Kentucky Journal of Undergraduate Scholarship

Volume 5 | Issue 1 Article 4

6-2021

Decisions are More Than Skin Deep: Exploring Correlations between Self-esteem and the Decision to have Bariatric Surgery

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Decisions Are More than Skin Deep: Exploring Correlations between Self-Esteem and the Decision to Have Bariatric Surgery

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Abstract: *Bariatric surgery is now a commonplace approach to addressing obesity. One insightful area of research is examining how bariatric decision relates to self-esteem. Of particular interest is correlations between self-esteem levels and the reason the surgery was selected, the source of the decision to get the surgery, and if the surgery recipient experienced a major life change following the event. In this study, the researchers examine a convenience sample of persons receiving bariatric surgery (n=31) and their motivations for having the surgery along with a pre-post measure of having the surgery. Results show respondents who indicated having the surgery was their idea had higher self-esteem prior to surgery while respondents who had the surgery to address their physical appearance or lose weight reported lower self-esteem prior to the surgery. In contrast, respondents who indicated they had the surgery to prevent a medical problem reported slightly higher self-esteem post-surgery.*

Keywords: *self-esteem; bariatric surgery*

Obesity and its related medical issues are increasingly being addressed through surgical procedures such as bariatric surgery (ASMBS, 2016). Bariatric surgery (which includes gastric bypass, gastric sleeve, gastric bands, and duodenal switches) impact obesity through restricting the volume and nutrient intake of food as well as insulin sensitivity while also addressing behavioral changes (Lim, 2016; ASMBS, 2016). Although the surgical approach offers risks, it also offers desirable outcomes to those able to adhere to the post-surgery guidelines (NIDDK, 2015). One overlooked element of the exhaustive research on bariatric surgery is an exploration of how characteristics like self-esteem can shape the decision to actually obtain the surgery, and how the decision to have the surgery might also shape one's self-esteem in turn. Although studies have linked constructs such as obesity and self-esteem (see Baudson, Weber, & Freund, 2016), there is room for new research examining how self-esteem relates to bariatric surgery. Specifically, it is interesting and useful to understand how different reasons for getting the surgery might reflect changes in self-esteem. Similarly, it is valuable to examine how these changes are understood both pre- and post-surgery. In this study, the authors explore how self-esteem correlates with multiple reasons for getting bariatric surgery. Using an online survey of persons who have received bariatric surgery, respondents shared their self-esteem both pre- and post-bariatric surgery, as well as some of their motivations for having the surgery. Results indicated three significant differences in self-esteem (two pre-surgery, one post-surgery).

Obesity is a medical condition that can now be surgically treated (Farrell, Haggerty, Overby, Kohn, Richardson, Fanelli, 2009; NIDDK, 2015; Lim, 2016; ASMBS, 2016). Currently one-third of the US population is estimated to be obese (Farrell, et al., 2009). The definition of obesity is to have a body mass index (BMI) of 30 or greater (NIDDK, 2015). Evidence suggests that for the morbidly obese to achieve substantial and sustainable weight loss, surgical operations are the best treatment options (Farrell, et al., 2009). Bariatric surgery is only an option for the severely obese who have tried other ways to lose weight without success and those suffering with health problems related to their weight (NIDDK, 2015).

Furthermore, there is an increased risk of medical conditions and emotional issues associated with obesity, which makes it a priority for physicians to assess and treat (Aronne, 2012). Sleep apnea and type 2 diabetes are among the possible complications caused by obesity (Aronne, 2012). High blood pressure, unhealthy cholesterol levels, urinary incontinence, body pain, and knee and hip pain are also among the risk factors associated with obesity (NIDDK, 2015). Studies show that both the gastric sleeve and the gastric bypass are effective for improvement and remission of diabetes (ASMBS, 2016). Studies also show a reduced risk of cardiovascular-, stroke-, and cancer-caused mortality among bariatric surgery patients (Adams, Mehta, Davidson, & Hunt, 2015). Indeed, obesity is a significant cause of mortality (Christou, Sampalis, Liberman, Look, Auger, McLean, & MacLean, 2004), which is why treatments such as bariatric surgery are so important. Evidence shows that bariatric surgery improves survival among severely obese patients (Arterburn, Olsen, Smith, Livingston, Scoyoc, Yancy, Eid, Weidenbacher, & Maciejewski, 2015).

Bariatric operations include volume-restrictive and nutrient-malabsorptive procedures that effect satiety, absorption, and insulin sensitivity in combination with behavior changes to reach and sustain weight loss (Lim, 2016). To be more specific, bariatric surgery is an operation that helps a person lose weight either by reducing the size of the stomach so the person eats and drinks less, or by changing the small intestine so that it absorbs less calories and nutrients from what the patient consumes (NIDDK, 2015).

There are four types of bariatric surgeries used in the United States: gastric bypass, gastric sleeve, gastric band, and duodenal switch (NIDDK, 2015). The most common procedures are the gastric bypass and gastric sleeve, so this research will focus on those two. The gastric bypass is also referred to as the Roux-en-Y (ASMBS, 2016). The procedure first creates a one-ounce pouch in the top of the stomach, then divides the small intestines and connects the lower portion of those intestines to the created stomach pouch. Then, surgeons finish by connecting the top part of the intestines further down on the small intestine so the stomach acids and digestive enzymes bypass the stomach but still mix with the food while in the small intestines (ASMBS, 2016). The gastric bypass procedure is highly effective as a result of the creation of a smaller stomach, which causes the person to consume fewer calories. Additionally, the rerouting of the food changes the gut hormones, causing satiety and suppressing hunger (ASMBS, 2016). The laparoscopic sleeve gastrectomy is also referred to as the sleeve (ASMBS, 2016). This procedure is performed by removing approximately 80 percent of the stomach and leaving a tubular stomach that is similar in size and shape to a banana (ASMBS, 2016). The sleeve procedure is also highly effective and operates by creating a smaller stomach, which causes the person to consume less food. Similarly, the gut hormones react in such a way that it also impacts hunger, satiety, and blood sugar control (ASMBS, 2016).

Additionally, prior research has examined bariatric patients' demographic patterns (DeMaria, Pate, Warthen, Winegar, 2010). DeMaria et al. (2010) utilized a sample of 57,918 patients, 41,243 of which were between the ages of 26 and 55. Less than one percent were under the age of 18 (.14%) and almost six percent (5.67%) were over the age of 66. A majority (78.76%) of the patients were females, while another important demographic majority was White patients (78.12%). In all, 10.52% registered as African-American, 6.02% as Hispanic, .46% as Native American, and .20% as Asian. Of those patients, the majority chose to have the gastric bypass procedure (54.68%) more than any other any other bariatric procedure (DeMaria, et al, 2010).

Although the surgery is extremely beneficial, it is not a guarantee fix, and has some possible complications or disadvantages. The gastric sleeve has the advantage of requiring no re-routing of the food stream compared to the gastric bypass, and requires only a short hospital stay of two days or less (ASMBS, 2016). A major disadvantage of the sleeve, however, is that it is a non-reversible procedure and has the potential for long-term vitamin deficiencies (ASMBS, 2016). In regards to gastric bypass, because of its high complexity, it has high complication rates (ASMBS, 2016). Other disadvantages of gastric bypass are an increased risk of long-term vitamin/mineral deficiencies, usually requires a longer hospital stay than gastric sleeve patients (ASMBS, 2016), and, due to the way the bypass creates a difference in which the body breaks down and absorbs alcohol differently, possible alcohol-related issues (NIDDK, 2015). Additionally, the vitamin deficiencies and potential lack of nutrients can lead to health problems like anemia or osteoporosis (NIDDK, 2015). Gallstones can occur after rapid weight loss so that is a potential side effect from all bariatric surgeries (NIDDK, 2015). Other problems that could occur after bariatric procedures include strictures (narrowing of the new stomach or at the connection between the stomach and small intestine) which can cause nausea, vomiting, trouble swallowing, and hernias (which is repaired with another surgery) (NIDDK, 2015). Another important consideration is that these surgeries do not ensure 100% excessive weight loss. Specifically, the gastric bypass produces a long-term weight loss of 60 to 80 percent of a patient's excess weight, with the gastric sleeve having comparable weight loss percentages (ASMBS, 2016).

Other potential side effects from bariatric surgeries are bleeding, infection, leaking from the site where the sections of the stomach or small intestine were sewn together, diarrhea, blood clots, and death (NIDDK, 2015). Specifically, in a study of 57,918 patients, 78 of those patients died due to complications of the surgeries which put the mortality rate at .13% (DeMaria, et al, 2010). Birkmeyer et al. (2010) found that, in a sample of 15,275 bariatric patients, 7.3% experienced perioperative complications, most of which were minor-like wound problems. Prior literature also indicates that patients are at an increased risk for externally caused death such as suicide (Adams, et al., 2015). Indeed, there are risks involved in all surgeries, and it is critical that potential bariatric patients consider them, however, the studies show that these surgeries are saving lives at a tremendously higher percentage than the percentage of patients dying from the surgeries.

Research suggests that a person's self-esteem is linked to their physical appearance (CITE!). Indeed, the results of Frederick et al. (2016) showed that people with a higher BMI were less satisfied with themselves. The study examined the appearance and weight satisfaction among 12,176 adult men and women. Fifteen percent of the men and 20 percent of the women were "very-extremely dissatisfied" with their weights. Results indicated that weight and appearance satisfaction were associated with overall life satisfaction. In a similar study by Baudson et al. (2016) which focused on adolescents, results showed that good looks is an attribute associated with the perfect human. The idea of a perfect person is unattainable and leads people to feel inadequate. Charles Horton Cooley's (1902) "looking-glass self" concept was the assumption that one's self-perception mirrored how others perceived them. These notions are reflected in the structure of self-concept, which can be defined as the beliefs and attitudes people have about themselves, and beliefs one has about their own appearance is one main dimension of self-concept. The term self-concept has often been used interchangeably with the term *self-esteem*,

therefore, one can say that someone's opinion of their own appearance is a main dimension of their self-esteem, they are linked, and they feel that their opinion about themselves is also the opinion of others.

Although the majority of research focuses on the physical health that improves due to weight loss surgery, an aspect that seems to be overlooked is the *emotional impact* the surgery has on patients. The medical conditions that improve after bariatric surgery are numerous and that alone is reason for medical professionals to recommend the procedures to any morbidly obese patient. Treatment should not stop on the physical front, nevertheless, emotional health should be considered during the preop and postop stages. Indeed, an increased risk of externally-caused deaths, including suicide, after bariatric surgery is a valid reason for concern (Adams, et al., 2015). One must continue to monitor the patient even after surgery to better understand why the surgeries do not always succeed with maximum weight loss and externally-caused deaths rise. Surgeons should recommend that their patients seek help from mental care professionals, even just for routine checkups, to stay on top of their mental health during a time of drastic change in their lives.

Based on the literature review on this topic, the researchers established five hypotheses using difference of means testing to explore relationships between one's rationale for having the procedure and one's self-esteem.

H1A. Post-surgery self-esteem means will be higher for persons choosing bariatric surgery due to reasons attached to appearance.

H1B. Pre-surgery self-esteem means will lower for persons choosing bariatric surgery due to reasons attached to appearance.

H2A. Post-surgery self-esteem means will be higher for persons stating it was their choice to have the surgery.

H2B. Pre-surgery self-esteem means will be lower for persons stating it was their choice to have the surgery.

H3. Self-esteem means will be higher for persons stating they experienced a major life change post-surgery.

Method

Participants

Based on existing literature, the researchers examined how self-esteem and the decision to have bariatric surgery might be correlated with changes in self-esteem. The authors collected survey responses from a Facebook support group of persons (N = 125) who have had bariatric surgery. The online survey was released to the group on three occasions across a one-month period. In all, 31 persons responded to the survey. As not all persons who have had bariatric surgery have an opportunity to complete this survey, the sample is best treated as a convenience sample. As such, caution should also be used in applying any findings in the study to all persons who have had bariatric surgery.

Measures

This study utilized the Rosenberg Self-Esteem Scale, a ten-item and seven-point Likert item with four reverse coded items (with possible scores ranging between 1 and 7). The scale is posed to the respondent twice. Upon first assessment, they are asked to describe their self-esteem at the present time. Later, they are asked to think back in time to when they were considering having the surgery. Although the authors acknowledge it is imperfect, this gives the authors the best possible opportunity to analyze how other variables related to the surgery might have impacted self-esteem. Table 1 lists the item means for the scale examining self-esteem prior to the surgery (α = .866). Table 2 lists the item means for the self-esteem measure post-surgery (α = .935).

Item	n	Min	Max	Mean	SD
On the whole I am satisfied with myself.	30	1	7	4.67	2.00
At times, I think I am no good at all. (reverse coding)	30	1	7	4.50	1.99
I have a number of good qualities.	28	1	7	3.32	1.61
I am able to do things as well as most people.	28	1	7	4.18	1.96
I feel I do not have much to be proud of. (reverse coding)	28	1	7	3.86	1.97
I certainly feel useless at times. (reverse coding)	28	1	7	4.61	1.87
I feel that I'm a person of worth at least on an equal plane with others.	28	1	7	3.50	1.81
I wish I could have more respect for myself (reverse coding)	28	1	7	2.75	1.81
All in all, I am inclined to feel that I am a failure. (reverse coding).	28	1	7	4.14	2.10
I take positive attitude toward myself.	28	2	7	4.39	1.83

Table 1. *Descriptive Statistics for Self-esteem Scale (Before Surgery)* (α=.866)

Published by Encompass, 2021

Item	n	Min	Max	Mean	SD
On the whole I am satisfied with myself.	31	2	7	5.58	1.34
At times, I think I am no good at all. (reverse coding)	31	1	7	5.03	1.92
I have a number of good qualities.	31	3	7	5.87	1.15
I am able to do things as well as most people.	31	2	7	5.71	1.40
I feel I do not have much to be proud of. (reverse coding)	31	2	7	5.77	1.33
I certainly feel useless at times. (reverse coding)	31	1	7	4.97	1.82
I feel that I'm a person of worth at least on an equal plane with others.	31	3	7	5.81	1.25
I wish I could have more respect for myself (reverse coding)	31	1	7	3.74	1.77
All in all, I am inclined to feel that I am a failure. (reverse coding).	31	1	7	5.74	1.57
I take positive attitude toward myself.	31	2	7	5.35	1.54

Table 2. *Descriptive Statistics for Self-esteem Scale (Post Surgery)* (α = .935)

Next, the authors generated several variables that, based on literature, could explain why the respondent elected to have bariatric surgery and the manner in which those variables could influence self-esteem. First, respondents were asked their primary reason for having the surgery. Options offered included having the surgery to prevent a medical problem, to fix an existing medical problem, to change their physical appearance, to lose weight, and to find a solution to yo-yo dieting. Respondents could check any option that they felt applied to their experiences. Respondents were also offered a write-in category, but as only one respondent used it, it was not included in the analysis. For each category, a dichotomous dummy coding variable was created where 1 equaled the respondent being in that category and 0 equaled being outside that category. For example, if the respondent noted that they had the surgery to fix an existing medical problem they would be coded as a 1 in the new variable. Due to low *n* and respondents noting similarities in the wording of the two questions, the authors elected to combine persons who had the surgery to change their physical appearance and those who had the surgery to lose weight into a single category.

A measure asking if the respondent experienced a major life change following the surgery was also included. However, no analysis will be done on this variable in the self-esteem before surgery scale as the life change due to the order in which the variables would have happened. This was included as the authors expected this life event could also correlate with changes in self-esteem.

Finally, the authors generated measures on how the respondent first learned of their surgery. The authors analyzed one category ("I knew someone who had the surgery.") to examine how others could influence the decision to have the surgery. Similarly, the authors included a measure regarding if the respondent was the person who actively decided to have the surgery ("It was my idea to have the surgery.") or if it was someone else's idea, which helped account for social versus personal reasons for having surgery.

Procedure

The authors examined how decisions for having the surgery impacted self-esteem using a difference of means test. First, the authors examined this relationship prior to going through the surgery, then after the respondent has completed the surgery. In all cases, the authors included p-values for one-tailed and two-tailed results. The one-tailed results examined if the difference between groups was less than zero or higher than zero, while the two-tailed examines if the difference was not equal to zero. Including these provided more clarity in the results in this exploratory study.

Results

Table 3 presents the mean, standard deviation, and min/max for all variables in this study. The two self-esteem scales are continuous scale measures formed via the Likert matrix and is described in the methods report. The remaining variables are dichotomous dummy coding and their means can be interpreted as percentages of cases indicating they are in that category. Overall, the sample self-esteem scale (before surgery) scores had a mean of only 3.73 with a minimum score of 1.00 and a maximum score of 6.50. In comparison, the sample self-esteem scale (after surgery) scores averaged 5.35, with a minimum of 2.20 and a maximum of seven, the highest possible score. Note that there were three participants who failed to complete the self-esteem scale (before surgery), which created slight *n* differences in the analysis noted later in this section.

	n	Mean	SD	Min	Max
Self-esteem Scale (Before Surgery)	28	3.73	1.51	1.00	6.50
Self-esteem Scale (After Surgery)	31	5.35	1.21	2.20	7.00
Prevent medical Problem	32	.28	.45	.00	1.00
Fix existing medical problem	32	.25	.43	.00	1.00
Change physical appearance or lose weight	32	.31	.47	.00	1.00
To find a solution to yo-yo dieting	32	.12	.33	.00	1.00
Experienced major life change	30	.40	.49	.00	1.00
I knew someone who had the surgery.	32	.78	.42	.00	1.00
It was my idea to have the surgery.	32	.78	.42	.00	1.00

Table 3. *Descriptive Statistics of Variables in Analysis.*

Recall that the dichotomous dummy coded categories examine the main reason for having the surgery, if the respondent experienced a major life change following the surgery, how the respondent first heard about the surgery, and whose decision it was to have the surgery. Regarding participants' main reasons for having the surgery, 28% of surgery recipients did so to prevent a medical problem, while 25% elected to have surgery to fix an existing medical issue. Almost a third of respondents indicated that changing their physical appearance or losing weight was the main reason for having the surgery. Only 12% felt that finding a solution to yo-yo dieting was the main reason for having the surgery. In all, 40% of respondents indicated they experienced major life changes after their surgery.[1] A notable 78% indicated they knew someone who had the surgery prior to selecting the surgery. Similarly, 78% also indicated it was primarily their idea to have the surgery. As these two variables had the same mean and standard deviation, it should be noted that these findings are not typos. Likewise, respondents' answers from the first variable were not always the same in the second variable.

Table 4 presents the difference of means testing, which examined reasons for getting the surgery, if the respondent experienced a major life change following the surgery, how the respondent first heard about the surgery, and whose idea was it

[1] Although not examined in this paper, the survey included a question asking the respondent to state in their own words the nature of their major life change. The authors categorized their answers into the following groups: education change (3), employment change (2), martial/relationship change (2), physical activity change (2), and medical problem change (1). Future research should examine this important aspect of the decision to undergo surgery, leading the authors to include this research note.

to get the surgery, and the differences in self-esteem before and after the surgery. The table lists p-values examining both ends of the t-test for reference purposes and includes two significant results. First, respondents who indicated that they had the surgery to change their physical appearance or lose weight had lower mean self-esteem prior to the surgery (2.60) than those who did not (3.92). Second, respondents who indicated that it was their idea to have the surgery had statistically higher self-esteem (4.01) than those who did not indicate this was a reason for having the surgery (2.71). These findings give evidence to support hypotheses 1B and 2B.

Table 5 examines self-esteem post-surgery in which only one finding was statistically significant. Respondents who indicated that they had the surgery to prevent a medical problem had statistically higher self-esteem (5.97 vs 5.10). Based on these findings, this evidence does not support either hypotheses 1A, 2A, or 3.

	Category (cases)	Mean (SD)	(p: Difference <0)	p: Difference not equal to zero	(p: Difference >0)	t-test Result (df)
Prevent medical Problem	0=20	3.54 (.36)	.13	.27	.86	-1.10 (26)
	1=8	4.23 (.41)				
Fix existing medical problem	0=22	3.56 (.30)	.12	.24	.87	-1.18 (26)
	1=6	4.38 (.69)				
Change physical appearance or lose weight	0=24	3.92 (.28)	.94	.10	.05	1.68 (26)
	1=4	2.60 (.96)				
To find a solution to yo-yo dieting	0=24	3.76 (.32)	.59	.81	.40	.23 (26)
	1=4	3.57 (.45)				
Experienced major life change post-surgery	-	-	-	-	-	-
	-	-				
I knew someone who had the surgery.	0=5	4.16 (.61)	.74	.50	.25	.67 (26)
	1=23	3.64 (.32)				
It was my idea to have the surgery.	0=6	2.71 (.67)	.03	.06	.96	-1.96 (26)
	1=22	4.01 (.29)				

Table 4. *Difference of Means Testing for Self-esteem Measures and Reasons for Undergoing Bariatric Surgery, Pre-surgery*

	Category (cases)	Mean (SD)	(p: Difference <0)	p: Difference not equal to zero	(p: Difference >0)	t-test Result (df)
Prevent medical Problem	0=22	5.10 (.26)	.03	.06	.96	-1.89 (29)
	1=9	5.97 (.28)				
Fix existing medical problem	0=24	5.39 (.25)	.62	.75	.37	.31 (29)
	1=7	5.22 (.40)				
Change physical appearance or lose weight	0=26	5.43 (.21)	.79	.40	.20	.83 (29)
	1=5	4.94 (.77)				
To find a solution to yo-yo dieting	0=27	5.35 (.24)	.48	.97	.51	-.02 (29)
	1=4	5.37 (.32)				
Experienced major life change	0=18	5.21 (.32)	.20	.41	.79	-.82 (27)
	1=11	5.60 (.29)				
I knew someone who had the surgery.	0=6	5.95 (.25)	.90	.18	.09	1.34 (29)
	1=25	5.21 (.25)				
It was my idea to have the surgery.	0=6	5.13 (.75)	.31	.62	.68	-.04 (29)
	1=25	5.41 (.21)				

Table 5. *Difference of Means Testing for Self-esteem Measures and Reasons for Undergoing Bariatric Surgery, Post-surgery*

Discussion

The analysis in this study offers new exploratory knowledge of the complex relationship between self-esteem and bariatric surgery, as well as a number of new outlets for future research. First, the difference of means tests indicated that there is a relationship present between reasons for getting bariatric surgery and self-esteem both before and after the surgery. The explanations for this finding, however, are still convoluted and deserve more research. For example, when looking at persons who chose the surgery to change their physical appearance or to lose weight, what remains unclear is exactly how physical appearance manifests into self-esteem. A potential explanation here could be socialized expectations about appearance. The person considering the surgery has, across their life course, experienced ideas about what a normal person looks like, which might influence their decisions. Similarly, the person may be seeking to match some kind of preconceived idea of beauty or wellness. More work should be done to explore surgery recipients' motivations, including what other forces (such as social/family networks or even mediated images and preconceptions of beauty) may shape that decision. Future research should explore how one's self-appearance manifests into the decision to get surgery (or vice versa: how the decision to get the surgery shapes one's self-image).

Second, the study offers one case in which self-esteem changes post-surgery as a result of decision-making. Specifically, persons who chose to have the surgery for medical reasons correlated with higher self-esteem. Persons who indicated that getting the surgery to address medical problems on average had the highest means of any post-surgery category (5.97 of 7). This is a very interesting finding, but it also leads to more questions. For example, how exactly does the relationship between the two variables occur? Arguably it could have little to do with the surgery. It is reasonable that addressing any major life issue (such as a medical problem) could manifest as improved self-esteem. Even the process of overcoming a life barrier or meeting a life goal could correlate with the improved self-esteem. As such, further research should examine the nuance of how this change might function.

Third, mean self-esteem, regardless of reasons for choosing the surgery or influences on having the surgery, does show a slight change pre and post-surgery. Recall in Table 3

that the pre-surgery mean self-esteem was 3.73, while the post-surgery mean was 5.35. The max score would be a 7 in this scale. This offers an interesting finding that the surgery is having some kind of impact on the recipient. Exactly how that change is experienced, however, is unclear and deserves more research. For example, is the change a manifestation of feeling a different level of health, socialized understandings of beauty, or perhaps some other force altogether? This topic requires deeper analysis.

Fourth, the analysis also provides support for new research that looks in more detail at social networks' and relationships' impact on the decision to get bariatric surgery and how these might matter. For example, there were no statistical differences in means for persons who indicated they knew someone else who had the surgery (which was the bulk of the sample). However, persons who did not chose the surgery for themselves reported very low self-esteem (2.71 of 7). Is this lower self-esteem due to the participants taking others' perspectives into account, or perhaps allowing others to impact the decision-making process? It would be interesting to understand how social networks might impact an individual's self-esteem and conceptions of their appearance, while also examining this among the decision-making process for getting surgery.

This study includes several omissions that should be addressed in future research. First and foremost, the findings are difficult to extrapolate to all persons who have had bariatric surgery. There are also additional variables, such as changes in our society, which are not accounted for in this snapshot of a small group of bariatric surgery recipients. One further issue with the sample is that participants were engaged in a support group, which could also shape the data in unpredictable ways.

Next, the measurement of self-esteem prior to the surgery, while interesting, is also problematic. Although in spirit a respondent could go back to that moment and reflect on their self-esteem, it is still something that can be shaped by events that have happened since that moment. Ideally, this kind of data should be collected from future surgery recipients prior to their surgery, making a more ideal analysis of this relationship.

This exploratory study also offers directions for future research in relation to its findings. One example is an in-depth examination of the two-way relationship between self-esteem and bariatric surgery. Thorough analysis using larger samples could help establish how these variables influence each other and provide new information about the direction of the research. As mentioned in several cases in the discussion, the study also warrants further research into clarifying the relationships between self-esteem and bariatric surgery. There is need of more thorough explanations regarding the nuances of how these changes in self-esteem might be experienced in relation to changes post-surgery, but also how overcoming life issues (such as a medical problem) might equally be relevant to the change in self-esteem.

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