the BDI-II averages at 0.93. Concurrent validity of the BDI-II ranges from 0.73 to 0.80. The internal consistency of the BDI-II averages at 0.92, while concurrent validity averages at 0.93 (Beck, Steer, & Brown, 1996; Beck, Steer, & Garbin, 1988).

Self-Report Family Instrument (SFI; Beavers & Hampson, 2000; Beavers, Hampson, & Hulgus, 1990). This inventory, based on the Beavers Systems Model (BSM) of family functioning, measures the perceptions of family members about their families' competence and style. The main purpose of this inventory is to identify high-risk families for researchers and to evaluate change following intervention for clinicians. Scores from the SFI identify six types of families (nine total with subcategories): optimal, healthy, adequate, midrange, borderline, and severely dysfunctional. Optimal families, adequate families, and severely disturbed centrifugal families are just a few types of families this survey identifies. The reliability for the entire SFI ranges from 0.84 to 0.88 (Beavers, Hampson, & Hulgus, 1990). The 30- to 90-day test-retest reliability of the SFI

ranges from 0.84 to 0.87 for family health/competence. Convergent and concurrent validity of the SFI have been demonstrated through comparisons with the Family Adaptability and Cohesion Evaluation Scale, the McMaster Family Assessment Device, and the Beavers Interactional Scales (Beavers, Hampson, & Hulgus, 1990).

Obesity Adjustment Survey (OAS; Butler et al., 1999). This survey is an obesity-specific quality of life assessment. The OAS asks specific questions about a person's present weight and how it affects their feelings, relationships and activities. The OAS was developed in a population of gastric bypass surgery patients and was used to determine quality of life after gastric bypass surgery. The test-retest reliability of the OAS is 0.87, internal consistency is 0.72, and construct validity ranges widely from 0.38 to 0.50 (Butler et al., 1998).

Analysis

This study was primarily designed to determine if both previously tested and untested psychosocial variables are predictive of successful bariatric surgery up to five years after the surgery. Statistical analysis was conducted with SPSS. Data screening to evaluate missing data, outliers, normality, linearity, and homoscedasticity was conducted. Analysis included frequency and percent determinations for all categorical parameters and means and standard deviations for all continuous parameters. Appropriate statistical tests were employed to determine any statistical differences and predictive relationships between groups or subgroups once they were identified, which involved descriptive statistics, paired sample *t* tests, and multiple regression. Descriptive statistics allowed for summarization of the sample population. For example, the Gastric Bypass Surgery

Questionnaire assessed the prevalence of the following in our patient population: depression, bipolar, anxiety disorder, eating disorder, personality disorder, ADHD or ADD, schizophrenia, drug and alcohol addiction, and sexual, verbal/emotional, or physical abuse. Also, the percentages of age, gender, and race in this sample were determined.

Multiple paired sample *t test*s were used to assess changes in weight, depression, obesity-related quality of life, and family functioning before and six months after surgery. Paired-sample *t test*s evaluate paired data before and after some intervention. In the case of this study, the same participant is assessed on two separate occasions: before surgery and six months after surgery.

Multiple regression analyses were used to determine what factors are predictive of weight loss and complications up to five years after surgery. Multiple regression was used to assess the relationship between multiple independent variables (predictor) and the dependent variable (predicted or criterion). For example, do scores on the Beck Depression Inventory-II, Self-Report Family Instrument, or Obesity Adjustment Survey predict more weight loss up to five years after surgery? Multiple regression permitted the researcher to determine if a relationship existed between predictor variables as a group and the predicted variable. In other words, how well does the model of numerous psychosocial variables predict weight loss (current weight, baseline, or before-surgery weight) or complications? Complications consisted of three variables: type of complication, complication (yes or no), and number of total complications.

For multiple regression analyses, the statistics that were of importance were the R, R^2, and the *p*-value.

> The multiple correlation (R) is a Pearson correlation coefficient between the predicted and actual scores of the dependent variable. The squared multiple correlation (R^2) represents the degree of variance accounted for by the independent variable or combination of independent variables. (Mertler & Vannatta, 2010, p. 171)

The R statistic ranges between 0 (no linear relationship) to 1 (perfect linear relationship). In the present study, the R statistic allowed for the assessment of the correlation between the predicted and actual scores of the dependent variables of weight and complications. R^2 was used to see how much variation in the predicted variable is explained by the by the independent variable or combination of independent variables (Beck Depression Inventory-II, Self-Report Family Instrument, Obesity Adjustment Survey). Also, R^2 indicated how well each variable and the group of variables fit the regression line (Gravetter & Wallnau, 2007; Mertler & Vannatta, 2010). For example, was there a strong linear relationship between increases in obesity-related quality of life and increases in weight loss? The following study utilized a *p*-value of less than 0.05 to determine statistical significance. A *p*-value of <0.05 indicated that the results of the study have less than a 5% chance of occurring by accident. In addition, evaluation of the contribution that each predictor variable made towards predicting outcomes was conducted using the stepwise regression option (Gravetter & Wallnau, 2007).

Ethical Considerations

The study was approved by Walden's Institutional Review Board (# 02-05-14-0055470). The policies for protection of human research subjects and their records (45 C.F.R. Part 46) was followed when conducting this study. The present study was no more than minimal risk because the study was a retrospective review of archival data. Data confidentiality was maintained and the patient's medical record number corresponded to a study number on the data collection sheet. All data collection sheets were coded (utilizing arbitrary identification numbers and a separate listing of medical record numbers) and stored in locked cabinets of locked offices and password protected within the HIPAA compliant hospital data server. The final product, however, will include no protected data. The master reference sheet linking patient identifiers to deidentified patient information will be kept securely locked in the office of the Emig Research Center of York Hospital and cannot be referenced by anyone outside of the data acquisition team.

An ethical consideration was breach of confidentiality. The steps taken to deal with this consideration were to use a linking document, so that identifying information was not physically associated with research data. In addition, all research data were kept in locked files in locked offices, and on password protected computers.

Summary

This chapter summarized the methodology for conducting the present retrospective three-phase research study. Research questions and hypotheses were discussed, as well as the instruments used to collect data, and the statistical tests that were

implemented. The sample of participants and the measures taken to protect them were discussed.

Chapter 4: Results

Introduction

The purpose of this secondary data analysis was to investigate the relationship between psychosocial factors and weight-loss surgery outcomes. Three research objectives were addressed: (1) To determine the prevalence of certain psychological disorders/issues (e.g., depression, bipolar, anxiety disorder, eating disorder, personality disorder, and abuse) in the study population; (2) To evaluate weight and psychosocial variables (depression, family functioning, and obesity-related quality of life) before and after weight-loss surgery; and (3) To identify psychosocial variables that are predictors of weight loss and complications after Roux-en-Y bariatric surgery. To answer the three research questions, three null hypotheses were proposed: (1) There is not a high prevalence of psychological issues in a sample of bariatric surgery candidates compared to the general population; (2) Weight and scores of depression, obesity-related quality of life, and family function do not change at six months after bariatric surgery; and (3) Depression, obesity-related quality of life, and family functioning are not statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications five years post surgery.

Data Review and Cleaning

This study was based on quantitative analyses of archival data collected from a study assessing psychosocial variables and weight-loss surgery, which took place between 2005 and 2009 (baseline data). Archival data were compiled in three phases. Phase 1 is baseline data (Gastric Bypass Surgery Questionnaire, Beck Depression

Inventory II, Self-Report Family Inventory, and the Obesity Adjustment Survey), Phase 2 is the extraction of postsurgical data (Beck Depression Inventory II, Self-Report Family Inventory, and the Obesity Adjustment Survey) six months postsurgery, and Phase 3 is data extraction of weight and complication data up to five years postsurgery. A total of 99 baseline cases from this study were available for analysis. Six cases were removed because the consent for the original study could not be located. All 93 cases were kept for analysis even if partial data were missing. For example, one case was missing data from the back of the BDI-II; however, the rest of the data, including information on weight, history of behavioral health condition, and SFI and OAS scores were available and were valuable data for assessing research questions.

The 93 cases were coded and entered in SPSS (Version 21, Armonk, NY). The raw datasets from the BDI-II, SFI and OAS were calculated according to its standard scoring system, and subscale and total scores (when applicable) were obtained for each case. The final sample of 93 records was cleaned using SPSS functions, including sorting data, checking data range, categorization, recoding/labeling or reformatting variables, and creating new variables.

The primary inferential statistic used in the present study was multiple regression with the main outcome being weight at five years. The data set was investigated to ensure that it satisfied the assumptions of outliers, normality, linearity, and homoscedasticity as relates to the dependent variable "weight at five years postsurgery."

Outliers in a dataset have the potential to distort results of an inferential test.

A check of boxplots for the "weight at five years variable" was performed to visually inspect for outliers, and one outlier (Case 48) was found. Given that there was only one outlier and that removing this would increase the chances of significant results and therefore increase Type I error, it was decided to not remove the outlier. The outlier in question was a five-year weight of 375 pounds. Removing it would make the mean five-year weight much lower and potentially distort results. Of note, the analyses were performed with and without the outlier and no differences in results/outcomes of the study occurred (see Figure 5).

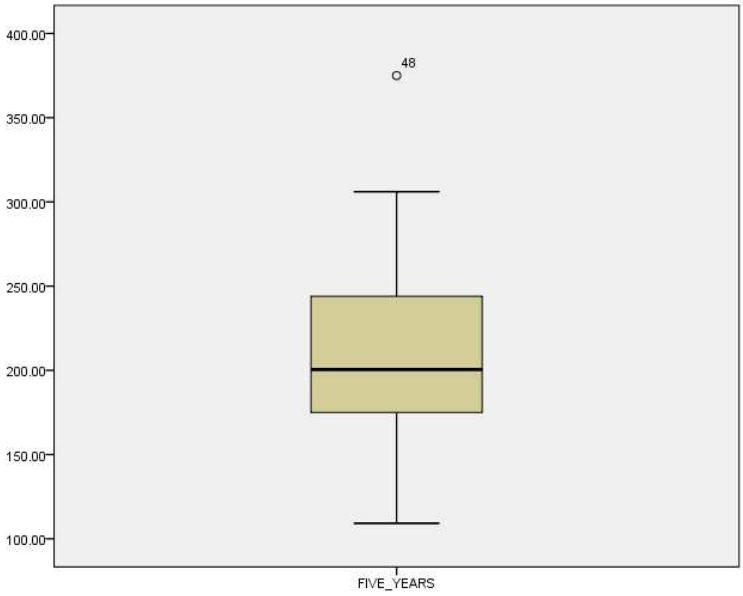

Figure 5. Assessment of outliers.

Normality for the five-year weight was investigated with SPSS Explore. The Kolmogorov-Smirnov test for normality indicated a normal distribution (p=0.200). A visual check of the histogram and Normal Q-Q plot for the five-year weight also indicated a normal distribution. Therefore the assumption of normality was met.

Assumptions of normality, linearity between study variables, and homoscedasticity were checked with scatterplots of the data. The assumptions of linearity and homoscedasticity were not violated (see Figure 6). An additional screening using multiple regression function predicting outcomes at five years indicated that all of the assumptions for the primary regression analysis were met. This screening included an assessment of outliers, multi-collinearity, and linear relationships.

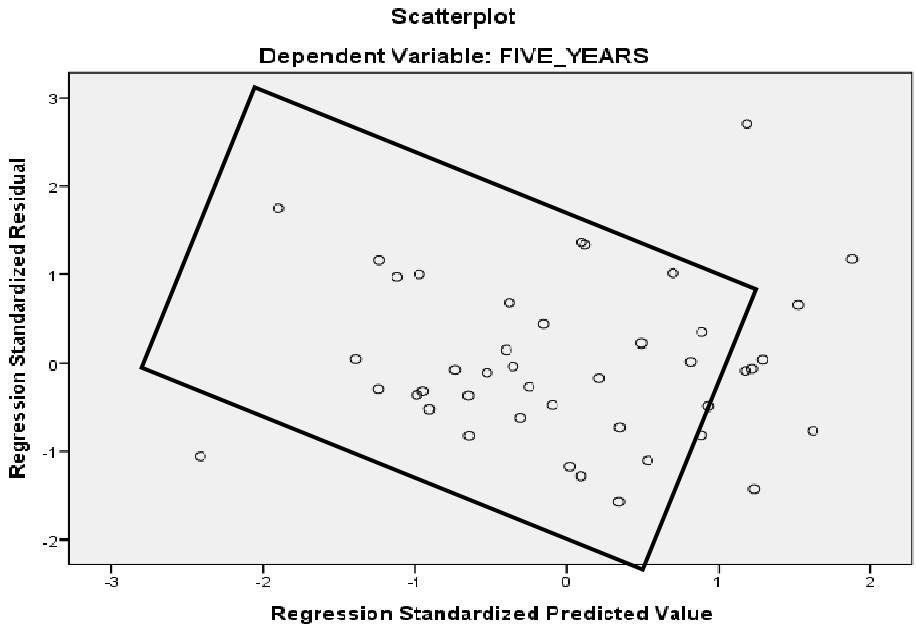

Figure 6. Assessment of linearity and homoscedasticity.

Demographics and Characteristics of Study Sample

Mean (*M*) weight before surgery was 291.35 pounds. Additional demographic characteristics of the study sample are reported in Table 3. The mean age of the sample was 44 (standard deviation [*SD*] = 10.48). The majority of the sample was female (80.4%), Caucasian (95.5%), high school educated (34.1%), employed fulltime (63.3%),

Table 3

Study Sample Demographic Characteristics

Variable	Variable Detail	*N*	%	*M* (*SD*)
Age		96		44 (10.48)
Gender	Female	78	80.4%	
	Male	19	19.6%	
Race	Caucasian	84	95.5%	
	African American	2	2.3%	
	Hispanic	1	1.1%	
	Other	1	1.1%	
Education	High school graduate	31	34.1%	
	GED	5	5.5%	
	Technical school	11	12.1%	
	Some college	21	23.1%	
	College degree	17	18.7%	
	Advance college degree	6	6.6%	
Work	Full time	57	63.3%	
	Part time	13	14.4%	
	Homemaker	9	10.0%	
	Retired	4	4.4%	
	Disabled	3	3.3%	
	Other	4	4.4%	
Relationship status	Single	19	20.4%	
	Married	62	66.7%	
	Separated	6	6.5%	
	Divorced	5	5.4%	
	Other	1	1.1%	
Support	Significant other	74	100%	
	Family & friends	73	96.1%	
	Coworkers	68	89.5%	

and married (66.7%). Of those who had a social support network (i.e., significant other, friends, family, and coworkers) in place, 100% indicated their significant other supported them, 96.10% indicated their friends and family gave support, and 89.47% indicated their coworkers supported their decision for weight-loss surgery. Eighty-five percent of the sample indicated trying at least one "trend diet," which included Atkins, NutraSystem,

Weight Watchers, Slim Fast, Tops, South Beach, and Jenny Craig. Eighty-nine percent of the sample indicated some reason for wanting bariatric surgery. Motivation for wanting bariatric surgery included: losing weight, feeling better/more energy, improving physical appearance/looking better, leading an overall healthier lifestyle, resolving ongoing medical issues (e.g., orthopedic problems, diabetes, acid reflux, shortness of breath, and sleep apnea), and longer life span.

Analysis

Hypothesis 1

Is there a high prevalence of at least one psychological disorder/issue in the study's sample of bariatric surgery candidates? Psychological disorders/issues include a diagnosis of: depression, bipolar disorder, anxiety disorder, eating disorder, personality disorder, ADHD, schizophrenia, addiction, and sexual, physical, or verbal abuse. Addressing this question utilized descriptive statistics to determine the percentage of the sample that has one or more psychological disorders. This question also utilized a nonparametric binomial test to test the percentage of psychological issues in the study sample to the national average of 25%.

Null hypothesis (H01). There is not a high prevalence of psychological issues in a sample of bariatric surgery candidates compared to the general population. Published studies report that about 25% of all U.S. adults have a mental illness (CDC 2011b).

Alternative hypothesis (H11). There is a high prevalence of psychological issues in a sample of bariatric surgery candidates compared to the general population (25%).

Table 4 is a summary of diagnoses and reports of psychological disorders/issues in the sample. Any psychological condition that had a DSM-V code was aggregated to determine presence of one or more behavioral health conditions. The top four psychological issues in this sample were depression (36.6%), verbal abuse (41.5%), sexual abuse (20.7%), and physical abuse (20%).

Table 4

Psychological Conditions

Diagnosis or report of (general DSM V diagnostic code)	*N*	%
Depression (296.30)	30	36.6%
Bipolar (296)	1	1.2%
Anxiety (300)	8	9.8%
Eating disorder (307.5)	2	2.4%
Personality disorder (301)	0	0.0%
ADHD or ADD (314.01)	1	1.2%
Schizophrenia (295.90))	0	0.0%
Neurocognitive (602)	2	3.7%
Substance abuse (291.2, 303)	2	2.4%
Sexually abused (995.81)	17	20.7%
Verbally/emotionally abused (995.82)	34	41.5%
Physically abused (995.81)	16	20.0%
Hospitalized for psychological illness	5	6.4%
Ever been treated by a mental health professional	27	32.9%
Taking meds for psychological illness	16	19.5%

Of the 72 cases that provided psychological data, 48 indicated one or more behavioral health conditions; thus, the prevalence of psychological conditions in this sample of gastric bypass patients was 66.7%. Compared to reports of the general population of 25%, there is a clinically higher prevalence of psychological conditions in this sample. For this sample, an exact binomial sign test indicated that the there was a

high prevalence of a behavioral health condition, 48 of 72 patients having been diagnosed or reported some behavioral health condition ($p = 0.006$). However, using a second binomial test, when this sample was compared to the 25% of the general population, the results were nonsignificant ($p = 0.070$).

Hypothesis 2

Do weight and scores of depression, obesity-related quality of life, and family function change after bariatric surgery? Addressing this question utilized paired sample *t* tests.

Null Hypothesis (H02). Weight and scores of depression, obesity-related quality of life, and family function do not change at six months after bariatric surgery.

Alternative hypothesis (H12). At six months, weight and scores of depression, obesity-related quality of life, and family function change in a positive way after bariatric surgery.

Results of a paired sample *t test* (see Table 5) show that mean weight scores differ before bariatric surgery (Mean [*M*] = 296.97, *SD* = 60.82) and six months after bariatric surgery (*M* = 220.88, *SD* = 48.94) at the 0.05 level of significance ($t = 17.98$, $df = 54$, $N = 55$, $p < 0.001$, 95% CI for mean difference 67.60 to 84.57, $r = 0.858$). Baseline weight (*M* = 287.4, *SD* = 46.49) significantly decreased at one year postsurgery (*M* = 192.65, *SD* = 42.14, $t = 20.07$, $df = 62$, $N = 63$, $p < 0.001$, 95% CI for mean difference 85.34 to 104.22, $r = 0.646$), as well as from baseline (*M* = 295.18, *SD* = 52.60) to five years (*M* = 210.65, *SD* = 51.27) postsurgery ($t = 15.11$, $df = 49$, $N = 50$, $p < 0.001$, 95% CI for mean

Table 5

Results of T test and Descriptive Statistics for Weight by Surgery

	Presurgery		Six Months Postsurgery			95% CI for Mean Difference			
Outcome	*M*	*SD*	*M*	*SD*	*N*		r	t	df
Baseline to 6 months	296.97	60.82	220.88	48.94	55	67.60, 84.57	0.858	17.98*	54
Baseline to 1 year	287.40	46.49	192.65	42.14	63	85.34, 104.22	0.646	20.07*	62
Baseline to 5 years	295.18	52.60	210.65	51.27	50	73.28, 98.77	0.71	15.11*	49

*p < 0.05

difference 73.28 to 98.77, r = 0.710). On average, weight was about 76.09 pounds lower at six months, 94.75 lower at one year, and 84.53 at five years.

Results of a paired sample *t test* (see Table 6) show that mean depression scores differ before bariatric surgery (*M* = 8.91, *SD* = 6.50) and six months after bariatric surgery (*M* = 3.23, *SD* = 2.18) at the 0.05 level of significance (t = 3.98, df = 21, N= 22, p = 0.001, 95% CI for mean difference 2.71 to 8.65, r = 0.08). On average, depression scores were about 5.68 points lower after bariatric surgery.

Table 6

Results of T test and Descriptive Statistics for Depression Scores by Surgery

	Presurgery		Six Months Postsurgery			95% CI for Mean Difference			
Outcome	*M*	*SD*	*M*	*SD*	N		*r*	*t*	*df*
Depression	8.91	6.50	3.23	2.18	22	2.71, 8.65	0.08	3.98*	21

* $p < 0.05$.

For the OAS, lower scores indicate better obesity-related quality of life. Results of a paired sample *t test* (see Table 7) show that mean OAS scores significantly differ

Table 7

Results of T test and Descriptive Statistics for OAS Scores by Surgery

	Presurgery		Six Months Postsurgery			95% CI for Mean Difference			
Outcome	*M*	*SD*	*M*	*SD*	N		*r*	*t*	*df*
OAS	60.78	9.82	35.22	11.64	23	20.16, 30.97	0.33	9.81*	22

* $p < 0.05$.

before bariatric surgery ($M = 60.78$, $SD = 9.82$) and six months after bariatric surgery ($M = 35.22$, $SD = 11.64$) at the 0.05 level of significance ($t = 9.81$, $df = 22$, $N = 23$, $p < 0.001$, 95% CI for mean difference 20.16 to 30.97, $r = 0.33$). On average OAS scores were about 25.57 points lower after bariatric surgery.

Results of paired sample *t* tests (see Table 8) show that mean SFI subscale scores do not differ before bariatric surgery and six months after bariatric surgery, all $p > 0.05$.

Table 8

Results of T test and Descriptive Statistics for SFI Subscale Scores by Surgery

	Presurgery		Six months Postsurgery			95% CI for Mean Difference			
Outcome	*M*	*SD*	*M*	*SD*	N		*r*	*t*	*df*
Health / Competence	34.68	9.79	34.50	9.01	22	-3.61, 3.98	0.59	0.10	21
Conflict	19.77	5.92	20.77	10.31	22	-6.15, 4.15	0.06	-0.40	21
Cohesion	11.00	3.22	11.36	2.98	22	-1.76, 1.03	0.49	-0.53	21
Leadership	7.48	2.40	8.05	1.77	21	-.206, .91	-0.21	-0.80	20
Expressiveness	8.00	4.20	7.78	3.36	23	-.81, 1.24	0.83	0.44	22

Hypothesis 3

Can depression, obesity-related quality of life, and family functioning predict successful bariatric surgery, as defined by weight loss and no complications at five years postsurgery?

Null hypothesis (H03): Depression, obesity-related quality of life, and family functioning are not statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

Alternative hypothesis (H1). Depression, obesity-related quality of life, and family functioning are statistically significant predictors of successful bariatric surgery, as defined by weight loss and no complications.

Depression, obesity-related quality of life, and family functioning were placed in a multiple regression analysis to test if all or any of these variables significantly predicted weight loss at five years postsurgery. The regression model accounted for 13.9% of the variance; however, only one predictor variable (obesity-related quality of life) was found to be significant ($R=0.372$, $R^2=0.139$, $F[1,41]=6.953$, $p = 0.014$). All other variables (depression and family functioning) while in the model, did not significantly contribute to predicting weight loss at five years after surgery. The results suggest that those who were the most dissatisfied with their quality of life because of their obesity lost the most weight at five years postsurgery.

Multiple regression analysis was used to test if depression, obesity-related quality of life, and family functioning significantly predicted complications at five years postsurgery. Complications postsurgery ranged from zero to five. The results of the

regression indicated that no psychosocial variable significantly explained any of the variance and no variable was entered into the equation.

Additional Findings

One of the primary reasons for conducting the present study was due to the fact that bariatric surgery is a serious surgery and not without risks. Interestingly, 97.5% of this sample of bariatric patients said they understood the risks and indicated that it is a "serious surgery," "could have major complications," and "could possibly die."

Summary

While there were a significant number of patients (66.7%) who had a behavioral health condition in this sample of obese patients seeking bariatric surgery, that rate was not significantly different from the national average of 25%. Weight, depression, and obesity-related quality of life improved at six months after surgery; however, family functioning did not. Only obesity-related quality of life was a significant predictor of weight loss at five years. Those whose obesity significantly impacted their quality of life in a negative way were more likely to lose significant weight at five years.

While the present study was not without limitations, the data strongly suggest that psychological evaluations by a behavioral health specialist are an important factor in making bariatric surgery candidate decisions. Those whose quality of life was significantly impacted by obesity had the greatest weight loss at five years. With 63% of Americans being overweight or obese, Type II diabetes almost tripling to 20.9 million, obese people being 83% more likely to develop kidney disease, and obesity costing the

American workforce an estimated $73.1 billion per year, it is imperative to manage this epidemic (Hoffman & Chaykin, 2012).

To this end, behavioral health specialists who can assess a person's obesity-related quality of life before surgery are more likely to help poor surgical candidates avoid potential serious risks and/or lack of success with the surgery.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This chapter starts with an overview of the study background, followed by an interpretation of the study results and findings, and how they are related to the theoretical framework and implications for positive social change. At the end of this chapter, study limitations are addressed, and recommendations for future research are suggested.

Obesity is trending higher and affecting a disproportionately large number of individuals within our communities, regions, and all across the United States. This is important because obesity can lead to a wide range of physical, mental and quality of life issues. When traditional weight-loss methods do not work, bariatric surgery is becoming a feasible weight-loss option. While bariatric surgery often results in weight loss and physical, psychological, interpersonal, and quality of life improvements, not all patients gain these benefits. While previous research has investigated the role of psychological factors in relation to obesity, few have investigated psychological factors as predictors of weight loss and complications after bariatric surgery. The purpose of this study is threefold: (1) To determine the prevalence of certain psychological disorders (e.g., depression, bipolar, anxiety disorder, eating disorder, and personality disorder) in the study population, (2) To evaluate weight and psychosocial variables (depression, family functioning, and obesity-related quality of life) before and after weight-loss surgery, and (3) To identify psychosocial factors that are predictors of weight loss and complications after Roux-en-Y bariatric surgery.

Three theoretical foundations that are important to the present study are the Transtheoretical Model of behavior change (TTM), interpersonal processes, and protection motivation theory. TTM focusses on a person's readiness to act on a new behavior, and then acting on the new behavior and maintaining it. Interpersonal processes (Andrews, 1996) proposes that it is imperative to get patients to engage in long-term multidisciplinary support. This theory emphasizes that people interact with others on a daily basis, almost repetitively, to develop a sense of self and personality, as well as adapting to the many aspects of social interactions. The culmination of these developments leads to appropriate intimate connections with others and the development of appropriate boundaries, which can lead to trust in human encounters. Protection Motivation Theory (Prentice-Dunn & Rogers, 1986; Rogers & Prentice Dunn, 1997, as cited in Boeka et al., 2010) stated that people are motivated to act in ways that help them achieve their goals and, therefore, comply with recommendations that promote their survival. The following discussion reviews the findings in this study based on the results reported in Chapter 4.

Interpretation of the Findings

Research Question 1

Research Question 1 assessed if there is a high prevalence of at least one psychological disorder/issue in the study's sample of bariatric surgery candidates. Psychological issues included a diagnosis of: depression, bipolar disorder, anxiety disorder, eating disorder, personality disorder, ADHD, schizophrenia, addiction, and sexual, physical or verbal abuse. According to a report published by the CDC in 2011,

about 25% of all U.S. adults have some form of mental illness. There are a variety of psychological and social (or psychosocial) illnesses (Greenberg et al., 2005; Kinder et al., 2008; Sanderson et al., 2011; Sarwer et al., 2005) related to obesity, and this psychological burden is considered one of the most difficult aspects of obesity (National Institute of Health, 1985, as cited in Stunkard & Wadden, 1992).

This study found that the prevalence of psychological conditions in this sample of gastric bypass patients was 66.7%. For this sample, there was significantly more people with a behavioral condition ($p = 0.006$). However, compared to reports of the general population of 25%, the results were nonsignificant, $p = 0.070$. According to these results, the null hypothesis of Research Question 1 cannot be rejected and therefore, this sample of patients did not have significantly higher mental health issues than the general population.

While the results may not indicate statistical significance, it does yield clinical significance to know that nearly 67% of individuals receiving bariatric surgery have some form of behavioral health issue. Of note, 41.5% indicated some form of verbal/emotional abuse, and 20.7% indicate sexual abuse. This supports current research that indicates physical and sexual abuse are predictors of obesity. Therefore, the confluence of abuse and obesity should be addressed in both the patient seeking bariatric surgery and the individual who is not (Richardson, 2014).

Research Question 2

Research Question 2 assessed if weight and scores of depression, obesity-related quality of life, and family function change after bariatric surgery. Literature supports that

in addition to reduction in weight, scores on depression (Herpertz et al., 2003), quality of life (Chang et al., 2010; Lier et al., 2011; McLoed et al., 2012), and relationships with friends, family members, and significant others (Herpertz et al., 2003) have demonstrated marked improvement after bariatric surgery.

The present study confirmed improvement for weight, depression, and obesity-related quality of life, but not for family functioning. While depression and obesity-related quality of life were only assessed six months postsurgery, weight was assessed up to five years after surgery. On average, weight was about 76.09 pounds lower at six months after surgery, 94.75 lower at one year, and 84.53 at five years. Depression scores were about 5.68 points lower after bariatric surgery. On average, OAS scores were improved by 25.57 points after bariatric surgery. Mean change scores (in parentheses) on the FSI remained relatively unchaged at six months postsurgery: health/competence (M = -0.18), conflict (M = 1.0), cohesion (M = 0.36), leadership (M = 0.57), and expressiveness (M = -0.22). Depression and obesity-related quality of life significantly improved ($p > 0.05$).

Research Question 3

Research Question 3 assessed if depression, obesity-related quality of life, and family functioning (independent variables) predict successful bariatric surgery, as defined by weight loss and absence of complications (dependent variables). Empirical research has found some psychosocial variables that are often associated with bariatric surgery outcomes; however, this research has not uncovered any consistently reliable psychosocial predictors of successful bariatric surgery (van Hout et al., 2005).

Furthermore, while some variables (e.g., social support; Sockalingham et al., 2011) have been investigated as predictors of bariatric surgery outcomes, and variables like quality of life have been investigated before and after surgery, more specific versions of these variables, such as healthy family function have not, (Beavers, 1977) and obesity-related quality of life (Butler et al., 1999), which present a gap in the literature.

Multiple regression analysis was used to test if depression, obesity-related quality of life, and family functioning significantly predicted weight loss at five years postsurgery. The results of the regression indicated that only obesity-related quality of life predicted weight loss at five years after surgery ($p = 0.014$). The results suggest that those who were the most dissatisfied with their quality of life because of their obesity, lost the most weight at five years postsurgery. Depression and family functioning did not predict weight loss at five years ($p > 0.05$).

Multiple regression analysis was also used to test if depression, obesity-related quality of life, and family functioning significantly predicted complications at five years postsurgery. Complications postsurgery ranged from zero to five; however, the results of the regression indicated that no psychosocial variable predicted weight loss at five years after surgery.

Additional Findings

Nearly 98% of this sample indicated that they knew that the this surgery is serious and could have harmful complications and even death. This may be why there appeared to be significant weight loss at five years postsurgery and may be explained by the theoretical concepts in the next section.

Methodological and Theoretical Implications of the Findings

The findings of the present study have some methodological, theoretical, and empirical implications. For example, the more obesity negatively impacted a person's life before surgery, the more likely they were to sustain significant weight loss at five years after surgery. This finding can be explained by certain theoretical foundations, but one must concede that any sort of success with bariatric surgery relies on compliance. Bariatric surgery requires proactive and conscious effort on the part of the patient to take care of themselves physically, emotionally, and adhere to their new strict diet and lifestyle changes. To not follow these instructions not only hinders the purpose of the surgery, but threatens the overall health and wellbeing of the person.

The theoretical framework for perceiving that something threatening could happen if patients did not follow postsurgical instructions comes from protection motivation theory (Prentice-Dunn & Rogers, 1986; Rogers & Prentice Dunn, 1997, as cited in Boeka et al., 2010). In this model, patients perceive something as a substantial threat to their health and then try to find effective ways to avoid that threat. The OAS assesses threats to quality of life, such as unhappiness, avoidance, early death, alienation, low self-esteem, hindered movement, and depression.

Perceived threats, such as these, may energize a person to protect themselves and follow through with recommendations. For example, adhering to something like postsurgical instructions will enable a patient to avoid negative health consequences and could make one more likely to comply with the dietary, behavioral, and lifestyle changes needed to have success with this surgery (Boeka et al., 2010). This is similar to Sherif's

(1936) and Cialdini and Trost's (1998) theory that people are motivated to act in ways that help them achieve their goals and comply with recommendations that promote our survival.

One possible explanation that family functioning did not change before and after surgery is that all of the scales were within Competent Family Style before surgery. Thus, this set of cohorts most likely had the social support necessary for the complexities of bariatric surgery.

Endorsing the importance of social support for change, Andrews (1996) offered a theoretical framework for the postsurgical treatment of bariatric patients that can help the patient succeed. Andrews contends that it is imperative that psychologists use interpersonal processes to get patients to engage in long-term multidisciplinary support. Her theory emphasizes that people interact with others on a daily basis, almost repetitively, to develop a sense of self and personality, as well as adapting to the many aspects of social interactions. The culmination of these developments leads to appropriate intimate connections with others and the development of appropriate boundaries, which can lead to trust in human encounters.

Limitations of Study

This secondary data analysis had some limitations in methodology and measurement. First, using archival data introduces potential problems that can occur at the initial gathering of the information. Socially desirable answers is one problem. Since the data collection tool asks about information related to obesity, family functioning, quality of life, and an assortment of psychological soliloquy, people might be

uncomfortable sharing information about personal life and therefore be biased to answer more "positively" and give "socially desirable answers." To this end, some psychological issues may be subject to underreporting or overreporting. Assurance in the historical phase of the study that data will be de-identified and confidential was used as a countermeasure.

A second limitation is that complications can be a medical issue, rather than a psychosocial issue. This retrospective data do not have the capacity to distinguish between the two. However, discussions with medical doctors, psychiatrists, and clinical weight-loss program staff, who have years of clinical expertise, were conducted to identify complications that are associated with noncompliance. Third, the data analyzed in this study were based on a clinical population of bariatric patients at a community teaching hospital in South Central Pennsylvania, and may not be generalizable to all geographic regions.

Recommendations for Future Research

The present study was 80% female and 96% Caucasian from a community teaching hospital in South Central Pennsylvania, which narrows the implications for generalizability. Recommendations for future research would employ methods that increase generalizability by obtaining samples from several states to increase the sample size and ethnic diversity. Furthermore, a controlled prospective design would be beneficial to eliminate errors most commonly found in retrospective designs (e.g., bias, convenience sampling, and transcription/exporting errors).

To ensure the success of such a large project, which requires a wide range of resources, acquiring funding for study databases and research personnel to enroll, consent, and track patients across time would be paramount. Future studies should employ strategies (e.g., patient incentives) and personnel to locate patients through family contacts provided at the outset of the study to maximize retention rates. With appropriate resources,

> future research will need to address the methodological limitations of previous studies to establish the relationship between psychopathology and postoperative outcome. Large, prospective studies that include widely used, standardized assessment methods, such as the Structured Clinical Interview for DSM Disorders (a structured clinical interview considered the "gold standard" method to assess psychopathology), and that follow patients for several years are needed to best characterize this relationship. (Sarwer, Wadden, & Fabricatore, 2005, p. 641)

Implications for Positive Social Change

According to the Walden University Social Change Report (2012), social change is designed to be an applied outcome of scholarly work. Instead of just acquiring information, education is designed to give students the knowledge and skills they have learned in the classroom and apply them to the real world and make a difference in their own lives, as well as their communities by contributing to the greater common good.

The outcomes of the present study shed more light on the interactions between obesity and overall wellbeing. As leaders and politicians push for healthy communities, knowledge regarding the significant negative impact of obesity on health is of critical

importance. A study such as this, was implemented in hopes that obesity will be taken seriously and people will consider the implications of proper diet and exercise and taking care of the body holistically. When standard ways of managing weight does not work, obesity surgery is a viable option, but it is an option with risks. This study hopes to make society better by educating people about the risks of such a surgery and reducing the number of people who undergo this surgery with an unlikely outcome of success.

By understanding the many complicated factors surrounding obesity and mental health, the present study hopes to bring about social change by reducing the stigma of these two conditions. To understand that obesity and mental health are not the result of weakness, but rather influenced by genetics and previous life experiences, it is hoped that people with such issues are approached with more sympathy and empathy.

Implications for Health Institutions and Organizations

The findings of this research have implications for health institutions and organizations by supplementing current knowledge and practices of professionals in various fields. For service lines in behavioral health, surgery, internal medicine, and nutrition, having knowledge to assess appropriate bariatric candidates may reduce unneeded risks of bariatric surgery and improve payments for services if complications and readmissions are kept to a minimum.

While the present study cannot arrive at a valid and reliable "surgical success tool," Glinski, Wetzler, and Goodman (2001) stated that developing tools to help behavioral health specialists evaluate bariatric surgery candidates is important and for valid data to be obtained, bariatric surgery candidates should be assessed by trained

mental health professionals (Glinski et al., 2001). The present study brings practitioners and researchers closer to such a tool, by seeing the importance of obesity-related quality of life, thus allowing healthcare institutions and organizations to focus on how badly obesity impacts a person's quality of life. This knowledge may help determine surgical success, improve the health and wellbeing of obese surgical patients, and improve pay for service reimbursements.

Implications for Individuals and Society

In the end, it is hoped that this research can bring about social change by continuing to draw attention to the epidemic of obesity and how truly harmful it can be. Promoting and endorsing knowledge of obesity into clinical practice and healthcare organizations may lead to improved clinical strategies and patient care. For a healthy community, it will be important to systematically screen for psychosocial risk facts This study may also help develop a generalizable method, or even tool, that behavioral health specialists can use to determine proper candidates for bariatric surgery. Improving positive outcomes and reducing negative outcomes should equate to a healthier community, which could lead to lower healthcare costs.

Implications for Action

Recommendation for action would include continuing research that minimizes the assent in the literature pertaining to psychosocial predictors of successful bariatric surgery. In addition, anything that can help reduce the inception of obesity-related behaviors, such as supporting government funded programs (e.g., Step Up Program), as

well as supporting urban agriculture and buying and eating local produce, would allow for healthier lifestyles that might result in normal weight.

When obesity has become an issue, healthcare practitioners and providers must encourage people to seek appropriate support and educate them on the negative impact of obesity. If bariatric surgery becomes the most appropriate action to take care of obesity, an appropriate action would be to make sure behavioral health workers are involved from the beginning to assess individuals' quality of life and candidacy for the surgery.

Conclusion

The present study supports that there is a high rate of psychological conditions in a sample of bariatric surgery patients; that weight, depression, and obesity-related quality of life improve after bariatric surgery; and that obesity-related quality of life predicts more weight loss at five years after surgery. In terms of other psychosocial variables not predicting bariatric surgery success, van Hout et al. (2005) offered an opinion:

> In conclusion, presence of psychological disorders cannot be taken as an absolute criterion for exclusion of candidates for obesity surgery. However, it would be important to identify those aspects of a patient's psychological make-up, personality and eating behaviors that are relevant to their adjustment after surgery and which would be expected to improve or worsen their prognosis. Accurate presurgical education and postoperative psychological support are likely to increase the patient's compliance and, by that, the percentage of successful cases. (p. 558)

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Curriculum Vitae

Rodney D. Grim

Personal Information:
Email: rgrim2@wellspan.org

Education:

Present — Walden University
Ph.D., Research and Evaluation
Current GPA: 4.0

2002 — Radford University
M.A., Experimental Design and Research
Master's Thesis: Examined the effects of a family history of hypertension on cognitive performance, decision making and cardiovascular reactivity
Graduated GPA: 4.0

2000 — York College of Pennsylvania
B.S., Psychology
Graduated GPA: 3.5

Professional Experience:

2003-present — Research Scientist, Emig Research Center, York Hospital

- Designs research protocols, consent forms, data collection methods and instruments
- Provides IRB support
- Collects scientific data, creates secure databases and verifies data
- Performs specialized statistical analyses
- Interprets, summarizes and presents research results
- Prepares tables and graphs of scientific data
- Develops abstracts, posters and papers for scholarly presentation
- Writes and processes manuscripts for publication in peer-reviewed journals
- Oversees research assistants and interns

2002-2003 — Research Technician, Hershey Medical Center

- Worked in the sleep disorders research laboratory
- Analyzed data using SPSS and reported results using Excel graphing software
- Scored and screened patients' sleep records and wrote full reports based on the results, which were used for patient diagnosis and treatment

2000-2002 Graduate Assistant, Radford University, Department of Psychology

- Administered and graded exams
- Proofread manuscripts
- Tabulated research data

2000-2002 Research Assistant, Radford University, Department of Neuroscience

- Worked in Center for Brain Research and Informational Sciences on research projects related to ageing and brain function
- Duties included applying EEG montages, scoring EEG records and administering cognitive tests during EEG procedures

2001 Research Assistant, Radford University, Department of Psychology

- Headed meta-analytical research project
- Duties included reading and extracting data from hundreds of journal articles, entering and analyzing data, writing papers based on the results, presenting findings at annual conferences, and publishing my first manuscript

1998-2000 Research Assistant, York College, Department of Behavioral Sciences

- Assisted and led various research projects in the field of cognitive psychology
- Duties included designing research protocols, writing research proposals, recruiting participants, collecting and analyzing data, and presenting findings at annual conferences

Teaching Experience:
2000-2002
Delivered lectures and led class discussions in graduate level physiological psychology, cognitive psychology, and learning classes (Radford University).

2003-2014
Delivered lectures and led class discussions in undergraduate level respiratory therapy research classes

Program Experience:
SPSS base package
SPSS Tables
SPSS Sample Power
SPSS Text Analysis
Microsoft office Remark
Remark Web

Publications:

Alaishuski, A., Grim, R., & Domen, R. (2008). The informed consent process in whole blood donation. *Arch Pathol Lab Med, 132*, 947-951.

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Thimmapuram, J., Oosterveen, S., & Grim, R. (2012). Use of glucagon in relieving esophageal food bolus impaction in the era of eosinophilic esophageal infiltration. *Dysphagia.*

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Wisotzkey, S., Bell, T.D., & Grim, R. (2011). Connect and engage for better nurse retention. *Nurse Management, 42*(10), 14-8.

Honors and Distinctions:

- Drover's Bank Scholarship
- National Honor Society in Psychology
- Division 3 Member of the American Psychological Association
- Graduate Research Assistantship, Radford University, 2000-2002
- Society of Clinical Research Associates, 2005-2006