

**CORRELATES OF SERVICE UTILIZATION AND ADHERENCE TO
DIETARY AND EXERCISE MODIFICATIONS IN A SAMPLE OF
WOMEN BEFORE AND AFTER BARIATRIC SURGERY**

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University of Pittsburgh, 2008

This cross-sectional study of 163 women with a mean age of 48 examined service utilization before and after gastric bypass surgery. Time since surgery ranged from 12 months to over 6 years. Service use prior to surgery, specifically extended dietary counseling and attendance at bariatric support groups, was associated with a higher sense of coherence and better postsurgical dietary adherence. Attendance at groups after surgery was mildly associated with better exercise adherence. Postsurgical depression was significantly related to postsurgical weight gain and worse quality of life outcomes.

A 9-item eating assessment designed for the study was used to examine pre and postsurgical dietary adherence. The measure detected a significant improvement in eating behaviors for the majority of participants. A path analysis indicated that postsurgical dietary adherence, sense of coherence, and BMI accounted for 59% of the variance in postsurgical quality of life.

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PREFACE

During the past decade there has been an international uproar regarding the “obesity epidemic”. There has also been a growing body of evidence that the health risks of mild to moderate obesity have been overemphasized (Aphramor, 2005; Janssen, Katzmarzyk, & Ross, 2004; Ernsberger, 1999). The fact that it is a sedentary life-style that poses a greater risk to health than being overweight has been obscured, in great part, by the idealized (and sometimes biologically impossible) standards of thinness in most westernized cultures. There are implications of misogyny and ageism in the cultural fabrication that only extreme leanness is healthy and an appropriate aspiration for everyone. Women are biologically “fatter” than men, and there is reliable research indicating that women who gain modest amounts of weight as they age are healthier than women who are underweight (Rothblum, 1990; Carryer, 1991; McCrone, Dennis, Tomoyasu & Carroll, 2000; Berg, 2003). The health risks for women trying to lose weight, of course, include excessive and continuous dieting (McCabe, Mills, & Polivy, 1999). The reasons for these excessive and frequently dangerous attempts at weight loss often reflect a belief that fatness is an indication of personal failure. The psychological risks that come with pursuing an “ideal” body size are enormous, as women of all sizes and shapes may feel inadequate and do more damage to their physical and mental health by pursuing thinness. The war against obesity has become, in its most extreme form, a “moral and aesthetic judgment about how one ought to look” (Jutel, 2001, pg. 285). It has fattened the estimated 30 billion dollar per year diet industry

coffers (PEN, 2006) while consistently failing to demonstrate an actual link between dieting and health enhancement.

This dissertation is not written as an admonition of obesity or in support of the pursuit of thinness. The women in this study who came to a decision to undergo a surgical intervention have diverse life histories and many reasons for wanting a lower body weight. There is no perfect size or weight outcome. With this in mind, the following study was chosen in an attempt to learn more about health outcomes for women who have made a decision to have gastric bypass surgery. We must all take into consideration the fact that weight and size are as variable as every other human physical characteristic.

“Few handicapped human beings are so neglected, misunderstood and discriminated against in our society as the obese. They experience rejection and ridicule from society, including (sometimes quite severely) from those who ought to be most knowledgeable—our healthcare professionals. Those involved in the care of these persons of weight must commit to increasing other’s understanding of obesity based on the results of current scientific and behavioral research. We can be effective in changing attitudes toward this prevailing prejudice, if we take advantage of our casual and formal opportunities to educate those with whom we have contact. We must teach others to reach out with affection and concern to touch the real person who resides within that incommensurable exterior. We must also teach by using that most powerful tool—our example.”

(Fox, Taylor, & Jones, 2000, p. 480-481)

1.0 INTRODUCTION

There is an increasing demand for bariatric surgery in the United States. It is estimated that at least one million obese individuals will elect to have a surgical procedure for weight loss over the next ten years (Zhang, Mason, Renquist, & Zimmerman, 2005; Fujioka, 2005). If current trends persist in the future, women will continue to greatly outnumber men in requesting surgery for severe obesity by four to one (Choban, Onyejekwe, Burge & Flancbaum, 1999; Halmi, Long, Stunkard & Mason, 1980). As the most frequent consumers of bariatric surgery, as well as all other obesity treatments, women will constitute the greatest number of individuals at risk for postsurgical medical and psychological complications.

While the recent accessibility of surgical options has decreased obesity-related disease morbidity and mortality for thousands of individuals, compiled outcome studies consistently find that between 20% and 36% of postsurgical patients are unable to adhere to recommended dietary and exercise guidelines, resulting in weight regain and serious health risks (Funnell, Anderson, & Ahroni, 2005). Postsurgical weight gain is associated with an increased incidence of medical and psychological complications and a lower quality of life (Spaulding, 2003; Waters, Pories, Swanson, Meelheim, Flickinger, & May, 1991; Funnell, Anderson, & Ahroni, 2005; Farber, 2003). It has been linked to depression and an increased risk for suicide (Jones-Corneille, Wadden, & Sarwer, 2007; Omalu et al., 2005; Hsu et al., 1998). Research to date has not conclusively determined what presurgical and postsurgical factors impact upon postsurgical outcome.

1.1 PROBLEM STATEMENT

Specific to bariatric surgery, previous research utilizing a medical or disease model to link psychopathological predictors to inadequate behavioral adherence and poor quality of life postsurgically, specifically the presence of eating disorders, depression, and other mental disorders classified in the DSM-IV-TR (American Psychological Association, 2000), has resulted in inconclusive and sometimes contradictory findings. Burgmer, Petersen, Burgmer, Zwaan, Wolf, and Herpetz (2007), for example, did not find an association between the presence of presurgical depression and weight outcome in a predominately female sample of patients. (Poole et al., 2005; Funnell, Anderson, & Ahroni, 2005). Dixon, Dixon, and O'Brian (2003) found that presurgical depression – particularly for women –decreased significantly after bariatric surgery, and continued to remain lower than presurgical levels up to 4 years after surgery. Hsu et al. (1998), Jones-Corneille, Wadden, and Sarwer (2007), and Omalu et al. (2005), conversely, all found that a higher risk for postsurgical depression (and suicide) in patients was linked to a presurgical history of recurrent depression or other psychopathology. These conflicting findings suggest that an explanation for the variance in postsurgical adjustment and outcome may not be best explained within a pathogenic or “disease” paradigm, but may be better interpreted within a health orientation or salutogenic framework.

The traditional pathogenic model of treatment limits the exchange between the health professional and the patient to one requiring only professional authority and patient compliance. The consequences of bariatric surgery bring to the forefront the incompatibility of authority and compliance, and require an altogether new framework for describing the relationship of the health care provider and the health care consumer. “Increasingly, the responsibility for health-related matters is passing to the individual. The social norms which cast doctors and public

health officials as the brokers of medical information are yielding to an era in which individuals actively seek information.” (Johnson & Meischke, 1991, p.749). Funnell, Anderson, and Ahroni (2005) suggested that a philosophy of consumer “empowerment” would better serve both consumers and providers. Such an approach would emphasize collaboration between the consumer and the provider, with more of an emphasis on psychosocial support rather than advice, and on self-management rather than compliance. The application of a salutogenic model to bariatric research will address such a collaborative process and expand our understanding of the complex biopsychosocial factors contributing to individual health management and health outcomes.

The emergent literature suggests that influential psychosocial resources and cognitive factors, including individual traits, cultural and environmental factors, and social resources, significantly contribute to physical and psychological health and quality of life in individuals. A salutogenic paradigm draws upon analogous sources and perspectives grounding ecological theories, specifically learning theories, and in a similar manner assesses the beneficial effects of diverse psychosocial factors. A salutogenic paradigm to health both compliments and expands the reach of the traditional pathogenic model by emphasizing the human capacity to adapt and cope with inevitable life events and stress while remaining healthy (Antonovsky, 1987).

1.2 PURPOSE OF THE STUDY

The primary objective of this dissertation research was to examine the influence of psychosocial service use on behavioral health and quality of life in a sample of women following gastric bypass surgery for severe obesity. Given the importance of sustained postsurgical life-style

modifications for optimal health enhancement, there is a need for relevant empirical research to identify effective interventions for improving adherence and postsurgical outcome, including “more individual psychosocial intervention strategies” (Kinzl, Schrattenecker, Traweger, Mattesich, Fiala, & Biebl, 2006). There is also a need to identify interventions that make use of learning theories and behavioral health techniques to provide a “link between research and practice” (Bond et al., 2004) to better assist postsurgical patients in managing difficult life-style modifications beneficial to improved health and extended life. Additionally, it is important to identify a behavioral framework and theory that best explains a possible intervening mechanism linking these interventions to behavioral adherence. Toward this purpose, this study investigated a number of psychosocial resources used by a sample of women potentially contributing to good postsurgical adjustment and quality of life.

1.3 SOCIAL WORK RELEVANCE

Greene (1991) proposes that the foundation of modern social work practice developed from an ecological perspective, characterized by its focus on the continuously changing relationship between the individual and the environment. Included within this broad ecological perspective of development, the concepts of relatedness, adaptiveness, and competence address the individual’s ability to connect to others, adjust to change, cope with stress, and grow throughout life. Antonovsky’s salutogenic life orientation model (1987) identifies similar biopsychosocial influences on health maintenance, submitting that individuals remain healthy for the reason that they perceive life as manageable, comprehensible, and meaningful.

The social work profession has historically promoted the identification and dissemination of macro and micro level interventions to assist individuals in overcoming financial, social, political, and interpersonal barriers to good health. Proctor (2003) identified a critical need for social work research that is simultaneously “intervention informative” and “grounded by the reality and complexity of clients’ perspectives and environmental contexts.” Similarly, Hallman, Thomsson, Burell, Lisspers, and Steerling (2003), argue that feminist health research must strive for methodologies that strengthen our understanding of the unique perspectives of women. Such research, they suggest, begins by “using old measurements to raise and answer new questions, while working to develop new tools that are more sensitive to women’s experiences” (p. 442). Identifying psychosocial resources potentially improving health outcomes for obese individuals with diverse needs, including many professional services traditionally provided by social workers, is an important focus for health care research. Identifying culturally relevant resources with the potential for improving service utilization and health outcomes for women makes this a worthwhile topic for social work research.

The next chapter contains a review of the literature pertaining to the etiology and treatment of obesity, the history of surgical interventions, and current research on behavioral health adherence.

2.0 REVIEW OF THE LITURATURE

2.1 OBESITY

Obesity is difficult to treat due to a high rate of recidivism (Goodrick & Foreyt, 1991; Wadden & Bell; Brownell & Wadden, 1991). For the majority of people attempting weight reduction, the behavioral and dietary modification necessary for both weight loss and weight maintenance are not easily sustained (Mitchell et al. 2001; Argurs-Collins, Kumanyika, Ten Have & Adams-Campbell, 1997; Manning, Jung, Leese & Newton, 1995). The complex biological, environmental, and psychosocial factors contributing to the development of obesity also predict this high rate of relapse with weight loss attempts (Moreno-Aliaga, Santos, Marti, & Martinez, 2005).

Short-term interventions for weight loss using conventional methods - including behavior therapy, low-calorie diets, pharmaco-therapy, and combinations of these approaches – report a failure rate (weight regain) as high as 90 to 95 % within two years (Perri, Nezu, Patti & McCann, 1989; Platte, Pirke & Wade, 1995; Jequier, 1990). For severely obese individuals (a body mass index over 40 kg/m² or a body weight greater than 100 pounds over ideal body weight), in particular, treatment outcomes with conventional weight loss approaches have been even less effective, with a success rate below 5% (Calle, Thun & Petrelli, 1999; Goodrick & Foreyt, 1991; Wadden & Bell; Brownell & Wadden, 1991).

2.1.1 Defining Obesity

The criteria for obesity in humans is established in a number of ways: type of adiposity has been dichotomized according to the distribution of body fat (visceral and non-visceral), and designated into a number of levels ranging from mild to severe overweight and obese. Level of obesity is measured in a variety of ways, as well: using waist circumference, waist hip ratio, body mass index, and as a percentage of an “ideal” weight and height composite based upon population means. Research on the pathogenesis of obesity in past decades has demonstrated that there is a great deal of variance in individuals’ susceptibility to obesity, and it cannot be simplistically accounted for by behavioral or lifestyle factors alone (Stunkard, Stinnet & Smoller, 1986; Rosmond, 2004; Anderson , Konz, Frederick, & Wood, 2001).

2.1.2 Etiological Theories

Obesity is a chronic disorder believed to result from a complex etiological mix of factors including genetic, biochemical, neuro-psychological, and cultural variables (NIH). Snyder et al. (2004) identified 430 human phenotypes associated with “BMI, body-fat mass, percentage of body fat, abdominal fat, fat-free mass, skin folds, resting metabolic rates, plasma leptin levels, and other components of fat distribution and energy balance” (pg 369).

In the early 1960s, Hirsch and Han (1969) found inheritable factors in adipose tissue that influence basal metabolic rates and intractable obesity in related rats. Leibel and Hirsch (1984) hypothesized that these factors could also explain metabolic changes subsequent to weight loss attempts in obese humans. According to Set Point Theory, attempts to gain or lose weight trigger a hypothalamic response that stimulates the autonomic nervous system to decrease or

increase sympathetic and parasympathetic activity. The body responds at a cellular level to maintain body weight.

Alterations in serotonergic neurotransmission in individuals have been linked to weight regulation, appetite control, and obesity, as well as to the development of certain eating disorders (Toornvliet, Pijl, Frolich, Westendorp & Meinders, 1997; Wurtman et. al., 1993; Bulik, Sullivan, & Kendler, 2002). More direct evidence of neurochemical influences on obesity was investigated by Wang et al. (2001), who found a link between reduced dopamine activity and obesity. Wang, Volkow, Thanos, and Fowler (2004) have suggested a possible mediating link (energy homeostasis) between protein-coupled receptors and addictive behaviors (reduced inhibition in eating regulation) that increase susceptibility to a cluster of behaviors present on the spectrum of addictive disorders.

Psychosocial theorists look to learning theory and environmental causes for overeating, pointing to the need for life-style change as an important component of weight loss. Eating as a response to stress or to cope with other strong emotions is subsumed within these theories. Environmental factors, such as the availability of convenient, high calorie foods and fast food restaurants, and behavioral factors, such as a sedentary life-style and poor dietary habits, have contributed greatly to the increasing prevalence of obesity in developed nations. Lifestyle behaviors contribute additively to the development of many chronic diseases, including obesity, and some health researchers believe that addressing lifestyle modifications to manage and prevent chronic diseases will have a greater impact upon restorative and preventive health than will all of the existing and emerging medical technology (WHO, 2001; Poston, Haddock, Dill, Thayer & Foreyt, 2001).

2.1.3 Prevalence and Medical Risks of Obesity

Medical research links severe obesity (a body mass index over 40 kg/m² or a body weight greater than 100 pounds over ideal body weight) to an increased risk for chronic health problems and premature mortality (Centers for Disease Control and Prevention (CDC), 2002; National Institutes of Health (NIH) Publication No. 98-4083, 2000; United States Preventive Services Task Force (USPSTF), 2003). Within the United States population, percentage rates of overweight (BMI>25 kg/m²), obese (BMI>30 kg/m²), and severely obese individuals are increasing, with over 34 % of all Americans qualifying as overweight, and over 27 % considered obese (USPSTF, 2003). Obesity-related health risks include diabetes, cardiovascular disease, hypertension, sleep apnea, osteoarthritis, and certain kinds of cancer (USDHHS). Obesity is a contributory factor to chronic diseases that are amenable to treatment and, in part, are preventable and sometimes reversible with certain behavioral health modifications.

The greatest risks to health are associated with the most severe levels of obesity. While men in the U.S. have a slighter higher rate of overweight compared to women, women have a higher rate for obesity and severe obesity compared to men, with estimates of 8% to 10% of women and 5% of men living in the United States qualifying as morbidly obese (Lara, Kothari & Sugerman, 2005). Severe obesity is associated with increased risk for impaired quality of life (Kral, Sjostrom, & Sullivan, 1992; Schauer, Ikramuddin, Gourash, Ramanathan, & Luketich, 2000), and for social, educational, and occupational discrimination (Puhl & Brownell, 2001; Wadden & Bell, 1990; Wardle, 1995; Flegal, Carroll, Kuczmarski & Johnson, 1998).

2.1.4 Demographic Trends in Obesity

Within the United States, rates of obesity by gender vary geographically, but within the general population as whole 65.5 % of men and 47.3 % of women are considered to meet criteria for mild to severe obesity (Kaiser Foundation, 2006). Women, however, appear to outnumber men slightly in rates of severe obesity. In states with higher rates of poverty and with larger numbers of minorities, however, the gap in percentage rates between obese males and females decreases.

The U.S. census data indicate that an income at or below the poverty level is a significant risk factor for obesity (Strauss & Pollack, 2001, Sobal & Stunkard, 1989), and obese individuals have an increased likelihood of experiencing discrimination in obtaining both education and employment. Women at or below poverty level and women living in largely segregated neighborhoods have a significantly greater risk for obesity independent of race (Boardman, 2004). Low-income women are at the greatest risk for experiencing access limitations to health services, underutilization of available services, and early attrition from interventions targeting behavioral health changes (Kumanyika, 2002; Kumanyika, 1998; Berka, Nunlee-Bland, Erabhaoui, Belmanoun & Dunston, 2004).

Rates of obesity are increasing within all socioeconomic and racial groups, but there is a disproportionately higher rate of obesity – especially severe obesity - in low-income African American women (34.9 %), compared to Hispanic women (25.5 %) and Caucasian women (19.3 %) (CDC, 2000). Since 1980, the number of severely obese African Americans adolescents has more than doubled, and an estimated fifty percent of low-income African American women are reported to be obese (Flegal, Carroll, Ogden & Johnson, 2002).

2.1.5 Psychosocial Risk Factors for Obese Women

Obese women in the general population have been found to have higher rates of depression than obese men, and also have higher rates of binge eating, body image disturbance, and reported psychological distress (Fabricatore & Wadden, 2004; Ben-Tovim & Walker, 1994). Obese women report more discrimination than men do in the work place and in all social contexts (Falkner, French, Jeffery, Neumark-Sztainer, Sherwood, & Morton 1999). This is not surprising in light of the cultural prejudice against obesity and the pressure on American women to maintain an idealized body type in order to meet a preferred standard of appearance (McCabe, Mills, Polivy, 1999; Cramer & Steinwert, 1998; Crandall, 1994; Ben-Tovim & Walker). Obese African American women may also experience compounded obstacles of bias and discrimination due to both weight and race, resulting in barriers to occupational and educational equality (Falkner, French, Jeffery, Neumark-Sztainer, Sherwood, & Morton 1999; Puhl & Brownell, 2004).

2.2 THE TREATMENT OF OBESITY

The tremendous variability in individuals' success at weight loss and weight maintenance has led to a stream of research intent upon finding psychosocial factors predicting treatment outcome. Weight loss and weight maintenance are complex processes influenced by polygenetic variables, as well as by behavioral and environmental factors. Psychosocial and behavioral predictors of successful weight loss and weight maintenance have been inconclusive, but studies have generated a body of knowledge with several themes that eventually converge into the central

concept of adherence. Adherence to treatment directives has been reported by the World Health Organization (2003) to be the most important factor in treatment effectiveness. However, the WHO also reports that rates of adherence across disease interventions are “alarmingly low”.

Conventional treatment approaches that use behavioral and dietary changes for initial weight loss have had very limited success with severely overweight individuals (Calle, Thun, Petrelli, Rodriguez, & Heath, 1999). The long-term results of conventional weight loss interventions, typically combined behavior modification and reduction in daily caloric intake, have been generally disappointing. Rates of failure (weight regain) are similar across treatment types, and method of weight loss used is not predictive of success or failure (Willett, 2002). Only 2 to 5 % of severely obese individuals using conventional weight loss treatment are successful at maintaining lost weight (Bjorvell & Rossner, 1985; Stunkard & Wadden, 1992; Rubino & Gagner, 2002).

Any method of treatment for obesity can simplistically be conceptualized as two distinct phases or stages: an initial stage of decreased caloric intake with resultant weight loss, and a second stage requiring maintenance of the lower weight achieved in stage one. Both stages require a number of behavioral changes in eating patterns (how often one eats, what foods one eats, and the amount of food one eats). There is an increased chance of success in both the weight loss stage and weight maintenance stage when an individual increases and maintains a more physically active life-style.

Three behavioral factors - eating patterns, food selections, and behavioral restraint - are the most consistent predictors of weight loss and weight maintenance (Elfhag & Rossner, 2005). Individuals who eat between meals, choose high fat and high calorie foods at meals, and who exert less cognitive control over eating patterns, are unsuccessful at losing weight or maintaining

a lower weight after a short-term diet. Increasing physical activity contributes slightly to initial weight loss, but exercise is most effective as a means to maintain a lower body weight (Jeffery, Wing, Sherwood, & Tate, 2003).

2.2.1 Characteristics of Women Seeking Treatment for Obesity

Women outnumber men in seeking all methods of weight control from Weight Watchers to pharmacotherapy (Wadden, Womble, Stunkard, & Anderson, 2002; Lean, Han, & Seidell, 1999; Fontaine, Cheskin, & Barofsky, 1996). Anderson, Konz, and Frederick (2001) found that medical doctors are more likely to recommend and refer women with moderate obesity for weight loss treatment compared to men at identical BMIs, but the majority of women seeking weight loss treatment are self-referred. Although women greatly outnumber men in requesting obesity surgery for weight control four to one, for the presentation of non-surgical obesity treatment these numbers are closer (60 % of women compared to 40 % of men) (Choban, Onyejekwe, Burge & Flancbaum, 1999; Halmi, Long, Stunkard & Mason, 1980).

2.2.2 Pharmacotherapy

There is a slightly higher success rate for initial weight loss when medications are used in combination with a reduced calorie diet. Long-term results are similar to behavioral treatments alone, however, as there continues to be limited success for weight maintenance (Fujioka, 2002). Two commonly prescribed medications for obesity are Sibutramine (Meridia) and Phentermine (Ionamin) (Weigle, 2003). Sibutramin is a neurotransmitter (norepinephrine and serotonin) reuptake inhibitor that reduces appetite by acting on the central nervous system. Phentermine ,

an appetite suppressant, is related chemically and pharmacologically to the amphetamines. It has a stimulating effect and serious side effects. It can be addictive and can exacerbate medical conditions commonly occurring in obese individuals, such as coronary artery disease and hypertension.

Orlistat is a lipase inhibitor that can reduce dietary fat absorption by 30%. It can cause frequent and unpleasant gastrointestinal side effects, as well as the possibility of a vitamin D deficiency (Weigle). Again, long-term results are not superior to behavioral interventions without a medication component (Fujioka, 2002).

2.2.3 Liquid Diets

There are very low calorie liquid diets used for weight reduction that have limited success for severe obesity when individuals are able to tolerate them. Long-term use can result in liver or renal damage and may contribute to bone loss. Very low calorie liquid diets require physician supervision and are typically expensive. They are also associated with a high rate of weight regain once discontinued (Fujioka, 2002). They may be considered when weight loss is medically necessary and surgery is not an option.

2.2.4 Long-Term Weight Maintenance

Improving and extending the use of behavioral skills for weight maintenance after initial weight loss is currently believed to be the most elusive factor in obesity treatment (Wadden, 1993; Klem, 2000; Katzmarzyk, Janssen & Ardern; Jakicic & Otto, 2005). Research addressing interventions targeting long-term weight maintenance frequently dovetail with studies aimed at

improving adherence to exercise and other lifestyle modifications to both prevent and treat obesity. Among a number of factors that increase the likelihood of successfully maintaining a lower weight, Elfhag and Rossner (2004) found that individuals participating in some consistent form of exercise were more likely to maintain lost weight than sedentary individuals. Additionally, the incorporation of physical activity in lifestyle modification - independent of weight - has also been shown to improve certain health factors. Exercise appears to counteract some of the negative effects of obesity on specific health trends and on all-cause mortality (Katzmarzyk, Janssen & Ardern, 2003; Jakicic & Otto, 2005).

2.2.5 Psychosocial Predictors of Physical Inactivity

There are also psychosocial characteristics that correlate with a more or less active lifestyle. A cross-sectional study including over 2000 ethnically mixed women reported that perceived environmental barriers, lower motivation, and the presence of young children at home were all associated with less physical activity. Demographic risks for a more sedentary lifestyle also included being Hispanic or African American, being older, having less education, and having a higher BMI. Social support and self-efficacy were correlated with increased activity level, with stronger effects in Caucasian women (Seinfeld, Ainsworth, & Queensberry, 1999).

Adherence to regular health-promoting exercise is difficult for many individuals, regardless of their weight, and for severely obese individuals it is undoubtedly a significant challenge. Optimal levels of exercise necessary for weight loss and health improvement have been investigated. Anderson et al. (2001) found that the benefits of exercise on weight management could be achieved merely by increasing the level of activity involved with daily

tasks (such as housework), thus improving the likelihood of adherence for individuals who might have difficulty exercising on a regular basis.

2.3 BARIATRIC SURGERY

Bariatric surgery is currently the most effective treatment for severe obesity. Within the first 12 to 18 months after surgery there is a considerable reversal of both the obesity and the comorbidities associated with obesity (Hsu et al.,1998), suggesting that there are additional physiological factors involved in weight loss resulting from surgery. Compiled national and international data and a limited number of randomized, controlled trials comparing conventional behavioral and pharmacological weight loss methods to surgery, have established that surgical interventions are superior to non-surgical interventions for initial weight loss, long-term weight maintenance, and the amelioration of certain comorbid medical conditions, including type II diabetes, cardiovascular risk factors, hypertension, and degenerative joint disease (Lara, Kothari, & Sugerman, 2005; Maggard et al., 2005).

Not all obese individuals are suitable candidates for bariatric surgery. There are medical and psychological risks associated with all of the currently utilized surgical procedures (Buchwald & Williams, 2004). Individuals are typically required to demonstrate that previous conventional weight loss attempts (behavioral approaches, pharmacological approaches, low-calories diets, or medically supervised diets), were ineffective for weight loss and/or weight maintenance. A successful outcome from a surgical procedure has been established as a weight loss of 50% or more of excess pre-surgical weight (% EWL) after a period of 24 months in at least 85 % of patients (Warde -Kamar, Rogers, Flancbaum, & Laferrere, 2004).

Optimal results following surgery can only be achieved with adherence to behavioral modifications for diet and physical activity level. Postsurgically, individuals are required to adhere to daily dietary habits that would be difficult for any person, and, ironically, require a stricter adherence to behavioral changes than more conventional weight loss treatments.

2.3.1 History of Surgical Treatment

The earliest surgical methods for weight loss required the removal of sections of the intestines in order to decrease the absorption of nutrients. The first widely used method was the jejunio-ileal bypass introduced in the 1950s. The operation required a shortening of the small (normally highly absorptive) intestine from twenty feet to approximately eighteen inches, resulting in severe nutrient malabsorption (including vitamins, minerals, fats, carbohydrates, and proteins). Due to a high mortality rate and serious and often painful complications, it was eventually discontinued and replaced by the biliopancreatic diversion. This procedure was an improvement over the jejunio-ileal bypass because it did not cause small bowel dysfunction (and frequent liver problems), replacing the small bowel removal with a limited gastrectomy (the surgical removal of part of the stomach) and a diverted long limb Roux-en-Y opening to the large intestine. Although this procedure was safer than the jejunio-ileal bypass, it also had unpleasant gastrointestinal complications that could be persistent, and it is no longer popular as a surgical option (Hydock, 2005).

In the late 1960s, combined restrictive (reducing the size of the stomach) and malabsorptive surgery was introduced. There are currently five types of surgical procedure used internationally (Buchwald & Williams, 2004), including gastroplasty (vertical or horizontal partition of the stomach with staples), two gastric bypass procedures (Roux-en-Y or Long-limb

Roux-en-Y) which involve partitioning and repositioning the stomach pouch, biliopancreatic diversion or duodenal switch, and gastric banding procedures (stomach constriction with a band) (Buchwald & Williams). In 2003, over 60 % of the bariatric surgeries in the United States were done laparoscopically, and the two most common procedures were the laparoscopic gastric bypass and the laparoscopic adjustable banding (Buchwald & Williams, 2004).

In a 2003 Cochrane Review, gastric bypass surgery was compared to other types of surgery and was found to produce the greatest amount of weight loss by a factor of 20 % (Colquitt, Clegg, Sidhu, & Royle, 2003). This significant improvement in weight loss with gastric bypass surgery is achieved by the combination of restrictive and malabsorptive procedures. Weight outcome for combined restrictive and malabsorptive procedures, such as the Laparoscopic Roux-en-Y Gastric Bypass, show that 60 to 75 % of individuals post-surgically are able to maintain at least one half of total postsurgical weight lost 5 to 10 years after surgery (Smith, Goodman, & Edwards; Suter et al. 2000; Wolf, Kortner, & Kuhlmann, 2001). With a restrictive procedure alone (gastroplasty or gastric banding), the individual's stomach pouch is initially diminished in size (resulting in a sense of fullness with less food), but the stomach pouch has been known to stretch and allow larger a greater amount of food (Hydock, 2005).

2.3.2 Medical Complications of Bariatric Surgery

There are risks for serious medical complications with surgery, including a postoperative mortality rate of one-half to one percent (Buchwald, Avidor, Braunwald Jensen, Pories, Fahrbach & Schoelles, 2005). Postoperative complications are reported in about 15 % of patients. The most common complications - wound infections and ulcers - appear to diminish in frequency after the first year postsurgically (Toth & Voll, 2001; Pandolfino, Krishnamoorthy & Lee, 2004).

There are generally fewer complications reported in long-term follow-up studies, with the exception of certain mineral deficiencies and long-term bone loss (Coates, Fernstrom, Fernstrom, Schauer, & Greenspan, 2004; Fujioka, 2005). The most common gastrointestinal symptoms reported by patients are nausea, vomiting and “dumping” (a painful physical response to the ingestion of sweet or high fat foods), and are generally a result of poor compliance with dietary recommendations (Pandolfino, Krishnamoorthy, & Lee, 2004), and may appear at any point after surgery.

Due to improvements in surgical techniques and safer and more effective surgical methods (such as the use of laparoscopic surgery), the demand for surgery as a treatment is increasing. In 2004 over 140,000 adults in the United States elected to have bariatric surgery (Maggard et al., 2005) This indicates a tremendous increase since 2001 when approximately 40,000 surgeries were performed (Buchwald & Williams, 2004; Ferraro, 2004). There continue to be risks with these procedures, and surgery of any kind is more complicated for obese individuals due to an increased risk of wound infections and postsurgical complications. Post-operative mortality rates vary. Fernandez-Acenero, Silvestre, Fernandez-Roldan, Cortes, & Garcia-Blanch, (2004) found mortality rates between .5 % and 2.9 % in a population-based study, and identified type of surgery and surgeon experience to be the most important factors contributing to post-surgical mortality.

2.3.3 Resolution of Comorbid Conditions

According to Courcoulas and Flum (2005), research on obesity surgery is a relatively new endeavor, with published studies following the rapid increase in safe surgical procedures beginning in the early 1990s. The first studies funded by the National Institutes of Health began

in 1991. Four collective literature reviews by Kushner and Noble (2006), Maggard et al (2005), Buckwald et al. (2004), and Ballantyne (2003), as well as a Cochrane database-review (Colquitt, Clegg, Sidhu, & Royle, 2003), found that follow-up studies were difficult to compare due to the use of mixed surgical methods, high drop-out rates, and missing information on demographic characteristics. Courcoulas and Flum suggested that the overall difficulty in assessing surgical outcomes occurs because “unlike many other conditions treated by surgeons, obesity affects every organ system and component of well-being.” (p. 1959).

Following weight outcomes, the most frequently reported observations in the literature address postsurgical changes in comorbid conditions. Cost analyses and long-term outcomes are less frequently reported by studies, usually because the follow-up analyses were for the short-term (Kushner and Noble, 2006). The majority of prospective studies used non-randomized samples from surgical providers (Colquitt, Clegg, Sidhu, & Royle, 2003). The Swedish Obese Subjects Study is the longest and largest randomized controlled trial including 2000 postsurgical subjects and 2000 nonsurgical controls followed for a period of 10 years (Sjostrom et al., 2004). The study supported previous findings from smaller non-randomized studies, and confirmed that that weight loss from surgical interventions (gastric bypass, gastroplasty, and gastric banding) is significantly greater and is sustained longer than results from nonsurgical interventions.

Ballantyne (2003) reported that the documentation of comorbid conditions in reviewed studies was inconsistent, but he was able to establish that there were “sub-population” variations for weight outcomes and in the resolution of comorbidities for the factors of race, gender, SES, age, and presurgical BMI. In a number of the studies he reviewed on postsurgical weight outcomes, African American women lost less weight than Caucasian women. One early study by Capella and Capella (1993) examined the impact of type of surgery as well as race on

postsurgical outcomes. They reported that African American women had poorer postsurgical weight loss and resolution of comorbidities compared to Caucasians and Hispanics.

Averbukh et al. (2003) investigated the impact of presurgical health/mental health indices and demographic characteristics (gender, race, and age) on weight outcomes. The authors found that patients over the age of 55 had the most medical complications and less weight loss postsurgically. Finding worse outcomes for older surgical patient has been reported in other samples. Flum et al. (2005) found that males over age 65 had the highest mortality rate postsurgically. Residori, Garcia-Lorda, Flancbaum, Pi-Sunyer, and Laferrer (2003) found that men reported more pre and postsurgical comorbidities than women. Huerta, Kohan, Siddiqui, Anthony, and Livingston (2007) examined gastric bypass outcomes in veterans, with the largest percentage of men in a published study (62%). They did report a higher mean presurgical BMI and a greater incidence of comorbid conditions in their study compared to previous studies with predominately female subjects. They did not compare results by sex, and reported a comparable resolution of comorbid conditions for the combined sample.

The most frequently reported comorbid conditions in surgical studies appear to be diabetes, hypertension, and factors contributing to coronary artery disease - primarily dyslipidemia. Even a small amount of weight loss, it has been found, can improve all of these conditions (Ballantyne, 2003). Metton, Steele, Schweitzer, Lidor, and Magnuson (2008) followed 495 patients who were at least 12 months out of gastric bypass surgery. Although 11% of their sample did not reach optimal weight loss (50% excess weight loss), postsurgical resolution of hypertension did not significantly differ from individuals who achieved optimal weight loss, with a total resolution at 96% for the entire sample. Resolution of diabetes, however, was higher for patients achieving optimal weight loss (68% vs. 80%). White, Brooks,

Jurikova, and Stubbs (2005) followed 342 patients who had a gastric bypass procedure between 1990 and 2003 to evaluate changes in weight and obesity related comorbidities. There was a significant dropout rate of 24% of the patient sample after two years and over 60% after five years. The majority of patients achieved resolution or improvement in presurgical diabetes and hypertension, but dyslipidemia was resolved in only 34 % of patients with significant pre-surgical lipid levels, and in 17 % of the patients it was unchanged or worsened. They found that higher presurgical BMI was associated with less postsurgical weight loss, although age was not found to be associated with higher BMI. The resolution of comorbidities for women across race, however, was found to be comparable.

2.4 BEHAVIORAL FACTORS

2.4.1 Recommended Eating Behaviors Following Surgery

Included on a Web Page for the American Obesity Association was a list of indicators determining suitability for a surgical intervention for the treatment of severe obesity:

From AMERICAN OBESITY ASSOCIATION (2004):

Web Page: <http://www.obesity.org/>

You may qualify for obesity surgery:

1. If you are severely obese (BMI of 40 or more) or have a BMI of 35 to 39.9 with serious medical conditions (such as high blood cholesterol and triglycerides, hypertension, sleep apnea, type 2 diabetes and other serious cardiopulmonary disorders).

2. If you have tried other methods of weight loss (changes in eating, behavior, increased physical activity and/or drug therapy) and are still severely obese.
3. If you are unable to physically perform routine daily activities (work-related and family functions) and your quality of life is seriously impaired due to the severity of your obesity.
4. If you understand the procedure, risks of surgery and effects after surgery.
- 5. If you are motivated to making a lifelong behavioral commitment that includes well-balanced eating and physical activity habits which are needed to achieve the best results.**

(My emphasis)

Bariatric surgery is comparable to nonsurgical obesity treatments in two ways: First, there are two distinct stages entailing initial weight loss and weight maintenance, and second, both surgical and nonsurgical treatments require behavioral modifications of previous eating patterns to assist with weight loss and weight maintenance. Several differences make bariatric surgery more successful, however, at least in the short term. The initial weight loss is rapid and more easily achieved due to the surgical alteration of the stomach pouch. The individual experiences an initial period of reduced hunger and a sense of satiation with very small amounts of food. Many people report feeling euphoric during this period because they are not burdened by food cravings and experience an increased sense of control over their eating behaviors. (Ogden, Clementi, Aylwin, & Patel, 2005; Horchner, Tuinebreijer, & Kelder, 2002). Greeno, Jackson, Williams, and Fortmann (1998) observed that greater perceived control over eating

(independent of weight) was associated with increased life satisfaction in a non-surgical community-based sample. For bariatric patients, however, this initial sense of control over food intake diminishes within the first year after surgery, when more effort is required by the individual to manage re-emerging food cravings and urges to return to previous eating habits.

The risks for weight regain after surgery increase over time, and individuals who are successful at adhering to a low calorie diet must also maintain a moderate level of physical activity for optimal health and weight control. These changes are important for weight loss, weight control, and health enhancement. For the majority of individuals the first year following surgery is the most likely period to see good adherence to these changes (Hsu, Sullivan, & Benotti, 1997). In the long-term, individuals must continue to adhere to daily dietary habits that would be difficult for any person regardless of his or her weight or eating history.

2.4.2 Regulation of Meals

Following gastric bypass surgery, individuals are required to regulate meals and eat more frequently. Meals must contain low calorie, low fat, and high protein (50 grams of protein per day is recommended) foods that are easily digested. Meals are small – several teaspoons of food or an egg-sized intake is typical in the months after surgery. Eventually individuals can eat small portions that contain enough nutrition to extend the time between meals, but they cannot eat portion sizes or meals typically served and eaten. Individuals must avoid foods high in fat and sugar, and many are not able to tolerate dairy foods. Additionally, individuals must follow a strict vitamin regimen and develop regular exercise habits that are necessary for continued weight maintenance. Previous eating habits, such as frequent grazing, binge eating, night eating

and sweet eating all contributed to obesity, and some individuals find ways to resume similar habits after surgery.

2.4.3 Eating Patterns Linked to Outcome

There are a number of eating patterns that are linked to weight regain. The frequent ingestion of soft foods and liquids high in calories, for instance, or eating small amounts of high fat and high calorie foods very frequently, may all contribute to weight regain and poor long-term outcome after surgery (Hsu et al., 1998).

There are studies examining specific presurgical eating behaviors likely to postsurgical success. Hsu, Betancourt, and Sullivan (1996) found that patients with presurgical eating disorders including bulimia nervosa, binge eating disorder, and night-eating syndrome (limited food intake during the day and eating the majority of calories during the evening), were more likely than patients without these diagnoses to regain weight after vertical banded gastroplasty. Boan, Kolotkin, Westman, McMahon, & Grant (2004), however, found that all the participants in their study (even those with presurgical binge eating) achieved a complete remission of binge eating after gastric bypass surgery. Burgmer et al. (2005) also followed a large sample of patients after a gastric restriction procedure, and did not find any predictive significance between reported eating pathology presurgically and eating pathology postsurgically. They did find that individual's eating behaviors following the surgery were the most predictive indicators of success or failure with weight loss and weight maintenance.

2.4.4 Sense of Control

Improvements in postsurgical quality of life measures have been found to correlate with a perceived sense of control over eating (Ogden, Clementi, Aylwin, & Patel, 2005) and increased physical activity after weight loss (Boan, Kolotkin, Westman, McMahon, & Grant , 2004). Ogden, Clementi, Aylwin and Patel found that quality of life was not as closely associated with postsurgical weight loss as was an individual's sense of control over daily eating habits.

Elkins, Whitfield, Marcus, Symmonds, Rodriguez, and Cook (2005) identified specific patterns of eating behaviors in postsurgical patients that were linked to weight gain, and found that patients were the least likely to be compliant with exercise recommendations, avoiding eating between meals, and adhering to a low fat and calorie diet. They found that individuals were most compliant with avoiding alcohol and carbonated beverages, and eating the recommended amounts of protein in their diet.

Kenler, Brolin, and Cody (1990) looked at dietary compliance (self-reported) in two groups of patients receiving Roux-en-Y gastric bypass or horizontal-gastroplasty, and found that the gastric bypass surgery resulted in better adherence to dietary recommendation for up to twenty-four months. Other studies have also reported that bypass procedures can result in long-term physical and psychosocial improvements, but these procedures do require more compliance with behavioral modifications, such as changes in the types of food and the amount of food that individuals can eat at any time (Delin, Watts, Saebel, & Anderson, 1997).

2.4.5 Exercise Adherence

Adherence to regular health-promoting exercise is difficult for many individuals, regardless of their weight, and for individuals with a history of morbid obesity it is undoubtedly a significant change. Murr, Siadati, & Sarr (1995) found a high rate of reported arthritis (over 90 %) in an ethnically diverse group of obese patients age 50 and older scheduled for bariatric surgery. As this sample could be similar to other samples of presurgical candidates, it is likely that many obese individuals seeking surgery have avoided exercise due to physical discomfort. Arthritis and other obesity-related health complications are potential obstacles to engaging in any physical activity.

Successful long-term weight maintenance after bariatric surgery requires a commitment to a more active lifestyle. Pre-surgical physical barriers to exercise are generally reversed with even small changes in weight postsurgically (Valera-Mora et al., 2005). Despite these changes and with knowledge of the importance of postsurgical exercise, Elkins, Whitfield, Marcus, Symmonds, Rodriguez, and Cook (2005) still found that adherence to exercise was one of the most common behavioral lapses reported by post-surgical patients in their study, with slightly over 40 % of patients failing to comply with recommended levels of exercise at a 12 month follow-up.

2.4.6 Diabetes Studies

The life-style changes required for coping with diabetes involve dietary modifications and restrictions similar to those recommended for patients following gastric bypass surgery. This is particularly true for control of sweet intake and for maintaining a total lower caloric intake.

Studies on individuals' adjustment to diabetes, then, will be applicable in some clinical and psychosocial aspects to the adjustments required with obesity surgery. Both severely obese individuals and individuals with type II diabetes also have a greater risk of depression than do healthy controls, and approximately one half of the individuals diagnosed with type II diabetes are obese.

Weight maintenance is often considered the most difficult part of postsurgical adjustment and of glycemic control with diabetes (Dixon, Dixon, & O'Brien, 2001; Ciechanowski, Katon, & Russo, 2000). Following a period of weight loss there are fewer social reinforcements and reminders to motivate individuals, and, as in all weight loss attempts, there is a tendency for individuals to "drift" back to old habits. Extended contact between patients and health providers is associated with long-term weight maintenance (Wadden, Butryn, & Byrne, 2004). Aucott et al. (2004) reported that glycemic control, weight loss, weight maintenance, and level of activity goals in a group of diabetic patients participating in an extended intensive life-style intervention program (involving frequent contact with health providers and with peers) improved by a factor of 50% over pre-intervention levels. Compared to a conventionally treated group of diabetics, glycemic control and weight maintenance were superior.

African American women outnumber Caucasian women with diabetes in the U.S. by two to one (Keyserling, Samuel-Hodge, Ammerman, Ainsworth, Henriquez-Roldan, Elasy, 2002). To date, bariatric surgery is considered the most effective treatment for diabetes in severely obese individuals. Residori, García-Lorda, Flancbaum, Pi-Sunyer, and Laferrere (2003) found that BMI and age (independent of race) were the best predictors for the presence of diabetes in a cohort of obese individuals requesting surgery. Ethnicity and gender were linked to other co-morbid conditions, such as higher rates of hypertension in African Americans and higher total

cholesterol levels in Caucasians. As of 1998, the National Institutes of Health ranked diabetes seventh in rates of mortality.

3.0 THEORETICAL FRAMEWORK

3.1 SALUTOGENESIS

In the past several decades behavioral health research has identified contributory health-enhancing factors that represent individual differences in cognitive, emotional, attitudinal, and behavioral traits (Fishbein & Ajzen, 1975; Bandura, 1989). Originating from social learning/social cognitive theories, many early health models, such as the Health Belief Model, Health Locus of Control Model, Self-efficacy Theory and Reasoned Action Theory, as well as more recent and sophisticated motivational theories like Prochaska's Trans-theoretical Model and Stages of Change Construct, have clearly demonstrated the association between cognitive processes and behavioral change at the individual level (Glanz, Lewis, & Rimer, 1997).

Antonovsky's salutogenic model (1979, 1991, and 1993) contains a comprehensive approach to individual health traits, theorizing that a number of additional influential factors can be found that link cognitive processes and health behaviors. He identifies three constructs in his theoretical model that he termed sense of coherence (comprehensibility, manageability, and meaningfulness) that encompass an individual's cognitive, motivational, and dynamic processes, potentially influencing adaptation, coping skills, and health behaviors. Sense of coherence is

defined as “a global orientation that expresses the extent to which one has a pervasive, enduring, and dynamic, feeling of confidence that:

(1) “The stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable. (*Comprehensibility*);

(2) “The resources are available to one to meet the demands posed by the stimuli.” (*Manageability*); and

(3) “These demands are challenges, worthy of investment and engagement.” (*Meaningfulness*)

(Antonovsky, 1993, p. 725).

Antonovsky theorized that an individual’s location on the SOC continuum, although well established by the time of adulthood, can be strengthened by “individual effort, by communication, interaction, therapy, and alteration of social and political relationships” (Novak, 1998, p.5). Antonovsky (1987) theorized that individuals on the high end of the SOC spectrum have more “generalized resistance resources” (GRRs). GRRs are any personal, social, or environmental processes or factors found to facilitate an individual’s success coping with life stressors and enhancing health. For individuals seeking a surgical treatment option for obesity, and faced with the stress of adapting to tremendous physical changes and behavioral challenges postsurgically, the utilization of pre and postsurgical psychosocial resources (as measurable and modifiable GRRs) would contribute specifically to what Antonovsky conceptualized as an individual’s ability to find life stressors manageable and comprehensible.

Postsurgical patients have described “Life-after-surgery” as a life-changing event. Acquiring the necessary skills to navigate through difficult and behaviorally challenging situations and temptations is essential for success. It requires a tremendous emotional investment involving psychological, behavioral, and social changes. The benefits of extended contact with specialized supports include both emotional and instrumental fortification for these changes. When individuals utilize health care resources they gain increased exposure to realistic information about health maintenance, and are more likely than non-service users to cultivate health-promoting coping skills. Psychosocial services, faith-based services, and other support sources, then, are examples of influential events that may potentially strengthen SOC.

Sense of coherence (SOC) has been investigated as a moderating variable in trauma studies and disease treatment, and as an intervening variable in occupational health and behavioral health research for over two decades (Antonovsky, 1993; Julkunen, 2001; Wettergren, Langius, Bjorkholm, & Bjorvell, 1997; Feldt, Kinnunen, & Mauno, 2000; Gana & Garnier, 2001). It has been associated primarily with stress theory (Antonovsky & Sagy, 1986; Cooper & Payne, 1991), where it has been strongly linked to other standardized measures of physical and mental health. It has been used in multi-ethnic groups and found to be a reliable measure cross-culturally (Bowman, 1998). In medical and epistemological research, SOC has served as an alternative orientation to health and well-being distinct from the traditional medical model (Baker, North, & Smith, 1997).

Cohen and Kanter (2004) examined sense of coherence in individuals with type I and type II diabetes. Although they did not find differences in SOC scores between the diabetic groups and a control group without a diagnosis of diabetes, they did find that a higher sense of coherence was positively related to adherence to self-care behaviors in the diabetic groups. The

positive influence of a higher SOC on adherence was present regardless of the level of psychological distress reported.

Weissbecker, Salmon, Studts, Floyed, Dedart and Sephton (2002), conducted a randomized trial testing the effects of a psychosocial intervention on treatment adherence, symptom control and quality of life in women with fibromyalgia. The authors found a pre to post treatment increase in SOC and a decrease in the targeted symptoms among the women who received the intervention. Similarly, Sanden-Eriksson (2000) found that higher SOC scores in a group of diabetic patients were correlated with better management of and adherence to life-style changes required for control of blood glucose levels. These individuals also required less involvement with professional support services for disease management, although informal support sources were not examined. Fok, Chair, and Lopez (2005) examined SOC in a cohort of patients after experiencing a critical illness, and found that family support was associated with a stronger SOC and the use of more independent and successful coping skills following discharge. Ray, Nickles, Sayeed, and Sax (2003) found that a stronger SOC predicted greater weight loss following Roux-en-Y gastric bypass surgery. They concluded that dietary noncompliance was the most common reason for inadequate weight loss or weight regain after surgery, and that a higher SOC positively influenced individuals' ability to comply with post-operative life-style changes. The emergent literature suggests that SOC is associated with successful management of necessary behavioral changes for health maintenance, and contributes to a growing understanding about the diversity of responses to disease, recovery from illness, and post-surgical outcomes.

3.2 SERVICE UTILIZATION

Complex theoretical models for resource utilization in healthcare research are derived from economic models, including queuing theory, and the event count model (Chi, 1998). Health service utilization is typically measured as either count frequencies for samples with varying units of measurement (population-based or per capita statistics in large samples), or by simply using binary coding (service use/no use). Comparisons of service utilization rates are commonly used in healthcare research, including cross-sectional studies such as this. Self-reported healthcare resource utilization, however, has been found to be less accurate than information obtained in medical records, with a trend toward underreporting ambulatory service use (Petrou, Murray, Cooper, & Davidson, 2002).

There are no standard measurement instruments for service utilization in the behavioral health literature. Studies may indicate service utilization simply by reporting the general use of services by category, usually without indicating frequency or length of service use. Garland, Lau, Yeh, McCabe, Hough, and Landsverk (2005), for instance, examined service utilization in a large, multi-ethnic sample of adolescents. In their analysis of service use, they grouped formal services to include outpatient and inpatient mental health treatments, and informal services to include self-help/peer groups, pastoral counseling, and alternative medical treatments. If a study participant indicated that they had sought a type of service within the groupings under investigation, only the type of service was recorded. Data was presented as percentage of participants having utilized specific services. Service use has also been recorded as measurable counts or units of use and presented either by grouping similar types of services or by specific service. Service use can be measured as the number of service visits, hours of service use, length of service use, or a combination of these measures. Carlson and Gabriel (2001), for instance,

measured service use in individuals receiving substance abuse treatment by recording attendance to either treatment groups or individual treatment as one unit of service use for each hour of attendance, resulting in a totaling of the number of hours for each participant for analysis.

3.2.1 Service Utilization and Behavioral Health

Individuals motivated to seek health information and those with better access to health advice have been found to be more compliant with health-promoting behaviors (Moorman & Matulich, 1993). Johnson and Meischke (1993) also proposed that “Individual information seeking has become a critical element in determining health behaviors”. Savolainen (1995) linked information seeking with better control over health and with a stronger sense of coherence. Warner and Procaccino (2004) found that women use both formal and informal sources of information to cope and gain control over health-related issues for themselves and for their family members, and Muller (1990) found that women are significantly more likely than men to seek both health information and services for health care.

Giusti et al. (2004) investigated the impact of presurgical information on the informed consent process in a group of individuals presenting for bariatric surgery. The authors presented six hours of pre-operative education about the surgical risks and behavioral/psychological modifications required with gastric banding and Roux-en-Y procedures to a large sample of individuals presenting for bariatric surgery. They found that the majority of individuals were not knowledgeable about post-surgical life-style changes or about the differences between the two procedures, and that almost 10% of the patients declined a surgical option for treatment following the educational intervention.

The influence of presurgical education on long-term postsurgical adherence to life-style changes, however, has not consistently demonstrated a positive impact on outcome. Madan and Tichansky (2005) found that the retention of presurgical information provided by the surgical team was poor in almost 50% of a tested sample one year after surgery, suggesting a link between incomplete retention of information about postsurgical management and poor adherence to behavioral changes long-term. This suggests that there may be significant health-promoting benefits for postsurgical patients from continued participation in specialized bariatric support services.

3.2.2 Service Utilization and Race

The influence of race and ethnicity on service utilization has been described in research addressing health (Young, 2005; Institute of Medicine, 2002; Green, Lewis, & Bediako, 2005), mental health (Snowden, 1999, & 2005), and chronic disabilities (Terhune, 2005). One observed difference between Caucasian and minority groups is level of service utilization, which is linked to poorer health in African Americans and other minorities due to lower rates of health service use. African American women have been found to benefit less than Caucasian women from conventional weight loss treatments (Kumanyika, 2002), and from surgical treatments (Capella & Capella, 1993; Latner, Wetzler, Goodman, & Glinski, 2004), suggesting that improvements in both service use and treatment efficacy will require a responsiveness to cultural diversity when designing and providing treatment interventions.

Jones (2004) identifies a limitation in social work research contributing to service delivery that fails to address the psychosocial competence of African American women to cope with “oppressive realities” and, instead, relies upon treatment models accenting dysfunction and

pathology. Jones suggests that interventions grounded within ecological frameworks are more effective at emphasizing important cultural influences that reveal strengths, psychosocial competence, and healthy coping skills in African American women. A salutogenic paradigm draws upon analogous sources and perspectives constructing ecological theories, specifically learning theories, and in a similar manner assesses the beneficial effects of diverse psychosocial factors, including individual strengths and coping skills, and formal and informal resources.

There are increasing numbers of minority women considering surgery as a treatment option, but little is known about possible cultural differences in the types of support preferred by non-Caucasian women to assist with short and long-term postsurgical adjustment. Conventional weight loss treatments report mixed findings on ethnicity and treatment use. Davis (2005) found that the spiritual sources of support many African American women seek to assist with weight management are not endorsed by Caucasian health professionals (this was also reported true for traditional food and taste preferences and attitudes regarding physical activity). Striegel-Moore et al. (2003) found that African American and Caucasian women in a community sample were equally likely to seek weight loss treatment, but African American women were significantly less likely to seek professional treatment for an eating disorder. Cachelin, Rebeck, Veisel, & Striegel-Moore (2000), however, did not find differences in professional service use in a racially mixed sample of women. They did find that the greatest number of women (58%) in the racially combined groups reported avoiding eating disorder treatment because of financial difficulties, but only 10 % reported avoiding treatment because of an ethnic incompatibility with practitioners.

African American women choosing bariatric surgery potentially face tremendous obstacles balancing the traditional values that connect them to their family, community, and

spiritual supports, while attempting to adhere to a number of lifestyle modifications that may not be easily adapted to some environments. Many traditional and popular foods (fried foods and sweets, for instance) may not be tolerated postsurgically. Davis (2005) identified obstacles for some individuals including limited recreational activities in low income neighborhoods as well as fewer peers to join in activities for weight loss and weight maintenance. Identifying resources and services that compliment and support the health needs of African American women and contribute to good post-surgical outcome is an important issue that has not been adequately addressed.

3.3 PSYCHOSOCIAL SERVICES

3.3.1 Self-help Groups

A common source of information and support for individuals facing similar life-changing events is the self-help group or support group. Peer and mutual support groups have a long history in the treatment of substance abuse (Panepinto, Garret, Wilford, & Priebe, 1982; Amodeo & Jones, 1997) and more recently have been adapted for individuals with psychiatric disabilities. Results of randomized and nonrandomized studies suggest that participation in peer support groups contributes to decreased psychiatric symptoms and hospitalizations, larger social support networks, enhanced self-esteem and social functioning, and improved well-being (Kyrouz, Humphreys, & Loomis, 2002).

Mutual support groups for bariatric patients facilitated by peers and by professionals have proliferated in the past five years. The increase in the number of groups coincides with the

demand for bariatric surgery. New companies advertising their services to host and maintain surgical support groups for medical facilities starting up bariatric center indicate the popularity of these groups. Support groups have historically been linked to addiction and recovery from traumatic events, but have proliferated in all areas, benefiting participants because of mutual interests or problems.

There are a variety of support sources and specialized services for individuals before and after bariatric surgery that provide support and education aimed at increasing compliance with recommended lifestyle changes and assisting individuals with the dramatic transition to “life after surgery.” These services include intensive educational and support groups sponsored by hospitals or surgical centers and facilitated by peers or professionals. These groups are frequently recommended or even required for pre and postsurgical patients, as they focus on providing accurate information and preparing individuals for surgical and postsurgical experiences. Bauchowitz et al. (2005) found that almost all of the bariatric surgery programs surveyed across the country strongly recommended group attendance to patients for education and support.

Hildebrandt (1998) found attendance to support groups following Roux-en-Y gastric bypass to be moderately associated with greater weight loss. She also found that the amount of postoperative weight lost increased with more frequent attendance. In a more recent study looking at weight loss one year after laparoscopic adjustable gastric banding (LAGB), the authors found significant mean weight loss differences between patients who attended groups and those who did not attend groups (Elakkary, Elhorr, Aziz, Gazayerli, & Silva, 2006). Harper, Madan, Ternovits, and Tichansky (2007) found similar results for postoperative weight loss differences in a sample of patients after gastric bypass surgery when comparing patients compliant with general follow-up appointments from those who were not compliant.

3.3.2 Web-based Support and Education

There are increasing numbers of local and national Web-based support groups for weight loss surgery. Yahoo (an on-line search engine) lists 713,631 sites under “support groups for bariatric surgery”, with some sites sponsored by individuals and others by educational or commercial institutions or surgical providers. In a recent examination of general postings on a National Web Site for weight loss surgery (Association for Morbid Obesity Support: Resources and peer support for morbid obesity and weight loss surgery) this author found hundreds of postings from individuals who had undergone obesity surgery. Many letters from the site were requests for support and information about coping with postsurgical problems - particularly problems with depression, anxiety, weight regain, and a resumption of former eating patterns. In the majority of replies to these letters online, it was suggested that individuals seek medication and/or support from therapists and other mental health professionals. In reviewing a random selection of replies to inquiries about postsurgical problems encountered, 45 of the first 50 postings found on the Association for Morbid Obesity Support Web site included information about psychotropic medication and professional assistance.

In 2000 Fox, Taylor, and Jones did not find significant internet use among 400 post-surgical patients. Five years later, however, when Madan, Tichansky, Speck, and Turman (2005) investigated internet use among bariatric patients, they found that almost 90% of a primarily female cohort of surgery patients reported using the internet as a source for both information and support.

Internet use has been found to assist in life-style changes. Tate, Wing and Winett (2001) demonstrated that on-line behavioral interventions produced greater weight loss in adult participants than similarly delivered face-to-face educational interventions. On-line education

and support can be elicited at the participant's convenience, providers and peers can more readily respond to on-line requests for information and support, and participants can self-monitor (an important component for behavior change) by computer daily, apparently increasing long-term commitment and attendance to treatment compared to face-to-face groups requiring self-monitoring with written materials (White, Martin, Newton, York-Crowe, & Ryan, 2004). Glasgow et al. (2005) used a computer-assisted intervention with African American patients in a primary care setting that had a positive impact on life-style changes and treatment adherence. White, Martin, Newton, York-Crowe, & Ryan found that African American girls receiving behaviorally focused internet-based obesity treatment were more consistent with treatment goals and lost more weight than a control group receiving an educational program alone.

There are web-based support groups advertised for African American women specific to bariatric surgery (Black Obesity Surgery Support Group: Black-OSSG.com), and some general bariatric sites that address topics related to age, gender, and ethnicity. Most surgical or hospital sites sponsor a face-to-face support group that meets monthly, and there are frequently on-line support groups associated with them. In the greater Pittsburgh area, there are six hospitals with bariatric surgery centers and a local on-line group (pghwlssupport.Pittsburgh) available to anyone obtaining access through the founder and monitor. The group is advertised at surgical centers, at face-to-face support groups, and through word of mouth. The frequency of use of these on-line groups by pre- and postsurgical patients, and the effect of these resources on postsurgical adherence and health outcomes, however, has not been determined.

3.3.3 Formal Support Services

Research on conventional weight loss methods in past decades has established that behavioral therapy prior to weight loss attempts, extended involvement with weight loss programs, and continued treatment with behavioral health providers after weight loss interventions improves weight loss outcomes (Jeffery, Wing, Sherwood, & Tate, 2003); Klein et al., 2004). As early as 1986 Bennett found that length of treatment time and extended contact with a psychotherapist consistently predicted better adherence to weight loss strategies and better weight maintenance. This has also been reported in research on weight loss surgery (Fobi, Lee, Felahy, Che, Ako, & Fobi, 2005; Delin & Watts, 1995; Delin, Watts, Saebel, & Anderson, 1997). Vogel (1991) found that postsurgical patients with a history of behavioral treatment for weight loss presurgically were more successful with dietary adherence and weight loss.

Caniato and Skorjanec (2002) examined the influence of psychological group treatment on postsurgical outcome, and tested a preoperative Brief Strategic Therapy (a short-term, cognitively based, and “solution oriented” intervention utilizing an active professional facilitator) on weight loss, obesity-related co-morbidities, and quality of life at one, two, and three years after laparoscopic adjustable gastric banding (LAGB). They selected a sample of presurgical patients (no information on race provided) who reported the presence of eating behaviors commonly seen in obese individuals (bingeing, overeating, grazing or “nibbling”, and a greater intake of foods high in sugar). The proportion of patients noncompliant with eating changes (20%) was similar to other studies (Sarwer et al., 2004) in the combined treated and untreated groups. Postoperative follow-up found individuals treated with Brief Strategic Therapy had a better rate of success on weight loss, remission of obesity-related health problems, and quality of

life than the untreated group, with women showing the greatest improvements in all three variables.

The extent of pre-and postsurgical utilization of health professionals, including social workers, psychologists, and other mental health specialists, and the possible intervening mechanisms affecting behavioral adherence, have not been thoroughly investigated in outcome research. Research originating from sources independent of surgical providers is needed to determine if these specialized services have an effect on behavioral adherence and postsurgical outcome. Additionally, there is a need to identify a behavioral framework and theory that best explains how these services influence behavioral adherence and good postsurgical outcome. Building upon previous research, a Salutogenic model may assist in clarifying the direct and indirect effects of service utilization and SOC on postsurgical behavioral adherence.

3.3.4 Informal Support Services

Alternative or informal services utilized by individuals can include resources within the community, church, extended social networks, as well as alternative medical practitioners (Parker, Nichter, Nichter, Nuckovic, Sims, & Ritenbaugh, 1995). George (1981) and Ellison and George (1994) found that religious support was strongly associated with perceived well being and health related factors in African Americans. Ellison and Sherkat (1994) and Levin (1994) also reported that religious support vis-à-vis a regular connection to a religious healer increased physical health and improved overall mortality rates for African Americans.

According to Gordon et al. (2002), informal resources commonly address the “purposeful health behavior by an individual [that] is conceived as action taken deliberately to sustain and/or achieve a state of well being. Such behavior may include following a program of exercise, a

planned diet or medical regimen either of which (or a combination thereof) may be believed to be associated with healthful outcomes.”(p. 5). Informal community based programs for weight loss and life-style changes, however, do not show outcome improvements compared to other treatments, but these programs are more assessable and affordable and may be beneficial for increasing activity level and for primary prevention of obesity (Jeffrey, 1993).

3.4 HEALTH-RELATED QUALITY OF LIFE

Health-related quality of life (HRQL) is a multidimensional concept describing symptoms, individual perceptions of health, satisfaction with life, and ability to function and cope with stressors in daily life (Padilla, Grant, & Ferrell, 1992; Dempster and Donnelly, 2000). HRQL measures compare or contrast periods of time when an individual may experience physical, psychological, or social changes due to age, illness, or trauma, or other important life events. The psychological, social, and physical sequela following a significant life event (such as the onset of illness or undergoing major surgery), and changes in health-related dimensions following an intervention for health improvement will be demonstrated by fluctuations in HRQL scores. Variance in HRQL between individuals after similar significant life events is attributed to the influence of complex psychosocial factors on perception, functional status, and satisfaction (Padilla, Grant, & Ferrell.).

One HRQL measure used in health research since the 1980s is the 36 Item Short-form Medical Outcomes Health Survey (SF-36). It measures psychological health, behavioral functioning, social and family roles and satisfaction with roles, perceived well-being, and general health. The eight dimensions conceptualized by the survey are mental health, physical function,

role physical, general health, vitality, social function, role emotion, and bodily pain (Padilla, Grant, & Ferrell, 1992; Dempster and Donnelly, 2000). Examining HRQL measures in obesity treatment research is important because obesity – particularly severe obesity – compromises functional ability, social relationships, life satisfaction, and general health perception in many obese individuals (Koletkin, Ross, Crosby, Kosloski, & Williams, 2001). Ford et al. (2000) conducted a nationwide cross-sectional study using the SF-36 questionnaire, and found that African American, Caucasian, and Hispanic adults with BMIs > 30 kg/m² reported the lowest HRQL related to poor psychosocial and physical functioning. Doll, Petersen, and Stewart-Brown (2000) also found an association between obesity and level of physical disability (but not level of emotional well-being) predicting the lowest HRQL with the SF-36 questionnaire.

A number of traditional HRQL measures like the SF-36 have been used in surgical outcome studies (Bocchieri, Meana, & Fisher, 2002; Choban, Onyejekwe, Burge, & Flancbaum, 1999), as well as measures developed specifically for research on surgical outcome (Moorehead, Ardelt-Gattinger, Lechner, & Oria, 2003; Weiner et al., 2005) Reviewing a number of studies examining psychosocial changes following surgery, Herpertz, Kielmann, Wolf, Langkafel, Senf, & Hebebrand (2003) found that fewer of them examined quality of life, but did find that particular components or single dimensions in quality of life measures were replicated within other types of psychosocial assessments and surveys.

Choban, Onyejekwe, Burge, & Flancbaum (1999) found that pre-surgical scores on seven of the eight dimensions of the SF-36 in a cohort of seventy-nine pre-surgical candidates were significantly lower than general population scores. Emotional factors, however, did not differ preoperatively from normal population scores. Scores improved in all health dimensions shortly after surgery and remained high at 18 months. Malone and Alger-Mayer examined HRQL and

pre-surgical binge eating following surgery with the SF-36, and found that all postsurgical patients reported a significant improvement in quality of life regardless of presurgical binge eating. However, Sabbioni et al. (2002), using the Impact of Weight on Quality of Life-lite Questionnaire developed by Kolotkin and Crosby (2002), found that pre-surgical binge eating did predict variance in post-surgical HRQL, indicating that a measure specific to weight loss treatment may be more sensitive to post-treatment changes in obese populations.

Dymek, Le Grange, Neven, and Alverdy (2002), further established possible benefits of using a specialized HRQL measure in bariatric research. They compared three quality of life measures in a racially diverse cross-sectional study; the SF-36, the Impact of Weight on Quality of Life-lite Questionnaire for obese populations developed by Kolotkin, Crosby, and Williams (2002), and the Bariatric Analysis and Reporting Outcome System designed by Oria and Moorehead (1998) for bariatric surgery patients. They concluded that the most sensitive measure for bariatric outcome was the Impact of Weight on Quality of Life-lite Questionnaire because it distinguished emotional factors influenced by weight loss. Kolotkin, Crosby, Pendleton, Strong, Gress, & Adams (2003) used the same measure to compare obese individuals seeking surgical treatment with obese individuals who were not seeking treatment, and found that surgical treatment-seekers had higher depression scores, more obesity-related co-morbidities, and poorer HRQL than individuals who were not seeking treatment.

There are methodological difficulties examining gender differences in HRQL across surgical treatments due to the significantly larger percentage of women in samples studied. Lang, Hauser, Buddeberg, & Klaghofer (2002), Dymek, Le Grange, Neven, and Alverdy (2001) and Weiner et al (2003) did not report gender differences in HRQL with percentages of women in their samples ranging from 69% to 90%. Pre-surgical self-esteem measures, however, have

consistently shown that women have lower self-esteem than men with similar BMIs, and this has been found in conventional treatment studies as well (Kolotkin ,Crosby, & Williams, 2002). It is possible that similar HRQL scores between men and women may be related to the fact that men seeking surgery often have greater BMIs and report more health problems than women, both factors contributing to poor HRQL and likely differing from men who do not seek surgery.

Karlsson, Sjostrom, and Sullivan (1998) found that health-related quality of life in surgically treated patients was significantly better than it was for a control group of conventionally treated patients. Weight loss was directly correlated with HRQL suggesting that amount of weight loss and not method of weight loss mediated the effects of treatment on HRQL. Post-surgical patients who regained weight had significantly poorer HRQL than did patients who maintained a lower weight, and there were gender differences detected between patients who regained weight. Caucasian women who gained weight postsurgically reported the poorest quality of life compared to all other surgical and nonsurgical groups, including the group of men who regained weight after surgery.

3.5 HYPOTHESES AND OBJECTIVES

Optimal results from a surgical procedure require changes in behaviors that include, most importantly, eating and exercise habits. Adherence to the necessary modifications around food choices, eating behaviors, and exercise following bariatric surgery potentially result in significant amounts of weight loss. Most importantly, behavioral adherence has been linked to improvement in physical and psychological health, and to better quality of life (Pessina, Andreoli & Vassallo, 2001; Wadden et al., 2001; Herpertz, Kielmann, Wolf, Langkafel, Senf,&

Hebebrand, 2003;Hsu, Sullivan & Benotti, 1997). Specifically, compliance with postsurgical recommendations has been linked to increased postsurgical satisfaction, a decrease in preoperative comorbidities, and decreased risks for postsurgical medical and psychological complications (Delin, Watts, Saebel, & Anderson, 1997; Burgmer et al.; van Hout, 2005).

There is increasing evidence that behavioral adherence to healthy diet and exercise modification rather than amount of weight lost after surgery may be a better indicator of long-term health benefits. Behavioral models of adherence theorize that modifiable environmental factors and psychological traits are precedents to the behaviors that affect adherence (Ewart, 1990; Glanz, Lewis, & Rimer, 1997; Fishbein & Ajzen, 1975; Bandura, 1989). Based upon recent literature identifying psychoeducational interventions improving behavioral adherence following bariatric surgery, pre and postsurgical psychosocial service utilization is anticipated to be positively associated with postsurgical dietary and exercise adherence (Madan and Tichansky, 2005; Hildebrandt, 1998; Elakkary, Elhorr, Aziz, Gazayerli, & Silva, 2006). The following hypotheses were developed for this study based upon these findings.

3.5.1 Psychosocial Service Utilization: Hypothesis 1a to 1d

H_{1a}: Individuals reporting utilization of presurgical and postsurgical services will have greater postsurgical sense of coherence.

H_{1b}: Individuals reporting utilization of presurgical and postsurgical services will have better eating and exercise adherence postsurgically.

H_{1c}: Individuals reporting utilization of presurgical and postsurgical services will have lower postsurgical BMIs.

H_{1d}: Individuals reporting utilization of presurgical and postsurgical services will have lower postsurgical depression.

3.5.1.1 Justification for H_{1a} to H_{1d}

Antonovsky (1979, 1991, & 1993) hypothesized a positive contributory link between three trait dimensions assessed by SOC (meaningfulness, comprehensibility and manageability) and overall health. Psychological services and psychosocial support are among a number of factors believed to strengthen SOC (Novak, 1998). As previous studies have connected SOC with better weight outcome after bariatric surgery (Ray, Nickles, Sayeed, and Sax, 2003), and with improved behavioral adherence after treatment for diabetes (Sanden-Eriksson, 2000), it is expected that service utilization will be positively associated with higher SOC, and, subsequently, that it will be associated with better postsurgical dietary and exercise adherence, lower BMI, and lower rates of depression.

3.5.2 Weight Outcome: Hypothesis 2

H₂: The variables of service utilization, dietary and exercise adherence, SOC, and level of depression, will be found to significantly contribute to a prediction model for postsurgical weight outcome.

3.5.2.1 Justification for H₂

Postsurgical behaviors related to food intake and level of activity have been found to be the best predictors of postsurgical weight loss and weight maintenance (Elkins, Whitfield, Marcus, Symmonds, Rodriguez, & Cook, 2005; White, Brooks, Jurikova, & Stubbs, 2005). Even with

moderate weight gain postsurgically, given the prolongation of a percentage of excessive weight lost after surgery (as low as 10% EWL), a lower pre to post BMI change has been linked to better postsurgical physical and psychological health.

3.5.3 Service Use and Race: Hypothesis 3

H₃: Analysis of formal and informal service utilization by race will reveal cultural distinctions, specifically of African-American women utilizing more faith-based and complementary /alternative services than Caucasian women.

3.5.3.1 Justification for H₃

Service use specific to bariatric surgery has not been investigated based upon race, education, or income level. Describing postsurgical African American and Caucasian women as two distinct groups with dissimilar utilization patterns is neither accurate nor empirically supported. Carr Copeland (2005) proposes that social inequalities potentially reinforce a belief in some individuals that the health care system is remote, reproachful, and difficult to use. It is this negative perception of the health care system, she suggests, and not race, that predicts service utilization. For general obesity treatment, however, Davis, Clark, Carrese, Gary and Cooper (2005) did observe that African American women used spiritual sources of support to assist with weight management more frequently than Caucasian women. Striegel-Moore et al. (2003) also investigated the types of weight loss treatments sought by Caucasian and African American women, finding that African American women sought fewer professionally-sponsored services. This hypothesis was exploratory and had no substantive basis in previous bariatric research.

3.5.4 Quality of Life: Hypothesis 4

H₄: Service utilization, SOC, dietary and exercise adherence, and current BMI will account for a significant amount of the variance of postsurgical quality of life. Service utilization will be related to quality of life directly and indirectly through SOC and dietary and exercise adherence.

3.5.4.1 Justification for H₄

Health-related quality of life has been found to improve dramatically after bariatric surgery (Choban, Onyejekwe, Burge, & Flancbaum, 1999; Malone & Alger-Mayer, 2004; Latner, Wetzler, Goodman, & Glinski, 2004). There is some evidence that in particular a new sense of control over eating behaviors and considerable health transformations are more important predictors of this improvement in quality of life than are other general emotional factors (Choban, Onyejekwe, Burge, & Flancbaum, 1999). Finding that higher SOC predicted better postsurgical weight loss (Ray, Nickles, Sayeed, and Sax, 2003), and that weight maintenance after surgery is associated with higher quality of life scores (Karlsson, Sjostrom, & Sullivan, 1998), suggests that both eating and exercise adherence following surgery will be found to contribute to the variance in health-related quality of life. A path analysis of service utilization and postsurgical quality of life is predicted to show significant associations between predictor variables and quality of life. These associations will indicate probable direct and indirect effects of the independent variables of service use, behavioral adherence, SOC, BMI, and depression impacting upon postsurgical quality of life (figure 1).

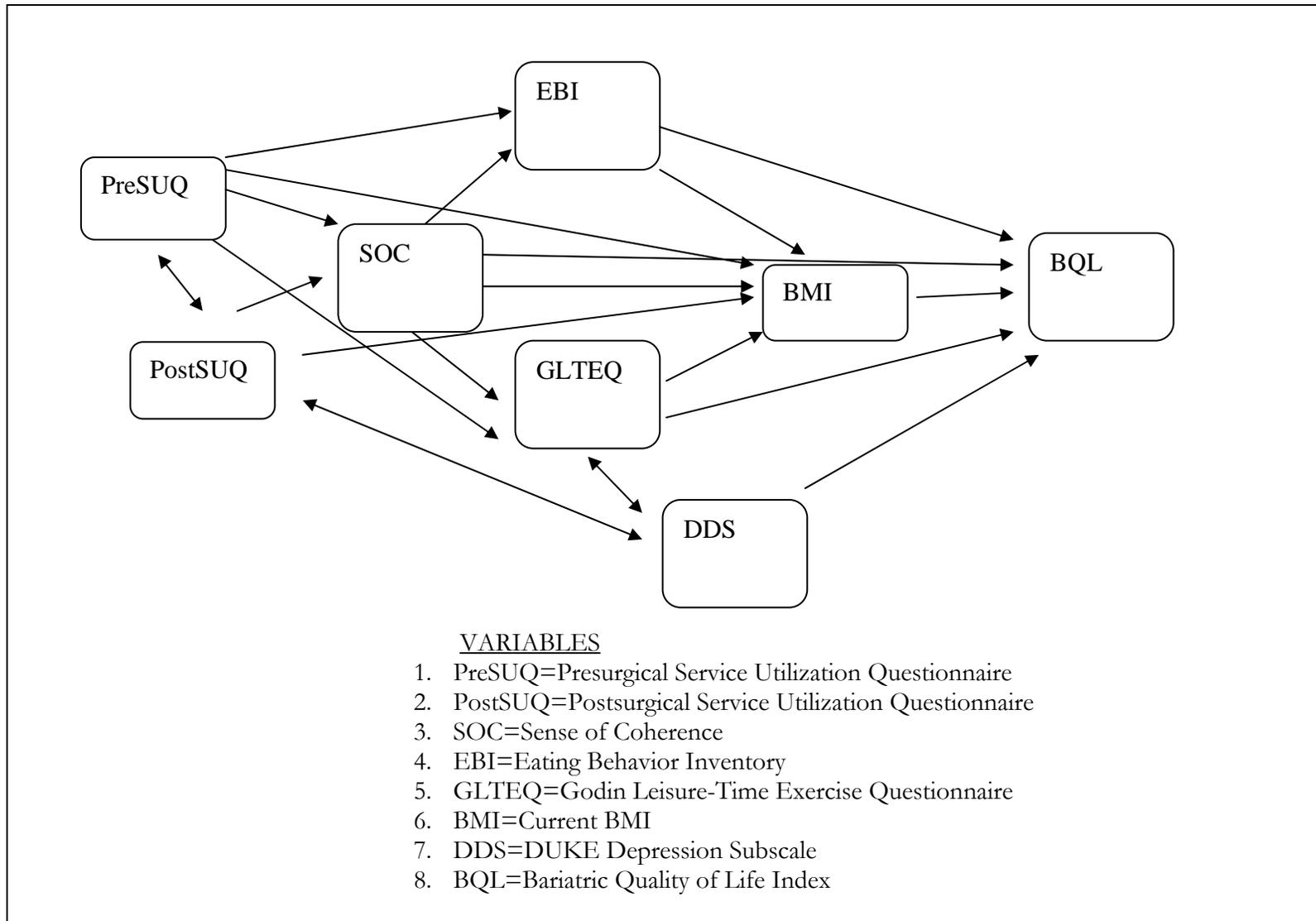


Figure 1: Proposed path diagram of service utilization and quality of life

4.0 METHODOLOGY

4.1 PARTICIPANTS AND PROCEDURE

Data for the study were collected with a seven page self-administered questionnaire. The study was a cross-sectional survey design. The data obtained were demographic and psychosocial factors from a cohort of postoperative patients responding to a mailed survey. The population targeted for the study included women who had previously had Roux-en-Y gastric bypass surgery at Western Pennsylvania Hospital in Pittsburgh, Pennsylvania. There have been approximately 1500 surgeries at the Bariatric Surgical Center at Western Pennsylvania Hospital since it opened in 2003, with several hundred more performed at the hospital between 1999 and 2003. Since 2003, 80% of the patient population have been women and 14.3 % have been African American. Each seven page survey was sent with a letter describing the purpose of the study and explaining confidentiality and the meaning of volunteer participation. The packets including a stamped return envelope addressed to the surgical clinic in care of the primary researcher. Participants were informed that the researcher was not a member of the surgical staff or an employee of the hospital. There was no individual identifying information included in the surveys. The returned surveys were collected weekly and remained sealed until then. A general reminder was included in a monthly newsletter published by the clinic and sent to all current and

former patients. The brief message on the first page of the newsletter reminded individuals who had received the survey to return them. The questionnaire was sent to 400 women meeting study criteria (women age 18 and older having gastric bypass surgery at least 12 months prior to the study). Of the 400 questionnaires sent, 9 were returned due to an incorrect or changed mailing address and 226 (57%) did not return them. A total of 165 women (41%) completed questionnaires. Two of the surveys did not include enough information for comparative data analysis. They were excluded from the final sample resulting in a total sample of 163 women.

All policies and procedures required for the protection of human subjects participating in research were followed. All materials and methods were approved by the University of Pittsburgh Institutional Review Board and the Western Pennsylvania Hospital Institutional Review Board prior to recruitment of participants (Appendix C).

4.2 MEASURES

Eight measurement instruments were used to collect data for the following variables:

1. Presurgical and current eating patterns.
2. Current exercise habits.
3. Presurgical and postsurgical psychosocial services used.
4. Presurgical and current physical symptoms.
5. Current sense of coherence.
6. Presurgical and current quality of life.
7. Current mental health status.
8. Demographic statistics.

Data for the four dependent variables used in the analyses were obtained with an inventory of presurgical and postsurgical eating habits, two exercise adherence measures, pre- to postsurgical body mass index (BMI calculated from participants weight history and current height and weight statistics), and a current quality of life scale. The independent variable representing service utilization ascertained participant's use of four possible therapeutic, educational, or support modalities.

Additional variables used in the analysis included a hypothesized mediating variable measuring dispositional traits collectively identified as sense of coherence (Antonovsky, 1971), the anticipated covariates of depression, anxiety, self-esteem and perceived health obtained from the 17-item Duke Health Profile (2005), and an inventory of pre- and postsurgical comorbid medical conditions and physical symptoms. Demographics collected were age, race, weight and weight history, marital status, income, household composition, and time of surgery. The date of surgery was not asked due to the confidentiality risk. A list of an approximate times individuals had obtained the surgery (1 year, 2 years, over 2 years and less than four, over 4 years and less than 5 years , and over 6 years) was used.

Psychometric properties and specific guidelines for measuring the variables are discussed in detail below.

4.2.1 Dietary adherence

The Eating Behaviors Inventory (EBI) was developed for this study to identify postsurgical dietary adherence and to compare presurgical and postsurgical eating habits. It is a 13-item instrument identifying eating behaviors positively linked to weight gain and negatively linked to

weight management. Each item is rated along a 5-point Likert-type scale indicating how true each statement is for the respondent. The measure is intended to identify eating behaviors linked to one of three categories: 1. Behaviors indicating adequate control and linked to weight loss or weight maintenance (e.g., "I eat normal meals and snack between meals", and "There are times when I can't stop myself from eating"); 2. Emotion-induced eating behaviors linked to overweight and obesity (e.g., "I often find myself eating when I'm bored or lonely" and "I consider myself a binge eater"); and 3. Habitual eating behaviors lined to a less active life-style and to overweight and obesity (e.g., "One of my favorite activities at the end of the day is to snack in front of the television" and "I graze on food all day long"). The range of the EBI is 13 to 65, with a lower score indicating greater adherence to eating behaviors found to assist with weight loss and weight maintenance and a higher score indicating a greater risk for obesity.

The original Eating behaviors Inventory (EBI) with 14 items was pilot tested with a group of 70 social work graduate students (mixed age, BMI, and race). The Cronbach's alpha coefficient was .79. One item ("I prefer eating out at restaurants over home prepared meals") was removed due to a low item-total correlation of .22. The Cronbach's alpha coefficient for the remaining 13 items was .83.

4.2.2 Exercise adherence

The Leisure Time Exercise Questionnaire (Godin & Shephard, 1985; Godin, Jobin, & Bouillon, 1986) was developed to easily determine how much an individual exercises within a 7-day period (one week) and how frequently they exercise enough to "work up a sweat." Responses are 1) often, 2) sometimes, and 3) never/or rarely. It measures three levels of exercise intensity (strenuous, moderate, and mild/light exercise), and asks respondents to recall how many times

("on the average") they do each level for a minimum of 20 minutes during a typical week (7 days). Under strenuous exercise, it lists "running, jogging, roller skating, jumping rope, karate, and playing basketball, soccer, or field hockey." Under moderate exercise, it lists "fast walking, tennis, easy bicycling, dancing, swimming, baseball, or badminton." Under mild exercise it lists "easy walking, gardening, archery, bowling, golf, yoga, fishing, or horseshoes." Each level of exercise is independently recorded, as is the scale for the number of times in a seven day period a respondent "works up a sweat."

The measure is reported to have good validity and reliability statistics (Godin & Shaphard, 1985). A recently reported composite reliability ($r=.85$, $p, .01$) and comparative studies found it correlated closely with other standard exercise measures (Hagger, Chatzisarantis, Barkoukis, & Baranowski, 2005).

4.2.3 Service Utilization.

For this study service utilization was operationalized as receiving or participating in any service modality identified as a general psychosocial service or a service specific to bariatric surgery patients. The Service Utilization Questionnaire (SUQ) contains sixteen categories of service use collected within four modalities: 1) behavioral health services, 2) informal or alternative/complementary services, 3) group services for bariatric patients, 4) internet support and information specific to bariatric surgery. For pre- and postsurgical behavioral health services there are six possible service categories identified as individual therapy, family therapy, marital/couples therapy, group therapy, dietary counseling and life-coaching. For presurgical and postsurgical informal services there are four categories labeled faith-based counseling, spiritual healing, acupuncture, and holistic treatment. The third category, specialized bariatric support

groups measured at both time frames, includes four group types identified as hospital sponsored groups, educational programs, commercially organized fee-for-service groups, and informal peer groups. The final modality, internet use, is recorded as contact or interaction with an educational or collaborative web site specific to bariatric surgery, including the use of both national chat rooms and local chat rooms for support or information. Specific service types are selected by respondents by indicating “yes” or “no” to each of the sixteen categories. An “other” category is included for each of the four modalities. For data coding one unit was entered as 0 (no) or 1 (yes) for each type of service. Items combined for a linear 0 to 21 distribution at each time frame.

The service utilization measure was pilot tested with 5 adult women (1 African American woman and 4 Caucasian women) who had gastric bypass surgery between 2 to 8 years earlier. Originally service time was to be included in the total score as 1 unit per occasion (per group, per session, or per day attended). The individuals in the pilot reported that it was difficult to remember length of service time. Since it was not practical or accurate to include time, only 1 unit per type of service was maintained for use in this study. The range for combined presurgical and postsurgical service use for the pilot (total SUQ) was 3 to 6, with a mean of 4.67.

4.2.4 Sense of Coherence

The Sense of Coherence Scale (Antonovsky, 1987) was used as a current single score with post hoc testing using three subscales. The SOC scale has a total of 29 items. Each of the 29 items present conspicuously apposing statements anchoring a 7-point Likert type scale. Antonovsky conceptualized three components within the measure representing manageability, meaningfulness, and comprehensibility. Thirteen items are intended to measure “manageability” in the SOC Scale. Item number two asks:” In the past- when you had to do something which

depended upon the cooperation of others – did you have the feeling that it... “. Response (1) is: “surely would get done”, and the anchoring response (7) is “surely wouldn’t get done”. Seven items comprise the measure for “comprehensibility” in the scale. Item number nineteen asks:” Do you have mixed up feelings and ideas?” Response (1) states: “Very often”, and the contrasting response (7) states: “Very seldom or never”. Nine items are intended to measure the concept of “meaningfulness.” Item twenty-eight ask: “How often do you have the feeling that there is little meaning in the things you do in your daily life?” Contrasting responses are (1) “very often” to (7) “Very seldom or never”. The summation of items along a linear 29 to 203 distribution indicates a weaker to a stronger sense of coherence. For this sample the SOC scale had a mean score of 142 with a range between 45 and 196.

The validity and reliability of the SOC scale have been well documented in the general and behavioral health literature (Antonovsky, 1993). Eriksson and Lindstrom (2005) examined 124 health studies utilizing the 29-item SOC scale, and reported Cronbach’s alphas from .79 to .92, and test-retest correlations from .54 to .78 across a 10 year range.

4.2.5 Quality of Life

The Bariatric Quality of Life Index (Weiner, Sauerland, Fein, Blanco, Pomhoff & Weiner, 2005) organizes behavioral adjustment, life-style indicators, physical symptoms and medical complications relating to bariatric surgery within two instruments. The quality of life-measure (14-items) identifies four primary domains. The first domain conceptualized is social functioning, and an example item is “I am participating in social activities (movies, parties, etc.)”. The second domain is physical functioning, with the example “I exercise regularly”, indicating adherence or non-adherence to recommended life-style behaviors. The third domain is

psychological well-being, with the example “Sometimes I feel depressed”. The fourth and final domain is conceptualized as weight-related problems and symptoms, with an example item being “I feel under pressure because of my weight”.

Responses to each item in the first section are scored on a 5-point Likert type scale with responses ranging from 1) absolutely wrong to 5) absolutely right. The second section of the BQL measure assesses physical symptoms and medical complications associated with obesity and postsurgical adjustment. 17 items requiring a binary (YES/NO) response to short and long-term side effects (e.g. hair loss, belching, or heart burn), medical conditions (e.g. diabetes or hypertension), and physical complaints (e.g. diarrhea or nausea), are collected for the current time frame. Responses are coded directly and the summation of items is combined with the 14-item BQL scores. A lower to higher score on the measure (distribution is 14 to 70 points) indicates poor to good quality of life postsurgically.

The authors reported Cronbach’s alphas from 0.71 to 0.86 obtained from cross-cultural sources.

4.2.6 Depression

Current Depression was measured with a subscale of the 17-item DUKE Health Profile (Parkerson, Broadhead, Tse., 1990; Parkerson, Broadhead, Tse., 1991). Depression is assessed with five items reviewing sleep status, concentration, mood, motivation, and level of fatigue for the preceding week. Each of the items has three possible responses (1. “Doesn't describe me”; 2. “Somewhat describes me”; 3. “Exactly describes me” or 1. “None”; 2. “Some”; 3. “A Lot”). The scale range for the depression subscale is 0 to 100, with 0 indicating the lowest and the best health.

Bouchet, Guillemin, Dauphin, and Briancom (2000) compared the Duke to several longer and better known health measures (the SF36 and the NHP) and found it had comparable reliability estimates despite its small size. They reported Cronbach's alpha statistics over .60 for the health and mental health scales. Parkerson, Willke, and Hays (1999) also found the measure to be psychometrically reliable and clinically responsive for assessing functional health status across several countries, including the United States, and also reported Cronbach's alpha over .60. Subscales were used in secondary analyses. Only the depression subscale was used in the hypothesis testing.

4.2.7 Current Body Mass Index (BMI)

Body mass index (BMI) is a standard measure of body fat based upon height and weight that doesn't directly measure body fat. It has, however, been correlated closely with both x-ray and underwater methods of body fat calculation (Blew et al., 2002; Nicklas, Berman, Davis, Dobrovolny, & Dennis, 1999). BMI is calculated as weight in kilograms divided by height in meters squares. Categorization of BMI levels for women is designated as follows:

Underweight = BMI <19

Normal weight = BMI of 19.1 - 27.3

Overweight = BMI of 27.4 - 29.9

Obesity = BMI 30 to 39.9

Severe obesity = BMI of 40 to 43.9

Morbid obesity = BMI > 44

(Table from CDC, 2002)

4.2.8 Weight Change (Weight Regained)

Postsurgical weight maintenance and weight gain was coded as a single binary item. Participants indicated if they gained weight (YES/NO). There was also one open-ended question in the survey asking respondents who reported gaining weight after surgery why they thought this had occurred.

Weight regained postsurgically was also calculated from current weight and weight history. It was a continuous variable and more accurately reflected degree of weight gain. The continuous variable was used in secondary analyses.

5.0 RESULTS

The results of the statistical analyses are presented in this chapter. All data were coded and entered for analysis using the Statistical Package for Social Sciences version 15.0 (SPSS for Windows, 2006). The first section describes the sample of women who participated in the study and provided these data on pre and postsurgical weight outcomes, adherence measures, and psychometric traits tested for associations. The sample size of 163 exceeded the number of participants needed to support a power level of 95% at the 0.05 alpha level for detecting moderate size differences in the adherence and weight measures. The second section presents descriptives and psychometric properties of the main and contextual variables with necessary data transformations for further hypothesis testing. A cutoff of $<+-.80$ for skewness was used to determine if variables required transformation. The third section presents the results of the hypothesis testing. Multivariate tests required correlation support. Listwise deletion of cases was used for all tests. Essential data for completing t-tests and regression analyses were obtained from all 163 participants.

5.1 DESCRIPTION OF THE SAMPLE

Participants were one hundred and sixty-three women between the ages of 28 and 70 years with a mean age of 48 (S.D. =9.89). Thirty-six of the women were African American and one-hundred

twenty-six were Caucasian. One participant indicated being of multi or mixed race, and one participant selected “other” race category.

Time since gastric bypass surgery ranged from twelve months to over 6 years. The majority of women (73%) had the surgery between two and four years prior to the study.

Ninety-four women (58%) reported postsurgical weight gain since reaching the lowest postsurgical weight obtained, while the remaining sixty-nine (42%) reported maintaining the lowest postsurgical weight obtained. Accuracy in self-reported weight and weight history has been documented for obese individuals and individuals diagnosed with binge eating disorder (Cash, Counts, Hangen, & Huffine, 1989; Masheb & Grilo, 2000).

5.2 PSYCHOMETRICS

5.2.1 Weight Loss Outcomes

The sample as a whole had comparable weight outcomes to other recent studies (Wagner, Fabry, & Thirlby, 2007; Schneider, Villegas, Blackburn, Mun, Critchlow, & Jones, 2003). The range of weight regained after reaching the lowest postsurgical weight was 0 to 65 pounds. Contrasting the minimum and maximum amount of reported weight lost postsurgically (27.94 to 272.42 pounds with a mean of 115.43 pounds) with the presurgical to current weight change (250.47 pounds lost to 10 pounds gained with a mean of 105.07 pounds), indicated sustained benefits for most participants. A successful outcome from a surgical procedure has been established as a weight loss of 50% or more of excess presurgical weight (% EWL) after a period of 24 months in at least 85% of patients

(Warde-Kamar, Rogers, Flancbaum, & Laferrere, 2004). For the time since surgery category of between two and four years, 75% of this sample maintained over 62% of excess presurgical weight lost, with 50% calculated as currently having a normal body mass index (BMI below 25). Current BMI was used as the continuous dependent variable for hypothesis testing. Current BMI had a skewness value of .54 and a kurtosis value of .17.

For testing requiring a categorical dependent variable, weight outcome was designated as either weight gain (n=94) or weight maintenance (n=69) postsurgically.

5.2.2 Pre and Postsurgical Dietary Adherence (Eating Behaviors Inventory)

The presurgical EBI scale for this sample had scores ranging from 24 to 55, with a mean score of 40.26 (S.D. =6.63) and a median score of 40.00. The current EBI scale had scores ranging from 18 to 47, a mean score of 29.91 (S.D. =7.52), and a median score of 28.00. Lower scores on the EBI indicated better dietary adherence. The decrease in the presurgical to current mean EDI scores indicated a beneficial change in eating behaviors postsurgically.

Scale reliability was estimated using Cronbach's alpha coefficient at both time frames. Three items (#5 - "I eat normal meals", #6 - "I eat at normal times", and #12 - "I increase my intake of liquids when I can't eat") had low item-total correlations (.25, .21, and .30 respectively for the presurgical scale, and .21, .32, and .15 respectively for the current scale). They were extracted from the pre and current scales to improve internal consistency of the measures. For the presurgical EBI scale, Cronbach's alpha coefficient went from .76 with the original 12 items to .88 with 9 items. For the current EBI scale, Cronbach's alpha coefficient went from .72 with 12 items to .91 with 9 items. Scores for the presurgical 9-item EBI scale ranged from 9 to 45, with

a mean score of 32.09 (S.D. =6.91) and a median score of 35. Scores for the current 9-item EBI scale ranged from 9 to 34, with a mean score of 21.41 (S.D. =5.72) and a median score of 21.

Attempts to improve the symmetry of the presurgical EBI scale were not successful. It was not used in subsequent analyses.

To assist with interpreting the current EBI scale during hypothesis testing, the score was reversed by reflecting it. Thus improvement in dietary adherence was indicated with increasing scores. This allowed for consistency in evaluating the two adherence measures (dietary and exercise adherence) with low to high scores indicating poor to good adherence. The reflected EBI had a skewness of .99. A square root transformation was successful, resulting in an acceptable skewness of .329. The transformed scale had a mean of 3.76 (S.D. =1.05), a median score of 3.63, and an acceptable skewness value of .32. Only the current EBI (total scale) was used in hypothesis testing.

5.2.3 Exercise adherence (Godin's Leisure-Time Exercise Questionnaire)

Section 1 of the Godin's Leisure-Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985) was used as a continuous variable for hypothesis testing. The total three-item scale had a mean of 57.25(S.D. = 41.75) and a Cronbach's alpha of .70. Scores ranged from zero to 227, with a higher score indicating more frequent physical activity. It was transformed (square root) due to asymmetry (skewness = 1.42). The transformed scale had a mean of 7.11(S.D. =2.79) and a skewness of .03.

5.2.4 Quality of Life (The Bariatric Quality of Life Index)

The Bariatric Quality of Life Index (BQL) (Weiner, Sauerland, Fein, Blanco, Pomhoff & Weiner, 2005) for this sample had a Cronbach's alpha of .89. The authors differentiated four categories within the BQL, addressing bodily functions, activities, personal factors, and environmental factors contributing to quality of life after surgery. Principal components analysis for these data replicated the four-factor model, with 8 items loading on bodily functions, 9 items loading on activities, 7 items loading on personal factors, and 6 items loading on environmental factors. The Kaiser-Meyer-Olkin measure of sampling adequacy was .87 (a minimum recommended value is 0.6), indicating that items in the measure were correlated and appropriate for factor analysis. The scores for this sample ranged from 26 to 76 with a mean of 59.20 (S.D. =10.02). Scores approached a normal distribution with a skewness value of -.054 and a kurtosis value of .078. Only the total BQL score was used for primary hypothesis testing.

5.2.5 Service Utilization (Service Utilization Questionnaire)

For this sample of 163 women there was a notably higher use of presurgical services compared to postsurgical service use. The pre to postsurgical contrast revealed a decrease in behavioral health service use by 25%, a decrease in informal service use by 6%, and a decrease in support group attendance and internet access by 32% each. 68% (n=111) of the sample reported using at least one behavioral health service category presurgically. The most frequently reported services used were dietary counseling (46%) and individual treatment (41%), with other category use combined to total 17%. Reported time for service use ranged from 1 month to 240 months.

Due to the limited number of responses for pre- and postsurgical family therapy, group therapy, and marital/couples counseling, they were combined under one heading along with “other” services. There was no reported use of "life coaching" at either time period, and it was dropped from the analysis.

The reported use of specific informal pre and postsurgical services was very low. Total presurgical participants by group for faith-based counseling (n=11), spiritual healing (n=4), acupuncture (n=4), holistic treatment (n=4), and an “other” category (n=7) were subsequently combined as “informal services and alternative treatments” for later analysis and totaled around 20% of the total presurgical service use. The combined informal services used postsurgically was only 9% (n=14). These data were not included in the analyses due such low response rates and unequal group sizes.

59% of the total sample (n=96) reported using specialized bariatric support groups presurgically. Because the majority of support group use was specifically accounted for with attendance at hospital sponsored groups, other group types (educational programs, commercially organized fee-for-service groups, and informal peer groups) were included in the single category of “support groups” for further analyses.

Attendance at postsurgical groups was lower than attendance at presurgical groups, with a total of 37% of the sample attending postsurgical “support groups” after combining attendance at the four group modalities.

Similar to the other three service categories, reported internet access was higher presurgically (71%) than postsurgically (39%). For both time frames national and local chat room use was collapsed into a single category labeled “internet support”.

Total service utilization scores at each time frame (pre and postsurgical) were used as continuous variables for linear testing. For presurgical services the scale had a mean of 2.89(SD=1.77), a median of 2, and a skewness of .31. For postsurgical services the raw data required a transformation due to a skewness of 1.44. A square root transformation resulted in a mean of 1.89(SD=.98), a median of 1.80, and a skewness of .19. This sample had a 14 point

For statistical analyses requiring binary coding, service use was identified as use/no use for the four service categories, as well as by each specific service type for primary and post hoc analyses.

5.2.6 Sense of Coherence (Sense of Coherence Scale)

Principal components analysis of the 29 SOC scale items replicated the three-factor structure conceptualized by the scale author. The Kaiser-Meyer-Olkin value of .88 exceeded the recommended value of 0.6 for sampling adequacy. The mean for the Meaningfulness subscale was 62.29 (S.D. =13.98), the mean for the Manageability subscale was 45.77 (S.D. =10.58), and the mean for the Comprehensibility subscale was 34.40 (S.D.=8.12). Coefficient alphas for the three subscales were .92, .85, and .68 respectively, with an alpha of .92 for the full scale.

For these data the total SOC scale had a score range between 45 and 196, a mean score of 141.89 (S.D. =28.01), and skewness and kurtosis values of .67 and .28. Only the total SOC scale was used in hypothesis testing.

5.2.7 DUKE Depression Subscale

The five-item depression subscale of the Duke Health Profile (DUKE) for this sample had scores ranging from 0 to 90, a mean score of 31.22 (S.D.=22.41), and a median score of 30. Combined items had a Cronbach's alpha of .79, a skewness value of .75, and a kurtosis value of .21.

5.3 HYPOTHESIS TESTING

5.3.1 Bivariate Correlations of Study Variables

The correlation matrix is presented in table 1. Higher presurgical service utilization (preSUQ) was significantly related to higher sense of coherence (SOC), and better exercise adherence (GLTEQ). It was not significantly associated with dietary adherence, as had been predicted. As expected, the use of presurgical services was associated with both decreased depression and lower BMI (although not significant for BMI at $p=.08$). The use of postsurgical services, conversely, was associated with both increased depression scores and with higher current BMI. Service use postsurgically and presurgically was associated with better exercise adherence.

Higher SOC, as anticipated, was significantly correlated with better dietary and exercise adherence, lower BMI, and lower depression scores. SOC was not associated with age, time since surgery, or postsurgical service use. It was, however, positively associated with presurgical service utilization.

Postsurgical quality of life was significantly correlated with all of the variables except for service use at either time and for age. A negative correlation with current BMI, eating adherence,

and depression, indicated that quality of life scores were associated with a lower body weight, better eating adherence, and lower depression scores. A positive association with GLTEQ and SOC (as above), indicated that higher quality of life scores were associated with better exercise adherence and higher SOC. Time since surgery , but not age, was negatively correlated with quality of life.

The demographic variables included in the model were age and time since surgery (TSS). Age was positively correlated with time since surgery. As would be expected, younger participants were more likely to have had more recent surgical procedures. Age was negatively correlated with dietary adherence, also supporting an association between decreasing behavioral adherence and time since surgery. Marital status, household composition, number of children, and income were not found to be correlated with the predictor and outcome variables - with one exception. Higher income was correlated with higher quality of life ($r=.11$, $p=.05$).

Table 1: Correlation Matrix of predictor variables, outcome variables, and selected demographics

Variables	1	2	3	4	5	6	7	8	9
1. Age	----								
2. TSS	.19*	----							
3. PreSUQ	-.05	-.12	----						
4. PostSUQ	-.07	.00	.42	----					
5. SOC	.01	.07	.24**	.01	----				
6. EBI	-.17*	-.26**	.06	.01	.44**	----			
7. GLTEQ	-.11	-.18*	.18*	.20*	.21*	.28**	----		
8. BMI	.05	.26	.04*	-.01	-.17*	-.41**	-.27**	----	
9. DDS	-.04	.06	-.16*	.04*	-.66**	-.34**	-.29**	.30**	----
10. BQL	.02	-.23*	.11	-.14*	.63**	.52**	.31*	-.46**	-.50**

*p<.05, **p<.01, ***p<.001

VARIABLES

1. Age=Current Age
2. TSS=Time Since Surgery
3. PreSUQ=Presurgical Service Utilization Questionnaire
4. PostSUQ=Postsurgical Service Utilization Questionnaire
5. SOC=Sense of Coherence
6. EBI=Eating Behavior Inventory
7. GLTEQ=Godin Leisure-Time Exercise Questionnaire
8. BMI=Current BMI
9. DDS=DUKE Depression Subscale
10. BQL=Bariatric Quality of Life Index

5.3.2 Hypotheses 1a through 1d

T-test results for hypotheses H_{1a} to H_{1d} follows. Binary coding (service use/no service use) established 2 groups for each of the 4 presurgical and postsurgical service categories. The results are presented in table 2.

Table 2: Presurgical and postsurgical service users and non-users mean scores for EBI, GLTEQ, SOC, BMI, and DDS

	Service users		Non-users		<i>P</i>
	M	SD	M	SD	
<u>Presurgical Behavioral Health Services</u>	n=110		n=53		
1. Sense of Coherence (SOC)	145.63	25.86	134.13	30.85	.01**
2. Eating Behaviors (EBI)	3.87	1.03	3.54	1.08	.06
3. Exercise Behaviors (GLTEQ)	5.81	2.84	5.35	2.23	.29
4. BMI	28.78	5.19	29.90	4.91	.19
5. Depression (DDS)	30.27	22.73	33.21	21.82	.43
<u>Postsurgical Behavioral Health Services</u>	n=48		n=115		
1. Sense of Coherence (SOC)	135.69	31.83	144.48	25.97	.06
2. Eating Behaviors (EBI)	3.72	1.24	3.78	.97	.78
3. Exercise Behaviors (GLTEQ)	6.28	2.87	5.40	2.53	.05**
4. BMI	29.47	4.95	29.0	5.20	.60
5. Depression (DDS)	39.38	28.39	27.83	18.49	.01**

Table 2. (continued)

Presurgical and postsurgical service users and non-users mean scores for EBI, GLTEQ, SOC, BMI, and DDS

	Service users		Non-users		<i>P</i>
	M	SD	M	SD	
<u>Presurgical Informal Health Services</u>	n=25		n=138		
6. Sense of Coherence (SOC)	150.56	28.74	140.32	27.69	.09
7. Eating Behaviors (EBI)	3.73	1.11	3.77	1.05	.88
8. Exercise Behaviors (GLTEQ)	6.28	3.00	5.54	2.58	.20
9. BMI	29.42	4.91	29.09	5.16	.77
10. Depression (DDS)	27.6	23.50	31.88	22.23	.38
<u>Postsurgical Informal Health Services</u>	n=14		n=149		
6. Sense of Coherence (SOC)	133.71	20.20	.66	28.57	.26
7. Eating Behaviors (EBI)	3.56	1.34	3.78	1.34	.46
8. Exercise Behaviors (GLTEQ)	4.85	2.14	5.73	2.69	.24
9. BMI	31.43	6.15	28.93	4.98	.08
10. Depression (DDS)	37.14	22.34	30.67	22.41	.30

Table 2. (CONTINUED)

Presurgical and postsurgical service users and non-users mean scores for EBI, GLTEQ, SOC, BMI, and DDS

	Service users		Non-users		<i>P</i>
	M	SD	M	SD	
<u>Presurgical Group</u>	n=96		n=67		
Attendance					
11. Sense of Coherence (SOC)	148.18	26.50	132.88	27.85	.001***
12. Eating Behaviors (EBI)	3.84	1.02	3.65	1.11	.28
13. Exercise Behaviors (GLTEQ)	5.94	2.67	5.26	2.61	.10
14. BMI	28.18	4.61	29.09	5.79	.92
15. Depression (DDS)	28.13	21.49	35.67	23.11	.03*
<u>Postsurgical Group</u>	n=44		n=119		
Attendance					
11. Sense of Coherence (SOC)	148.66	27.19	138.39	28.01	.06
12. Eating Behaviors (EBI)	3.93	1.06	3.69	1.05	.21
13. Exercise Behaviors (GLTEQ)	6.33	3.0	5.41	2.48	.05*
14. BMI	28.96	5.19	29.21	5.10	.79
15. Depression (DDS)	25.91	24.24	33.19	21.46	.06

Table 2. (continued)

Presurgical and postsurgical service users and non-users mean scores for EBI, GLTEQ, SOC, BMI, and DDS

	Service users		Non-users		<i>P</i>
	M	SD	M	SD	
<u>Presurgical</u> Internet Access	n=115		n=48		
16. Sense of Coherence (SOC)	142.86	28.55	139.56	26.82	.49
17. Eating Behaviors (EBI)	3.77	1.04	3.73	1.10	.83
18. Exercise Behaviors (GLTEQ)	5.66	2.77	5.64	2.38	.97
19. BMI	28.94	5.11	29.62	5.15	.44
20. Depression (DDS)	30.96	22.32	31.88	22.85	.81
<u>Postsurgical</u> Internet Access	n=63		n=100		
16. Sense of Coherence (SOC)	143.87	30.19	140.64	26.63	.48
17. Eating Behaviors (EBI)	3.85	.94	3.71	1.12	.41
18. Exercise Behaviors (GLTEQ)	6.33	2.91	5.23	2.41	.01**
19. BMI	28.91	4.37	29.29	5.54	.65
20. Depression (DDS)	31.43	24.89	31.10	21.41	.93

5.3.2.1 H1a

Individuals reporting utilization of presurgical and postsurgical services will have greater postsurgical sense of coherence.

Hypothesis 1a was partially supported. As expected, individuals who reported using presurgical behavioral health services had higher SOC scores ($M=145.63$) than non-service users ($M=134.13$, $t [161] = -2.49$, $p=.01$). Surprisingly, the use of postsurgical behavioral health use approached significance in a different direction, with lower SOC scores ($M=135.69$) for service users than for non-service users ($M=144.48$, $t [161] = 1.84$, $p=.06$). The higher depression scores for postsurgical service users explained this finding, as SOC and depression were previously found to be negatively correlated.

SOC scores for presurgical groups were also significantly different. The SOC scores for group attendance ($M=148.18$) were higher than for non-attendance ($M=132.88$, $t [161]$, $p=.001$.) Group attendance postsurgically approached significance, with attendees again reporting higher SOC ($M=148.66$) than non-attendees ($M=138.39$, $t [161] = -1.89$, $p=.06$). There were no significant SOC score differences for groups using informal services or internet services at either time frame.

5.3.2.2 H1b

Individuals reporting utilization of presurgical and postsurgical services will have better eating and exercise adherence postsurgically.

Surprisingly, only EBI score differences for presurgical behavioral health services approached significance. Service users had a mean score of $M=3.87$ and non-users a mean of $M=3.54$, $t (161) = -1.87$, $p=.06$. No other service groups approached significance for dietary adherence. For

exercise adherence, however, both postsurgical behavioral health services users ($t(161) = -.195$, $p = .05$) and postsurgical group attendees ($t(9161) = -1.81$, $p = .05$) had higher GLTEQ scores.

Secondary analyses found that among specific behavioral health services only presurgical dietary counseling showed significant group differences for dietary adherence scores. Service users ($n = 75$) had a higher mean of $M = 4.03$, compared to non-service users ($M = 3.53$, $t(161) = -3.14$, $p = .002$). Exercise adherence was not significantly different for the groups. Hypothesis 1b was only partially supported with finding in the secondary analyses.

5.3.2.3 H1c

Individuals reporting utilization of presurgical and postsurgical services will have lower postsurgical BMIs.

Although non-significant, BMIs for the groups reporting postsurgical behavioral health service use and postsurgical informal service use were higher than for non-users. Secondary analyses found that BMI scores for reported use of presurgical dietary counseling ($M = 28.29$) were lower than scores for non-users ($M = 29.86$, $t[161] = 1.96$, $p = .05$). Results for hypothesis 1c were supported only with mean score differences for dietary counseling groups.

5.3.2.4 H1d

Individuals reporting utilization of presurgical and postsurgical services will have lower postsurgical depression.

Depression scores for presurgical group attendees ($M = 28.13$) were lower than scores for non-attendees ($M = 35.67$, $t[161] = 2.14$, $p = .03$). Depression scores for postsurgical group attendees were also lower ($M = 25.91$) than non-attendees ($M = 33.19$), but the score difference only approached significance ($t[161] = 1.86$, $p = .06$). Higher depression scores had been found earlier

for postsurgical behavioral health service users ($p=.01$) and informal postsurgical service use ($p=.30$). Hypothesis 1d was supported only for attendance at pre and postsurgical bariatric groups. Secondary analyses found that among the individuals who reported seeking postsurgical treatment for depression, only 27% ($n=8$) also attended postsurgical support groups.

5.3.3 Hypothesis 2

H₂: Service utilization, dietary and exercise adherence, SOC, and level of depression will be significant predictors of postsurgical weight outcome.

A series of logistic regressions were done to examine the effects of pre and postsurgical service use, SOC, and the adherence variables on weight outcome. All 163 participants were included in the regressions. The dichotomous dependent variable for weight outcome (0=weight maintenance, 1=weight gain) was used in all three models.

As weight variability in women is linked to a number of demographic factors, including age, race, income level, and marital status (Wardle, Waller, & Jarvis, 2002), these variables were examined prior to entering the hypothesized predictors. Time since surgery was also examined along with the demographic variables, as time is a significant factor for weight gain following all methods of weight loss (Bryne, Cooper, & Fairburn, 2003; Averett & Korenman, 1999). The variables of age, race, marital status, household composition, and income level, were not found to be significant in predicting postsurgical weight outcome for this sample ($p>.05$). They were not included in the three regression models. Time since surgery was significant ($p=.0001$), and it was retained in the three models as a dichotomous categorical variable (0=surgery under 3 years ago, 1=surgery over 3 years ago). The first regression model entering the variables pre and

postsurgical service use, dietary and exercise adherence, sense of coherence, depression, and time since surgery, is presented in table 3.

Table 3: Estimates of the Logistic Regression Predicting Weight Outcome

Variables		B	S.E.	Wald χ^2	df	Sig.	Exp(B)	95% C.I. for EXP(B) Upper / lower	
Step 1	PreSUQ	-.249	.133	3.495	1	.062	.779	.600	1.012
	PostSUQ	.405	.291	1.941	1	.164	1.499	.848	2.651
	EBI	-1.083	.249	18.894	1	.000**	.339	.208	.552
	GLTEQ	-.136	.084	2.633	1	.093	.873	.736	1.026
	SOC	.009	.011	.707	1	.400	1.009	.988	1.030
	DDS	-.003	.012	.075	1	.784	.997	.973	1.021
	Time	1.648	.412	15.978	1	.000**	5.197	2.316	11.662
	Constant	3.644	1.788	4.153	1	.042	38.253	----	----

*p<.05, **p< .01

Pre/Post SUQ = Service Utilization Questionnaire

EBI=Current Eating Behaviors Inventory

GLTEQ=Godin's Leisure-Time Exercise Questionnaire

SOC=Sense of Coherence Scale

DDS= DUKE depression subscale

Time=Time Since Surgery (2 category)

Test	Chi-square	df	sig.
Omnibus Tests of Model Coefficients	68.86	5	.000
Hosmer and Lemeshow Test	15.18	8	.06

-2 Log Likelihood = 156.49

Ox and Snell R Square = .33

Nagelkerke R Square = .44

The results in table 3 show that only dietary adherence and time since surgery were influential predictors of weight outcome. With these two variables the model explained between 33% and 44% of the variation in weight outcome (indicated by the Ox and Snell and Nagelkerke R square values on the last 2 lines of table 6). The model provided an overall accuracy for predicting weight outcome of 78.5%, contrasted with a 57.7% overall prediction accuracy prior to regressing the variables in the model. The Hosmer - Lemeshow Goodness of Fit Test had a p-value of .06. This was just above the acceptable cutoff of .05, indicating very limited support for the model.

The significant contributions of dietary adherence and time since surgery were indicated by the large Wald estimates and the significant p-values. The B value was negative. The odds ratio below 1.0 found in the exponentiated (B) column for EBI, indicated that for every point increase in the EBI score there was a 34.9% (95% CI 21.3% to 57.1%) decrease in the odds of postsurgical weight gain (independent of the contribution of the other variables). For time since surgery, a categorical predictor, the large odds ratio value of 5.41 (with a positive B value) indicated that predicting inclusion in group 2 (weight gain) over group 1 (weight maintenance) was over 5 times more likely for individuals reporting having surgery more than 3 years ago. The 95% confidence interval for the time since surgery prediction (between 2.33 and 12.66), indicated that the true odds ratio values will actually fall somewhere within this range.

SOC and depression were not significant predictors of weight outcome. Exercise adherence had a Wald estimate of 2.63 and a p-value of .09, and it was not a significant predictor in the model.

Presurgical service use approached significance in this model with a Wald estimate of 3.50 and a p-value of .06. The score for service use was a summation of the various services

used at each time frame. It was considered a possibility that the contribution of specific types of services could be “washed out” when combined with other services. An examination of the influence for each type of service might increase the sensitivity of a prediction-model. This was the advantage of a logistic regression, with the option of entering binary predictor variables along with scale variables in the same model.

The second regression model included the two variables found to be significant predictors in the first model (EBI and time since surgery) and four dichotomous categorical predictors for each of the categories of presurgical service. The categories for presurgical services were behavioral health services, informal and alternative services, bariatric group services, and surgery-specific internet support.

The results of the second model regressing dietary adherence, time since surgery, and the four categories of presurgical service use, are presented in table 4. The Hosmer-Lemeshow Goodness of Fit Test p-value of .01 was below the acceptable cutoff of .05. This did not support the model. The Omnibus Tests of Model Coefficients, however, with a $p < .05$, indicated that the model including these variables was better at predicting weight outcome than a model without the variables. The Ox and Snell and Nagelkerke values indicated that between 35% and 48% of the variability in weight outcome was explained by these variables.

Presurgical behavioral health service use was found to be a significant predictor ($p = .002$) of weight outcome. The other three service categories were not found to contribute to the model. For behavioral health services with a negative B value (-.48), the exponentiated B value indicated that the odds for inclusion in the weight gain group by individuals reporting behavioral health service use were .22 times lower than for individuals not reporting service use. The 95% confidence interval for the BHS variable was quite large, indicating that the actual odds ratio

values for predicting weight outcome from behavioral health service use would fall somewhere between .09 and .57.

Table 4: Estimates of the Logistic Regression Predicting Weight Outcome

Variables		B	S.E.	Wald χ^2	df	Sig.	Exp(B)	95% C.I. for EXP(B) Upper/ lower	
Step 2	EBI	-.987	.229	18.519	1	.000**	.373	.238	.584
	Time	1.943	.422	21.183	1	.000**	6.977	3.051	15.957
	BHS	-.483	.468	10.038	1	.002**	.227	.091	.568
	IAS	-.099	.575	.030	1	.864	.906	.294	2.796
	BSG	-.323	.425	6.276	1	.077	.599	.250	.872
	SSIS	-.516	.455	1.287	1	.157	.597	.245	.956
	Constant	4.402	1.083	16.508	1	.000	81.592	----	----

*p<.05, **p< .01

EBI=Current Eating Behaviors Inventory
 Time=Time Since Surgery (2 category)
 BHS=Behavioral Health Services
 IAS=Informal/alternative Services
 BSG=Bariatric Support Groups
 SSIS=Surgery-specific Internet Support

<u>Test</u>	<u>Chi-square</u>	<u>df</u>	<u>sig.</u>
Omnibus Tests of Model Coefficients	71.30	6	.000
Hosmer and Lemeshow Test	19.56	8	.01

-2 Log Likelihood = 150.82

Ox and Snell R Square = .35

Nagelkerke R Square = .48

In the final model (table 5) only two specific presurgical behavioral health service types (individual therapy and extended dietary counseling) had cell sample numbers sufficient for inclusion in the regression model. They were entered as binary predictors (0=no service use, 1=service use). Only presurgical dietary counseling was a significant predictor of weight outcome. Individual therapy approached significance with a Wald estimate of 9.35 and a p-value of .06. Dietary counseling had a negative B-value (-1.84) and an odds ratio of .16 (95% CI .07 to .37), indicating that individuals reporting the use of presurgical dietary counseling were slightly more likely not to report postsurgical weight gain than were individuals not reporting service use. This model produced the best goodness of fit indices out of the three models, with a Hosmer-Lemeshow Goodness of Fit Test p-value of .42, and an Omnibus Tests of Model Coefficients p-value >.001. The Ox and Snell and Nagelkerke values indicated that between 41% and 57% of the variability in weight outcome was explained by dietary adherence, time since surgery, and presurgical dietary counseling. This model also provided the highest overall accuracy for predicting weight outcome, at 81.6%.

Hypothesis 2 was not fully supported with these data. Dietary adherence, presurgical behavioral health service use (dietary counseling), and time since surgery were the only important contributors to the final prediction model for postsurgical weight outcome. SOC and depression were not found to be influential in predicting a binary weight outcome.

Table 5: Estimates of the Logistic Regression Predicting Weight Outcome

Variables		B	S.E.	Wald χ^2	df	Sig.	Exp(B)	95% C.I. for EXP(B) Upper / lower	
Step 3	EBI	-.952	.234	16.554	1	.000**	.386	.244	.611
	Time	1.688	.429	15.458	1	.000**	5.411	2.332	12.556
	PreBH Type 1	-1.003	.575	10.038	1	.064	.227	.017	.986
	PreBH Type5	-1.839	.429	18.375	1	.000**	.159	.069	.369
	Constant	4.284	1.019	17.685	1	.000	72.545	----	----

*p<.05, **p< .01

EBI=Current Eating Behaviors Inventory

Time=Time Since Surgery (2 category)

PreBH Type 1 = Presurgical Individual Therapy

PreBH Type 5= Presurgical Dietary Counseling

Test	Chi-square	df	sig.
Omnibus Tests of Model Coefficients	83.23	4	.000
Hosmer and Lemeshow Test	8.35	8	.42

-2 Log Likelihood = 138.89

Ox and Snell R Square = .41

Nagelkerke R Square = .57

5.3.4 Hypothesis 3

H₃: Analysis of formal and informal service utilization by race will reveal cultural distinctions, specifically of African-American women utilizing more faith-based and complementary /alternative services than Caucasian women.

Means for each service type by category were analyzed using Pearson's chi-square (table 6). The results indicated that there were no significant differences between racial groups for any service utilization categories or for individual services. Postsurgical behavioral health service use was higher for Caucasian women (73.6% vs. 39.5%), and approached significance with a p-value of .09. A higher percentage of African American women used postsurgical informal services (15.8% vs. 6.4%), which also approached significance at p=.07. Although non-significant, more Caucasian women used local chat rooms (11.2% versus 5.3%), but fewer of them used national chat rooms (19.2% versus 21.1%). Hypothesis 3 was not supported with these data.

Secondary analyses indicated significant racial differences for three demographic variables. Caucasian women reported a lower lifetime weight (149.23 lbs. vs. 159.90 lbs, p=.04). A higher percentage of Caucasian women were married (60.8% vs. 39.5%, p=.05). A higher percentage of Caucasian women reported a yearly household income above 50,000 (45.6% vs. 18.4%, p=.01).

T-tests comparing the 11 DUKE subscales, indicated that African American Women had significantly higher mental health scores ($t [161] = -.20, p=.05$), physical health scores ($t [161] = -.90, p=.05$) (both indicating better health for the African American women), and a significantly lower anxiety-depression score ($t [161] = 1.93, p=.05$), also indicating better health.

For all other demographic and weight history variables, including time since surgery, household composition and number of children, the groups were comparable. The reasons for seeking services were also examined in secondary analyses using Pearson’s chi-square. There were no significant differences between racial groups for any reasons for seeking services pre or postsurgically.

Table 6: Percentage of service category use by race

		African American (and other Non-Caucasian) (N=36)	Caucasian (N=125)
Service Type	Time		
Behavioral health - Presurgical		71.1	66.4
Informal	----	15.8	15.2
Groups	----	55.3	60.0
Internet	----	68.4	71.2
Behavioral health - Postsurgical		39.5	73.6 <i>p</i> =.09
Informal	----	15.8	6.4 <i>p</i> =.07
Groups	----	21.1	28.8
Internet	----	34.2	40.0

*2x2 Chi-square (Continuity Correction) *p<.05*

5.3.5 Hypothesis 4

H₄: Service utilization, SOC, dietary and exercise adherence, and current BMI will account for a significant amount of the variance of postsurgical quality of life. Service utilization will be related to quality of life directly and indirectly through SOC and dietary and exercise adherence.

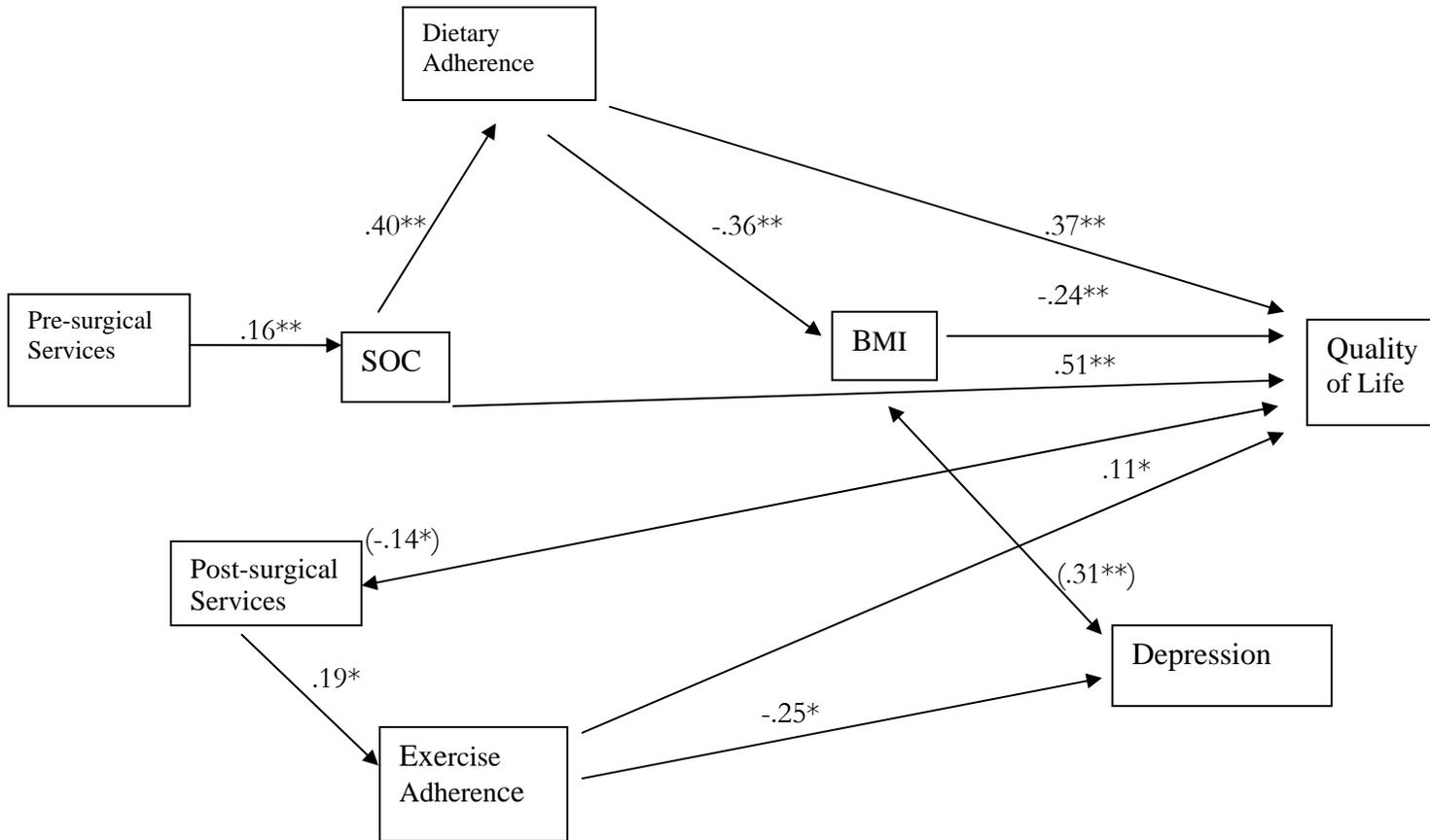
A recursive path analysis model was used to examine the hypothesized direct and indirect relationships between service utilization (at two time frames), sense of coherence, the two adherence measures, current BMI, and quality of life. Depression was included in the analyses

because it was found to be significantly related to both the predictor and outcome variables. The significant contribution of depression on postsurgical quality of life has previously been reported (Masheb, While, Toth, Burke-Martindale, Rothchild, and Grilo, 2007; de Zwaan, et al., 2002). There was a significant correlation between BMI and depression, but the direction of the effect could not be established with this study. Similarly, the negative direction of postsurgical service use and quality of life was not included as a path coefficient, since it was conceptually feasible that poor quality of life precedes service use. The results of the correlation analysis did not support further testing for an indirect (i.e., mediated) relationship between service use, sense of coherence and quality of life. The regression output confirmed that presurgical service use was not significantly related to either adherence measure, and postsurgical service use was associated only with exercise adherence.

The results partially supported hypothesis 4; behavioral adherence, BMI, and SOC were positively related to quality of life. The relationship between service utilization and quality of life through adherence was not supported. The path coefficients, however, suggested there could be an additional indirect relation from dietary adherence to quality of life through BMI. A mediation test (Baron & Kenny, 1986) for effect decomposition supported partial mediation of BMI in the relationship between dietary adherence and quality of life (see figure 3).

The model accounted for 59% of the variance in quality of life, 22% of the variance in BMI, 26% of the variance in dietary adherence, and 16% of the variance in exercise adherence. As indicated in figure 2, most of the standardized path coefficients were in the direction anticipated.

There were no other significant indirect effects determined through service utilization or adherence.



*p<.05, **p<.01

Figure 2: Path analysis model with significant variables entered

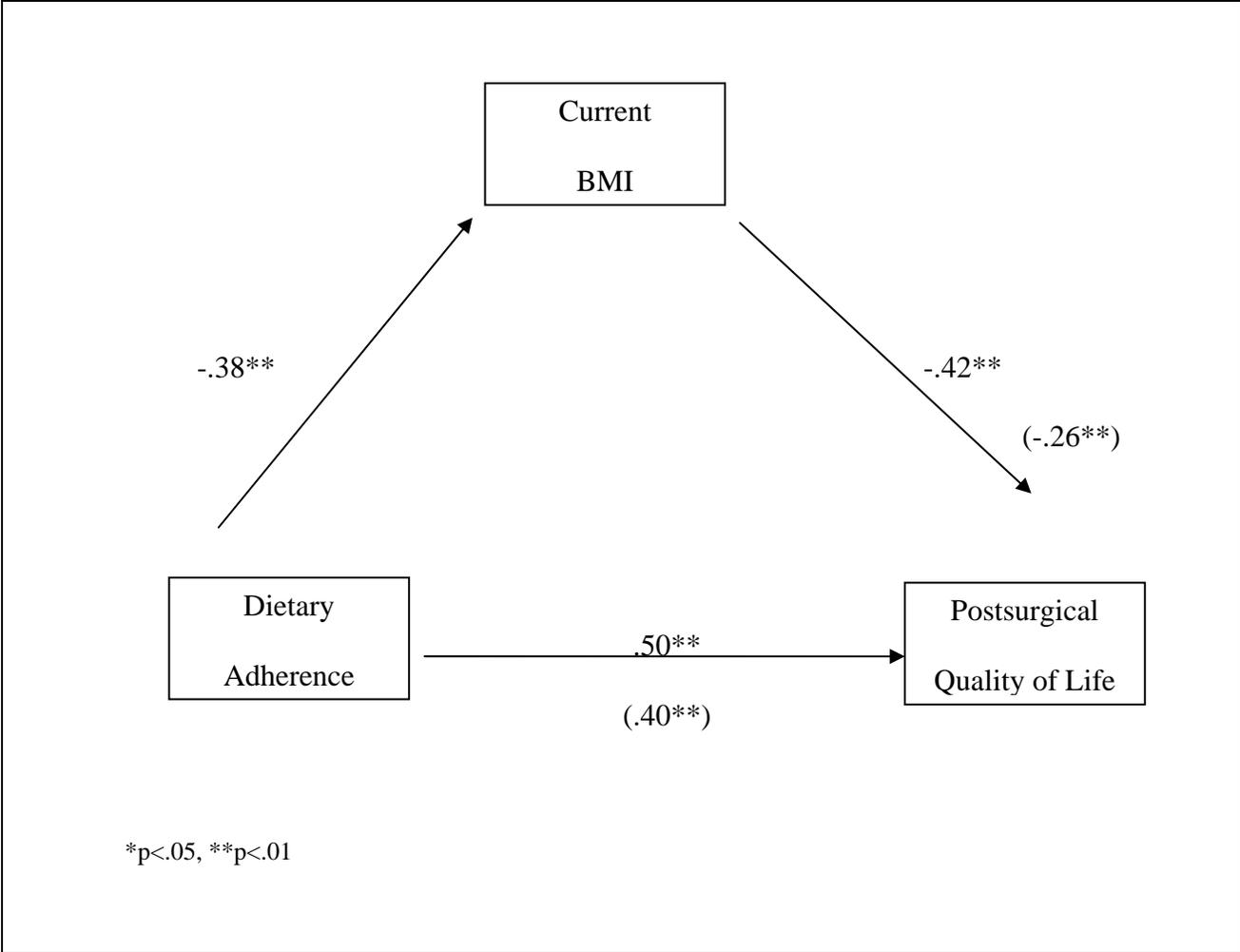


Figure 3: Partial mediation model for dietary adherence (EBI), current BMI, and postsurgical quality of life (BQL).

6.0 DISCUSSION

6.1 SUMMARY OF FINDINGS

The central investigation in this study was to determine if the use of psychosocial resources by individuals before and after bariatric surgery was associated with a stronger sense of coherence (H_{1a}). It was anticipated that increased service utilization and a stronger sense of coherence would be positively correlated with better postsurgical dietary and exercise adherence (H_{1b}). It was also anticipated that these variables would contribute significantly to a prediction model for postsurgical weight maintenance (hypotheses H_{1c} and H₂). It was expected that higher service utilization, stronger sense of coherence, increased level of behavioral adherence, and lower BMI, would all be significantly associated with better postsurgical quality of life (H₄).

Hypotheses 1a through 1c were partially supported with these data. Higher SOC scores and lower depression scores, in particular, were associated with presurgical group attendance. It is likely that the combination of information and support obtained in these groups provided a protection against postsurgical depression by increasing both the comprehensibility and manageability of postsurgical life. Specht and Courtney (1994), in support of this finding, reiterate previous research on the suitability of group interventions for behavioral change, surpassing individual therapy for “effectiveness, efficiency, and social utility” (p.145). Internet use, despite possessing some of the characteristics of groups (support and education), was not

found to be positively associated with SOC and depression scores, indicating a benefit from physical attendance at groups. Local hospitals, including Western Pennsylvania Hospital, are attempting to bridge the gap between the efficacy of group attendance and the convenience of internet access, by offering more alternatives for individuals who cannot attend groups in person, including video and live on-line groups. It will be useful to investigate the positive benefits of on-line groups and live chat-rooms for behavioral change and postsurgical outcomes.

Surprisingly, exercise adherence improved with both postsurgical attendance at groups and postsurgical behavioral health service use. Depression, however, was found to be highest for individuals reporting the use of behavioral health services despite an increase in exercise adherence.

Hypothesis 2 was partially supported. Although the SOC scale was found to be significantly correlated with dietary and exercise adherence, depression, and BMI, it was not found to be an influential predictor of a binary weight outcome in the logistic regression models. Only presurgical dietary counseling significantly contributed to the prediction model for weight outcome, along with dietary adherence and time since surgery.

Hypothesis 3 was not supported. There were no differences in pre or postsurgical service use between the African Americans and Caucasian participants. Informal service use was substantially lower than formal service use, although similar for both groups. This was possibly because of the centralized (urban) location of the surgical center with proximately to many formal and professional services, or, as likely an indication that the women who participated in the survey were more similar than those who chose not to participate.

Hypothesis 4 examining quality of life outcome was partially supported. Service use did not contribute to variance in BQL scores. Presurgical service use was positively related to SOC,

but the relationship between service use and dietary adherence was not supported. As anticipated, the EBI scores along with BMI and SOC, accounted for a reasonable amount of BQL variance. Depression was not a significant predictor in the path model, although its strong association with BMI may indicate an indirect effect. The direction of the influence of depression on BMI and quality of life cannot be examined in a survey design. The addition of some information about presurgical depression, however, expands an understanding of the persistence of depression for some of the women. This relationship of depression with worse outcomes for weight, quality of life, and adherence will be discussed more in the section on depression below.

6.1.1 Service Utilization

For individuals seeking a surgical treatment option for obesity, and faced with the stress of adapting to tremendous physical changes and behavioral challenges postsurgically, it was hypothesized that the utilization of pre and postsurgical psychosocial resources (as measurable and modifiable GRRs) would contribute specifically to what Antonovsky conceptualized as an individual's ability to find life stressors manageable and comprehensible. This hypothesis was only partially supported. Overall presurgical service use was correlated with higher SOC. SOC, in turn, was positively associated with behavioral adherence, negatively associated with BMI, and positively associated with postsurgical quality of life, although these associations could not strongly or directionally explained.

The use of presurgical dietary counseling contributed in predicting weight outcome in the logistic regression model along with dietary adherence and time-since-surgery. This was the only presurgical behavioral health service found to be associated with weight outcome. As all

surgical candidates who participated in this study are required to see a nutritionist on the treatment team for at least one presurgical dietary consultation, the 75 participants reporting the use of dietary counseling services were more than likely describing extended dietary counseling. Interestingly, Jamal et al. (2005) found conflicting results for the influence of extended dietary counseling. They compared 2 groups of gastric bypass patients (75% of the both samples were women), including one group mandated by their insurance companies to attend 6 months of preoperative dietary counseling and one group who had not been mandated to services. After one year the postsurgical patients who received extended presurgical dietary counseling had significantly less weight loss and higher postsurgical BMIs compared to patients who did not receive mandated dietary counseling. The study did not report on the use of other services or voluntary use of dietary counseling prior to surgery. Further prospective research is needed to evaluate the impact of presurgical dietary counseling on surgical outcome.

Although this study found that SOC was significantly correlated with outcome variables, the necessary criterion for time ordering was not possible using a cross-sectional study. The direct and indirect effects of presurgical service use on postsurgical SOC or any of the variables could not be determined. SOC may be an important link to improving surgical outcomes, and these findings suggest that further prospective research is warranted.

6.1.2 Dietary Adherence

As would be expected, higher scores on the current Eating Behaviors Inventory were significantly associated with lower BMI. Improved dietary adherence also contributed to predicting postsurgical weight maintenance. Kalarchian, Wilson, Brodin, and Bradley (1999), similarly, found a significant association between self-reported dietary control and postsurgical

weight outcomes. Kalarchian, Marcus, Wilson, Labouvie, Brolin and LaMarca (2002) reported that 46% of their sample of postsurgical patients reported binge eating potentially contributing to weight regain. For this sample, 72.4% reported presurgical binge eating at least sometimes, corresponding to 60% reporting a complete remission of binge eating postsurgically. There was also a reported pre-post decrease in “grazing” by 32.5%, and “eating when bored or lonely” by 35%. With 57.7% of the sample reporting postsurgical weight gain, it appeared that a number of eating behaviors in addition to postsurgical binge eating contributed to this.

The use of presurgical dietary counseling was found to be the only service significantly predicting higher EBI scores. This result was based upon a general self-report of receiving dietary services presurgically, and requires further investigation about the frequency and type of dietary services associated with finding a significant improvement in dietary adherence. Further research identifying interventions assisting with the reduction of specific postsurgical eating behaviors contributing to weight regain, including binge eating, is important.

Higher current EBI scores were found to be directly and indirectly associated with higher postsurgical quality of life, supporting the previously observed connection between a sense of control over eating behaviors, lower postsurgical BMI, and better postsurgical quality of life (Ogden, Clementi, Aylwin, & Patel, 2005). Further research to investigate the unique contributions to quality of life from an increased sense of control and a lower body weight is warranted. The emphasis placed on weight loss, for instance, may be better directed for some individuals toward improving their sense of control over eating behaviors.

Although the EBI is a short inventory containing only 9 items, it appeared to adequately measure eating behaviors contributing to presurgical obesity and postsurgical weight loss. As it is a conveniently sized measure for repeated testing, it may be of assistance in tracking changes

in dietary adherence and improving timely interventions to assist with weight maintenance postsurgically.

6.1.3 Exercise Adherence

Increased exercise adherence approached significance in the odds ratio model predicting weight gain. Results from the linear regression indicated that higher exercise adherence was associated with a lower BMI, higher SOC scores, and higher postsurgical quality of life scores. As level of exercise increased in this sample, depression scores decreased. The strong association between postsurgical depression and exercise has been described in the literature (Goldfarb, 2006), supporting these findings. Attendance at postsurgical groups was the only service used that approached significance for improving exercise adherence.

Only 15% of the adult population in the U.S. exercises with any regularity (NIH, 1999). For the combined sample in this study, 27.6% of the women reported “exercising often”, 39.9% reported “exercising sometimes”, and 32.5% reported “never exercising”. Greater time since surgery reduced exercise frequency: 50% of the women who had the surgery over 3 years prior to the study reported “never exercising” compared to 26.4% who had the surgery less than 3 years before. There was a substantially higher rate of exercise in the sample than in the general population at both time periods. Increased exercise in postsurgical patients has been observed in the literature. It has been attributed to an increased ease of movement post weight-loss (Seres et al., 2006), as well as to individual motivation regarding optimal postsurgical outcome (Goldfarb, 2006).

The importance of regular and continued exercise for optimal weight loss following bariatric surgery is emphasized in the literature. As attendance at postsurgical groups has been

found to positively impact on postsurgical weight loss (Hildebrandt, 1998), the near significant findings in the results most likely support the association between group attendance and increased exercise frequency. A larger sample may have corroborated a beneficial impact of group attendance on exercise adherence. Prospective research designs can better identify services improving behavioral adherence.

6.1.4 Depression

Depression and other psychiatric comorbidities have been found to be more prevalent in severely obese individuals seeking treatment (de Zwaan, 2001; Becker, Margraf, Turke, Soeder, & Neumer, 2001; Fabricatore, Saarwer, Wadden, Combs, & Krasucki, 2007). Women seeking surgical treatment have also been found to have higher rates of depression than men (Mazzeo, Saunders, & Mitchell, 2005). For this sample, there was a significant decrease in reported service use for depression pre to postsurgically (39% presurgically and 18% postsurgically).

Although the self-reported use of services may not indicate the actual rate of depression or severity of depression for the sample, similar estimates of presurgical depression and pre-post declines in depression have been reported in studies using more rigorous methods for assessing psychological status (Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2006; Mathus-Vliegen , de Weerd, de Wit, 2004; Fontaine, Barofsky, Bartlett, Franckowiak, & Andersen, 2004; Dymek, Grange, Neven, & Alverdy, 2002). Kalarchian, Courcoulous, Levine, Ringham, and Marcus (2005), for instance, found that 40% of a sample of surgical candidates (85.5% women) met clinical criteria for an Axis I disorder. Elkins et al. (2005) found a 12% rate of depression in a patient sample (81% women) 1 year after gastric bypass surgery. Burgmer, Petersen, Burgmer, Zwaan, Wolf, and Herpetz (2007) found very similar results for both presurgical and postsurgical

rates of depression. They reported that 40% of a mixed gender cohort presenting for Roux-en-Y gastric bypass surgery met DSM-III-R (APA, 1987) criteria for a depressive disorder. They reassessed the sample at 1 and 2 year intervals after surgery, reporting a decline in depression to around 17%. Karlsson, Taby, Ryden, Sjostrom, and Sullivan (2006) found a rate of 24% presurgically, and a rate of 15% at a year 10 follow-up. A matched non-obese control group was reported by the authors to have a rate of 6%. For a reference point, the NIMH (1999) reported U.S. population rates of major depressive disorder at 6.5% for adult women and 3.3% for adult men.

The presence of presurgical depression and other psychopathology has been reported to predict better postsurgical outcomes in some studies (Emery et al., 2007; Masheb et al., 2007). Both higher rates of weight loss and higher quality of life have been found for postsurgical patients diagnosed with either presurgical depression or pathological eating behaviors (Sarwer, Wadden, & Fabricatore, 2005; Bocchieri, Meana, & Fisher, 2002). For this sample of women, there were no detectible differences in mean scores for predictor and outcome variables of participants reporting presurgical service use for depression compared to those who did not report service use. Burgmer, Petersen, Burgmer, Zwaan, Wolf, and Herpetz (2007), similarly, did not find an association between the presence of presurgical depression and weight outcome in a longitudinal study.

The presence of a severe and persistent mood disorder is frequently considered a contraindication to weight loss surgery. Hsu et al. (1998), Jones-Corneille, Wadden, and Sarwer (2008), and Omalu et al. (2005) all found the risk for depression (and suicide) in postsurgical patients linked to a presurgical history of recurrent depression or other psychopathology.

Postsurgical service use for depression was reported in 18% of this sample. There were significant differences in weight outcome, adherence measures, SOC, depression, and quality of life between postsurgical service users and nonusers. For all variables, t-tests showed worse outcomes for individuals who reported seeking postsurgical services for depression. DUKE depression scores for these individuals (mean of 52.76, SD=25.20) were double that of those who did not use report service use (mean of 26.56, SD=18.84, $p<.0001$). 17% of this subgroup of individuals reporting postsurgical service use for depression also reported presurgical service use for depression. Mean scores for predictor and outcome variables were not significantly different for the pre and postsurgical users compared to those reporting only postsurgical use. These were very small samples ($n=29$ and $n=15$), however, and statistical results should be interpreted cautiously. These findings do, however, confirm the importance of close monitoring and referral to appropriate follow-up services for postsurgical patients reporting depression.

6.1.5 Race and Service Use

Hypothesis 4 was not supported with these data. There were no racial differences observed in the type or frequency of service use. Possible reasons for this finding could be comparable demography as well as availability and access to health services specific to bariatric surgery. Although the Pittsburgh region is abundant in both traditional and alternative health services, surgery seekers are likely to have similar health insurance sources providing coverage for bariatric surgery. Larger studies examining health service utilization and race have reported similar findings, observing little variability in the utilization of health care services for SES-matched African American and Caucasians (Trivedi, Zaslavsky, Schneider, & Ayanian, 2006). Similarly, Fowler-Brown, Ashkin, Corbie-Smith, Thaker, and Pathman (2006) did not find racial

differences in the frequency or choice of service use, but did find differences in satisfaction with services, with African Americans reporting less satisfaction with health care despite their level of health. Most recently, Barkley (2008), did not find that race predicted health behaviors (positive and negative) in a large national sample.

The only significant difference detected among demographic characteristics by race was a larger percentage of African Americans reporting lower household incomes compared to Caucasian women. The study was limited to information on income level only, and education and employment status were not known. This was an error in methodology, as these demographics may have assisted with the analyses. A recent study conducted in a comparably-sized eastern city looking at similar variables to this study, however, collected information on education and employment status as well as income, and did not find that these or any other demographic variables correlated with weight or quality of life outcomes (Masheb, White, Toth, Burke-Martindale, Rothchild, & Grilo, 2007).

Several studies have found that type of insurance and residence are associated with surgical outcomes. Compared to privately insured patient, Medicaid patients in urban environments were found to have a higher risk for postoperative complications than patients in a rural setting (Dallal, Bailey, Guenther, Curley, & Sergi, 2008), as well as higher mortality risk (Poulose et al., 2005). Race, presurgical BMI, and income were not significant predictors of outcome in either study.

Racial disparity in health care is a significant contributing factor to poorer health in racial and ethnic minorities (Schneider, Zaslavsky, & Epstein, 2002; Sue & Dhindsa, 2006). Disparity in the utilization of health care services is frequently attributed to perceptions of discrimination

or other racial barriers (Trivedi, Zaslavsky, Schneider, & Ayanian, 2006; Williams, Neighbors, & Jackson, 2003), as well as to availability and access to care (Ashton et al., 2003).

It was hypothesized that African American women in this study would seek more alternative psychosocial resources because of possible racial barriers. This hypothesis was not supported, although it is possible that resources specifically addressing bariatric surgery, with the relatively recent but rapid growth in the surgical procedure, offer few alternative sources for support or education outside of mainstream medical providers and organizations.

A satisfaction rating for either surgical services or psychosocial services was not included in this survey. It may be an important variable to take into account for improving postsurgical outcome. Individuals who experienced racial barriers or poor satisfaction with health services may not be as well represented in survey research as they would be in longitudinal studies. The impact of race and ethnicity on treatment outcome continues to be a crucial concern for obesity treatment research and general health research.

6.1.6 Postsurgical Quality of Life

Hypothesis 3 was partially supported. Presurgical service use as predicted, however, was not significantly associated with quality of life and did not contribute to variance in BQL scores. The use of presurgical dietary counseling was found to be the only service significantly predicting better weight outcome. Postsurgical group attendance (controlling for depression) approached significance predicting better exercise adherence. Although exercise adherence was not found to contribute significantly to predicting weight outcome in the logistic regression models, results from the linear regression indicated that higher exercise adherence was associated with lower current BMI and with higher postsurgical quality of life.

There was no statistical corroboration for the hypothesized mediation path of service use, SOC and quality of life. Dietary adherence, SOC, and BMI were all associated with quality of life, and accounted for significant unique and total variance in BQL scores ($F_{5, 162} = 44.32$, $p < .001$, $R^2 = .59$). An indirect effect of dietary adherence was also found to be partially mediated through BMI.

The associations between BMI, quality of life, and psychological health appear to be quite ambiguous. Studies in both general obesity research and surgical research have had conflicting findings (Kolotkin, Head, Hamilton, & Tse, 1995; Doll, Peterson, & Stewart-Brown, 2000; Kushner & Foster, 2000). Gender differences may explain some of these contradictory outcome findings.

Sarlio-Lähteenkorva (2001) looked at a very large and diverse population of men and women in Finland, and collected data on quality of life, weight loss attempts, and weight outcomes. From these findings he surmised that weight maintenance after substantial weight loss is difficult because quality of life and psychological well-being do not change dramatically enough following weight loss; individuals, therefore, lose the motivation to adhere to the challenging behavioral changes necessary for weight maintenance. This theory explains the prevailing tendency for regaining lost weight over time in all methods of weight control.

Sarlio-Lähteenkorva found, moreover, that gender differences in weight loss and quality of life likely contribute to conflicting findings in obesity research. In his study, for instance, he found that for women but not for men, poor quality of life and unhealthy life-style behaviors observed before weight loss interventions predicted better long-term weight loss maintenance and better quality of life.

Obese women in the U.S. and other countries report substantially higher levels of social stigma and labor discrimination than reported by obese men (Puhl & Brownell, 2001; Sarlio-Lähteenkorva, 2001; Himes & Thompson, 2007). Gender and weight discrimination contribute to lower quality of life for obese women, explaining in part why greater numbers of women compared to men are obtaining weight loss surgery (Saguy, 2007).

Bariatric research in the past decade has consistently shown that greater weight loss predicts better quality of life (Dymek, Grange, Neven, & Alverdy, 2002; Arcila et al., 2002; Malone & Alger-Mayer, 2004). There is also evidence that the most significant improvements in quality of life are reported following surgery-induced weight loss (Weiner, Sauerland, Weiner, & Pomhoff, 2005). The greater proportion of women obtaining weight loss surgery (including women experiencing poor presurgical quality of life) may explain the strength of these findings. For this sample, quality of life was significantly higher for individuals reporting postsurgical weight maintenance compared to those reporting weight gain. These results are similar to those in recent studies with disproportionately greater numbers of women.

6.2 PERTINENT PUBLIC POLICY

Fast foods, “junk” foods, prepared foods with an extended shelf-life, and the use of high fructose corn syrup in foods and beverages have been the preferred foods of Americans for the past two decades (Greenwood & Stanford, 2008). According to many public health experts, they are directly linked to the current “obesity epidemic” (Philipson & Posner, 2003), along with an extremely sedentary American lifestyle. Indeed, the U.S. has become “the world’s leading innovator in passive entertainment, which is highly sedentary.”(Philipson & Posner, p. 91). Some

public health policy, particularly government funded programs promoting nutritional and health education, follows from the perspective that the national increase in rates of obesity result totally from individual dietary behaviors and leisure interests (Drewnoski & Specter, 2004). Tillotson (2004), however, traces the origin of current obesity rates in the U.S. to the broadly subsidized U.S. policies in the past that favored agriculture and food manufacturer's interests without regard to social and health consequences. In response to this alternative perspective, more recent public policies to alleviate the problem of a "fatter" population propose regulating the practices of food manufacturers by such means as increased taxing of calorie dense foods and beverages, limiting the availability of some foods to vulnerable populations, and by legally limiting portion sizes provided by restaurants. The so called "anti-obesity laws" propose the need for government intervention at the marketing and food production stages to protect people from overeating (Philipson & Posner, 2003). As the result of these policies, legislation on the ban of soft-drinks and fast foods in schools has occurred in many states (de la Rosa et al., 2002). This has also led to personal-injury lawsuits blaming food manufacturers on individual cases of obesity (Oliver & Lee, 2002). Additionally, punitive suggestions for alleviating the obesity problem still reflect the public and legislative attribution of obesity to individual behaviors, and range from taxing obese individuals to limiting insurance benefits to obese individuals (Philipson & Posner, 2003).

Despite the declaration of a national obesity epidemic by health experts in the 1990s, preventive services that are "lifestyle-related" are not mandated at the state or national level (Salinsky, 2005). Dietary counseling, for instance, is denied or limited by most public and private health insurance policies without a comorbid condition, such as diabetes. Medicare's reclassification of "obesity" as a disease factor in 2004 (revision to §40.5 of Pub. 100-03), resulted in increased coverage for obesity treatments "only when an integral and necessary part

of a course of treatment for a medical condition.”(DHHS, 2004). Bariatric surgery became available to Medicare and Medicaid recipients after the 2006 Medicare expansion of coverage for surgery in obese individuals with a comorbid diagnosis (“hypertension, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, respiratory problems, and certain types of cancers.”(DHHS, 2006). Medicaid coverage for surgery varies by state. At the federal level, restrictions include limiting facilities that can perform the surgeries to only “high volume” facilities with low mortality rates. For individuals with private insurance, bariatric surgery coverage is also variable. Some policies allow a “carve out” for individuals to pay more for expanded coverage of the surgery (Champion & Williams, 2006). Individuals without insurance, of course, are unlikely to be able to afford a procedure costing between \$20,000 and \$35,000 (Obesity Action Coalition, 2008).

In general, the issue of obesity presents a policy conundrum. Although low SES is the most significant risk factor for poor health (including obesity-related health risks), obesity rather than social inequality has become the focus for an overwhelming number of U.S. health organizations with their subsequent policy proposals (O’Dea, 2005). These policies, most often targeting individual behavioral change and marketing strategies, therefore, have been totally ineffective in reducing rates of obesity in the general population (Swinburn, Egger & Raza,1999), or in reducing health disparities resulting from income, education, or race (Oliver, 2006). Public policy targeting social inequality – policies to reduce disparities in income and education, in particular – will have the greatest impact upon health (Drewnoski & Spector, 2004; Williams, 1999; Novak, Ahlgren, & Hammarstrom, 2006).

6.3 RELEVANCE TO SOCIAL WORK

It is significant to the issue of obesity and health that many obesity alarmists frequently fail to differentiate overweight and level of obesity contributing to actual health risks. A problem with the general term “obesity” is the issue of severity. Including the incidence of severe obesity and its sequelae with “overweight”, mild, or moderate obesity in the population, does not accurately distinguish risk factors. It is severe obesity (BMI>40) that is linked to increased morbidity and mortality. According to the CDC (2005), in fact, slightly overweight individuals have better overall health than underweight individuals. The acceptance of anti-obesity laws, and the current outrage over a fatter U.S. population, in effect, is attributed by some health and policy experts to widespread anti-fat sentiment rather than to concerns about public health (Oliver, 2006). Many public and private interest groups benefit financially by promoting an “obesity epidemic”, and policy suggestions from these groups can be self-serving and economically motivated (Oliver, 2006; Acs, Cotten, & Stanton, 2007).

It follows that the current issues of obesity and health cannot be understood or critically examined without recognizing the influence of social epistemology and social inequality. Research on “obesity” implies the existence of a factual physiological or medical circumstance relevant to knowledge. Many feminist epistemologists, however, criticize the creation of obesity as a behavioral disorder, disease or disability, since to do so implies pathology, culpability, and deficiency (Herndon, 2002; Solovay, 2000). It is suggested that the medicalization of obesity mirrors the cultural rubrics of anti-fat bias and misogyny. Solovay (2000) articulates the risk of social narratives conferring fatness as defective: “all gradations of fat, even slight to moderate, have been regarded by government agencies and popular culture as mutable, volitional, and dangerous conditions that are synonymous with physical and moral shortcomings” (p.151).

Herndon (2002), similarly, reminds us that women, as the biologically “fatter” sex, are twice regarded as “flawed” by virtue of their gender and their size. Research independent from both the marketing scams of the diet industry and the alarmist and sometimes overzealous government agencies is required to distinguish between actual health risks of obesity and this ubiquitous anti-fat sentiment.

As social workers we are called upon to advocate for social equality and justice. To do so at a time in the U.S. characterized by the national preoccupation with weight loss and the socially sanctioned pastime of denigrating obese individuals, we must sort through the messy dialectics of fatness, beauty and preferred standards of physical size and shape. It is imperative that we recognize that the cultural creation of a thin weight preference is as professionally and ethically insupportable as all other culturally prescribed standards limiting diversity based upon race, ethnicity, gender, religion, sexuality, or physical and mental capacity.

It is only a short step to considering that the continued popularity and increased use of bariatric surgery is yet another indication of the excessive lengths to which individuals will go to lose weight. There continue to be controversies about the commercial role of surgical procedures, and viable suggestions that economic interests rather than health interests have increased the use of surgery to treat severe obesity (Lyles & Cotton, 2007). There is a growing body of research specifically addressing issues of safety and efficacy in the surgical treatment of severe obesity, with a primary focus on short and long-term outcomes measured as quality of life, physical and mental health, and life expectancy. There are numerous groups composed primarily of women, who speak out about their choice of a surgical intervention, and who strongly identify with other individuals who are seeking or living with the results of surgery. These women actively participate in support groups, educational forums, support networks, and

internet services. All of these women understand the injustice of weight discrimination. It is essential that we, as social workers, understand the hazardous effect weight discrimination has on women's physical and psychological health, as well as understanding the powerful and potentially negative influence of market-driven obesity treatments. A forthright dialogue between consumers and providers about realistic health risks, anti-fat rubric, and safe choices for health enhancement is needed.

The increase in the occurrence of severe obesity internationally is significant to the social work profession because of three issues: severe obesity is strongly linked to increased morbidity and mortality, disproportionate rates of severe obesity are found among minority and marginalized populations in the U.S. and in other westernized countries (Kumanyika, Wilson, & Guilford-Davenport, 1993; Rigby, Kumanyika, & James, 2004; Henderson, 2007), and the highest rates of obesity-related health risks are found in adults and children living below the poverty level (O'Hare & Mather, 2003). It is our directive as social workers to advance and engage in efforts to assure social equality for all individuals, and to promote the elimination of health disparities to resulting from race, gender, size, or any other attribute. We must support public policy promoting social equality as opposed to socially-fabricated anti-fat rubric.

6.4 APPLICATION TO SOCIAL WORK PRACTICE

An important role of the social worker is that of matching clients with unique needs to appropriate services. In addition to linking clients with services, Kahng and Mowbray (2005) suggested the need for social workers to "help consumers develop healthy behavioral coping mechanisms with more selectively tailored interventions corresponding to their psychological

and behavioral characteristics.” (p. 87). For all women, risk factors for depression include being female, being severely obese, and experiencing discrimination due to either gender or weight. For women who have undergone bariatric surgery, there is an additional risk factor for depression with postsurgical weight gain (Fabricatore, Saarwer, Wadden, Combs, & Krasucki, 2007). Social workers in many settings and in numerous service roles assist women in coping with the complexity of their lives due to multiple demands, stress factors, and health issues specific to women. Identifying effective interventions and health-promoting services corresponding to the individual characteristics of women who are seeking treatment for obesity or adjusting to life after a weight loss intervention, requires an understanding of the particular concerns that weight and size bring to the already complex issues women contend with. Consumers of health and mental health services are always better served when providers are well informed about empirically validated interventions for improving behavioral health.

6.5 STRENGTHS AND LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

The most serious methodological limitation of this study was the lack of treatment equivalence among service comparisons, hindering both reliability and comparability of findings. The generalizability of the results was restricted by participant recruitment from a single surgical provider, compounded by the use of a sample containing exclusively self-selected participants. There was an increased chance of inaccuracy and reporting error using retrospective data – compounded by combining both current and retrospective questions in a lengthy survey. The combination of the small sample size with the number of details about service use “watered

down” information and made the study more detail heavy and less focused. Not including information about participants’ level of education limited investigating the relationships between SES and outcome, which has been found in the social work literature and general medical literature to impact significantly upon behavioral health (Marecek, 2006; Jackson & Williams, 2006; Sterk, Theall, & Elifson, 2006).

As a preliminary step, the study provided a naturalistic investigation of several important health issues concerning women following gastric bypass surgery. It highlighted the significance of postsurgical depression when assessing outcome, and identified the range of specialized services used by women before and after surgery. The significant association found between dietary adherence and both postsurgical weight maintenance and better quality of life identifies a continued focus for future research to assist women with behavioral adherence after bariatric surgery. Further research using prospective designs and standard methodology is supported by these findings.

6.6 CONCLUSION

Women seeking treatment for severe obesity have multiple risk factors for discrimination, depression, and poor quality of life. Despite the limitations of this study, it found that service utilization by women prior to gastric bypass surgery, particularly the use of nutritional counseling and attendance at bariatric support groups, was associated directly with better postsurgical behavioral adherence and weight maintenance, and indirectly with better quality of life. It is important for social workers to understand the unique needs of women seeking both surgical and non-surgical interventions for weight management. As behavioral health treatment

is intrinsically linked to the missions and values in social work (Simon, 1994), knowledge of etiological factors, treatment effectiveness, and available support services will assist social workers in needs assessment and service referrals for women desiring treatment for obesity. Contemporary social work principles emphasizing a biopsychosocial perspective of health can guide both the development and application of behavioral health research. Further research to improve treatment outcomes and identify barriers to potentially health-promoting service utilization by women is needed.

APPENDIX A

LETTER TO SURVEY PARTICIPANTS

Dear Study Participant:

- Thank you for taking the time to fill out this survey. It will take between 15 and 20 minutes to complete the questionnaires.
- Your participation is completely voluntary, and you are under no obligation to fill out this survey.
- The information obtained with this survey is completely anonymous.
- All of the information will be used in an aggregate form (pooled), and it will be used only for the purpose of this study and subsequent analyses.
- There are no direct benefits associated with participation in this study. You will, however, be contributing to important research about improving services and outcomes for women who choose weight loss surgery for the treatment of severe obesity.
- This survey is for dissertation research.

If you would like more information about this study, or if you wish to speak with the doctoral student researcher conducting this study, you can call her toll-free number:

Robin Santhouse, L.S.W. at 1-888-361-4429

You can also call her faculty mentor:

Christina Newhill, Ph.D., L.C.S.W. at (412) 624-6330

APPENDIX B

THE SENSE OF COHERENCE SCALE

(ANTONOVSKY, 1987)

1. **In the past - when you had to depend upon the cooperation of others to get something done - did you feel that it...**
SURELY WOULD GET DONE 1...2...3...4...5...6...7 SURELY WOULDN'T GET DONE
2. **When you talk to people, do you have the feeling that they do not understand you?**
VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER
3. **Doing the things you do every day is...**
PLEASURABLE AND SATISFYING 1...2...3...4...5...6...7 PAINFUL AND BORING
4. **Has it happened in the past that you were surprised by the behavior of people you thought you knew well?**
VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER
5. **You anticipate that your personal life in the future will be...**
FULL OF MEANING AND PURPOSE 1...2...3...4...5...6...7 WITHOUT MEANING AND PURPOSE
6. **Does it happen that you have feeling that you don't know exactly what is about to happen?**
VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER
7. **Think about the people you have contact with daily. Aside from the ones you feel closest to, how well do you know most of them?**
YOU KNOW THEM VERY WELL 1...2...3...4...5...6...7 YOU FEEL THEY ARE STRANGERS
8. **Many people – even those with a strong character – sometimes feel like losers in certain situations. How often have you felt like this in the past?**
VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER
9. **Do you think there will always be people that you will be able to count on in the future?**

YOU ARE CERTAIN THERE WILL BE 1...2...3...4...5...6...7 YOU DOUBT THERE WILL BE

10. How often do you have the feeling that there is little meaning in the things you do in your daily life?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

11. When something unpleasant happened in the past, your tendency was to...

SAY "O.K, THAT'S THAT, MOVE ON" 1...2...3...4...5...6...7 "EAT YOURSELF UP" ABOUT IT

12. In the past 10 years your life has been...

FULL OF CHANGES WITHOUT KNOWING WHAT WILL HAPPEN NEXT 1...2...3...

...4...5...6...7 COMPLETELY CONSISTENT AND CLEAR

13. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

14. When you face a difficult problem, the choice of a solution is...

ALWAYS COMPLETELY CLEAR 1...2...3...4...5...6...7 ALWAYS CONFUSING OR HARD TO FIND

15. Do you have the feeling that you don't really care about what goes on around you?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

16. You feel your life is...

FULL OF INTEREST 1...2...3...4...5...6...7 COMPLETELY ROUTINE

17. Has it happened that people you counted on disappointed you?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

18. Until now your life had...

VERY CLEAR GOALS AND PURPOSES 1...2...3...4...5...6...7 NO CLEAR GOALS OR PURPOSE

19. Do you have the feeling that you are being treated unfairly?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

20. When something happens have you generally found yourself...

OVERESTIMATING OR UNDERESTIMATING ITS IMPORTANCE 1...2...3...

...4...5...6...7 SEEING THINGS IN THE RIGHT PROPORTION

21. How often do you have feelings that you're not sure you can keep under control?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

22. When you think about difficulties you are likely to face in important aspects of your life, do you have the feeling...

YOU WILL SUCCEED IN OVERCOMING DIFFICULTIES 1...2...3...

...4...5...6...7 YOU WON'T SUCCEED IN OVERCOMING DIFFICULTIES

23. Do you have mixed up feelings and ideas?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

24. When you think about your life, you very often...

FEEL HOW GOOD IT IS TO BE ALIVE 1...2...3...4...5...6...7 ASK WHY YOU EXIST AT ALL

25. Your life in the future will probably be...

FULL OF CHANGES WITHOUT YOUR KNOWING WHAT WILL HAPPEN NEXT 1...2...3...

4...5...6...7 COMPLETELY CONSISTENT AND CLEAR

26. Does it happen that you have a feeling inside you that you would rather not feel?

VERY OFTEN 1...2...3...4...5...6...7 VERY SELDOM OR NEVER

27. What best describes how you see life?

ONE CAN ALWAYS FIND A SOLUTION TO PAINFUL THINGS IN LIFE 1...2...3...

...4...5...6...7 THERE IS NO SOLUTION TO PAINFUL THINGS IN LIFE

28. Most of the things you do in the future will probably be...

COMPLETELY FASCINATING 1...2...3...4...5...6...7 DEADLY BORING

29. When you do something that gives you a good feeling...

IT'S CERTAIN THAT YOU'LL GO ON FEELING GOOD 1...2...3...

4...5...6...7 IT'S CERTAIN THAT SOMETHING WILL HAPPEN TO SPOIL IT

APPENDIX C

THE BARIATRIC QUALITY OF LIFE INDEX

(WEINER, SAUERLAND, FEIN, BLANCO, POMHOFF & WEINER, 2005)

Mark the one answer that best expresses your experience.

<p>1. I like my weight.</p> <ul style="list-style-type: none"><input type="checkbox"/> Absolutely wrong<input type="checkbox"/> To some extent wrong<input type="checkbox"/> Half/half<input type="checkbox"/> To some extent true<input type="checkbox"/> Absolutely true	<p>2. I can accept my weight.</p> <ul style="list-style-type: none"><input type="checkbox"/> Absolutely wrong<input type="checkbox"/> To some extent wrong<input type="checkbox"/> Half/half<input type="checkbox"/> To some extent true<input type="checkbox"/> Absolutely true
<p>3. I exercise regularly.</p> <ul style="list-style-type: none"><input type="checkbox"/> Absolutely wrong<input type="checkbox"/> To some extent wrong<input type="checkbox"/> Half/half<input type="checkbox"/> To some extent true<input type="checkbox"/> Absolutely true	<p>4. I am participating in social activities (movies, parties, etc).</p> <ul style="list-style-type: none"><input type="checkbox"/> Absolutely wrong<input type="checkbox"/> To some extent wrong<input type="checkbox"/> Half/half<input type="checkbox"/> To some extent true<input type="checkbox"/> Absolutely true

<p>5. I often meet my friends and family.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true 	<p>6. I feel excluded from social life.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true
<p>7. I feel under pressure because of my weight.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true 	<p>8. Sometimes I feel depressed.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true

<p>9. All in all, I feel satisfied with my life.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true 	<p>10. At home, I feel restricted because of my weight.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true
<p>11. At work, I feel restricted because of my weight.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true 	<p>12. Privately, I feel restricted because of my weight.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Absolutely wrong <input type="checkbox"/> To some extent wrong <input type="checkbox"/> Half/half <input type="checkbox"/> To some extent true <input type="checkbox"/> Absolutely true

13. I feel self-confident.

- Absolutely wrong
- To some extent wrong
- Half/half
- To some extent true
- Absolutely true

14. HOW IS THE ACTUAL QUALITY OF YOUR LIFE? (mark only one)

- VERY BAD
- BAD
- OK
- GOOD
- VERY GOOD

(Section two has been modified for this study)

Section Two

The following questions are about physical and medical problems you may or may not be currently experiencing (check the right side if you experienced any of these problems before your surgery)

Please indicate **YES** or **NO** (circle choice) to the following questions:

DO YOU CURRENTLY SUFFER FROM:	DID YOU SUFFER WITH THIS PROBLEM <u>BEFORE</u> YOUR SURGERY?	
1. Vomiting	YES NO	YES NO
2. Sour belching	YES NO	YES NO
3. Heartburn	YES NO	YES NO
4. Nausea	YES NO	YES NO
5. Diarrhea	YES NO	YES NO
6. Flatulence (gassing)	YES NO	YES NO
7. Foul odor feces	YES NO	YES NO
8. Bladder problems or Urinary incontinence	YES NO	YES NO
9. Hair loss	YES NO	YES NO
10. Gallbladder pain (or gallbladder removed)	YES NO	YES NO
11. Diabetes	YES NO	YES NO
12. High blood Pressure or Hypertension (even if treated)	YES NO	YES NO
13. Asthma	YES NO	YES NO
14. Arthritis	YES NO	YES NO

15. Gout	YES NO	YES NO
16. High cholesterol	YES NO	YES NO
17. Other health problems (Please list) _____	_____ _____ _____ _____	YES NO YES NO YES NO

APPENDIX D

DUKE HEALTH PROFILE

(PARKERSON, BROADHEAD, TSE,, 1990; PARKERSON, BROADHEAD, TSE,, 1991)

DUKE HEALTH PROFILE

Instructions: Please read each question and check your best answer. There are no rights or wrong answers.

	Yes, describes me exactly	Somewhat Describes me	No, doesn't describe me at all
1. I like who I am.....	_____	_____	_____
2. I am not an easy person to get along with.....	_____	_____	_____
3. I am basically a healthy person.....	_____	_____	_____
4. I give up too easily.....	_____	_____	_____
5. I have difficulty concentrating.....	_____	_____	_____
6. I am happy with my family relationships.....	_____	_____	_____
7. I am comfortable being around people.....	_____	_____	_____

TODAY would you have any physical trouble or difficulty:

	None	Some	A Lot
8. Walking up a flight of stairs.....	_____	_____	_____
9. Running the length of a football field.....	_____	_____	_____

DURING THE PAST WEEK: how much trouble have you had with:

	None	Some	A Lot
10. Sleeping.....	_____	_____	_____
11. Hurting or aching in any part of your body....	_____	_____	_____
12. Getting tired easily.....	_____	_____	_____
13. Feeling depressed or sad.....	_____	_____	_____
14. Nervousness.....	_____	_____	_____

DURING THE PAST WEEK: How often did you:

- | | None | Some | A Lot |
|---|-------|-------|-------|
| 15. Socialize with other people (talk or visit with friends or relatives)..... | _____ | _____ | _____ |
| 16. Take part in social, religious, or recreation activities (meetings, church, movies, sports, parties)..... | _____ | _____ | _____ |

DURING THE PAST WEEK: How often did you:

- | | None | 1-4 days | 5-7 days |
|--|-------|----------|----------|
| 17. Stay in your home, a nursing home, or hospital Because of sickness, injury, or other health Problem..... | _____ | _____ | _____ |

APPENDIX E

THE LEISURE TIME EXERCISE QUESTIONNAIRE

(GODIN & SHEPHARD, 1985; GODIN, JOBIN, & BOUILLON, 1986)

Leisure-Time Exercise Questionnaire

1. Consider a typical 7-day period (one week), and indicate how many times on the average you do the following kinds of exercise for at least 20 minutes during your free time.

a) Strenuous exercise (your heart beats rapidly and you sweat).

This included activities such as running, jogging, roller skating, jumping rope, karate, and playing basketball, soccer, or field hockey.

Number of times per week _____

b) Moderate Exercise (not exhausting – results in a light sweat))

This includes activities such as fast walking, tennis, easy bicycling, dancing, swimming, baseball, or badminton.

Number of times per week _____

c) Mild Exercise (minimal effort – no sweating)

This includes activities such as easy walking, gardening, archery, bowling, golf, yoga, fishing, or horseshoes.

Number of times per week _____

2. Considering a 7-day period (one week), how often do you engage in any regular activity long enough to work up a sweat (rapid heart beat)?

OFTEN SOMETIMES NEVER/OR RARELY

APPENDIX F

THE EATING BEHAVIORS INVENTORY

(SANTHOUSE, 2006)

The following questions refer to your current eating habits.

Choose only one response that best fits your current eating habits:

1. *I think my eating habits are very unusual.*

Not at all Very occasionally Sometimes Frequently All the time

2. *No matter how much food I eat I rarely feel full for long.*

Not at all Very occasionally Sometimes Frequently All the time

3. *I consider myself a binge eater.*

Not at all Very occasionally Sometimes Frequently All the time

4. *I graze on food all day long.*

Not at all Very occasionally Sometimes Frequently All the time

5. *There are times when I feel I can't stop eating.*

Not at all Very occasionally Sometimes Frequently All the time

6. *I eat normal meals and snack between every meal.*

Not at all Very occasionally Sometimes Frequently All the time

7. *I usually eat meals at normal times and snack mostly in the evening.*

Not at all Very occasionally Sometimes Frequently All the time

8. *I eat large meals and I don't try to control my intake of fat or calories.*

Not at all Very occasionally Sometimes Frequently All the time

9. *I often find myself eating when I'm bored or lonely.*

Not at all Very occasionally Sometimes Frequently All the time

10. I find myself eating even when I'm not hungry.

Not at all Very occasionally Sometimes Frequently All the time

11. Even when I try to follow the recommended guidelines for eating after surgery, I can always find ways to eat "forbidden" foods when I'm alone.

Not at all Very occasionally Sometimes Frequently All the time

12. One of my favorite activities at the end of the day is to snack in front of the television or the computer.

Not at all Very occasionally Sometimes Frequently All the time

13. I drink a lot of liquid supplements, juice, or other drinks because I can't eat when I want to.

Not at all Very occasionally Sometimes Frequently All the time

APPENDIX G

THE SERVICE UTILIZATION QUESTIONNAIRE

(SANTHOUSE, 2006)

The questions in this section refer to services you obtained before your weight loss surgery. Mark as many of the items in each section that apply to you during the years preceding your surgery.

1. Did you seek individual therapy, counseling, or other face-to-face behavioral health care before your surgery? YES NO

(If you marked NO proceed to question 2)

(Mark all that apply)

Types of services used: Length of time services were used

- Individual therapy _____
- Family therapy _____
- Marital/couples therapy _____
- Group therapy _____
- Dietary counseling _____
- Life coaching _____
- Other: (specify) _____

Reason for services sought:

- Depression Insurance company referral
- Anxiety Referred by your Surgeon
- Eating Disorder Family problems
- Weight Gain Drug Treatment
- Relationship issues Alcohol treatment

- Marital conflict
- Other (specify) _____

How long before your weight loss surgery did you obtain these services?

- 1 year or less
- 2 to 5 years
- over 6 years before surgery

2. Did you make use of other types of formal or informal services such as faith-based counseling or alternative healing methods before your surgery? YES NO
(If you marked NO proceed to question 3)

(Mark all that apply)

Type of services used: Length of time services were used

- Faith-based Counseling _____
- Spiritual Healing _____
- Acupuncture _____
- Holistic Treatment _____
- Other (specify) _____

Reason for services sought:

- Depression Insurance company request/requirement
- Anxiety Drug Treatment
- Weight control Referred by your PCP/other provider
- Eating Disorder Family problems
- Referred by your surgeon Alcohol treatment
- Relationship issues Marital conflict
- Other (specify) _____

How long before your surgery did you obtain these services?

- 1 year or less
- 2 to 5 years
- over 6 years before surgery

Greatest frequency of use:

- Daily
- Weekly
- Monthly
- Less than monthly

7. Did you use a local online group (i.e. Pghwlssupport.yahoo.com)? YES NO

Greatest frequency of use:

- Daily
 - Weekly
 - Monthly
 - Less than monthly
-

The questions in this section refer to services you obtained **SINCE** your weight loss surgery.

Mark as many of the items in each section that apply to you during the time following your surgery to the present.

1. Have you sought individual therapy, counseling, or other face-to-face behavioral health care since your weight loss surgery?

YES NO

(If you marked NO proceed to question 2)

(Mark all that apply)

Types of services used: Length of time services were used

- Individual therapy _____
- Family therapy _____
- Marital/couples therapy _____
- Group therapy _____
- Dietary counseling _____
- Life coaching _____
- Other: (specify) _____

Reason for services sought:

- Depression Insurance company referral
- Anxiety Referred by your Surgeon
- Eating Disorder Family problems
- Weight Gain Drug Treatment
- Relationship issues Alcohol treatment

- Marital conflict
- Other (specify) _____

Considering the most recent of these services used, when did you obtain these services?

- Within the past six months
- Over one year and less than five years ago
- Within the past year
- Over five years ago

2. Have you sought other types of formal or informal services such as faith-based counseling or alternative healing methods since your weight loss surgery? YES NO
(If you marked NO proceed to question 3)

(Mark all that apply)

Type of services used: Length of time services were used

- Faith-based Counseling _____
- Spiritual Healing _____
- Acupuncture _____
- Holistic Treatment _____
- Other (specify) _____

Reason for services sought:

- Depression Insurance company request/requirement
- Anxiety Drug Treatment
- Weight control Referred by your PCP/other provider
- Eating Disorder Family problems
- Referred by your surgeon Alcohol treatment
- Relationship issues Marital conflict
- Other (specify) _____

APPENDIX H

DEMOGRAPHIC SECTION

The following questions are about you and about your weight loss surgery.

Your current age: _____ Your current height ____/____ & weight_____

Race/Identified Origin Marital Status

- African American Married
- Caucasian Single
- Chicana or Latina Widowed
- Asian or Pacific Islander Divorced
- Native American Engaged
- Multi or mixed
- Other (specify) _____

Total household income:

- Below 10,000
- 10,000 to 19,000
- 20,000 to 29,000
- 30,000 to 39,000
- 40,000 to 49,000
- Above 50,000

Number of individuals in your household_____

Number of children_____

Number of adults_____

Your highest weight since age 18 _____

At what age _____
Your lowest weight since age 18 _____
At what age _____
Pre-surgical Weight _____
Lowest post-surgical weight _____

Indicate how long ago you had weight loss surgery.

- Approximately 1 year ago
- Approximately 2 years ago
- Over 2 years and less than 4 years ago
- Over 4 years and less than 6 years ago
- Over 8 years ago

Have you gained any weight back since your surgery? YES NO
(If you marked YES) why do you think this happened?

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