BARIATRIC SURGERY:
WHAT IS THE RELATIONSHIP BETWEEN BARIATRIC SURGERY PATIENTS
AND THEIR SELF-EFFICACY TOWARD THE RECOMMENDATIONS OF
BARIATRIC SURGERY?

A Thesis

Presented in Partial Fulfillment of the Requirements for

the Degree Master of Science in the Graduate

School of The Ohio State University

By

Robin L. Schmitt, B.A.

****

The Ohio State University
2009

Master’s Examination Committee:

Dr. Kay N Wolf, Advisor

Approved by

Dr. Shirley Kindrick

Dr. Jill Clutter

Advisor
Graduate Program in Allied Medical Professions
ABSTRACT

In 2006, the American Society of Metabolic and Bariatric Surgery (ASMBS) reported an estimated 177,600 people in the U.S. had bariatric surgery. This is a descriptive study regarding pre- and post-bariatric surgery patients’ self-efficacy toward successful adherence to recommendations of bariatric surgery. A questionnaire was completed by a group of bariatric surgery patients to measure self-efficacy pre- (n=20) and post-surgery (n=9). The results indicate weight loss and each domain show a statistical significance with overall success. This indicates that individuals with a higher pre-surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery will experience greater weight loss. More specifically, it demonstrates that they were more confident towards the statements that they could lose weight after surgery, achieve their goal weight and change their diet for life.
DEDICATION

Dedicated to my Mom,

Thanks for your loving support and always being there for me.
ACKNOWLEDGEMENTS

I would personally like to thank Dr. Kay Wolf for helping me throughout this process. I could not have done this without your support and help. Thanks for helping me stay focused and playing a vital role in increasing my self-efficacy toward finishing this task.

I would also like to thank each member of my thesis panel, Dr. Kay Wolf, Dr. Shirley Kindrick and Dr. Jill Clutter, for all of your support and input that went into this thesis. I am grateful for the opportunity to work with you all.

Additionally, I would like to thank my mom. With her love and support I am able to achieve my goals. Thanks for supporting me in whatever I chose to do in life. Mom, without you I would not be the person I am today.
VITA

February 18, 1982  ..........................................Born – Steubenville, Ohio

2004................................................................B.A. Psychology, The Ohio State University

2006-2009 .................................................................Coordinated Dietetic Program
                                             The Ohio State University

FIELD OF STUDY

Major Field:  Allied Medical Professions
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract ................................................................. ii</td>
</tr>
<tr>
<td>Dedication ............................................................... iii</td>
</tr>
<tr>
<td>Acknowledgments ....................................................... iv</td>
</tr>
<tr>
<td>Vita ................................................................. v</td>
</tr>
<tr>
<td>List of Tables ......................................................... viii</td>
</tr>
</tbody>
</table>

Chapters:

1. Introduction ........................................................................................................1
   1.1 Background of the Problem .................................................................1
   1.2 Significance of the Problem .................................................................3
   1.3 Objectives of the Study .................................................................4
   1.4 Definition of Terms .................................................................5

2. Review of Literature ............................................................................6
   2.1 Bariatric Surgery .................................................................6
   2.2 Bariatric Surgery Results .................................................................9
   2.3 Self-efficacy ........................................................................13
   2.4 Role of Self-efficacy in Behavior Modification .........................16
   2.5 Summary of Literature Review .........................................................23

3. Methodology ..........................................................................................31
   3.1 Research Design .................................................................25
   3.2 Population and Subject Selection .........................................................25
   3.3 Instrumentation .................................................................26
   3.4 Data Collection ........................................................................29
   3.5 Data Analysis ........................................................................29

4. Bariatric Surgery: What is the Relationship between Bariatric Surgery Patients and Their Self-efficacy toward the Recommendations of Bariatric Surgery?.30
   Abstract ......................................................................................30
   Introduction ..................................................................................30
   Methods ....................................................................................32
   Results .......................................................................................35
   Discussion ...................................................................................40
5. Discussion ........................................................................................................45
   5.1 Findings ................................................................................................45
   5.2 Conclusion .......................................................................................... 46
   5.3 Implications ........................................................................................47
   5.4 Limitations ........................................................................................48
   5.5 Future Study .......................................................................................49
References ...........................................................................................................54

Appendix A: Explanation of the Study .................................................................51
Appendix B: Questionnaire ..................................................................................52
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>28</td>
</tr>
<tr>
<td>4.1</td>
<td>34</td>
</tr>
<tr>
<td>4.2</td>
<td>36</td>
</tr>
<tr>
<td>4.3</td>
<td>38</td>
</tr>
<tr>
<td>4.4</td>
<td>39</td>
</tr>
<tr>
<td>4.5</td>
<td>40</td>
</tr>
</tbody>
</table>

- listed by domain and Cronbach’s alpha for each domain and time period ............28
- Items measuring self-efficacy by domain ..............................................................34
- Pre- and post-surgery self-efficacy measurements ..............................................36
- Domain and Mean for Time 1 and Time 2 and Paired Samples T-test for differences between Time 1 and Time 2 .................................................................38
- Pearson correlations between weight loss and self-efficacy in four domains of post-bariatric surgery ..............................................................39
- Weight, in pounds, lost by individuals grouped by months post-surgery ..........40
Chapter 1

Introduction

1.1 Background of Problem

In 2006, the American Society of Metabolic and Bariatric Surgery (ASMBS) reports an estimated 177,600 people in the U.S. had bariatric surgery.\textsuperscript{1} This is a substantial increase from more than 100,000 bariatric procedures during the years of 2002 to 2004 combined.\textsuperscript{2} This number can only be expected to rise with the growing rates of obesity.

Bariatric weight loss procedures are recommended as a weight loss tool for those who are struggling with morbid obesity. Morbid obesity is defined as having a body mass index (BMI) $\geq 40$. For the many individuals who are of a normal or overweight BMI (20-30), a weight loss regimen includes diet and exercise. However, for those persons with a BMI $>40$, it is increasingly difficult to lose enough weight and keep it off by medical weight management (diet and exercise or weight loss medications) alone to be medically significant. This may be a partial result of the medical limitations that may accompany morbid obesity; including severe arthritis, shortness of breath, asthma and poor blood
circulation. Therefore, bariatric surgery can be an important option for some in the weight loss process.

The success rate of these surgeries is compelling. Results of one to two years post weight loss, for both gastric bypass and gastric banding, surgery shows a tremendous decrease in BMI and excess weight loss (EWL). Sears et al performed a prospective study on gastric bypass patients. The beginning mean BMI was 52.4 and one year later the BMI decreased to a mean of 32.3. Kim et al found similar results where the gastric bypass group mean pre-operative BMI was 47.2 and at 12 months there was an average of 63.5% EWL. For the gastric band procedure, the beginning BMI was 47.1 and at 12 months 34.4% EWL. At 24 months, the gastric bypass and gastric band groups had an average of 68% and 47.5% EWL respectively. These studies illustrate the universal findings of high amounts of EWL and decrease in BMI for the first one to two years of weight loss for post-surgery patients.

Data is now being released examining weight loss in these patients five to ten years after bariatric surgery. A trend of weight gain is occurring after the initial weight loss. Velcu et al examined patients who had undergone a Roux-en-Y Gastric Bypass (RYGB) five years post surgery. They found that the greatest amount of weight loss occurred one to two years after surgery. Then they witnessed an upward trend in weight regain. More specifically, the BMI of these patients at year one was 28.6; then at year five was 31.2. A BMI greater than 30 is considered to be obese. Sjöström examined the Swedish Obesity Subjects and found that the gastric bypass patients, one to two years post operation, had an average of 32 percent EWL and the gastric banding patients had 20 percent EWL. Increase in weight was documented beginning at this point. The estimated
weight loss for the gastric bypass and gastric band had decreased to 25 percent and 14 percent respectively. These studies, along with others, have found a similar trend in increased weight or weight plateau after years one to two.

Many factors can influence an individual’s success after weight loss surgery. Adherence to diet and exercise are vital components in achieving their goal weight. Return of former eating patterns and grazing appear to be problematic for some patients. Additionally, many patients do not re-introduce exercise into their life after their initial weight loss period. Predictors of weight loss success after surgery are good mental health status and increased self confidence. A positive self-efficacy may be a key element in helping to determine those who will adhere to the surgery recommendations and thus succeed long term.

Self-efficacy can influence the goals that are set, the amount of effort put forth, resilience when faced with failure and perseverance when faced with obstacles. In relation to success in gastric bypass, self-efficacy’s impact may be important in determining the amount of effort people post-surgery will put forth in order to reach their goal weight. An individual’s self-efficacy towards weight loss success post-surgery may prove to be a vital component in predicting their long-term weight loss.

1.2 Significance of the Problem

Obesity is growing at an alarming rate. This condition can lead to further health problems such as diabetes, hypertension, arthritis and some cancers. Currently, bariatric weight loss surgeries appear to provide one treatment option for the problem. Persons who have bariatric surgery may have success with weight loss to the extent of even
reversing some co-morbidities. However, long term success of bariatric surgery depends on many factors including patient motivation and adherence to diet and exercise recommendations. An influential factor in maintaining the recommendations post surgery may be self-efficacy. A positive self-efficacy has been shown to assist persons in achieving results in behavior modifications such as increasing exercise and making more healthful diet choices. It may influence successful weight loss and maintenance of weight lost by impacting the goals that are set and amount of persistence put forth towards obtaining the goals. Therefore, it is important to determine if a positive self-efficacy is related to better post-bariatric surgery outcomes as judged by EWL. If this can be determined, it may not only predict successful individuals, but also those who need more cognitive behavioral therapy prior to surgery to enhance their positive self-efficacy towards weight loss success.

1.3 Objectives of the Study

1) Describe pre- and post- bariatric surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery.

2) Determine the relationship of pre-surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery and its outcomes.

3) Determine the relationship of post-surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery and its outcomes.
4) Determine the relationship between pre- and post- bariatric surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery.

1.4 Definition of Terms

Self-efficacy - people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy determines how people feel, think, motivate themselves and behave. Self-efficacy produces these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes.¹⁰

Weight loss success - loss of body mass, measured in weight, which is not regained following the implementation of the intervention. This may also be defined by the researcher(s). For example, reaching a particular goal such as >30% excess weight loss (EWL).
Chapter 2

Literature Review

2.1 Bariatric Surgery

There are many types of surgery, including the adjustable gastric banding, vertical banded gastroplasty and the Roux-en-Y. The most popular weight loss surgery in the U.S. is the Laparoscopic Roux-en-Y Gastric Bypass (LRYGB, gastric bypass). The most popular procedure in the rest of the world is the Laparoscopic Adjustable Gastric Banding (LAGB, Lap-Band). These two surgeries shall be discussed further in this paper.

LRYGB is a procedure that achieves weight loss through two mechanisms: malabsorption of selected nutrients and restriction of food intake. The surgery involves making a small pouch out of the existing stomach and bypassing portions of the stomach and small intestine. The small pouch can hold up to eight ounces of food, allowing the patient to feel full from a small amount of food.

From the small pouch in the stomach, the food travels through a stoma, roughly the size of a dime, into the small intestine. This also contributes to fullness in not allowing the stomach to empty as fast as it once normally did. Once the food is through the stomach region, it then passes through the new proximal small intestine where it passes a distal stoma connecting the now bypassed digestive tract. Digestive juices from
the remaining portion of the stomach and intestine secrete into this region of the intestine and aid digestion. Since the food being consumed does not pass through the entire stomach and small intestine, nutrients from the food are not absorbed completely. The result is a decrease in the amount of calories, vitamins and minerals absorbed.

The second procedure is Gastric Banding, or Lap-Band. This technique involves placing a small adjustable silicone band around the upper portion of the stomach. The band can be filled with saline in order to tighten or loosen the stoma that enters into the rest of the stomach. The device acts to restrict food intake and decrease the rate that the food will enter the rest of the stomach for digestion. The pouch that the band creates can hold about four to eight ounces of food. This allows the patient to feel full for longer from smaller portions of solid food.

Prior to the weight loss surgeries, the patients are instructed on specific behavioral changes that they must maintain after surgery. The instruction includes diet and exercise modification. The information can be provided through classes that are required by most insurance and some institutions to be completed prior to surgery. The classes can last from weeks to months. For example, the Living Well or LEARN programs at The Ohio State University focus on multiple facets of lifestyle in order to promote a healthy lifestyle.

Dietary recommendations for the procedures can be considered quite cumbersome. The American Dietetic Association’s Nutrition Care Manual identifies a standard nutrition prescription following bariatric weight loss procedures. Upon discharge from the hospital, and for the first two weeks, it is recommended to limit meals to one-fourth of a cup each time. Five cups of fluids are recommended to be sipped between meals.
Three of the cups should consist of a high protein supplement. The remainder of fluids should be non-carbonated, low sugar or sugar free beverages. A daily multivitamin along with a calcium citrate is also recommended.

For week two until week four the diet consistency is to be pureed. It is recommended for people to eat the proteins first. At one month, the diet is advanced. Fluid requirements increase to six cups daily, sipped between meals. Three of the cups should contain protein and the remainder is to be noncarbonated and low in sugar. Alcohol is to be avoided, and fat and sugar limited. Food no longer needs to be pureed. The small meals are to be maintained indefinitely. Patients are urged to eat these meals slowly and avoid drinking fluids during the meal. Proteins should still be consumed first, followed by vegetables, soft fruit then starches. Soft breads are to be avoided to prevent obstruction of the stoma. Forty-eight ounces of noncarbonated sugar free beverages are to be consumed, starting 30 minutes after meals. Patients are also urged to avoid high fat, starchy, sugary foods to prevent dumping syndrome. Further changes to these dietary recommendations are implemented by the physician, for example, when it is safe to reintroduce raw foods.

This long list of dietary behaviors is to be maintained for the remainder of the patient’s life. Strict adherence to these recommendations is difficult. A patient must be dedicated to this lifestyle change and feel that they are able, or self-efficacious, in order to maintain these changes for life. Adherence to these recommendations not only is the key to weight loss but also to avoid weight regain. Weight regain is possible, especially if the patient over eats and stretches out their pouch and stoma. This in turn allows the patient to eat more food at a faster rate. Other complications can arise from the patient
returning to his food “grazing” patterns exhibited prior to surgery.\textsuperscript{13} It is important for the patient to feel that he can maintain the dietary recommendations to avoid complications and experience long-term weight loss success. An important example of this is demonstrated in a study by Alger-Mayer et al.\textsuperscript{14} The researchers investigated the impact of weight loss surgery on those with Binge Eating Disorder (BED). This study concluded that those with BED did not have any significant difference in weight at 6 years than did non-BED individuals. While pre-surgery BED is not predictive of long term weight loss success, it is important to also note that these individuals were able to have the efficacy to overcome their disorder. This gives hope for interventions aiming to help individuals overcome such issues and obtain weight loss success.

\subsection*{2.2 Bariatric Surgery Results}

Since bariatric surgery is a popular method to combat weight loss, many studies have been performed on the results it produces. Many short term studies are available. On the other hand more studies comparing long term weight loss are being conducted since some patients are going on to seven to ten years post-surgery. This section will review the results from short term time frames to research comparing more long term results.

A study by Kim et al\textsuperscript{5} compared the outcomes of weight loss, complications and early outcomes of co-morbidity resolution in gastric bypass patients and gastric band patients. The researchers prospectively collected data on 392 patients, 232 who received Laparoscopic Gastric Bypass (LGBP) and 160 who underwent Laparoscopic Adjustable Silicone Gastric Banding (LASGB). Weight loss outcomes were measured as Percentage Excess Weight Loss (%EWL) at 3, 6, 12, 18, and 24 months after surgery. LGBP and
LASGB subjects had a mean BMI of 47.2 and 47.1, respectively. Kim et al found that the LGBP patients had a greater %EWL than LASGB patients at 3, 6, 12 and 18 months. At 3 months LGBP had a %EWL of 29.9 then 63.5 and 68 at the 12, 18 and 24 month measurements, respectively. The LASGB had a %EWL of 18.5, 34.4 and 47.5 at the 3, 12 and 24 month measurements. This study illustrates that there is a large amount of weight lost recorded up to 2 years.

Another study focused on quality of life (QOL) in gastric bypass patients compared with both subjective and objective surgery outcomes. Sears et al evaluated a total of 75 patients over 1 year. Subjects completed QOL forms while also gathering anthropometric measurements at a preoperative appointment and then again at the one year follow-up appointment. The preoperative BMI was 52.4 and had decreased to 32.3 at one year. The researchers found that QOL had increased through this time. Sears et al concluded that gastric bypass led to decreased weight, BMI, blood pressure and cholesterol while QOL increased. Overall, this study also reflects the large amount of weight loss that occurs over the first year after surgery.

Cottam et al compared the outcomes of RYGBP and Lap Band up to three years. They analyzed %EWL and reduction in co-morbidities. The researchers conducted a case-controlled matched-pair cohort study with 181 subject pairs. Cottam et al matched RYGBP and LAGB for age, sex, date of surgery and BMI. Preoperative and postoperative care was identical for both groups. The initial mean BMI was 46 for the subjects. At 12 months percent EWL for LAGB and RYGBP was 47 and 77, respectively. At 36 months percent EWL was 49 and 80 for LAGB and RYGBP. The researchers concluded that at 3 years, RYGBP was significantly better than LAGB in regards to
weight loss and co-morbidity resolution. This study indicates that at 3 years, weight loss was still occurring for these individuals among both procedures but the rate may start to decrease.

Weight regain in gastric bypass patients was studied at 5 years after surgery by Magro et al.\textsuperscript{16} The researchers performed a longitudinal prospective study on 782 patients. The outcome measure used was percent excess BMI loss (EBL) at 24, 36, 48 and 60 months and it was compared to measurements at 18 months when they considered weight loss to be greatest. They found that EBL was significant up to 18 months with an average of 1.06 kg/m\textsuperscript{2}. EBL was no longer significant at 24 months with significant regain at 48 months. At 60 months, the researchers found that weight increased an average of 8.8 kg compared to 18 months. This research indicates that there may be some weight regain in gastric bypass patients at 5 years, thus more long term research is needed.

A study by Mathus-Vliegen et al\textsuperscript{17} attempted to record more long term results. The researchers also wanted to investigate the results in a more natural setting, at home. A total of 236 subjects who had undergone vertical banded gastroplasty and RYGBP were used in the collection of height and weight. The subjects also completed general and health status questionnaires (Nottingham Health Profile). Average weight and BMI at time of the operation was 132.4 kg and 47.9, respectively. At the time of the home visit, the average time since the surgery was 8.2 years. The lowest weight and BMI since the operation was 83.9 kg and 29.4, respectively, and at time of the home visit, the average weight and BMI were 100.3 kg and 35.2, respectively. This study also indicates that there is a trend of weight gain up to 8 years after bariatric surgery.
A review by O’Brien analyzed medium-term, 3-10 years, results. The researcher stated that bariatric surgery has shown to be effective in the short term but not as convincing from 3 years plus postoperatively. Gastric surgeries compared were Roux-en-Y Gastric Bypass (RYGBP), Laparoscopic Adjustable Gastric Banding (LAGB) and Biliopancreatic Diversion (BPD) using %EWL as the outcome measure. In this review, inclusion criteria was 3 or more years of follow up and a subject pool of at least 100. Forty-three studies were included (18 RYGBP, 18 LAGB, 7 BPD). LAGB at year 1, 3 and 7 showed 42, 55 and 51 percent EWL, respectively. RYGBP showed at 1, 3 and 7 years 67 62 and 53 %EWL, respectively. The research reported that at 5 years post surgery, there was no significant difference in weight loss among any of the surgery types. O’Brien concluded that all bariatric procedures reviewed reflected effective and durable weight loss up to 10 years.

Sjöström et al carried out a prospective matched research design including 4047 obese subjects called the Swedish Obese Study (SOS). Of these, 1471 subjects underwent bariatric surgery. More specifically, 376 underwent gastric banding, 1369 had the vertical-banded gastroplasty and 265 underwent gastric bypass. 1444 subjects remained in the control group. These subjects were followed for 15 years. The control groups’ weight change fluctuated primarily between 1-2 years. At the maximum amount of weight loss, gastric bypass patients lost an average of 32%, vertical-banded gastroplasty was 25% and gastric banding was 20%. From this point, Sjöström et al found that weight change in all groups started to increase in the following years and leveled off around year 8-10. At 10 years, weight loss was 25%, 18% and 14% in the gastric bypass, vertical-banding gastroplasty and gastric banding groups, respectively. At 15 years, the weight
loss was 27%, 18% and 13%, respectively. This study shows that after 1-2 years the subjects start to regain some of their weight back. The results identify a possible time frame for which an intervention may be implemented to perhaps deter the weight regain.

A 13 year follow up study was conducted on subjects who underwent Adjustable Silicone Gastric Banding (ASGB). Camerini et al used 45 morbidly obese subjects, with an average BMI of 37, and followed the trend in BMI after surgery. They found that at 1 year, BMI was 79% of its pre-operative value. From that point on, the researchers found that BMI increased linearly over time by an average of .42 BMI units per year. BMI at years 1, 5, 9 and 13 was an average of 37, 30, 32 and 31. These findings also demonstrate that there is an incidence of weight regain or plateau further out from surgery.

After review of some of the research available on weight loss outcomes after bariatric surgery, it appears that some weight regain is observed. A great amount of weight loss is recorded within the first two years of surgery. After this point, it appears that there is some debate on the success of patients who undergo these procedures. After two years some weight loss has been recorded. It is important to investigate what some of the possible causes are to this incidence. While some researchers point to the cause being slow increase in calorie intake, lack of exercise or gastric pouch dilation, more psychological components cannot be ruled out. One of these possible factors may be one’s self-efficacy towards the recommended weight loss regimen of bariatric surgery and their own motivation and persistence in reaching their goal.
2.3 Self-efficacy

Self-efficacy, or personal efficacy, is the belief in oneself to successfully accomplish a particular behavior. More specifically, self-efficacy relates to beliefs about capabilities of performing specific tasks in particular situations. This has become an important component of the health care model because the concept of self-efficacy is seen as a predictor of health behavior change and maintenance. Before defining self-efficacy, it is important to define what it is not. Self-efficacy is not self-esteem. Self-esteem is related to one’s judgment on self worth. On the other hand, self-efficacy is one’s judgment on their capabilities. Health Locus of Control is also closely associated with self-efficacy. However, health locus of control is the belief of whether or not one’s behavior is associated with the presence or absence of health issues or independent of one’s actions. Self-efficacy is beliefs about the ability to take on particular behaviors. Finally, self-efficacy is not a personality trait or skill with which one is born. It is developed over time starting at a young age and then modified when deemed necessary.

Self-efficacy is a part of the Social Cognitive Theory belonging to Albert Bandura originating in 1977. This theory claims that one’s self-efficacy is shaped and influenced by multiple factors including: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. These different facets serve as a feedback system within the self. The amount that efficacy is changed is dependent on how the information itself is appraised and weighted. This explains why positive events do not
immediately negate the negative efficacy or why a single negative event can alter one’s positive efficacy completely.

As previously mentioned, one of the primary sources of information in which self-efficacy is built is performance accomplishments. Performance accomplishments can increase one’s self-efficacy resulting from task mastery. This involves learning from the consequences of one’s actions. This can provide multiple avenues of feedback, such as the amount of effort needed to achieve a particular outcome or whether the goal set is realistic. In the same context, repeated failures can cause a decrease in one’s personal efficacy.

Vicarious experiences involves observing events or other people attempt particular tasks. A possible attribute of learning through this facet may be observing another individual having repeated success with a task. One may process this information and draw the conclusion that, ‘if others can do it, so can I.’ Repeated observations of success of the other individuals translates into self perceived potential mastery of the task. For this type of observation feedback to work, the individual who observes another’s success must be able to relate to them in that the individuals share similarities, such as age or gender. This type of experience results in a weaker construction of self efficacy when compared to personal experience. Verbal persuasion is also a powerful tool. The power or suggestion can leave an imprint on personal efficacy. As with vicarious experience, this type of information serves as a weaker force in building self-efficacy. Positive verbal feedback is less strong than negative feedback on a person’s ability. This is an important facet of the self-efficacy feedback system. Health care professionals tend to use this to motivate a patient to change some health behaviors.
Emotional arousal, or physiological state, can also shape a person’s self-efficacy. A high level of emotional arousal can debilitate a person’s success; conversely, low to no arousal can assist in a better outcome. For example, if one experiences negative arousal symptoms, such as sweaty palms and rapid heartbeat, they may associate this with failure and their self-efficacy for the task decreases. On the other hand, if the individual feels comfortable they may not expect failure and be successful.

How much the experience alters one’s self-efficacy is dependent on a few factors. This is considered appraisal of efficacy information. Impact of feedback information obtained by the individual depends on how much it is weighted. For example, information from a highly credible individual will have a powerful impact rather than from someone who is not as trustworthy. Another factor affecting the power of influence information has is its interpretation. In order for one to increase their self-efficacy towards a particular task, they must attribute their own ability to the achievement, rather than to external factors, such as luck. These factors are important in building a health intervention that will focus on the appraisal of self-efficacy feedback information.

Self-efficacy helps to shape one’s expectations and in turn influences other factors such as the amount of motivation that one may exert, goal setting and task achievement. Preconceived thoughts of anticipated outcomes and self confidence influence the goals that they may set for themselves. Pre-conceived expectations may impact the amount of energy that the individual will expend on reaching the goal. Additionally, it may also determine the amount of persistence that one will have for the particular situation when faced with obstacles or adverse events. Thus, self-efficacy is growing more important in health care. The medical system is changing its focus from treatment to health prevention.
and promotion. At the center of this change is the patient, which is now involved in their own care. In order to change and maintain desired health behaviors, health care professionals must develop interventions that will motivate the patient. Self-efficacy is a powerful tool that needs to be included in such interventions.

2.4 Role of Self-Efficacy in Behavior Modification

A significant amount of research has examined the relationship of self-efficacy and behavior modification. Researchers have been successful in identifying a positive correlation between a high self-efficacy and a positive behavior change or increased health status. It is important to examine the relationship between self-efficacy and particular states of feeling healthy or eliciting a particular behavior. This section of the review will look at some particular studies that attempt to demonstrate the correlation between self-efficacy towards actual situations and the subject’s behavior and emotional states.

Katula et al examined the effects of self awareness and its influences on self-efficacy. They performed a randomized controlled trial investigating the role of a mirror in exercise confidence. The researchers had two study groups in which one group was to run on a treadmill in front of a full length mirror and the control group ran without the mirror. Katula et al measured self-efficacy before the study began, pre-exercise, immediately post-exercise and then at 20 minutes after the work out. A significant increase in self-efficacy was recorded after 20 minutes had passed after the work out session. This same outcome was not found in the control group. They attributed this finding to the mirror playing a self awareness role that allowed the subjects to become
more self-aware and thus creating and influencing a positive self-efficacy. This study provides further confirmation that feelings of mastery can positively influence self-efficacy.

Another study by Chang et al\textsuperscript{24} examined the effects that self-efficacy had on choosing low fat foods. More specifically, Chang et al studied specific domains of self-efficacy and the amount they were influenced by education level and previous weight management experience. The authors looked at young, low income mothers of Caucasian and African American descent. They evaluated them on three domains of self-efficacy: positive mood self-efficacy, negative mood self-efficacy and food availability. Results showed that education level did not have an impact on self-efficacy in relation to decreasing fat intake. Negative and positive mood did vary some between the groups in regards to the specific behaviors of decreasing fat in the diet. Overall, Chang et al demonstrated a need for more tailored models of behavior change regarding decreasing fat intake among this population. They stated that interventions will be most effective in increasing confidence if they address the specific domains of self-efficacy separately. This can be important when designing pre-surgery education classes, in that tasks aim at increasing confidence through each specific domain of self-efficacy separately.

A study by Senécal et al\textsuperscript{25} examined self-efficacy and self regulation in patients with Type 2 Diabetes. A total of 638 patients completed questionnaires relating to self-efficacy, self regulation, self care activities and life satisfaction. The results showed that self-efficacy was most related to diabetes self care actions. For example, those with high self-efficacy were more apt to regularly monitor their blood glucose levels. On the other hand, self regulation was more related to life satisfaction. Those who exhibited higher life
satisfaction were found to feel more independent. Furthermore, both were correlated, weakly, with each other’s component (i.e. self-efficacy is weakly related to life satisfaction). Senécal et al stated that this finding is important for implicating in motivational models. Both self-efficacy and self regulation appear to influence adherence to a particular behavior so therefore both should be implemented in models incorporating behaviors.

Another study examined the role of self-efficacy and behavior in regards to multiple sclerosis (MS) patients. Motl et al evaluated the role of physical activity, self-efficacy and quality of life for these patients. The participants were administered three questionnaires evaluating the three factors of interest. The authors found that the subjects with increased physical activity had a higher self-efficacy for function and control which led to increased quality of life for both physical and psychological components. The bottom line of this study is that physical activity can lead to a feedback mechanism for self-efficacy thus improving the patient’s disease management and performing daily activities. Thus, self-efficacy can be altered positively by feedback mechanisms to improve outcomes.

Cross et al evaluated the correlation between self-efficacy and locus of control in arthritis patients. A survey was sent to subjects who suffered from both Osteoarthritis and Rheumatoid Arthritis. The participants were evaluated on actual health status and arthritis related costs over the past three months. After statistical evaluation was completed, Cross et al found that an increased self-efficacy was positively correlated with a better health status. More specifically, the subjects who had an increased self-efficacy had a higher belief that they could perform acts of daily living. Additionally, the
individuals who had a higher self-efficacy had less arthritis related costs. This meant that they spent less on items such as pain medications and had fewer physician visits. This study further demonstrates a link between a high self-efficacy and better health status.

A clinical review by Cochrane analyzed studies that examined self worth and its effects on weight loss treatments. The researcher specifically looked at treatment models and outcomes. Cochrane stated that the patient’s view of their own self perception is sometimes not addressed by programs promoting weight loss. In the author’s review, he identified a four step process that can help focus on repairing ego damage which in turn will help to promote an increased health status. The four steps include, focusing on self care, teaching self monitoring behaviors and emotions that relate to food, teaching coping strategies that deal with negative self perceptions and teaching the attitudes of normal and healthy individuals so they understand what it takes to reach good health. It is important to note that at each step, there is positive feedback into the individual’s self-efficacy. Cochrane found that self-efficacy correlates positively in all areas when engaging in treatments for weight loss.

A study by O’Hea et al explored the effects of self-efficacy and Type 2 Diabetes. More specifically, O’Hea et al explored internal locus of control, self-efficacy and outcome expectancy in relation to the individuals HbA1c level. A total of 109 subjects with Type 2 Diabetes were recruited. They were administered three surveys evaluating the three previously mentioned constructs of interest. The researcher found that self-efficacy showed a strong correlation in a subject with a lower HbA1c level. Furthermore, participants with a decreased self-efficacy felt that they would not be able to follow the health care professional’s recommendations and therefore would have an
increased HbA1c. O’Hea et al also found that all three constructs, internal locus of control, self-efficacy and outcome expectancy, were moderately correlated. An increased locus of control is correlated with increased self-efficacy, and both are correlated with positive outcome expectancy. This further demonstrates how self-efficacy towards a particular goal plays a part in goal setting itself and influencing the subject’s view on what the outcome will be like.

The next set of studies also attempts to measure the relationship between self-efficacy and a specific behavior. However, these studies set out to modify the subjects’ self-efficacy. More specifically, these researchers set out to determine what particular interventions are successful at modifying self-efficacy in a positive manner. This information may play an important role in designing successful behavior modification programs.

Roach et al\textsuperscript{30} also completed a study examining the effects of an intervention attempting to raise self-efficacy. The authors completed a 12 week intervention assessing weight loss and if behavior changes were influenced by self-efficacy. They studied the effects of a weekly session focused on healthy eating patterns and activities that increase confidence. A control group with no intervention session was used for comparison. Behavior change was measured by using a food frequency questionnaire and weight was taken at the beginning of each information session. They found that increased self-efficacy was correlated with both a higher weight loss and improvement in eating behaviors when compared with the control group. Overall, it is illustrated that self-efficacy is positively correlated with behavior change.
Another study measured the effects of self-efficacy and vascular risk management. Sol et al measured the effect that an intervention aimed at increasing self-efficacy had on a group of patients who were at risk for another vascular event versus a control group with the same characteristics. A baseline measurement was evaluated by a questionnaire that focused on self-efficacy. They found that the areas that scored low in self-efficacy for both groups were: ability to choose food when not at home and smoking cessation. The intervention consisted of outpatient counseling by nurses who encourages the patients to set reasonable goals for themselves. After a year of intervention or no intervention, the same questionnaire was given to both groups. They did not find a significant change in the total self-efficacy of each group. However, they did find a significant increase of self-efficacy in particular components such as choosing healthy food when not at home and increasing exercise. This study reflects that a counseling intervention may help promote a positive self-efficacy towards behavior change in diet and exercise.

Luszczynski et al assessed the effect of verbal persuasion and positive emotion reinforcement on behavior change. The persuasion and reinforcement were hypothesized to play a role increasing self-efficacy and fruit and vegetable consumption. A total of 200 individuals were recruited online to partake in a health survey. After the completion of the initial assessment, the individuals were randomized into three groups: a control, one with a self-efficacy intervention and the third group with a self-efficacy intervention and planning intervention. The self-efficacy intervention consisted of tailored emails to the subject; a letter of personal salutation, individual feedback on their self-efficacy score and positive emotions feedback. The third group had this intervention plus activities
involving the subject to complete written plans for including more vegetables and fruit in their diet. The results after the final survey was administered showed that both intervention groups were equally successful in increasing their fruit and vegetable consumption. The authors came to the conclusion that the increase in self-efficacy through positive and tailored feedback caused a significant behavior modification in these individuals. This further demonstrates the role of self-efficacy in behavior modification.

Rahman et al\textsuperscript{33} examined self-efficacy in patients with chronic musculoskeletal pain. Moreover, the authors were looking at factors influencing self-efficacy and pain intensity. A final total of 140 subjects were studied over five years. The participants were administered a survey at a physicians visit the first time, and then again when they came back for a follow up appointment. The researchers found that a low self-efficacy was correlated with depressive symptoms and not being employed. Furthermore, pain intensity was also influenced by depressive symptoms and also extensive pain accompanied with a low education level. The authors concluded that self-efficacy was influenced more by depressive symptoms and not being employed than extent or duration of pain. Outcomes of these patients were more dependent on psychosocial factors rather than actual physical ones. This further demonstrates the importance of appealing to self-efficacy in treatments.

A review by Silver\textsuperscript{34} examined two previous studies and explored how individuals with either high or low self-efficacy interpret feedback on performance. Silver found that people with high self-efficacy make self-serving attributions. The author also found that past performance appeared to be the most influential source of information for self-efficacy generation. The bottom line posed by the author is that self-efficacy both causes
and is caused by experiences of performance. Furthermore, attributions of past experiences are predictors of self-efficacy. This can be very important when working with a population who has had repeated failures with medical weight management.

2.5 Summary of Literature Review

Gastric Bypass and gastric banding are popular bariatric surgery techniques. With this surgery, very rigid regimens follow. One facet of this strict regimen is the dietary requirements. For example, it is recommended to radically limit portion sizes, eat and eliminate specific foods and perform these tasks on a daily basis for the rest of life. Furthermore, it is known that self-efficacy shapes one’s dedication towards a set goal or task. It has been established in these studies that there is a positive correlation between self-efficacy and health related behaviors. Those who have a high self-efficacy towards a particular health behavior or disease state tend to have better outcomes. Additionally, it has been demonstrated that it is possible to alter one’s self-efficacy towards a particular task to help elicit a desired behavior. After reviewing the preceding studies, it is plausible to deduce that one’s self-efficacy towards the regimen required of bariatric surgery may influence his success. This may be vital in designing pre and post-bariatric surgery classes. The patient’s efficacy towards the surgery requirements can be increased. This in turn, can help the patient to be more dedicated and determined to reaching his goal.
Chapter 3

Methodology

3.1 Research Design

The research was a descriptive study regarding pre- and post-bariatric surgery patients’ self-efficacy toward successful adherence to recommendations.

3.2 Population and Subject Selection

The target population consisted of post-bariatric surgery participants who completed a pre-surgery questionnaire measuring self-efficacy toward the requirements of bariatric surgery. The research is a descriptive study regarding pre- and post-bariatric surgery patients’ self-efficacy toward successful adherence to recommendations. The target population consisted of pre-bariatric surgery participants who completed a 3 to 12 month weight management program focusing on lifestyle, exercise and nutrition. Those who went on to the preparatory surgery class (n=20) were identified and requested to participate in the study and complete the self-efficacy toward successful adherence to recommendations questionnaire (Time 1).

After these individuals received bariatric surgery (the Lap-Band and Roux-en-Y Gastric Bypass) they were requested to complete the questionnaire (Time 2). The subject pool consisted of 12 post-operative patients, 9 of whom completed and returned both
survey (Time 1 and Time 2). Data collection for the post-surgery questionnaire was conducted over a four week period. The questionnaires were mailed to all subjects who received surgery and answered the original questionnaire (n=12). The survey was sent in 2 rounds of mailings. All 12 participants received the first mailing. Individuals who had not returned the completed survey within 2 weeks (n= 4) received another questionnaire packet. At the end of the four weeks, 9 out of 12 subjects returned the completed questionnaire for Time 2.

3.3 Instrumentation

The instrument was developed using the Weight Efficacy Life-Style Questionnaire (WEL). The survey measures self-efficacy toward successful adherence to the recommendations of bariatric surgery. It consists of 18 items utilizing a five- point Likert scale rating. Participants use the five- point percentage scale to rate their confidence on specific statements. The scale is as follows: 0% = no chance at all, 25% = a slight chance, 50% = a 50/50 chance, 75% = a good chance and 100% = completely certain. This instrument examined four domains of self-efficacy toward the patient’s success: adherence to recommended diet (7 items), cues other than hunger (4 items), self- sufficiency (4 items) and overall success (3 items). Success of the weight loss procedure was measured by requesting height and weight and calculating loss of excess weight.

The Cronbach’s alpha coefficient for each of the domains on Time 1 were as follows: .85 for adherence to the recommended diet (7 items) .79 for cues other than hunger (4 items), and .67 for self-sufficiency (4 items) which reflected strong internal
consistency. A low internal consistency was found for overall success .41 (3 items). The low internal consistency for the last domain may have been due to the small number of statements included in the domain and/or the limited amount of subjects tested. The same analysis was performed on the data collected for Time 2 (n=9). The internal consistency coefficients for the domains at Time 2 were as follows: cues other than hunger was .5, indicating low-moderate internal consistency, adherence to the recommended diet was .097, 0.0 for self-sufficiency and 1.29E-14 for overall success, indicating poor internal consistency. The low internal consistency for the second set of data may also be due to the low number of participants and/or limited number of statements included in each domain since Cronbach’s alpha is directly related to the number of items in the domain in question, the variance of scores on each question in that domain and to the total variance on the overall scores of the domain.
<table>
<thead>
<tr>
<th>Domain 1</th>
<th>Questions Included in the Four Domains</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
</table>
| (Adherence to the recommended diet) | 1. I can adhere to the recommended diet after surgery.  
2. I can eat 5-6 mini meals daily  
3. I can limit my food to recommended portions  
4. I can eat high protein foods.  
5. I can drink fluids in-between meals.  
6. I can avoid alcohol.  
7. I can avoid caffeine. | .85 | .10 |
| Domain 2      | 8. I can resist high-calorie foods.  
9. I can follow a recommended diet at restaurants.  
10. I can resist peer-pressure when I eat.  
11. I can follow a recommended diet at a party. | .79 | .50 |
| (Cues other than hunger) |                                                                                                           |                  |
| Domain 3      | 12. I can ask others to help support my new lifestyle (diet and exercise) changes.  
13. I can go to all of my scheduled follow-up appointments post-surgery.  
15. I can ask questions if I need to during any part of the program I’m unsure about. | .67 | 0 |
| (Self-sufficiency) |                                                                                                           |                  |
| Domain 4      | 16. I will lose weight after surgery.  
17. I can achieve my goal weight after surgery.  
18. I can change my diet for life. | .41 | 1.29E-14 |
| (Overall success) |                                                                                                           |                  |

Table 3.1 Statements listed by domain and Cronbach’s alpha for each domain and time period.
3.4 Data Collection

Data collection for the post-surgery questionnaire was conducted over a four week period. The questionnaires were mailed to all subjects who received surgery and answered the original questionnaire (n=12). The survey was sent in 2 rounds of mailings. All 12 participants received the first mailing. Individuals who had not returned the completed survey within 2 weeks (n= 4) received another questionnaire packet. At the end of the four weeks, 9 out of 12 subjects returned the completed questionnaire for Time 2.

3.5 Data Analysis

Descriptive statistics were used to describe the subject’s height, weight, type of surgery they received and the date of the procedure. Reliability of the instrumentation was calculated using Cronbach’s alphas. This calculation was completed for Time 1, when the survey was given pre-surgery (See Table 1.1). Additionally, Cronbach’s alpha was calculated for each of the four domains for Time 2, post-surgery (See Table 1.1). Mean scores and standard deviations were determined for each question and domain. A comparative analysis was conducted for each question to reveal any trends and changes. Pearson’s correlation was done to determine any relationship for each domain’s self-efficacy score with the amount of weight loss reported for Time 2. SPPS 16.0 was used for the analysis of the data.
Chapter 4

Bariatric Surgery:
What is the relationship between bariatric surgery patients and their self-efficacy toward the recommendations of bariatric surgery?

Written for submission to Obesity Surgery

Abstract

In 2006, the American Society of Metabolic and Bariatric Surgery (ASMBS) reported an estimated 177,600 people in the U.S. had bariatric surgery.¹ This is a descriptive study regarding pre- and post-bariatric surgery patients’ self-efficacy toward successful adherence to recommendations of bariatric surgery. A questionnaire was completed by a group of bariatric surgery patients to measure self-efficacy pre- (n=20) and post-surgery (n=9). The results indicate weight loss and each domain show a statistical significance with overall success. This indicates that individuals with a higher pre-surgery self-efficacy toward successful adherence to the recommendations of bariatric surgery will experience greater weight loss. More specifically, it demonstrates that they were more confident towards the statements that they could lose weight after surgery, achieve their goal weight and change their diet for life.

Introduction

In 2006, the American Society of Metabolic and Bariatric Surgery¹ (ASMBS) reported an estimated 177,600 people in the U.S. had bariatric surgery, a substantial increase compared to 2002 to 2004 in which only 100,000 bariatric procedures were performed.² The number can be expected to rise with the growing rates of obesity.

Short term effects of both gastric bypass and gastric banding have been staggering. Results of one to two years post weight loss surgery show a tremendous decrease in body
mass index (BMI) and excess weight loss (EWL). Sears et al\textsuperscript{3} performed a prospective study on gastric bypass patients. The beginning mean BMI was 52.4 and one year later had decreased to a mean of 32.3. Data on these patients five to ten years after bariatric surgery, however, show a trend of weight gain. Velcu et al\textsuperscript{4} studied long term bariatric surgery results by examining patients who had undergone a Roux-en-Y Gastric Bypass (RYGB) five years prior. The researchers found the greatest amount of weight loss occurred one to two years post surgery followed by an upward trend in weight regain. More specifically, the BMI of these patients at year one was 28.6 and at year five was 31.2. A BMI greater than 30 is considered to be obese. These studies, along with others, have found a similar trend in increased weight or weight plateau after years one and two.

Many factors can influence an individual’s success after bariatric surgery. Adherence to diet and exercise are vital components in achieving goal weight loss. An influential factor in maintaining the recommendations post surgery may be self-efficacy toward successful adherence to recommendations post- bariatric surgery. A high positive self-efficacy has been shown to assist persons in achieving results in behavior modification. It may influence successful weight loss and maintenance of weight lost by affecting the goals that are set, the amount of effort put forth, resilience when faced with failure, and perseverance when faced with obstacles.\textsuperscript{5} A study by Roach et al\textsuperscript{6} found that increased self-efficacy was correlated with both a higher weight loss and improvement in eating behaviors when compared with a control group. If a positive self-efficacy is related to better post-bariatric surgery weight loss, it may not only predict successful individuals, but also those who need more cognitive behavioral therapy to enhance their self-efficacy. Therefore, the purpose of this study was to describe pre- and post- bariatric surgery self-
efficacy toward successful adherence to the recommendations of gastric bypass and its relationship to bariatric surgery outcomes.

Methods

The research is a descriptive study and the target population consisted of pre-bariatric surgery participants who completed a 3 to 12 month weight management program focusing on lifestyle, exercise and nutrition. Those patients who went to the preparatory surgery class (n=20) were identified and requested to complete a questionnaire measuring their self-efficacy toward successful adherence to recommendations.

After these individuals received bariatric surgery (the Lap-Band or Roux-en-Y Gastric Bypass) they were requested to complete the questionnaire again. Of the original 20 participants, 12 completed the surgery, of which 9 completed and returned the survey.

Data was collected over a four week period. The questionnaires were mailed to all subjects who received surgery and answered the original questionnaire (n=12). The letter requesting the subject’s participation and the self-efficacy questionnaire was mailed using the addresses the subjects provided on their pre-surgery survey. Those participants who had not responded within 2 weeks received another questionnaire packet. At the end of the four weeks, 9 of the 12 original subjects returned the completed questionnaire.

The pre- and post- surgery questionnaire was developed to measure self-efficacy toward successful adherence to the recommendations of bariatric surgery using the Weight Efficacy Life-Style Questionnaire (WEL). The questionnaire consisted of 18 items utilizing a five-point Likert scale rating: 0% = no chance at all, 25% = a slight
chance, 50% = a 50/50 chance, 75% = a good chance and 100% = completely certain. The survey examined four domains of self-efficacy toward the patient’s success: adherence to recommended diet (7 items), cues other than hunger (4 items), self-sufficiency (4 items) and overall success (3 items). Success of the weight loss procedure was measured using the BMI. Participants self-reported their height and weight which was used to calculate the BMI. Reliability of the instrumentation was calculated using Cronbach’s alphas both pre- and post-surgery (See Table 4.1).

The pre- and post-tests were matched and coded for each individual to assess changes in scores before and after the bariatric surgery. Responses from the pre-tests and post-tests were entered into Microsoft Excel and imported into the Statistical Package for the Social Sciences (SPSS Corporation, version 16.0, Chicago, IL) for analysis. Mean scores were calculated for each item and summative scores were generated for each of the domains. Descriptive statistics were used to describe the subject’s height, weight, type of surgery they received and the date of the procedure. A comparative analysis was conducted for each question to reveal any trends and changes. Pearson’s correlation was calculated to determine relationships between each domain’s self-efficacy score and reported weight loss post-surgery.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Questions Included in the Four Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1</td>
<td>I can adhere to the recommended diet after surgery.</td>
</tr>
<tr>
<td>(Adherence to the recommended diet)</td>
<td>I can eat 5-6 mini meals daily</td>
</tr>
<tr>
<td></td>
<td>I can limit my food to recommended portions</td>
</tr>
<tr>
<td></td>
<td>I can eat high protein foods.</td>
</tr>
<tr>
<td></td>
<td>I can drink fluids in-between meals.</td>
</tr>
<tr>
<td></td>
<td>I can avoid alcohol.</td>
</tr>
<tr>
<td></td>
<td>I can avoid caffeine.</td>
</tr>
<tr>
<td>Domain 2</td>
<td>I can resist high-calorie foods.</td>
</tr>
<tr>
<td>(Cues other than hunger)</td>
<td>I can follow a recommended diet at restaurants.</td>
</tr>
<tr>
<td></td>
<td>I can resist peer-pressure when I eat.</td>
</tr>
<tr>
<td></td>
<td>I can follow a recommended diet at a party.</td>
</tr>
<tr>
<td>Domain 3</td>
<td>I can ask others to help support my new lifestyle (diet and exercise) changes.</td>
</tr>
<tr>
<td>(Self-sufficiency)</td>
<td>I can go to all of my scheduled follow-up appointments post-surgery.</td>
</tr>
<tr>
<td></td>
<td>I can advise the doctor of any complications/problems I am having post-surgery.</td>
</tr>
<tr>
<td></td>
<td>I can ask questions if I need to during any part of the program I’m unsure about.</td>
</tr>
<tr>
<td>Domain 4</td>
<td>I will lose weight after surgery.</td>
</tr>
<tr>
<td>(Overall success)</td>
<td>I can achieve my goal weight after surgery.</td>
</tr>
<tr>
<td></td>
<td>I can change my diet for life.</td>
</tr>
</tbody>
</table>

Table 4.1 Items measuring self-efficacy by domain.
Results

Of the nine participants who completed the survey, eight underwent gastric bypass and one underwent the Lap Band procedure. The body mass index was calculated using the BMI formula (weight in kilograms/ (height in meters)²). Mean BMI for the subjects (n=20) pre-surgery was 47.28 ranging from 36.3-68.8 (overweight= 25-29.9, obese= 30.0-39.9 and morbid obesity= 40.0 and above). The mean BMI for the individuals (n=9) post surgery was 41.3, ranging from 28.9 to 54.4. The surgery dates for the participants varied. The first surgery was performed in September 2008 and the most recent to date was February 2009 (See Table 1.2). Therefore, post-surgery measurements ranged from two months to seven months after surgery.

The mean scores for each item and each domain may be found in Table 4.2. This table lists each statement from the highest confidence to the lowest according to the post-surgery analysis. In general, the participants had the highest self-efficacy for the following items: Limiting food to recommended portions, avoiding alcohol, attending all follow-up appointments after surgery, advising the doctor of any problems, asking questions during any part of the program, losing weight after surgery and achieving goal weight after surgery. The mean score for these statements was 100 indicating that the participants were absolutely certain that they could perform these tasks.

The specific statements with the lowest mean score (86.1) post-surgery include: I can adhere to the recommended diet after surgery, I can eat 5-6 mini meals daily, and I
can avoid caffeine. This indicates the participants’ confidence levels were between 75 to 100 percent certain they could perform these tasks. The statements reflect possible areas of focus for bariatric surgery programs, both before and after surgery.
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean Post-surgery N=9</th>
<th>Standard Deviation</th>
<th>Mean Pre-surgery N=20</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can limit my food to recommended portions.</td>
<td>100.0</td>
<td>0.0</td>
<td>87.5</td>
<td>15.2</td>
</tr>
<tr>
<td>I can avoid alcohol</td>
<td>100.0</td>
<td>0.0</td>
<td>93.8</td>
<td>13.4</td>
</tr>
<tr>
<td>I can go to all of my scheduled follow-up appointments post-surgery.</td>
<td>100.0</td>
<td>0.0</td>
<td>98.8</td>
<td>5.6</td>
</tr>
<tr>
<td>I can advise the doctor of any complications/problems I am having post-surgery.</td>
<td>100.0</td>
<td>0.0</td>
<td>98.8</td>
<td>5.6</td>
</tr>
<tr>
<td>I can ask questions if I need to during any part of the program that I am unsure about.</td>
<td>100.0</td>
<td>0.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>I will lose weight after surgery.</td>
<td>100.0</td>
<td>0.0</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>I can achieve my goal weight after surgery.</td>
<td>100.0</td>
<td>0.0</td>
<td>96.3</td>
<td>9.2</td>
</tr>
<tr>
<td>I can ask others to help support my new lifestyle (diet and exercise) changes.</td>
<td>96.9</td>
<td>8.8</td>
<td>95.0</td>
<td>10.3</td>
</tr>
<tr>
<td>I can change my diet for life.</td>
<td>94.4</td>
<td>11.0</td>
<td>93.2</td>
<td>11.1</td>
</tr>
<tr>
<td>I can eat high protein foods.</td>
<td>91.7</td>
<td>12.5</td>
<td>95.0</td>
<td>10.3</td>
</tr>
<tr>
<td>I can drink fluids in-between meals.</td>
<td>91.7</td>
<td>12.5</td>
<td>91.3</td>
<td>16.8</td>
</tr>
<tr>
<td>I can resist high-calorie foods</td>
<td>90.6</td>
<td>12.9</td>
<td>81.6</td>
<td>16.3</td>
</tr>
<tr>
<td>I can follow a recommended diet at restaurants.</td>
<td>90.6</td>
<td>12.9</td>
<td>82.9</td>
<td>16.8</td>
</tr>
<tr>
<td>I can resist peer-pressure when I eat.</td>
<td>90.6</td>
<td>12.9</td>
<td>93.4</td>
<td>14.0</td>
</tr>
<tr>
<td>I can follow a recommended diet at a party.</td>
<td>90.6</td>
<td>12.9</td>
<td>86.8</td>
<td>15.3</td>
</tr>
<tr>
<td>I can adhere to the recommended diet after surgery.</td>
<td>86.1</td>
<td>13.2</td>
<td>90.0</td>
<td>14.9</td>
</tr>
<tr>
<td>I can eat 5-6 mini meals daily.</td>
<td>86.1</td>
<td>18.2</td>
<td>90.0</td>
<td>18.8</td>
</tr>
<tr>
<td>I can avoid caffeine.</td>
<td>86.1</td>
<td>18.2</td>
<td>91.3</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Table 4.2 Pre- and post- surgery self-efficacy measurements.
Mean scores were highest for the domains measuring self-sufficiency and overall success both pre- and post-surgery (See Table 4.3). Pre-surgery, the mean scores were 98.13 and 96.46, respectively and post-surgery were 99.25 and 98.15, respectively. The maximum score possible was 100, indicating the participant was completely certain he could achieve the specific behavior stated. The scores indicate the participants were very confident that they could perform tasks including seeking the support of others, attending follow-up appointments after surgery, achieving their goal weight after surgery, and changing their diet for life. Additionally, post-surgery scores remained high. The participant’s weight loss may serve as a positive feedback mechanism for the individual’s self-efficacy towards success with specific behaviors mentioned in these domains. The domains of adherence to recommendations and cues to hunger were the lowest of the four domains (See Table 4.3). The mean scores for pre-surgery were 91.25 and 86.63, respectively. Adherence to recommendations and cues to hunger remained the lowest of the four domains pre- and post-surgery. The mean scores for post-surgery were 90.28 and 91.67, respectively, indicating the patients were between having a good chance (75%) and completely certain (100%) that they would be successful in adhering to the diet recommendations. These confidence levels may be low in response to the participants having experience with following the diet recommendations. It may be more difficult to adhere to the diet recommendations than originally believed pre-surgery.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Mean Pre-surgery</th>
<th>Standard Deviation</th>
<th>Mean Post-surgery</th>
<th>Standard Deviation</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence to diet recommendations</td>
<td>91.25</td>
<td>10.65</td>
<td>90.28</td>
<td>5.89</td>
<td>1.75</td>
</tr>
<tr>
<td>Cues to hunger</td>
<td>86.63</td>
<td>12.09</td>
<td>91.67</td>
<td>8.27</td>
<td>-.69</td>
</tr>
<tr>
<td>Self-sufficiency</td>
<td>98.13</td>
<td>4.58</td>
<td>99.31</td>
<td>2.08</td>
<td>.00</td>
</tr>
<tr>
<td>Overall success</td>
<td>96.46</td>
<td>5.62</td>
<td>98.15</td>
<td>3.67</td>
<td>-1.25</td>
</tr>
</tbody>
</table>

Table 4.3 Domain and Mean for Time 1 and Time 2 and Paired Samples T-test for differences between Time 1 and Time 2

The relationship between the pre-surgery overall success and weight loss was found to be statistically significant ($r = .86$), as the individual’s pre-surgery self-efficacy toward successful adherence to the recommendations of surgery increased, the weight loss increased (See Table 4.4). Adherence to the recommended diet and weight loss have a moderate positive relationship ($r = .42$). A positive relationship ($r = .31$) also exists between weight loss and cues other than hunger. As confidence in the individual’s ability to follow the diet in different situations increased weight loss also increased.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Pearson Correlation with Weight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence to the Recommended Diet</td>
<td>.42</td>
</tr>
<tr>
<td>Cues other than Hunger</td>
<td>.31</td>
</tr>
<tr>
<td>Self-sufficiency</td>
<td>-0.05</td>
</tr>
<tr>
<td>Overall Success</td>
<td>.83**</td>
</tr>
</tbody>
</table>

** Statistically significant at the 0.01 level (2-tailed)

Table 4.4 Pearson correlations between weight loss and self-efficacy in four domains of post-bariatric surgery.

Participant’s excess weight loss has been outlined in Table 4.5 reflecting the individual’s amount of weight loss in pounds and the amount of time that has passed since surgery. Participants were at different stages in their weight loss for the post-surgery measurement. According to the National Institute of Health, bariatric surgery may result in weight loss of approximately 10 to 20 pounds a month. This table illustrates participants are having successful weight loss at this point in time.
Table 4.5 Weight, in pounds, lost by individuals grouped by months post-surgery.

<table>
<thead>
<tr>
<th>1-3 months post-surgery</th>
<th>3-6 months post-surgery</th>
<th>6-12 months post-surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>60</td>
<td>87</td>
</tr>
<tr>
<td>13</td>
<td>73</td>
<td>78</td>
</tr>
<tr>
<td>25</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion
Self-efficacy in this study was measured in terms of confidence level of patients receiving bariatric surgery regarding performance on specific tasks and comparing it with their weight loss after receiving bariatric surgery. Individuals were asked if they can perform the behavior, indicating a judgment of capability, where a statement expressing that they will indicates intention. “Perceived self-efficacy is a major determinant of intention, but the two constructs are conceptually and empirically separable.” Therefore the outcome measure, confidence level, indicates the individual’s self-efficacy towards the specific statement.

Results indicate that pre-surgery subjects in this study had high self-efficacy towards success at the recommendations following bariatric surgery. Furthermore, results from the questionnaire given after the surgery showed that self-efficacy was still high among these individuals. The measurement of weight loss indicated a significant, positive relationship between overall success and pre and post-self efficacy This indicates that as the individuals felt more confident about their success after surgery, the greater their weight loss. More specifically, it demonstrates that they were more confident that they could lose weight after surgery, achieve their goal weight and change their diet for life.
Positive correlations also existed among cues to hunger and adherence to diet recommendations but were not as significant. A negative correlation existed between self-sufficiency and weight loss.

Weight loss treatments should focus on increasing the patient’s self-efficacy towards the regimen prescribed. Focusing on each domain of self efficacy is vital because it is shaped and influenced by multiple factors including: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. Furthermore, these different facets serve as a feedback system within the self. The amount that efficacy is changed is dependent on how the information itself is appraised and weighted. Program coordinators of weight loss regimens need to be aware of their client’s personal efficacy and design treatments around it. This study has demonstrated a few areas which can be difficult for bariatric surgery patients; namely, those areas represented by the statements: I can adhere to the recommended diet after surgery, I can eat 5-6 mini meals daily, and I can avoid caffeine. Pre-surgery education can be designed to emphasize activities and information on these topics. Additionally, these constructs can be topics at follow-up appointments and support group meetings.

It is suggested interventions should focus on each domain of self-efficacy separately. The four domains include: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. Furthermore, this study identified several areas that may need to be of focus after surgery. These areas were adherence to the recommended diet after surgery, eating 5-6 mini meals daily and avoiding caffeine. For example, most individuals who are at risk for obesity have disordered eating schedules, such as skipping breakfast, hence the low confidence in eating 5-6 mini meals
daily. A possible task that the program can implement is trying to have the individual eat in a more scheduled manner by eating a breakfast, lunch and dinner. A small step like this can allow the individual to experience success, more specifically, and performance accomplishments. Additionally, group classes can allow the individual to relate to others when faced with tasks. For example, avoiding caffeine appears to be a problem area after surgery. Participants in the class, pre- or post-surgery, can relate to others, who like themselves, are struggling with the task. More importantly, the individuals can witness the success of others at the task and their own efficacy towards it may increase.

Verbal persuasion and emotional arousal can be coordinated. Verbal persuasion could be in the form of positive feedback in regards to task accomplishments which may be a vital role of the program leader and of the group members on others. Positive feedback may help promote a lower state of emotional arousal which is more conducive to increasing self-efficacy allowing the participants to feel more comfortable, less nervous, and promote a more positive attitude towards task mastery.

Bariatric surgery classes, interactions with health care professionals and support groups are all areas where it is possible to employ methods to maintain and increase a positive self efficacy. This study demonstrated a few areas that may need to be targeted that demonstrated low self-efficacy towards the recommendations of bariatric surgery. Additionally, a few methods of possibly increasing self-efficacy were also explored. Perhaps these efforts will help to ensure patient’s long term success. As obesity is on the rise in the U.S., one can only expect to see the number of bariatric surgeries to increase, as well.
Works referenced


Chapter 5
Discussion

5.1 Findings

Self-efficacy in this study was measured in confidence in the subjects to perform specific tasks after bariatric surgery. Individuals were asked if they *can* perform the behavior indicating a judgment of capability and *will* is a statement of intention. “Perceived self-efficacy is a major determinant of intention, but the two constructs are conceptually and empirically separable.” Therefore the outcome measure, confidence level, indicates the individual’s self-efficacy towards the specific statement.

In general, the participants had the highest self-efficacy during Time 2 for statements including: Limiting food to recommended portions, avoiding alcohol, attending all follow-up appointments after surgery, advising the doctor of any problems, asking questions during any part of the program, losing weight after surgery and achieving his goal weight after surgery. The mean score for these statements was 100 indicating that the participants were absolutely certain that they could perform these tasks. It may be important for bariatric surgery programs to ensure that they maintain these levels of confidence after surgery.

The specific statements that had the lowest mean score (86.1) during Time 2 includes: I can adhere to the recommended diet after surgery, I can eat 5-6 mini meals daily and I can avoid caffeine. This indicates that the participants’ confidence levels were between 75 to 100 percent certain they could perform these tasks. These statements reflect possible areas of focus for bariatric surgery programs, both before and after surgery.
Overall, mean scores were highest for the domains measuring self-sufficiency and overall success for both Time 1 and 2. For Time 1, the mean scores were 98.12 and 96.5, respectively and for the Time 2 was 99.3 and 98.1, respectively. The domains of adherence to recommendations and cues to hunger were the lowest of the four domains. The mean score for Time 1 was 91.3 and 86.6, respectively. The scores both changed during Time 2.

Pearson correlation between weight loss and each domain showed a statistical significance with overall success. This indicated that as the individuals felt more confident about their success after surgery the greater their weight loss. More specifically, this positive correlation (.826) demonstrates that they were more confident that they could lose weight after surgery, achieve their goal weight and change their diet for life.

5.2 Conclusion

Obesity is growing at an alarming rate. This condition can lead to further health problems such as diabetes, hypertension, arthritis and some cancers. Currently, bariatric weight loss surgeries appear to provide one option for the problem. Persons who have bariatric surgery may have success with weight loss to the extent of even reversing some co-morbidities. However, long term success of bariatric surgery depends on many factors including patient motivation and adherence to diet and exercise recommendations. An influential factor in maintaining the recommendations post surgery may be self-efficacy. Therefore, it is important to examine self-efficacy. An increased self-efficacy may lead to greater success rates of those who are confident in themselves. If this can be determined, it may not only predict successful individuals, but also those who need more cognitive
behavioral therapy to enhance their positive self-efficacy in weight loss. This study illustrated some of issues that can be focal points in bariatric surgery programs to ensure patient success.

5.3 Implications

Self-efficacy helps to shape one’s expectations and in turn influences other factors such as the amount of motivation that one may exert, goal setting and task achievement. Preconceived thoughts of anticipated outcomes and self confidence influence the goals that they may set for themselves. Pre-conceived expectations may impact the amount of energy that the individual will expend on reaching the goal. Additionally, it may also determine the amount of persistence that one will have for the particular situation when faced with obstacles or adverse events. Thus, self-efficacy is growing more important in health care. The medical system is changing its focus from treatment to health prevention and promotion. At the center of this change is the patient, who is now involved in his own care. In order to change and maintain desired health behaviors, health care professionals must develop interventions that will motivate the patient. Self-efficacy is a powerful tool that needs to be included in such interventions.

It is suggested that interventions focus on each domain of self-efficacy separately. The four domains include: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal. Furthermore, this study identified several areas that may need to be of focus after surgery. These areas were adherence to the recommended diet after surgery, eating 5-6 mini meals daily and avoiding caffeine. For example, most individuals who at risk for obesity have disordered eating schedules, such as skipping
breakfast, hence the low confidence in eating 5-6 mini meals daily. A possible task that
the program can implement is trying to have the individual eat in a more scheduled
manner by eating a breakfast, lunch and dinner. A small step like this can allow the
individual to experience success, more specifically, performance accomplishments.
Additionally, group classes can allow the individual to relate to others when faced with
tasks. For example, avoiding caffeine appears to be a problem area after surgery.
Participants in the class, be it before or after surgery, can relate to others, who are like
themselves, struggling with this task. More importantly, the individuals can witness the
success of others at this task and their own efficacy towards it may increase. The
influence of verbal persuasion and emotional arousal can go hand in hand. Verbal
persuasion could be in the form of positive feedback in regards to task accomplishments.
The program leader and of the group members on others may have a vital role in verbal
persuasion. This may help promote a lower state of emotional arousal which is more
conducive to increasing self-efficacy. This may allow the participants to feel more
comfortable, less nervous and promote a more positive attitude towards task mastery.

Weight loss treatments should focus on increasing the patient’s self-efficacy
towards the regimen prescribed. Focusing on each domain of self efficacy is vital because
it is shaped and influenced by multiple factors including: performance accomplishments,
vicarious experiences, verbal persuasion, and emotional arousal. Furthermore, these
different facets serve as a feedback system within the self. The amount that efficacy
changed is dependent on how the information itself is appraised and weighted. Program
coordinators of weight loss regimens need to be aware of their client’s personal efficacy
and design treatments around it.
5.4 Limitations

Limitations for this study include the low number of participants, use of a non-standardized tool for measurement of self-efficacy and analysis of subjects at different times after surgery. In regards to the Cronbach’s alpha scores, a larger number of statements in each domain may have increased reliability. An increased number of participants may also have increased the reliability. Additionally, it is suggested that the response scale have more than 5 intervals (0, 25, 50…100). The inclusion of 10 intervals (0, 10, 20…100) could allow for increased sensitivity and in turn may be a stronger predictor of performance than the 5-point scale allows.

5.5 Future Study

This study, although with limitations, is still important in illustrating a relationship between bariatric surgery weight loss success and self-efficacy. Further studies would be useful with a larger subject pool. This will help to ensure that the results can be generalized to the bariatric surgery population. Additionally, a long-term study can examine the effects of self efficacy toward the recommendations of bariatric surgery after the first one to two years after surgery. The outcomes of the surgery after the period of weight loss termed the ‘honeymoon phase’ can be measured. The ‘honeymoon phase’ is considered to be the weight loss period that occurs right after surgery due to the drastic restriction on the stomach alone. After this time period, the patient has to commit to the recommendations of surgery in order to continue losing weight. There are many demands of bariatric surgery, which require that the individual stay dedicated and a positive self-
efficacy may help. An individual’s self-efficacy towards being successful with weight loss post surgery may prove to be a vital component in predicting his long term weight loss success. Programs that are designed for bariatric surgery candidates before and after surgery can focus on strategies to increase self-efficacy and weight loss success rates. The programs can use different tactics to measure individual’s self-efficacy towards specific tasks and work on those specific areas to help ensure that the participant is successful.
Appendix A

Dear Wellness Participant,

Hello! We are writing you once again to participate in the continuation of our study on gastric bypass surgery. As you continue with your life style adjustments to the surgery, we would like your help.

As you were invited previously, we are asking you to re-participate in the study about your perceptions of the gastric bypass outcomes, especially those related to the eating patterns that you were asked to change. We are interested to know how your perceptions change over time, so we are asking you to re-take the same survey you filled out prior to the end of the education class before your surgery. This is an ongoing study, so we will ask for your help twice more up to your year anniversary.

The information that you provide can help us further understand the patients’ perceptions and successes with the outcomes of gastric bypass surgery. We hope that the outcomes of this research will help us create future education sessions. The research is also a component of graduate students’ research at Ohio State. We hope that you will continue to participate in our study. Please know that if you decide at any time to not participate in the study, your care will not be affected. You may be assured of complete confidentiality. Your name or university will never be placed on the survey. Responses will be summarized and reported as a whole.

Please complete the attached survey, place in the envelope provided, seal and return to Dr. Kindrick. We will be using the address you provide to send your follow-up surveys. If you have any questions or concerns regarding the project, please feel free to contact Kay Wolf at kay.wolf@osumc.edu or Shirley Kindrick at Shirley.Kindrick@osumc.edu.

Sincerely,

Kay N. Wolf, PhD, RD, LD
Director

Shirley Kindrick, PhD, RD, LD
Adjunct Assistant Professor

Robin Schmitt
Graduate Student
Appendix B

Initials: __________  Last 4 digits of phone number: __________

Diet/Life-Style Efficacy Questionnaire

Please fill-in the blank or check the appropriate box that applies:

Height: ______  Weight: ______________  Date of Surgery: ______________

Type of bariatric surgery received:  □ Gastric bypass  □ Lap-band

For the following questions please rate your confidence concerning the statements using the five-point percentage scale with 0% being no chance at all and 100% completely certain.

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can adhere to the recommended diet after surgery.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. I can eat 5-6 mini meals daily.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. I can limit my food to recommended portions.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. I can eat high protein foods.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5. I can drink fluids in-between meals.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>6. I can avoid alcohol.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7. I can avoid caffeine.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>8. I can resist high-calorie foods.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>9. I can follow a recommended diet at restaurants.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>10. I can resist peer-pressure when I eat.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>11. I can follow a recommended diet at a party.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
12. I can ask others to help support my new lifestyle (diet and exercise) changes.
   
13. I can go to all my scheduled follow-up appointments post-surgery.


15. I can ask questions if I need to during any part of the program that I’m unsure about.

16. I will lose weight after surgery.

17. I can achieve my goal weight after surgery.

18. I can change my diet for life.
Works Referenced


