Obesity on the rise: The influence of knowledge base and health locus of control on bariatric surgery utilization in young adults

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Abstract
Obesity is a leading public health concern on a worldwide scale for both adults and children. Problems associated with obesity in the research identify psychological, social, physical, medical, and societal domains. Behavioral and pharmacotherapy interventions tend to have insufficient results whereas weight loss achieved after bariatric surgery is, on average, 100 lb. In addition surgery can be effective in controlling some comorbid conditions, such as Type II Diabetes. Despite the success of bariatric surgery to achieve weight loss, rates indicate that 1% of individuals classified as morbidly obese are eligible to undergo bariatric surgery. Although there are known systematic barriers preventing individuals accessing surgery, the literature does not adequately address what personal barriers may exist or what personal factors precipitate individuals to choose bariatric surgery. This exploratory study examined potential relationships that exist between individuals’ knowledge of bariatric surgery, the familiarity people have with various forms of bariatric surgery, and health loci of control. There were three primary goals. The first was to examine the relationship between knowledge and familiarity of bariatric surgery and a likelihood of engaging in this surgery. The second goal was to explore the relationship between people’s health loci of control and their likelihood of undergoing bariatric surgery. The third goal was to explore relationships between demographic characteristics, knowledge and familiarity of bariatric surgery, health locus of control, and the reported likelihood to engage in bariatric surgery. Further, differences in the likelihood to undergo bariatric surgery between the three BMI weight classifications were explored. The only relationships the research suggested were associations for demographic characteristics (age, BMI, weight classification) and knowledge and familiarity bariatric surgery. Because the major limitation of the study was the small sample size (n=38), it is recommended further research is necessary to expand upon the current findings.

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OBESITY ON THE RISE: THE INFLUENCE OF KNOWLEDGE BASE AND HEALTH LOCUS OF CONTROL ON BARIATRIC SURGERY UTILIZATION IN YOUNG ADULTS

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Abstract

Obesity is a leading public health concern on a worldwide scale for both adults and children. Problems associated with obesity in the research identify psychological, social, physical, medical, and societal domains. Behavioral and pharmacotherapy interventions tend to have insufficient results whereas weight loss achieved after bariatric surgery is, on average, 100 lb. In addition surgery can be effective in controlling some comorbid conditions, such as Type II Diabetes. Despite the success of bariatric surgery to achieve weight loss, rates indicate that 1% of individuals classified as morbidly obese are eligible to undergo bariatric surgery. Although there are known systematic barriers preventing individuals accessing surgery, the literature does not adequately address what personal barriers may exist or what personal factors precipitate individuals to choose bariatric surgery. This exploratory study examined potential relationships that exist between individuals’ knowledge of bariatric surgery, the familiarity people have with various forms of bariatric surgery, and health loci of control. There were three primary goals. The first was to examine the relationship between knowledge and familiarity of bariatric surgery and a likelihood of engaging in this surgery. The second goal was to explore the relationship between people’s health loci of control and their likelihood of undergoing bariatric surgery. The third goal was to explore relationships between demographic characteristics, knowledge and familiarity of bariatric surgery, health locus of control, and the reported likelihood to engage in bariatric surgery. Further, differences in the likelihood to undergo bariatric surgery between the three BMI weight classifications were explored. The only relationships the research suggested were associations for demographic characteristics (age, BMI, weight classification) and knowledge and familiarity bariatric surgery. Because the major limitation of the study was the small sample size (n=38), it is recommended further research is necessary to expand upon the current findings.
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Obesity on the Rise: The Influence of Knowledge Base and Health Locus of Control on Bariatric Surgery Utilization in Young Adults

Introduction

Obesity is currently considered one of the leading public health concerns on a worldwide scale for both adults and children (Elder & Wolfe, 2007; Prentice AM, 2006; Thompson, Cook, Clark, Bardia, & Levine, 2007; World Health Organization, 2000). Research has shown that obesity is associated with problems across psychological, social, physical, medical, and societal domains. Very often, quality of life is significantly decreased; lifespan is typically shortened. This is particularly concerning in that prevalence rates are increasing for both children and adults (Elder & Wolfe, 2007; Hedley et al., 2004). Unfortunately, the majority of weight loss attempts typically consist of about 6 months of weight loss before the individual returns to their previous weight (Zhao & Encinosa, 2007).

Weight loss depends on the body expending more energy than it is taking in from food. Currently, achieving deliberate weight loss can occur through a variety of interventions including diet and/or exercise, pharmacotherapy, and bariatric surgery. There are pros and cons for each type of intervention, and each intervention is not always an appropriate method for weight loss for the individual. For example, bariatric surgery is only recommended for those considered morbidly obese because it is an invasive procedure altering the body’s digestive system and is associated with a host of complications ranging from infection to death. For individuals classified as morbidly obese, their health has often been compromised to a significant degree and the long term effects and risks of surgery are now overshadowed by the benefits of surgery. In
addition, pharmacotherapy and bariatric surgery are typically recommended in combination with altered diet and increasing exercise for successful outcomes.

The predominant intervention choice for morbidly obese individuals is surgical treatment (Elder & Wolfe, 2007). Surgical treatment is much more effective for morbidly obese individuals than nonsurgical treatment for both weight loss and for controlling of some comorbid conditions, such as Type II Diabetes (Elder & Wolfe, 2007). Weight loss achieved after bariatric surgery is significantly greater than other interventions (exercise, diet, and pharmacotherapy); on average weight loss due to surgery is 100 lb.

At present, research has found that 1% of individuals with morbid obesity are eligible undergo bariatric surgery (Elder & Wolfe, 2007). While the reasons for this are not entirely clear, individual and societal factors are suspected to be the cause. Individual factors include the patients’ lack of education about bariatric surgery and fears concerning postoperative complications. Societal factors often involve a lack of access to care and are often, but not exclusively, related to adequate funding for such procedures by insurance companies.

**Literature Review**

In humans, the etiology of obesity is the imbalance between energy ingested in food and energy expended and is the result of interactions between the environment and multiple genes (Bray, 2004; Li, Bowerman, & Heber, 2005). The prevalence of obesity among adults is increasing globally, and within the United States has double since 1980 to now approximately 30% (Elder & Wolfe, 2007; Flegal, Carroll, Ogden, & Johnson, 2010; Van Hout, Boekestein, Fortuin, Pelle, & Van Heck, 2006). More specifically, while obesity has increased in all subsets of the U.S. population, the prevalence of clinically severe obesity (equal to a Body Mass Index in
the Obese Class III range) has increased at a faster rate, standing at 4.8% of adults, quadrupling from 1986 to 2000. Among children and adolescents, obesity is also an increasing health concern. Data collected in 2001-2002 identified 31.5% of children ranging in ages 6 to 19 were either at risk for being overweight or are currently overweight (Hedley et al., 2004).

The term *obesity* refers to the presence of excess body fat relative to lean body mass; in adults it is currently defined based on the World Health Organization (WHO) Body Mass Index (BMI) classification system (World Health Organization, 2000). BMI, defined as the weight in kilograms divided by the square of the height in metres (kg/m²), is an index of weight-for-height used to classify individuals as underweight, normal weight, overweight, or obese in adults, independent of age and sex. The BMI for normal range is considered 18.50 to 24.99; classification for overweight is greater or equal to 25.00; pre-obese is considered in the range 25.00-29.99; classification of obese is greater or equal to 30.00. There are three classes of obesity: I, II, and III. Obese class I is considered a BMI in the range 30.00-34.99. Obese class II is considered a BMI range of 35.00-39.99. Obese class III is a considered a BMI of greater than or equal to 40.00 (World Health Organization, 2000).

There has been debate over whether there should be different BMI criteria for different ethnic groups due to differential associations found between BMI, percentage of body fat, and body fat distributions across populations (World Health Organization, 2000). Increased health risks are generally associated with increasing BMI levels; however, the interpretation of BMI classification in relation to risk may differ for different populations (World Health Organization, 2000). As a result, BMI may not correspond to the same degree of overall weight in different populations due, in part, to different body proportions. This is important because health risks
increase for some who are below the cutoff of 25 kg/m$^2$ defining overweight in the current WHO classification.

**Psychological, Social, and Medical Impact**

To understand the extensive impact obesity can have on an individual, medical, physical, social, and psychological implication need to be considered holistically. These implications are not independent of each other (Allison, Fontaine, Manson, Stevens, & VanItallie, 1999; Glinksi, Wetzler, & Goodman, 2001; Van Hout et al., 2006).

Physically and medically, obesity increases the risk of morbidity and mortality. More specifically, hypertension, hypercholesterolemia, dyslipidemia, type 2 diabetes mellitus, osteoarthritis, asthma, and sleep apnea are direct health consequences of obesity. Indirect health consequences include stroke and coronary heart disease. Increased body weight has been associated with increased death rates from cancer and increased risk of breast cancer in postmenopausal women. Conservative estimates of annual deaths attributed to obesity among adults across the United States range from approximately 236,111 to 341,153 (Allison, Fontaine, Manson, Stevens, & VanItallie, 1999). Conversely, weight loss can reduce the impact obesity has physically. Reducing weight at least 5% to 10% is associated with decreasing risks for chronic diseases and in some cases reverses type 2 diabetes mellitus (Goldstein, 1992; Knowler et al., 2002).

Socially, obese individuals are often subject to prejudice, discrimination, social isolation, dissatisfying relationships, and occupational problems (Van Hout et al., 2006). Public perception of obesity generally holds that it is a self-induced problem. For this reason, there can be a lack of
empathy from employers, peers, friends, family members, and strangers towards obese individuals struggling with comorbid disorders, attempts to lose weight, experiencing health complications, and having difficulties with aspects of daily living (i.e. limited clothing options, finding appropriate seating in public arenas or difficulty maintaining personal hygiene) (Van Hout et al., 2006).

In the research, psychological concerns identified as being typically associated with obesity include, but are not limited to, depression, somatization, negative body attitude, low self-esteem, denial, and Personality Disorder NOS (Glinksi, Wetzler, & Goodman, 2001; Van Hout et al., 2006). These issues may add to both the causes and maintenance of obesity, as well as being byproducts. Symptoms of depression often include overeating and weight gain, thus complicating the problem of obesity. In addition, negative body attitudes, somatization, and low self-esteem often interfere with an individual’s perceptions of whether they can bring about change such as weight loss.

**Societal Impact**

Obesity also has a significant financial impact on society. These costs include transportation costs, loss of productivity, and medical care. Loss of productivity is due to a variety of situations such as employees being absent due to obesity-related sickness, decreased productivity while employees are at work, increased disability benefits, and higher mortality rates. Direct medical costs related to obesity in the United States increased from an estimated 70 billion in 1999 to 147 billion for 2008; the 2008 estimate accounted for 10% of all medical spending (Thorpe, Florence, Howard, & Joski, 2004). This spending is typically attributed to the treatment of diabetes and hypertension.
Direct medical costs are predicted to continue and to increase. Childhood obesity in the United States is estimated to cost 14.3 billion currently (Hammond & Levine, 2010). Lightwood et al. (2009) projected the costs of obesity and associated diseases among US adults aged 35 to 64 from 2020 to 2050 (based on existing levels of overweight adolescents) to be 45 billion dollars. This figure does not reflect, however, any other age cohort or adolescents who will become obese (Hammond & Levine, 2010).

**Behavioral Interventions**

Behavioral interventions for obesity include diet, exercise, and psychotherapy (Thompson, Cook, Clark, Bardia, & Levine, 2007). At the most basic level, it is the behavioral changes of diet and exercise that reduce weight. Weight loss occurs when energy expenditure is more than caloric intake. One pound is lost for every 3,500 calories burned. This can be achieved by decreasing energy intake (restricting diet), increasing energy output (increased physical activity), or a combination of both. However, changing behaviors such as restricting diet and increasing exercise is often a difficult process. Engaging in therapy for support and education around behavioral change has been proposed as an effective adjunct to all interventions (Glinski et al., 2001; McTigue et al., 2003; Thompson et al., 2007).

While dietary change as an intervention for weight loss is fundamentally restricting caloric intake, many diet strategies are based around reducing and/or increasing a particular nutrient type, such as such as low carbohydrate diet, low fat diet, or high protein diet. Individuals may have a preferred (or even recommended) dietary change based upon food preferences or other medical concerns such as diabetes. However, research to date has found no evidence of
superiority for any particular diet type for weight loss (Thompson, Cook, Clark, Bardia, & Levine, 2007).

Most studies have shown that exercise alone results in negligible to modest weight loss (2 kg), and exercise in combination with diet appears to result in only modest weight loss (3 kg) (McTigue et al. 2003; Thompson et al., 2007). However, two studies that focused on longer-duration exercise (90 to 120 minutes daily) combined with reduced energy intake showed more weight loss success (7 to 8 kg; Thompson et al., 2007). Research supports that the amount of time spent exercising is more important than the intensity of the exercise. Nonetheless, exercise is important in healthy weight management. Regular vigorous physical activity is associated with less weight gain over time among both children and adults (Thompson et al., 2007). In fact, physical exercise is believed by some to be the single best predictor of long term weight maintenance.

Long-term behavior changes are essential for maintaining the modest success that can result with diet and exercise. However, maintaining long-term behavior change is a significant challenge. The only efficacious psychosocial intervention shown to maintain weight loss for morbid obesity has been extended behavior therapy in the form of weekly or biweekly group therapy sessions (Glinski et al., 2001; McTigue et al., 2003; Thompson et al., 2007).

Pharmacotherapy Interventions

At present, there are two drugs that have been approved (and maintained approval) for weight loss: sibutramine (a dopamine, norepinephrine, and serotonin reuptake inhibitor) and orlistat (a gastrointestinal lipase inhibitor). Several other pharmaceutical options have been
eliminated due to safety concerns. Sibutramine and orlistat, in combination with permanent altered diet and exercise routines, are approved for people with BMIs of 30 kg/m² or more or people who have BMIs greater than 27 kg/m² along with other significant risk factors such as diabetes, hypertension, and dyslipidemia (McTigue et al., 2003; Zhaoping et al., 2005).

The role of medication use for weight loss is considered controversial (Thompson et al., 2007). Long-term safety of weight loss drugs has yet to be determined. Further, co-occurrence of adverse effects such as cardiac valve abnormalities need to be further investigated and considered when considering the pros and cons of this type of weight loss intervention. Currently drug intervention for weight loss is seen as a short-term solution (Thompson et al., 2007). Results for weight loss appear to be small (weight loss means range from 2.89 kg to 6 kg at one year) and are not sustained once the weight loss drugs are discontinued. However, the FDA has only approved use for up to 2 years.

To summarize, behavioral and pharmacologic treatments of obesity can result in short term weight loss of approximately 5-10% body weight. These treatments, however, have not demonstrated long-term success. For obese individuals who need to lose weight for health reasons, these results are insufficient.

**Surgical Interventions**

Bariatric surgery is a broad term that refers to a host of surgical techniques for weight loss. These techniques include Roux-en-Y Gastric Bypass, Vertical Banded Gastroplasty, Adjusted Gastric Band, and Biliopancreatic Diversion with Duodenal Switch. At a very basic level, these surgical techniques range from restricting space for food to be consumed and
digested (such as stapling the stomach) to reorganizing the digestive system for malabsorption of food (Elder & Wolfe, 2007).

Roux-en Y Gastric Byass is the most common type of bariatric surgery (Elder & Wolfe, 2007). Stomach volume is decreased by creating a small pouch at the top of the stomach using surgical stables or a plastic band. The smaller stomach is connected directly to the middle portion of the small intestine. In doing so, the rest of the stomach and the upper portion of the small intestine are bypassed. The smaller pouch allows one to feel fuller (so theoretically one will eat less food). Bypassing part of the small intestine further reduces the amount of calories that are absorbed by the body.

Vertical Banded Gastroplasty, also known as stomach stapling, is similar to the Roux-en Y Gastric Bypass in that this technique also creates a smaller pouch in the top of the stomach with both staples and a band (Elder & Wolfe, 2007). The smaller pouch reduces the amount of food a person can absorb at one time and slows the passage of food. Unlike the Roux-en Y Gastric Bypass, in the bottom of the pouch there is a small hole allowing food to continue through the stomach onto the small and large intestines. Unlike the Roux-en Y gastric bypass, this procedure restricts the amount of food ingested but does not cause malabsorption.

The Adjusted Gastric Band is the least invasive surgical intervention. It is silicone device placed around the top of the stomach via laparoscopic surgery (Elder & Wolfe, 2007). Similar to the Vertical Banded Gastroplasty, the Adjusted Gastric Band (commonly known as the lap band) creates a smaller pouch area in the top of the stomach but allows food to pass through the rest of the stomach into the small intestine. The patient is able to continue to absorb nutrients normally, as no part of the stomach is stapled or removed and the intestines have not been re-routed;
further, the device is made entirely of biocompatible materials. The device can be adjusted as needed or removed relatively easily if desired.

Similar to the Roux-en Y gastric bypass, the Biliopancreatic Diversion with Duodenal Switch has both a restrictive and malabsorptive component (Elder & Wolfe, 2007). The stomach is reduced along the greater curvature by 70%. The small intestine is re-routed, creating two separate pathways and one common channel. By re-routing the small intestine, the body has less time to absorb calories. One pathway, known as the digestive loop, takes the food from the stomach to the common channel. The other pathway, known as the biliopancreatic loop, carries bile from the liver to the common channel. The common channel is in the small intestine and it is here that the food and the bile mix before emptying into the large intestine. This procedure reduces fat intake absorption to 20%.

For the treatment of clinically severe morbid obesity, bariatric surgery is becoming the predominant treatment option (Elder & Wolfe, 2007). Surgical treatment is the only intervention shown to result in long-term weight reduction specifically for morbid obesity (Van Hout, et al., 2006). Studies have shown weight loss after surgery can be sustained for up to 16 years. Zhao (2007) reported the number of bariatric surgical procedures in the United States increased 800%, from 13,386 in 1998 to 121,055 in 2004. Maggard et al (2005) concluded that while direct comparisons of surgical interventions and other interventions (pharmacology and diet/exercise) cannot be made because patient samples are very different, results indicate that surgical weight loss interventions produce overall more weight loss and greater sustained weight loss than diet change alone. However, with the exception of strictly malabsorption processes, changes in diet such as decreased calorie intake are a necessary adjunct to the surgical intervention in order to be successful. While studies have indicated success for patients with BMIs of 40 kg/m², more
research on the efficacy of bariatric surgery is needed for patients with BMI’s between 35 kg/m^2 and 39 kg/m^2.

Like all surgery, bariatric surgery involves several potential complications that can occur such as nutrient deficiencies, gastrointestinal pathology, and mortality. The mortality rate for individuals who have undergone bariatric surgery has been reported to be as high as 2% (Elder & Wolfe, 2007). The types of gastrointestinal pathology that can result are numerous and vary with bariatric surgical procedures. Most commonly across procedures are complications with ulceration, infection, hernia, nausea and vomiting after eating, and vitamin deficiencies.

**Public Perception of Bariatric Surgery**

Currently, approximately 1% of those eligible for bariatric surgery in a given year undergo surgical treatment (Elder & Wolfe, 2007). This is particularly significant given that for morbidly obese individuals, bariatric surgery has the highest success rates for both amount of weight loss and maintenance longevity. In addition, health complications associated with morbid obesity (such as diabetes, sleep apnea, and hypertension) are often resolved with surgery. Given the known successes of surgery and the associated psychological, social, medical, and physiological impacts that obesity can have, it raises the question of why surgery is not being considered more frequently as a treatment option.

Individual and system factors have been proposed for the low frequency of those opting for surgical treatment (Elder & Wolfe, 2007). Individual factors include patient’s fears concerning postoperative complications, costs associated with surgery, and overall lack of current education concerning bariatric surgery. Inequity of access to surgery appears to be the primary systematic problem. Despite a high number of obese medically disadvantaged people (
in addition have medical problems due to or associated with obesity), perhaps unsurprisingly in our current medical system, a disproportionately low percentage of these persons actually undergo surgery.

In a culture that is perceived as being motivated by the “quick fix,” research has demonstrated that obese individuals are not flocking to undergo bariatric surgery. In light of the paucity of literature addressing of what precipitates individuals to choose bariatric surgery, Munoz et al. (2008) attempted to identify relevant motivating factors. The study sample included 109 severely obese, primarily female and Caucasian, patients seeking either the duodenal switch or the Roux-en-Y gastric bypass surgery. The researchers used selected measures from a larger battery of pre-surgical psychosocial questionnaires, focusing on questions asking about reasons participants sought weight loss surgery. Responses were coded as “first,” “second,” and “third” reasons based upon the order the patients wrote their responses. The responses were then coded into seven categories, left unidentified in the article, falling under three themes: medical, psychological, and quality of life. The researchers found that patients were primarily motivated to undergo surgery to improve their current medical problems.

Glinski, Wetzler, and Goodman (2001) also found that the vast majority of patients seeking gastric bypass surgery were seeking weight reduction for health reasons. In fact, many patients considered surgery “a last resort” after other weight loss methods had failed. The researchers found that, for these patients, a fear of dying due to obesity-related illness had surpassed their fear of risks involved in the surgery.
Decisions for Health Change

The process of how a patient makes the decision for a particular health intervention is often not simple. This is likely to be especially true for bariatric surgery, as the reality is that this procedure is both invasive and expensive. There are several models of behavior change that attempt to account for how patients make the decision to go forth with a particular health intervention. Each model has support for its theory. While each provides insight into how patients choose to make behavioral change, it seems clear that this decision is not a simple or straightforward process.

According to the health belief model, a health behavioral change occurs based upon two factors: personal perception of the health threat and the perceived effectiveness of the intervention (Taylor, 2003). The degree to which a person perceives the personal health threat is influenced by general health values, specific beliefs about vulnerability to a particular disorder, and beliefs about the consequences of the disorder. Using obesity and bariatric surgery as an example, the individual may hold the belief that good health is important for quality of life, he or she is vulnerable to heart attacks and strokes due to family history, and he or she has seen the pain of family members experiencing these conditions. The perceived effectiveness of a particular intervention is influenced by an interaction of two components: the degree to which the individual believes the particular treatment will be effective and the cost of the intervention. Essentially the crucial question becomes, does the cost of the intervention exceed the proposed benefits of such an intervention (Taylor, 2003)? In the case of bariatric surgery, it is the individual’s belief that the success of the surgery is worth the money that the surgery costs.
According to the theory of planned behavior, change occurs as a direct result of a behavioral intention (Taylor, 2003). Attitudes towards the specific action, subjective norms regarding the action, and perceived behavioral control influence how a behavioral intention is formed. In the case of obesity and bariatric surgery, the attitude may be that surgery is a safe enough option to consider for weight loss, the individual has known it to be successful for others, and they have the means to be able to participate in the surgery (i.e. can afford it, have leave from work, others to assist during post-surgery).

According to the transtheoretical model of behavior, individuals go through many stages in order to make a behavioral change (Prochaska & Velicer, 1997). These stages are precontemplation, contemplation, preparation, action, and maintenance. During precontemplation, the individual has no intention of making a change. The individual may not even be aware of the problem or the extent of the problem; for example, he or she may not be aware that obesity is putting him or her at serious health risk. Contemplation is the stage wherein the individual is aware of the problem and has started contemplating whether he or she wants to make a change. For example, the individual may be aware of the health risk but hasn’t decided whether it is worth the cost and invasive nature of the surgery. During the preparation stage, the individual has decided to make the change but has not yet started the change. In this particular example, this involves finding a surgeon or making an appointment to begin the pre-surgery procedures. During this time he or she may be preparing for how to make the change. It is during the action phase that the change is made. During this phase, the individual is undergoing surgery. The last stage, the maintenance stage, is the time when the individual continues to act in accordance with maintaining the change (Taylor, 2003). This may involve the
individual following a diet and exercise routine to enhance (or at least not minimize) the success of the surgery.

These models attempt to account for the process of how individuals make behavioral change. However, the models do not account for whether individuals believe they have the control or others have the control to make change occur. Consider Rotter’s concepts of locus of control—the degree to which a person believes they can control their own lives defined as an internal locus of control versus their belief that decisions and events are controlled by the external factors such as the environment, chance, or fate (external locus of control) (Rotter, 1966). These concepts have been applied to health psychology in the assessment of loci individuals attribute to controlling their health. The Multidimensional Health Locus of Control (MHLC) was developed, grounded in Rotter’s internal or external loci of control, to assess the degree to which health may be attributed to three sources: internal factors, powerful others, or luck (Wallston, Wallston, & DeVellis, 1978). In the context of weight loss, internal factors may look like an individual’s ability to make the necessary dietary changes, follow pre and post-surgery recommendations, such as adding exercise to their lifestyle. Powerful others typical refer to health professionals and may in this case refer to such things as the surgeon’s capabilities to perform surgery or belief in the efficaciousness surgical, dietary, and exercise recommendations. Luck as a health attribution can be problematic because lifestyle advice or medical recommendations may be ignored, dismissed, or not followed appropriately.

Bariatric surgery as a health intervention for obesity does not involve a single change in behavior. It requires first the surgery and then diet and exercise in order to be effective. Thus, for each individual at least three health behavioral changes are necessary. The process of choosing
bariatric surgery is not an easy or simple decision, as is reflected in the low prevalence rates for bariatric surgery.

**The Present Study**

Obesity is a health epidemic worldwide affecting all age ranges. The rise of obesity among children and adolescents and the related medical problems associated with obesity increases the necessity of medical intervention for both younger individuals and more individuals over the course of their lifetimes. This exploratory study was an examination of potential relationships that exist between individuals’ knowledge of bariatric surgery, the familiarity people have with various forms of bariatric surgery, and health loci of control. There were three primary goals for this exploratory investigation. The first was to examine the relationship between knowledge and familiarity of bariatric surgery and a likelihood of engaging in this surgery. The second goal was to explore the relationship between people’s health loci of control and their likelihood of undergoing bariatric surgery. The third goal was to explore relationships between demographic characteristics (including sex, age, BMI, self-perceived weight classification, and number of health concerns), knowledge and familiarity of bariatric surgery, health locus of control, and the reported likelihood to engage in bariatric surgery. Further, differences between BMI weight classifications were explored. As this was an exploratory investigation, no direct hypotheses were proposed.
Methods

Participants

Thirty-eight male and female undergraduate, masters, and doctoral level students at a university located in the Pacific Northwest participated in the study. Students were eligible to participate in this study if they were at least 18 years of age.

Research Design and Procedure

Potential student participants were recruited via e-mail. The e-mail requested students over the age of 18 to participate in a study about health knowledge and attitudes. The e-mail described the purpose of the study and provided a link to an electronic survey housed on Survey Monkey, an online survey hosting service.

Upon entering the survey site, study participants were presented with further information regarding the purpose of the study, and informed consent was obtained (see Appendix A). Upon providing informed consent, study participants were presented with and asked to complete a demographics questionnaire, a bariatric surgery questionnaire, the University of Virginia Bariatric Knowledge Scale, and the Multidimensional Locus of Control Scale. These questionnaires are detailed in the Measures section below. Upon completion of these measures, the participant was informed that their participation was concluded and they were thanked for their time.

Measures

Demographic Questionnaire (see Appendix B). Participants were provided with a questionnaire, created specifically by the author of this dissertation, seeking demographic
information such as their age, their year in school, their gender, and their ethnicity.

_Bariatric Surgery questionnaire_ (see Appendix C). Participants were presented with questions created by the author of the present study regarding their familiarity with various forms of bariatric surgery, as well as questions regarding number of calories and weight loss. For the final question participants were asked to indicate their likelihood (on a 7-point scale) of utilizing bariatric surgery for weight reduction at some point in their lifetime.

_University of Virginia Bariatric Knowledge Scale_ (see Appendix D). Questions were taken from an unpublished scale devised at the University of Virginia. Within this measure, participants are asked to indicate their knowledge of and personal experiences with bariatric surgery, weight gain, weight loss strategies, as well as their beliefs regarding future health behaviors related to their weight (Bauchowitz, Azarbad, Day, & Gonder-Frederick, 2007). Scoring of the measure was simply a total score of questions answered correctly.

_Multidimensional Health Locus of Control_ (see Appendix E). Participants were asked questions regarding their perceptions of how much control they have when making health decisions. The Multidimensional Health Locus of Control Scale (MHLC) (Wallston, Wallston, & DeVellis, 1978) is an 18-item measure that contains three subscales that highlight the relative influence of three sources of control over an individual’s health: internal, powerful others (external), and chance (external). The MHLC has been found to exhibit moderate to strong reliability (Wallston, 1998). Chronbach alpha coefficients are generally within the .60-.75 range and test retest reliability is within .60-.70. The MHLC is scored not with a total score, but a sum for each of the three subscales.
Results

Demographics

Participants included 38 individuals, 6 of whom identified as male and 32 identified as female. Participants included individuals currently enrolled as undergraduate students (n=12), master’s students within a counseling program (n=12), or psychology doctoral students (Psy.D.) (n=14) The majority of participants identified as white (n = 34), 3 identified as multi-racial and 1 identified as Latina.

Four participants were identified as falling into the obese or morbidly obese range, 11 were classified as falling into the overweight range, and 23 were classified as being in the normal weight range. None of the participants were considered underweight. No significant differences were found between participant groups in regard to age, BMI, or self-reported weight. See Table 1 below for study sample demographic characteristics.

Table 1

Demographics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>19-41</td>
<td>25</td>
</tr>
<tr>
<td>Undergrad</td>
<td>19-22</td>
<td>20</td>
</tr>
<tr>
<td>Master’s</td>
<td>22-41</td>
<td>30</td>
</tr>
<tr>
<td>Psy.D.</td>
<td>22-30</td>
<td>24</td>
</tr>
<tr>
<td>BMI</td>
<td>18-38</td>
<td>25</td>
</tr>
<tr>
<td>Undergrad</td>
<td>20-30</td>
<td>24</td>
</tr>
<tr>
<td>Master’s</td>
<td>19-38</td>
<td>30</td>
</tr>
<tr>
<td>Psy.D.</td>
<td>19-33</td>
<td>23</td>
</tr>
</tbody>
</table>
Participants were asked about their familiarity with the term “bariatric surgery” as well as their knowledge of specific bariatric procedures (gastric bypass, lap band, vertical banded gastroplasty, Roux-en-Y bypass, biliopancreatic diversion with duodenal switch). The three response choices were: no knowledge (of the term), familiarity with but uncertainty of meaning, and knowledge of the term. Table 2 provides a breakdown of responses for each procedure.

Table 2

Knowledge and Familiarity by Procedure

<table>
<thead>
<tr>
<th>Variables</th>
<th>Knowledge</th>
<th>Familiarity</th>
<th>No knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bariatric surgery</td>
<td>0</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>Gastric</td>
<td>29</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Lapband</td>
<td>25</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Gastroplasty</td>
<td>2</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Roux-en Y</td>
<td>4</td>
<td>3</td>
<td>31</td>
</tr>
<tr>
<td>Duodenal</td>
<td>2</td>
<td>3</td>
<td>33</td>
</tr>
</tbody>
</table>
Knowledge and Surgery Likelihood

Pearson correlation analysis was conducted to determine the relationship between knowledge surrounding bariatric procedures and self-reported likelihood to undergo bariatric surgery. A total score was used by summing the number of correct answers for both the University of Virginia Bariatric Scale and the Bariatric Surgery questionnaire (excluding the question asking about the participant’s likelihood to undergo surgery) as the knowledge variable. This total score was correlated with the self-reported likelihood to undergo bariatric surgery indicated on the 7 point scale. This relationship, however, was not found to be significant ($r(38) = -.095$, n.s.).

Health Locus of Control and Surgery Likelihood

Pearson correlation analyses were conducted to determine the relationship between scores on the three health loci of control (internal, chance, and powerful others) and likelihood to engage in bariatric surgery. The scores of the three health loci of control were determined by summing each subscale; there is no total MHLC score. No significant relationships were found between surgery likelihood and an internal locus of control ($r(38) = -.013$, n.s.), a chance locus of control ($r(38) = -.123$, n.s.), or an locus of control based on powerful others ($r(38) = .224$, n.s.).

Demographic Characteristics and Surgery Likelihood

The relationships between demographic information gathered and perceived likelihood of undergoing bariatric surgery in one’s lifetime were also explored. A positive correlation was found between age and likelihood to undergo bariatric surgery, $r(38) = .588$, $p=.00$. Likewise, a positive correlation was found between BMI and likelihood of undergoing bariatric surgery,
r(38) = .748, p=.000. Further, a positive correlation was also found between BMI and age, r (38) =.429, p=.007.

**Differences between Weight Classifications**

T-test analyses were conducted to determine differences between participants whose BMI fell in the normal weight range (n=23) and those who whose BMI was either overweight or obese (n=15) in likelihood to engage in bariatric surgery and knowledge surrounding bariatric procedures. A significant difference in knowledge was found between those in the normal weight range (M=12.61) and those above a normal weight (M=11.27), t(36) = 2.33, p=.026. Further, a significant difference in surgery likelihood was found between those in the normal weight range (M=1.09) and those above a normal weight (M=2.00), t(36) = -2.62, p=.013.

Likewise, t-test analyses were conducted to determine differences between normal and above normal weight classifications on the three health locus of control characteristics. No significant differences were found between weight classifications in internal locus of control (t(36) = .279, n.s.), chance locus of control (t(36) = -.328, n.s.), or a locus of control driven by powerful others (t(36) = .084, n.s.).
Discussion

The purpose of this study was to explore potential relationships between knowledge of bariatric surgery, the familiarity people have the various forms of bariatric surgery, and health loci of control among young adults. Again, the three primary goals for this exploratory investigation were as follows: 1) to examine the relationship between knowledge and familiarity of bariatric surgery and one’s likelihood of engaging in this surgery themselves; 2) to explore the relationship between people’s health loci of control and their likelihood of undergoing bariatric surgery; 3) to explore relationships between demographic characteristics (including sex, age, BMI, weight classification, and number of health concerns), knowledge of bariatric surgery, health locus of control, and the reported likelihood to engage in bariatric surgery. Differences in responses to study variables (e.g., health locus of control, surgery likelihood, and bariatric knowledge) between BMI weight classifications were also explored.

There was no evidence to suggest a relationship between knowledge surrounding bariatric surgery and one’s likelihood of engaging in surgery. There was also no relationship between peoples’ health loci of control and their likelihood of undergoing bariatric surgery. Significant relationships, however, were found between BMI, participant age, and surgery likelihood. The first relationship, between BMI and the likelihood of undergoing bariatric surgery, suggests that as one’s BMI increases one is more likely to consider undergoing bariatric surgery at some point in their lifetime. The second was between age and BMI; as one gets older one’s BMI increases. Lastly, the relationship between age and bariatric surgery- as one gets older one is more likely to consider bariatric surgery.
Given the small sample size, however, it is difficult to draw conclusive relationships and the findings should be taken with caution. It is unclear if, within a larger sample, such relationships would be found. Previous research, has demonstrated that obesity is now problematic across the age spectrum, however, other factors such as lifestyle and health changes (both developmental and pathological) of adults as they age may contribute to such a trend (Allison, Fontaine, Manson, Stevens, & VanItallie, 1999; Hedley et al., 2004). The findings are intuitive, however, that as BMI increases so does the likelihood that one would consider undergoing bariatric surgery in one’s lifetime. It may be also be likely that as one ages one is more likely to consider bariatric surgery. The impact of obesity, particularly on health, increases as one gets older, and at this point those who fear death are most likely to undergo to bariatric surgery. Concern regarding the appropriateness of surgery for children and adolescents also likely would contribute to the positive relationship found between age and surgery likelihood.

In general the majority of people (68%) reported they believed they were familiar with bariatric surgery. The vast majority believed they had knowledge of (76%) or familiarity with the term (18 %) gastric bypass. Again, most believed they had knowledge of or familiarity with the term lapband (82%). This suggests that most people at least recognize surgery is an option for weight loss.

While differences were found between individuals with normal and above-normal weight BMI classifications in knowledge surrounding bariatric surgery and in indication of surgery likelihood, no differences were found between these groups on any of the health loci of control. These differences, however, indicate a breakdown between knowledge and surgery likelihood. Specifically, it was individuals within the normal weight classification that held more knowledge while it was individuals within the above-normal weight classification that indicated a greater
likelihood to have bariatric surgery. Speculating about this finding it appears the latter part seems intuitive and unsurprising - those who could need (either by their own desire or have been identified by a health provider) to reduce their weight are likely to consider bariatric surgery. However, why individuals who are within a normal weight classification would hold more knowledge appears more counter-intuitive. Having knowledge about bariatric surgery does not seemingly help these individuals maintain their normal weight and they appear less likely than their counterparts (who may either already qualify based upon weight or who may be more susceptible to one day qualifying by already being overweight) to utilize the information personally. On the other hand, it may be that individuals who are within normal weight classification are receptive to processing information regarding weight loss/maintenance information. It may be that individuals who are within above normal weight classification may find the information anxiety provoking because it reminds them their weight may be a problem. Therefore when coming into situations in which knowledge about surgery is introduced, those who find the information emotionally neutral are able to process the information whereas those who find the material anxiety provoking are unable to process the information. Research on memory suggests anxiety may impact an individual’s ability to control attention needed to process information (Phaf & Kan, 2007). Nevertheless, future research is necessary to better understand this finding.

Limitations and Future Directions

The most significant limitation of this study was the unknown validity of some of the measures being used - particularly the high reliance on the question asking participants about their likelihood to engage in bariatric surgery over the course of their lifetime. There is no data on the reliability or validity of both measures - the University of Virginia Bariatric Surgery Scale
and the Bariatric Surgery questionnaire. The latter was created for this research by the authors
and the former was created at the University of Virginia under similar circumstances. It is,
therefore, not possible to conclude whether the questions being asked—how much knowledge
does this population knows about bariatric surgery or their perceived likelihood that they may
engage in bariatric surgery—is actually being assessed by the measures being used. There may be
relationships that were not identified or found due to unknown validity problems with the
measures. The next step in this line of research should address the validity of the measures
intended at assessing general knowledge about bariatric surgery as well as one’s likelihood to
engage in bariatric surgery.

Further avenues in this research area should include looking at different populations to
compare knowledge and perceived likelihood to engage in bariatric surgery. Using samples from
those in the general population and comparing with samples from populations primed to be more
likely to consider or have knowledge of bariatric surgery may provide information about the
relationship between knowledge and one’s decision to engage in bariatric surgery. For example,
a comparison using a control sample, a sample of people from a population who have been
identified by their doctors to be a higher risk for morbid obesity and potentially needing bariatric
surgery), and a sample from a population people of who have been decided to undergo after
being recommended for recommended for bariatric surgery by their doctor may offer a clearer
picture about the relationships of individual’s demographic characteristics, their health
knowledge (bariatric surgery and obesity) and their decision making process (likelihood to
engage in surgery).

Currently 1% of those who could benefit from bariatric surgery actually opt to do it;
knowledge is a key component to accessing health interventions and making an informed
decision (Elder & Wolfe, 2007). Highlighted previously, interventions such as diet, exercise, and pharmacotherapy result in very modest weight loss and even less sustained loss. Due to this, these interventions are generally considered minimally effective in addressing obesity. Given that prevention of weight gain or surgery for weight loss are the best methods for combating the obesity epidemic, it remains unclear how much general knowledge people have regarding bariatric surgery or their potential susceptibility of needing to consider surgery over the course of their lifetime. Further research is strongly suggested.

Although beyond the scope of this research, a few considerations, particularly those linked to concerns of oppression, should be highlighted in regards to researching and addressing obesity concerns. Although it is true that weight loss depends on the body expending more energy than it takes in from food, it should be noted that the body’s ability to expend can be interrupted, prevented, and made more difficult by any number of issues (e.g. access to fresh foods, metabolic diseases, level of stress, genetic inheritance). Conversely, weight gain can occur due to the body’s inability to regulate. Research is ongoing to understand the rise in obesity in the population. Perceptions that obesity and its associated medical risks are exclusively self-induced should be avoided.

As noted in the literature review, there are many factors that contribute to an individual’s ability to choose surgery to reduce and control weight. Researchers should consider that included among these factors is access to care associated with socioeconomic status. With the introduction of the Affordable Care Act there will ideally be greater access to surgery options (Downey & Still, 2013). The actual outcome needs to be monitored and addressed accordingly.
References


Appendix A

Informed Consent

**Informed Consent Form**

<table>
<thead>
<tr>
<th>1. Study Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity on the rise: The influence of knowledge base and Health Locus of Control on bariatric surgery utilization in young adults</td>
</tr>
</tbody>
</table>

<table>
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<th>2. Study Personnel</th>
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</thead>
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<tr>
<td><strong>Name</strong></td>
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</tr>
<tr>
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</tr>
<tr>
<td>Program</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td>Telephone</td>
</tr>
</tbody>
</table>

3. Study Location and Dates

The study is expected to begin October 2011, and to be completed by December 2011. All study information will be collected via Pacific University.

4. Study Invitation and Purpose

This goal of this project is to examine potential relationships that exist between individuals’ knowledge of obesity medical interventions, the familiarity people have with various forms of bariatric surgery, and their health loci of control.

5. Study Materials and Procedures

In this study, you will be asked to complete a brief demographic survey. Once this is complete, you will be presented several brief questionnaires with items regarding your knowledge of obesity medical interventions and health locus of control. It should only take about 45 minutes to complete your participation in the study.
6. Participant Characteristics and Exclusionary Criteria

To participate in this study, you must be at least 18 years of age. If you are below the age of 18, please exit this survey immediately.

7. Anticipated Risks and Steps Taken to Avoid Them

Your participation in this project involves no foreseeable risks. None of the measures within the study should cause any discomfort, but if discomfort occurs, you should stop your participation immediately and contact the study researchers. You do not have to answer any question or engage in any task that you do not wish to perform.

8. Anticipated Direct Benefits to Participants

There are no direct benefits to you for your participation in this study. Your participation, however, will allow researchers to gain a better understanding of how

9. Clinical Alternatives (i.e., alternative to the proposed procedure) that may be advantageous to participants

Not applicable.

10. Participant Payment

Not applicable.

11. Medical Care and Compensation In the Event of Accidental Injury

During your participation in this project it is important to understand that you are not a Pacific University clinic patient or client, nor will you be receiving medical care as a result of your participation in this study. If you are injured during your participation in this study and it is not due to negligence by Pacific University, the researchers, or any organization associated with the research, you should not expect to receive compensation or medical care from Pacific University, the researchers, or any organization associated with the study.

12. Adverse Event Reporting Plan

If the study participant experiences continued discomfort during the study procedure you should stop your participation immediately and contact both Shawn Davis, Ph.D. at (503) 352-7319 and the Pacific University Institutional Review Board at (503) 352-2112.

13. Promise of Privacy

The records of this study will be kept private. Results from your participation will be available only to the researchers themselves. If a publication or other educational use results from this study and case reports are presented, all identifying material will be substantially modified so that your identity will be safeguarded. Your participation in this project is strictly anonymous. If
the results of this study are to be presented or published, we will not include any information that will make it possible to identify you as an individual.

14. Voluntary Nature of the Study

Your decision whether or not to participate will not affect your current or future relations with Pacific University. There are no costs to you for your participation other than the time involved in completing the surveys. If you choose not to participate, you are free to withdraw at any time; withdrawal will not result in penalty. Participation in this project is voluntary and the only other alternative to this project is non-participation. If you decide to participate, you are free to not answer any question or withdraw at any time without prejudice or negative consequences.

15. Contacts and Questions

The researcher(s) will be happy to answer any questions you may have at any time during the course of the study. Complete contact information for the researchers is noted on the first page of this form. If you have any questions or concerns regarding this study or your participation, please contact Dr. Shawn Davis at (503) 352-7319. If you are not satisfied with the answers you receive, please call Pacific University’s Institutional Review Board, at (503) 352 – 2112 to discuss your questions or concerns further. All concerns and questions will be kept in confidence.

16. Statement of Consent

I have read and understand the above. All my questions have been answered. I am 18 years of age or over and agree to participate in the study. I have been offered a copy of this form to keep for my records.

Since this is an on-line survey, signatures cannot be obtained. By clicking “NEXT” I understand I will be taken to the study and that my continued participation in the survey denotes my consent. If I choose not to participate or to withdraw from participation, I can close the web page at any time.
Appendix B

Demographics Questionnaire

What is your age? _____

What is your sex?

- Female
- Male

What is your ethnicity? ______

What is your approximate height? _____

What is your approximate weight? _____

How would you classify your weight class?

- Underweight
- Within normal limits
- Overweight
- Obese
- Morbidly obese

Do you have any of the following health conditions?

- Sleep apnea
- Hypertension
- Diabetes
- High cholesterol
- High blood pressure
Appendix C

Bariatric Surgery Questionnaire

Familiarity Questions

1. Have you ever heard of the term bariatric surgery?
   - Yes
   - No

2. Have you ever known anyone who has undergone bariatric surgery?
   - Parent
   - Sibling
   - Other family member
   - Friend/friend of the family
   - I don’t know anyone who has undergone bariatric surgery

3. How familiar is the term Gastric Bypass?
   - Never heard of it
   - Think I have heard of it, don’t know what it means
   - I have heard of it and I know what it means

4. How familiar is the term Lap Band?
   - Never heard of it
   - Think I have heard of it, don’t know what it means
   - I have heard of it and I know what it means

5. How familiar is the term Vertical banded Gastroplasty?
   - Never heard of it
   - Think I have heard of it, don’t know what it means
   - I have heard of it and I know what it means

6. How familiar is the term Roux-en-Y Gastric Bypass?
   - Never heard of it
   - Think I have heard of it, don’t know what it means
   - I have heard of it and I know what it means

7. How familiar is the term Biliopancreatic Diversion with Duodenal Switch?
   - Never heard of it
   - Think I have heard of it, don’t know what it means
   - I have heard of it and I know what it means
Knowledge Questions

9. How much energy do you need to burn in order to lose 1 pound?
   - 3500 calories
   - 5000 calories
   - 2000 calories
   - 1200 calories

10. On average, if you were to guess, how much weight do people typically lose and maintain over one year through diet and exercise alone?
   - 5 lbs.
   - 10 lbs.
   - 20 lbs.
   - 30 lbs.

Likelihood Question

Bariatric surgery is a broad term that refers to a host of surgical techniques for weight loss. These techniques include Roux-en-Y Gastric Bypass, Vertical Banded Gastroplasty, Adjusted Gastric Band, and Biliopancreatic Diversion with Duodenal Switch.

11. How likely do you think you are to utilize bariatric surgery for weight reduction at some point in your lifetime?
   - Not at all
   - 2
   - 3
   - 4
   - 5
   - 6
   - Definitely
Appendix D

University of Virginia Bariatric Knowledge Scale

What is one of the major benefits of bariatric surgery?

- It restricts the amount of foods people eat and they lose weight by decreased absorption of calories.
- It restricts the amount of foods people eat, so they can lose weight without having to adhere to a strict exercise or diet plan.
- Diet and exercise alone are not effective weight loss options.

Following bariatric surgery people do not usually require ongoing medical care and follow-up.

- True
- False

Bariatric surgery cures obesity and results in normal to ideal body weight for most people.

- True
- False

Which of these is the best description of how gastric-bypass surgery helps weight loss?

- Gets rid of fat cells
- Makes it easier to diet and exercise
- Makes it impossible to overeat

On average how much weight do people lose the first 2 years after surgery?

- All excess body weight
- ¾ of excess body weight
- 2/3 of excess body weight
- 1/3 of excess body weight
- ½ of excess body weight

On average how much weight do people lose 5 years after surgery?

- All excess body weight
- ¾ of excess body weight
- 2/3 of excess body weight
- 1/3 of excess body weight
- ½ of excess body weight
To help with weight loss how often do people have to exercise?

- 30 minutes of aerobic exercise 1-2 times per week
- A 10 minute walk 3-5 times a week
- Making small lifestyle changes such as taking the steps and parking farther away from store entrances is sufficient exercise.
- 30 minutes of aerobic exercise 3-5 times per week.

Is it possible to gain weight back after the surgery?

- Yes
- No

The most common complication after surgery is:

- Vitamin Deficiency
- Death
- Obstruction/ Internal Hernias
- Infections

The most serious complication after surgery is:

- Vitamin Deficiency
- Death
- Obstruction/ Internal Hernias
- Infections

Most complications occur immediately after surgery, while patients are in the hospital.

- True
- False

If people feel depressed for an extended period of time after surgery, there is no need to worry since it will pass quickly.

- True
- False

The amount of weight people lose does not depend on whether they exercise regularly after surgery.

- True
- False
Initially after surgery, how many meals do people have to eat each day?

- 1 to 2
- 3 meals with no snacks
- 4 to 6
- 8 or more

What is the consistency of food people will be eating following discharge from the hospital?

- Ice chips
- Clear liquids
- Blenderized/pureed foods
- Solid foods

What is the most important nutrient your diet must contain after surgery?

- Fats
- Protein
- Carbohydrates
- Caffeine

Many people can reach their weight loss goal without exercise.

- True
- False
Appendix E

Health Locus of Control Questionnaire

If I become sick, I have the power to make myself well again

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

Often I feel that no matter what I do, if I am going to get sick, I will get sick

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

If I see an excellent doctor regularly, I am less likely to have health problems.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

It seems that my health is greatly influenced by accidental happenings.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

I can only maintain my health by consulting health professionals

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue
I am directly responsible for my health

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

Other people play a big part in whether I stay health or become sick.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

Whatever goes wrong with my health is my own fault

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

When I am sick, I just have to let nature run its course.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

Health professionals keep me healthy.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

When I stay healthy, I’m just plain lucky.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue
My physical well-being depends on how well I take care of myself.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

When I feel ill I know it is because I have not been taking care of myself properly.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

The type of care I receive from other people is what is responsible for how well I recover from an illness.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

Even when I take care of myself, it’s easy to get sick.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

When I become ill, it’s a matter of fate.

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue

I can pretty much stay healthy by taking good care of myself

- Very true
- Somewhat true
- Somewhat untrue
- Very untrue
Following doctor’s orders to the letter is the best way for me to stay health.

☐ Very true
☐ Somewhat true
☐ Somewhat untrue
☐ Very untrue