

**“MAKING IT WORK:” THE ROLE OF GOALS, STRATEGIES AND SELF-
MONITORING IN DIETARY CHANGE AND WEIGHT MANAGEMENT
AFTER GASTRIC BYPASS SURGERY**

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Dietary practices following gastric bypass surgery must encompass new restrictions on eating, prevention of nutrient deficiencies, and weight maintenance. Using a mixed-methods approach, this project aimed to uncover gastric bypass patients’ experiences with long-term dietary practices and weight loss. All participants in this project were recruited from support groups in Upstate New York and were a minimum of one year post-surgery. In-depth, semi-structured, qualitative interviews were used to gain descriptions of patients’ experiences with dietary and weight management. Transcripts were analyzed using the constant comparative method, a grounded theory approach, and a constructivist perspective. The first analysis revealed participants’ weight loss outcome trajectories, which were characterized by periods of weight change accompanied by dietary transitions and changes in dietary management. Participants’ abilities to make cognitive and behavioral changes in dietary management following surgery differentiated their weight outcomes into one of three long-term trajectories: Maintained, Regain/Lost, or Regained. The second analysis uncovered complex,

multi-leveled networks of goals, strategies, and monitoring behaviors. The four emergent main goals (Weight Management, Health, Avoid Negative Reactions, and Integration) were supported by lower level goals. Lower level goals were accomplished through a multitude of strategies. Monitoring methods were used to assess strategy effectiveness and goal achievement. An emergent hypothesis from this analysis was that monitoring behaviors were related to successful weight loss outcomes after gastric bypass surgery. To explore this relationship, an on-line survey was developed to assess dietary monitoring (keeping food records and portion control methods), weight monitoring (self-weighing with a scale), and their association with current BMI, percent excess BMI lost, and percent weight loss maintained. Higher scores for dietary monitoring behaviors, being unmarried, and lower pre-surgery BMI were associated with lower current BMI and greater excess BMI lost, when controlling for age, sex, and time since surgery. Dietary and weight monitoring were positively related to percent weight loss maintained, however, once other variables were controlled for in the statistical models, the relationship was not significant. This project emphasized the complex and dynamic processes of weight and dietary change after gastric bypass surgery.

BIOGRAPHICAL SKETCH

Amanda began her academic career at Penn State University as an English major, after spending the better part of high school on editorial boards for magazines and newspapers. However, after a semester, she switched her major to Nutrition, realizing she liked food more than writing. While she has developed a better appreciation for writing during her years at Cornell, she still prefers cooking, eating, and talking about food. Upon graduating from Penn State with a bachelor's in Applied Nutrition, she completed a dietetic internship at Cornell. She then worked for two years at Strong Memorial Hospital in Rochester New York as a clinical dietitian on general medicine and surgical units. She decided to return to Cornell to pursue her PhD, and completed her Masters degree in 2008. In addition to developing research and writing skills, Amanda also began to hone her athleticism, completing her first triathlon, half marathon, and 100 mile bike ride around Lake Cayuga. She also volunteered as a dietitian for the Ithaca Free Clinic and as a cook for the Nutrition Graduate Student Organization's annual Cooking Demonstration. While in Ithaca, she met and married her husband, David Burress (who makes amazing tamales), and they are currently living in Buffalo, New York.

To Dave

For your constant encouragement, support, and love

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CHAPTER 1

INTRODUCTION

Obesity and Obesity Treatment in the United States

Obesity is a major public health concern in the United States due both to its growing prevalence and its relationship to increased co-morbidities and mortalities. The prevalence of obesity has steadily increased since the 1960s, however, evidence suggests that the trend has held steady among women over the past 10 years (1). The most recent data from NHANES (2007-2008) indicate over 30% of the US population is obese ($BMI \geq 30$) (1). Fourteen percent of the US population has a BMI greater than 35 and 5.7% of the population has a BMI greater than 40 (1). The fastest increasing subgroups of obesity are those with a BMI greater than 35 (Grade 2 obesity), and since 1986, there has been a 1000% increase in the number of persons with BMI greater than 50 (2).

Increases in morbidity and mortality associated with excess body fat make this increasing prevalence of obesity concerning from both public health and economic standpoints. Over 100,000 estimated excess deaths each year are attributed to obesity (3). Obesity is also associated with an increased risk of cardiovascular disease, sleep apnea, asthma, arthritis, and cancer (4, 5). Costs of obesity are substantial with estimates of \$147 billion spent on medical care associated with obesity per year (6) with a projected \$197 to 221 billion spent in 2020 if nothing is done to curb the increase in obesity (6, 7).

Efforts in reducing weight have focused on behavioral interventions for individuals including caloric reduction and increased physical activity. While diets do produce short-term weight loss, long-term maintenance of this weight loss has been shown to be modest at best. Anderson and colleagues (8) analyzed weight loss outcomes of dietary interventions with a minimum of 2 year follow-up and found weight loss maintenance at one year was 67%. At five years, maintenance was 21%, with an average weight loss maintenance of 4.6 kg for women and 4.7 kg for men (8). In another meta analysis of dietary and exercise interventions, average weight loss was 3.34 kg, with a two year maintenance of 1.64 kg (9). Given that a BMI of 30 represents approximately 30 pounds of excess weight, these average weight losses are not sufficient for a majority of obese persons looking to reduce their weight.

Pharmaceutical solutions have also been met with limited success. Most drugs have been removed from the market due to increased risks that are not outweighed by the weight loss benefits. There is currently only one FDA approved weight loss drug on the market, as Fen-Phen (fenfluramine and phentermine) and sibutramine (Meridia) were pulled from the market due to cardiac risks (10-12). Orlistat and its over-the-counter version Alli, (Xenical; Roche, Basel, Switzerland) work by inhibiting pancreatic lipase. When taken daily with meals, in combination with a hypocaloric diet, this drug results in modest weight loss (4.7-10.3kg) due to fat malabsorption (13). Orlistat has been associated with gastrointestinal complaints and liver, pancreas,

and kidney damage (14, 15). These increased safety concerns have led to petitions for its removal from the market. The fate of this weight loss drug remains to be seen.

In contrast to lifestyle and pharmacological interventions for obesity, bariatric surgery has been shown to result in dramatic weight loss that is successfully maintained over time. The two most common types of bariatric surgery performed in the US are laparoscopic gastric banding and roux-en-Y gastric bypass, which comprise approximately 8% and 88%, respectively, of bariatric surgeries performed in this country (16). Both gastric banding and gastric bypass result in weight losses greater than 10% of body weight in a year, compared to a loss of 1.6% among a control group of dieters (17). In a ten-year follow-up study, patients with gastric banding maintained a 13% weight loss, while gastric bypass patients maintained loss of 25% of their initial body weight. In contrast, dieters had an average weight gain of 1.6% above baseline body weight (17). Other studies have confirmed that gastric bypass surgery leads to greater weight loss and weight loss maintenance compared to gastric banding (18, 19), as well as greater reductions in waist circumference and percent body fat (20). These findings have led many to refer to gastric bypass surgery as the “gold standard” for weight loss surgery (21, 22).

Gastric Bypass Surgery, Weight Loss and Dietary Recommendations

Gastric bypass promotes weight loss through physical and structural alterations of the digestive tract. The stomach is partitioned to approximately 25-50 cubic centimeters and the small intestine is divided between the duodenum and jejunum,

reducing the absorptive surface by about one third, limiting the amount of food one can consume and absorb (23). Other effects of the surgery include food intolerances (24) and altered gastrointestinal and hormonal hunger and satiety signals (25, 26), which also contribute to reduced intake. The structural changes to the stomach and small intestine also place patients at risk for nutrient malabsorption, and lifelong vitamin and mineral supplementation is necessary (27, 28).

The recommended criteria for gastric bypass surgery is a body mass index (BMI: weight (kg)/height (m²)) of 40, or a BMI of 35 with significant health impairments (29). Long-term studies show that while a majority of patients remain significantly below their pre-surgery weight, the average BMI is between 30 and 35 (17, 30-32). Weight loss induced by gastric bypass surgery is associated with improvements of obesity related co-morbidities such as cardiovascular disease risk factors (17, 33), depression (34), asthma (35), and sleep apnea (36). Patients with pre-existing Type 2 diabetes experience blood glucose normalization or substantially improved glucose control which often occurs prior to appreciable amounts of weight loss (32, 37).

Gastric bypass surgery requires significant changes in dietary practices to manage decreased stomach capacity, food intolerances, nutrient deficiencies, and weight management. These changes begin immediately after surgery, as patients move from liquids to pureed foods and soft solids, progressing as tolerated over several weeks or months to a regular diet (38). To accommodate protein needs within the

constraints of the reduced stomach, patients rely on protein supplement drinks in the months following surgery (28) and eat protein first in meals after they have advanced to regular foods (39, 40). Drinking liquids between meals is also advised to avoid early satiety at meals and promote hydration (40).

Participants change their eating behaviors and food selection in part to prevent negative side effects. Nausea and vomiting frequently occur when an individual eats beyond the capacity of the reduced stomach, and patients are instructed to reduce portion sizes, increase meal frequency, and chew food thoroughly (39-41). New food intolerances lead participants to alter food selection. Common problem foods include dairy products, dry or chewy foods, red meat, tough poultry or pork, doughy breads, raw vegetables, and high fat foods (39). Sweets present a significant problem as they can cause dumping syndrome which occurs when large amounts of food solids and liquids rapidly empty into the small intestine (42). This overwhelms the small intestine's ability to absorb nutrients and causes fluid shifts, distention, pain, and diarrhea (43). Initially, weakness and rapid heartbeat can occur with possible onset of hypoglycemia some time later, which is thought to be the main deterrent in consuming high calorie, high sugar foods after gastric bypass surgery (39, 43, 44).

Gastric bypass is a radical intervention for obesity which successfully leads to substantial weight loss, weight loss maintenance, and positive health benefits. Given the current rates of obesity in the US, the lack of efficacy of other weight loss interventions, it can be expected that the number of surgeries will continue to

increase. Understanding the impact this surgery has on food and dietary practices is an important aspect of patient care, given the substantial changes to the gastrointestinal tract which lead to both changes in intake and nutrient absorption. In addition, understanding how these patients develop and manage new dietary requirements and restrictions in an “obesigenic” environment would provide needed insight into influences on long-term weight loss maintenance in this population.

Dietary Practices after Gastric Bypass Surgery

There is general agreement in the literature that gastric bypass surgery results in a dramatic decrease in calorie intake, almost completely due to the overall reduction in quantity of food consumed. Most studies indicate that calorie consumption begins to increase between six months and a year following surgery (45-49). The assumption is that the reduction in stomach capacity and altered gut hormones drive the decrease in calories, while over time intake increases due to the return of eating behaviors such as grazing or simply “noncompliance” with dietary recommendations.

In contrast, studies are mixed regarding changes in macronutrient composition and food selection following gastric bypass surgery. Although increases in percentage of calories from protein have been noted in the immediate post-operative period (45, 46), most studies report no sustained changes in macronutrient composition of post-surgery diets over time (24, 43, 45, 48, 50). Similarly, reported reductions in food choices have been noted including bread intake (43), milk products (46), and in pre-prepared meals (51), but these do not persist after one year. Studies report both

decreases and increases in sweets consumption (44, 50, 52). At least one study has documented an increase in dietary carbohydrate content (49), and one has noted a decrease in protein intake (53), both of which occurred after one year.

Other evidence suggests gastric bypass patients preferentially select lower fat foods, but do not systematically avoid high fat foods (54). Intolerances have been documented as reasons patients avoid high fat foods (20) and meat (24). Compared to obese controls, gastric bypass patients more frequently consume poultry, fish, and cooked vegetables and consume less chocolate, cake, and cookies (55). While providing detail on the contents of post-surgical diets, these studies do not provide reasons for these changes, with the exception of citing food intolerances. As participants' post-surgical food choices will impact their total caloric intake as well as their nutrient status, understanding their motivations and rationales is an important aspect in post-surgical counseling and education.

Two qualitative studies have examined gastric bypass patients' perceptions of changes after surgery. One study found participants described a transformation or "rebirth" after surgery which included the development of new eating behaviors and implementation of non-food related coping mechanisms (56). These participants described having to manage tension between the changes that occurred in their self perception, eating behaviors, and social life (56). Similarly, Ogden and colleagues (57) uncovered descriptions of "rebirth" following weight loss after gastric bypass surgery. In this investigation, participants described a new sense of control following surgery

which facilitated the development of new eating behaviors, but they also reported that other life factors and experiences shaped their dietary practices. Participants reported making a wide variety of dietary changes, including eating “less healthy” after surgery (57). These investigations suggest that dietary practices after surgery are not simply the result of negative consequences and depend on more than post-surgery dietary counseling, which warrants further investigation.

Dietary Practices and Weight Loss after Gastric Bypass

The role of dietary change in weight loss after gastric bypass surgery has been of increased interest given the substantial variation in weight loss outcomes (32, 37, 58, 59). With the exception of caloric intake, the literature remains contradictory and incomplete as to what factors promote weight loss maintenance or weight regain. Quantity of food eaten and caloric intake have consistently been related to greater weight loss (45, 58, 60). Few studies have found associations between macronutrient content of diet (e.g. percent calories from fat) and weight loss (58), though at least one found current weight was positively associated with carbohydrate and fat intake (60).

Welch and colleagues (61) examined a variety of gastric bypass specific dietary behaviors, such as eating small meals, using small utensils and plates, chewing food well, eating slowly, and assessing fullness, as well as food choice behaviors including protein, fruit, vegetable, whole grain and fluid intake. They found that none of the food choice or eating behaviors was related to weight loss (61). A follow-up study again found dietary behaviors two to three years after surgery were unrelated to

percent excess weight loss (62). In contrast, two studies have identified poor adherence to nutritional guidelines or dietary instructions as negatively impacting weight loss outcomes (50, 63). Limitations in these two studies exist as one did not define nutritional guidelines nor definitions of “low adherence” (63), while the other study assessed compliance with a single self-report question using a Likert scale asking participants to rate how well they were “following the diet plan given by the dietitian” (50). Participants’ rationales for performing or not performing behaviors were not addressed in any of these studies, nor were participants’ perspectives of “compliant” post-surgical diets.

Taken as a group, the studies on dietary practices following gastric bypass surgery provide evidence that gastric bypass recipients make specific dietary and behavioral changes which may influence sustained weight loss after surgery. However, they do not provide insight into reasons for the behaviors, nor whether patients’ believe these particular behaviors influence weight loss maintenance. These studies examined average changes across groups and did not identify individual practices or patterns of change. There is a need to understand patients’ explanations of dietary practices, as assuming early satiety, lack of hunger, and food intolerances are the driving forces for dietary change over simplifies the processes and behaviors involved. In addition, studies rarely examined gastric bypass patients’ perceptions of influences on weight loss. While Welch and colleagues based their survey on literature reviews and patient interviews, grounding their questions in patient experiences (61, 62), most

studies rely on researcher determined behaviors, factors, and perceptions of noncompliance. Because patient input is not sought, researchers may miss behaviors that patients utilize to successfully maintain weight loss.

Self-monitoring and Weight Loss in Non-Surgery Populations

Self-monitoring has been consistently and positively associated with weight loss and weight loss maintenance in interventions and observations of traditional weight loss methods (64). Self-monitoring is the evaluative and comparative components of the self-regulation of behavior, a theory which posits human behavior is goal-oriented (65-67). If one is not aware of his or her status or behaviors, there may little incentive to act or pursue change (67). Research in non-surgical weight loss methods suggests that self-observation behaviors, such as recording dietary intake and monitoring weight, positively influence both weight loss and weight loss maintenance (68). Although survey studies find that a majority of gastric bypass patients weigh themselves weekly as part of weight management behaviors, none have examined this behavior in relation to specific weight loss outcomes (69, 70).

Two types of self-monitoring have been reported in the traditional weight loss literature: recording behaviors such as food intake, or recording outcomes, such as weight. Research has shown a consistent and positive relationship between both types of self-monitoring and weight loss (71-73). Evidence also suggests that the act of monitoring matters more than the detail with which people record their behaviors

(74), implying that behavioral self-monitoring might act as an awareness generator of how often one performing their goal-directed behaviors.

Weight monitoring has been associated with long-term successful weight loss maintenance among both dieters (68, 75) and those at risk for weight gain (76).

Dieters who maintain weight loss monitor their weight more frequently than those who weigh themselves less frequently (77). Self-weighing may act as a check on weight regain, allowing individuals to address small weight gains which are easier to counteract than larger gains. In a study of male dieters, Byrne and colleagues (78) found that those who maintained weight loss reported monitoring their weight and taking action against weight gain, while those who had regained weight reported a lack of vigilance.

Study Purpose and Overview

This project was designed to address gaps in the literature regarding the long-term dietary practices and weight management behaviors of gastric bypass patients. Food selection and eating behaviors influence nutritional status, health, and weight loss maintenance following gastric bypass surgery, and understanding patients' perspectives on these behaviors is important. Patients create their own meanings for diseases and health which shape their behaviors (79, 80). These beliefs may not always be in line with practitioner views, but they will influence patients' thoughts and behaviors. Moreover, seeking patients' perspectives may expose previously undiscovered strategies or barriers, as well as shed light on the cognitive and behavioral aspects of changing dietary and weight management practices.

This project used a mixed-methods approach (81) to explore and understand gastric bypass patients' perspectives and experiences with dietary and weight changes. Qualitative methodology was chosen as it is suited to uncovering details about unexplored phenomenon that require detailed and descriptive answers (82). Survey methods were then employed to examine hypotheses which emerged during qualitative analyses.

In-depth, semi-structured interviews were used to acquire detailed information regarding patients' experiences with and perspectives of dietary practices and weight management. Analysis of these interviews yielded rich, detailed information on dietary behaviors and weight loss experiences, as well as generated hypotheses regarding the use of self-monitoring in long-term weight management. An on-line survey instrument was then developed to examine the role of self-monitoring behaviors in long-term weight loss outcomes among a separate sample of gastric bypass patients.

All participants in this project were recruited from gastric bypass support groups in Upstate New York and were at least 12 months post-surgery. A majority of weight is lost in the first 12 to 18 months and caloric intake returns to levels that promote weight maintenance as opposed to weight loss within a year after surgery (24, 45, 50). Focusing on the period after 12 months provides greater insight into behaviors patients develop as they established new ways of eating to manage weight loss and dietary requirements.

This dissertation comprises three papers resulting from this project. The first paper reports on how participants in the qualitative project constructed their weight management and dietary change processes over time. The analysis identified weight outcome trajectories which included periods of weight changes, phases of dietary management, and components of dietary management. The second paper reports the analysis of the qualitative data related to participants' descriptions of goals, strategies, and self-monitoring processes they developed to manage weight, health, and negative reactions to eating. This paper focuses on the relationships between strategies, goals and the processes of monitoring both behaviors and outcomes to assess goal attainment. The third paper reports on the development of an on-line instrument to assess self-monitoring behaviors and weight loss outcomes in gastric bypass patients. It explores the relationships between dietary and weight monitoring behaviors and the weight loss outcomes of BMI, excess BMI lost, and percent weight loss maintained.

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CHAPTER 2

“WHEN THE HONEYMOON IS OVER, THE REAL WORK BEGINS:” GASTRIC BYPASS PATIENTS’ WEIGHT OUTCOME TRAJECTORIES AND DIETARY CHANGE EXPERIENCES

Abstract

To understand gastric bypass patients’ experiences with managing food and eating for long-term weight management, this study examined patients’ self-reported, dietary changes and weight loss patterns. Thirteen women and three men between 15 months and 10 years post-gastric bypass surgery completed two qualitative, open-ended, in-depth interviews about their weight loss and dietary experiences. Using verbatim transcripts, researchers created timelines for each participant that summarized weight changes and the associated dietary thoughts, feelings, and behaviors. Constant comparative analysis of the timelines and transcripts identified a common initial rapid weight loss phase followed by a weight stabilization phase after which participants’ weight outcomes diverged into three possible long-term weight trajectories in subsequent years (Maintaining, Regained but Losing, and Regained). Dietary transitions over the phases of weight loss involved six components of dietary management: physical needs, hunger and fullness, relationship with food, strategy use, habit formation, and awareness of eating. In the “honeymoon period,” weight loss was “easy” because “surgery does the work” in limiting appetite, portion sizes, and

interest in foods. As weight stabilized, “the work begins” as participants became capable of eating a greater quantity and a wider variety of foods. Differences in weight outcome trajectories were associated with participants’ abilities to maintain their changed relationships with food and consistent strategy use, the successful formation of habits, and continued awareness of eating behaviors. Viewing weight loss outcomes of gastric bypass surgery as trajectories that develop as the result of dietary transitions and changes in dietary management suggests that patients need to be counseled on a variety of cognitive and behavioral strategies, and that they might benefit from follow-up health care support once their weight has stabilized.

Introduction

Gastric bypass surgery is increasingly being used as an intervention for morbid obesity, with an estimated 112,000 surgeries performed in North America in 2008 (1). Substantial weight loss, effective long-term weight loss maintenance, and amelioration of obesity related co-morbidities make this surgery an attractive option for obese individuals who have been unable to lose weight using dietary and lifestyle changes (2, 3). Dietary changes begin immediately after surgery, with post-surgical instructions to first consume clear liquids, then full liquids, followed by puréed and soft solids, after which patients may advance to a “normal” diet as tolerated (4). Patients then modify the “normal” diet as needed to accommodate physical and physiological changes that occur with the surgery. They must make significant changes to their dietary intake to

manage food intolerances (5, 6), nutritional deficiencies (7, 8), and reduced stomach capacity (9).

Patients vary considerably in weight loss after gastric bypass surgery. Average losses of 34-35% of body weight, or a reduction of 15-18 BMI units, have been reported (1). Studies suggest that a majority of weight loss occurs in the first 12-18 months after surgery, followed by a period of maintenance and then weight regain which typically occurs between two and three years (3, 10, 11). Amounts and prevalence of weight regain are not well understood both due to the lack of long-term studies, differences in outcome measures, and high attrition rates (10, 12).

Influences on weight maintenance and regain are also not well understood, though various eating behaviors have been identified, such as grazing (13), snacking (14), and choosing high calorie foods (15). Aside from reductions in caloric intake, (16, 17) no dietary behaviors (18, 19) or food choice selections (20-22) have consistently been associated with successful weight loss maintenance .

Existing studies examining relationships between specific dietary behaviors and weight loss have focused on researcher identified behaviors of interest. These studies offer few explanations as to why participants choose or avoid specific foods, why they engage in certain eating behaviors, or how they develop and manage new ways of eating after gastric bypass surgery. There is a need to understand patients' perspectives on these experiences, particularly in the long-term when patients are more

independent and less likely to be connected with the health care providers managing the immediate post-surgical period.

An integrated, grounded theory model of the food choice process (23) provides a useful framework for examining gastric bypass patients' long-term dietary management. This model takes a social constructivist perspective (24) and views people as actively constructing their thoughts, feelings, and behaviors in ways resulting from a variety of personal, social, cultural, economic, and environmental factors (23). To manage these influences, people develop personal systems of meanings and cognitive processes for making tradeoffs among conflicting food choice values (e.g. health, taste, and convenience), ways of classifying foods and eating situations (25), and scripts and routines for familiar situations (26). This model has been used to understand dietary change among cardiac patients (27-29), older adults (30), and athletes (31).

Food choice trajectories represent ways that people's thoughts, feelings, and behaviors about food interact with dynamic personal and environmental forces over time (32). From this perspective, gastric bypass surgery is a critical turning point in a patient's food choice trajectory. The concept of trajectories has been applied to understanding differences in cardiac patients' responses to dietary change interventions (27), changes in food and nutrition orientation over time among women (33), fruit and vegetable consumption in a multi-ethnic sample of adults(34), and women's experiences with post-partum weight loss (35).

The goal of this study was to develop conceptual understanding of how gastric bypass patients construct dietary behaviors and the relationship these behaviors have to long-term weight management. Using a social constructivist perspective and qualitative interviews, the researcher examined detailed information from patients regarding their experiences with dietary changes and weight loss management after surgery. This research approach and methods are well suited to revealing patients' realities which are often very different from the way the biomedical community constructs patients' experiences. Examination of the gastric bypass patients' perspectives on long-term dietary management can lead to insights both for clinical care and understanding of the dynamic nature of dietary change processes.

Methods

Purposive sampling (36) was used to recruit gastric bypass surgery recipients over 18 years old, who were a minimum of 12 months post-surgery. The researcher assumed that by one year, participants would have experienced their maximum weight loss (2, 3), would have transitioned to new ways of eating and managing weight in the context of a "normal" diet (4), and would be able to reflect upon the process of change and make comparisons between pre-surgery and post-surgery experiences. Pregnant women were excluded from the study because their dietary management needs would not be comparable to other adult patients.

Sixteen participants (13 female, 3 male) were recruited from three different bariatric support groups in Upstate New York. With permission of the support group

leader, the researcher attended support group meetings to observe the meetings and describe her study, to distribute flyers with details and contact information for those interested in participating, and to encourage participants to share flyers with others. She presented the study as an investigation regarding the experiences of dietary change and weight loss after gastric bypass surgery. The researcher, a registered dietitian and graduate student in nutrition, presented herself as a graduate student in human ecology to avoid potentially biasing participants' responses. In 2006, ten participants were recruited from two different support groups associated with hospitals in different cities. In 2009, six more participants were recruited from a third support group that met under the auspices of a work site wellness program. The university institutional review board approved all research protocols including recruitment efforts, informed consent processes, and participant involvement.

Two waves of recruitment were used because after initial analysis of the first ten participants, the researcher felt emergent similarities in topics, issues, and experiences might be due to shared support group participation and similar pre- and post-surgical treatments, as all participants went to one of three surgeons operating locally. As no major advances or changes in bariatric surgery practices had occurred between 2006 and 2009, it was assumed that medical management would remain comparable among all participants. In total, participants reflected upon experiences from six different surgical practices, and no differences in participants' experiences emerged that could have been attributed to the three year lapse in participation.

Theoretical saturation (37) was reached at the sixteenth participant, ending recruitment efforts.

Participant characteristics are summarized in Table 1.1. Participants ranged in age from 32 years to 63 years. Fourteen participants lived with a spouse or significant other, one participant lived with just her children, and one participant lived alone. Thirteen participants were employed part time or full time. Educational backgrounds and household incomes varied. Time since surgery ranged from 14 months to 10 years, with an average of three years and eight months. Fourteen participants had gastric bypass surgery as their first weight loss surgery, however, one participant had recently undergone surgical revision due to a staple line disruption and one had the bypass as a revision due to complications with a gastropasty. All participants' surgeries were covered by insurance.

Table 1.1. Characteristics of participants (n=16)

	Number
Marital Status	
Married/cohabitating	14
Single	2
Employment	
Full-time	9
Part-time	3
Unemployed/retired/disability	4
Education level	
High school diploma	1
Associates degree	6
Trade school	2
Some college	5
Graduate or advanced degree	2
Household Income¹	
\$10-19,000	1
\$20-29,000	1
\$30-39,000	1
\$40-49,000	1
\$50-59,000	3
>\$70,000	8
Time since surgery	
Less than 2 years (14-17 months)	5
2-4 years (2-3.75 years)	5
5-10 years (5-10yrs)	6

¹one person did not report their income

Semi-structured, open-ended interviews were used to elicit detailed descriptions of participants' experiences, providing a focus in topic while not limiting the content of participants' answers. Each participant was interviewed twice, providing the researcher with the opportunity to clarify and confirm topics and interpretations from the first interview. The development of interview questions was guided by the Food Choice Process Model (23, 38). The questions were developed to uncover participants' present and past food selection and eating behaviors and to understand the underlying influences and rationales for their choices, behaviors, and changes.

Questions covered a range of topics on dietary behaviors, weight loss, health, and surgical experiences. Interviews included broad questions such as “Tell me about the process of changing what you eat,” or “Tell me about your experiences with weight loss after surgery,” followed by more specific question such as “What was easiest to change in regards to food and eating? What was most difficult?” or “What are some strategies you use to manage your weight?”. Probing questions were used to elicit further detail on weight changes, dietary changes, and thoughts and attitudes regarding present and past experiences.

The interview guide was pilot tested with an individual meeting the criteria for the study. As no major changes were made to the questions or content for subsequent interviews, this participant’s interview was included in the data analysis. Interviews were conducted in mutually agreed upon locations between the participant and the researcher including cafeterias, offices, bookstores, and participants’ homes. Interviews lasted between 50 and 120 minutes, were audio-recorded, and transcribed verbatim.

Transcripts were reviewed and coded using the constant comparative method (37), using ATLAS.ti 6.2 (ATLAS.ti GmbH). Participants’ descriptions of weight loss and dietary change were identified and coded according to their meaning and depiction of experiences (39). Initial coding focused broadly on weight and weight loss and included pre-surgery dieting and weight changes, post-surgical weight loss, weight maintenance, and weight regain. Descriptions included perceptions of the

causes and consequences of obesity and reasons for weight loss, weight gain, and weight maintenance following gastric bypass surgery. These broad descriptions were broken down into smaller “meaning units” (39), which were sections of text that described the same concept. Coding continued in an iterative fashion until no further emergent concepts occurred. Concepts were grouped and categorized into common themes such as dieting histories, weight loss experiences, obesity attributions, weight goals, and changes in body. A chart was created for each participant to organize the summaries of text and quotes that related to each concept.

In describing their experiences with weight loss following the surgery, participants provided detailed accounts of their rates and patterns of weight loss, including actual weights and approximate months they reached their lowest weights, as well as physiological and physical changes they noticed. Participants also provided explanations for the rapid weight loss, weight plateaus (periods of no weight loss occurring between periods of rapid loss), and weight stabilization. Patterns of weight loss emerged based on self-reports of weight maintenance, weight regain, and loss of regained weight. Based on these accounts, a timeline was drawn to represent each participant’s weight loss pattern, beginning with pre-surgery weight and ending with weight at the time of the interview.

As timelines for participants were drawn, descriptions were re-read and notes were made on the timelines regarding participants’ descriptions of their weight changes, reactions to weight loss, what they did during weight plateaus, and events

they reported as influencing weight. Timelines noted participants' comments about consciously changing their behaviors and beliefs as part of the weight loss process, as well as their views about the role of maintaining these cognitive changes to promote weight maintenance. Transcripts were re-reviewed for passages related to dietary behaviors, with attention focused on the process of change, examples of past and present food choices and eating behaviors, thoughts and emotions directed towards food and eating, and events or episodes which impacted current ways of eating. Emergent themes regarding dietary changes included emotional eating, control, eating enjoyment, planning, relationship with food, and eating identity. These concepts were added to both participants' charts and weight timelines creating a detailed and multi-dimensional picture for weight and dietary changes for each individual. Figure 1.1 shows an example of a weight timeline with notations made regarding specific dietary changes.

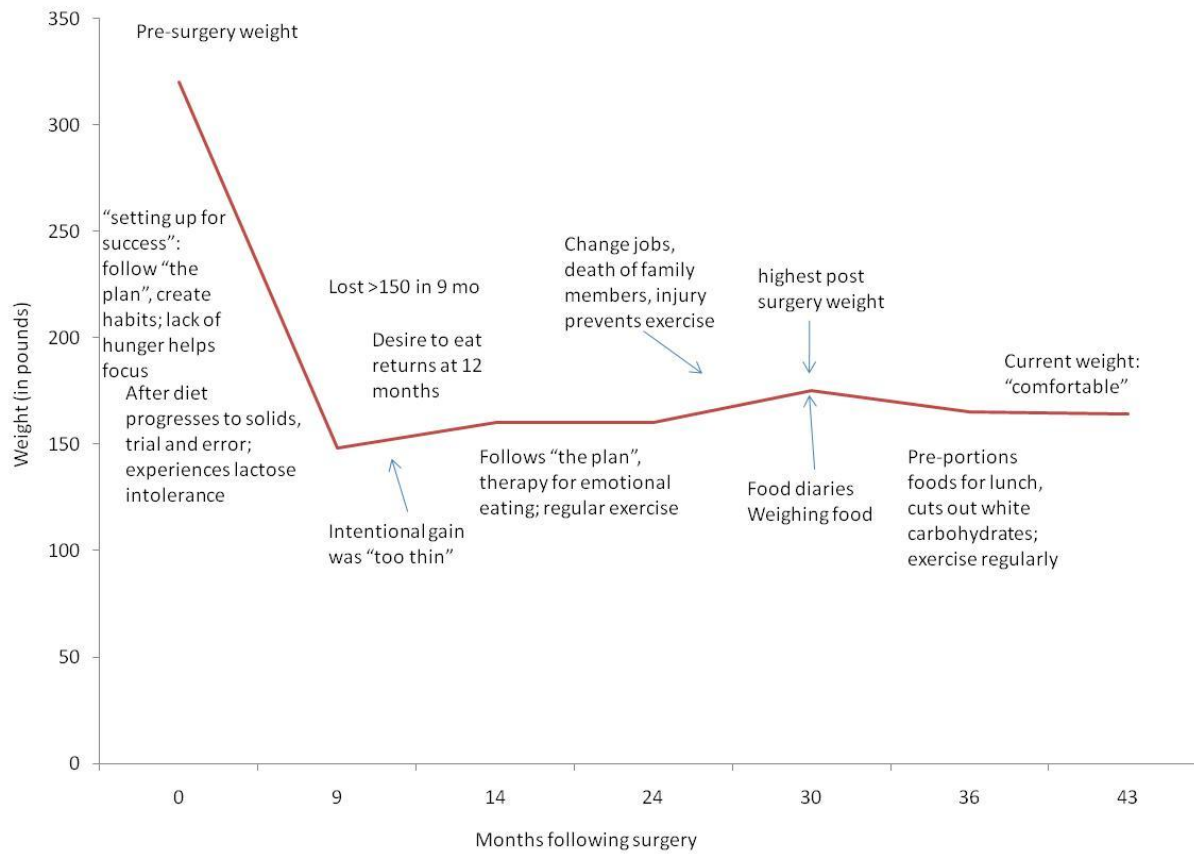


Figure 1.1. Example of a timeline prepared for each participant’s reported weight loss with notes about dietary management, influences, and reflections on weight. This is a representative timeline prepared using data from several participants to keep actual participant data private.

Charts for participants were combined and transformed into a matrix of cross-case displays which organized descriptions and provided structure for the exploration of data (40). Each row of the matrix represented one participant, while each column represented a salient concept related to weight and dietary changes; both quotes and summaries were placed within each cell. Thus, participants could be examined individually in relation to all the concepts, or compared to each other according to each concept. Individuals were first examined as individual cases, and then emergent

concepts were examined across cases (40). An excerpt of the matrix appears in Appendix 1.

Although all participants described changing food and eating behaviors, not all participants made or maintained permanent changes, providing negative cases (36) to consider in data analysis. One participant had returned to her pre-surgery eating behaviors, while another participant stated that with the exception of increased awareness of eating and portion control, her basic thoughts, beliefs, and attitudes towards food and eating had not changed. These negative cases were compared and contrasted with the other cases, and working frameworks and themes were adjusted to accommodate differences, enhancing the credibility of results (36).

Techniques to establish trustworthiness were employed throughout data collection and analysis, as outlined by Lincoln and Guba (36). Multiple contacts with participants as well as the researcher's role as a nonparticipant observer at support group meetings enhanced credibility through prolonged engagement. Multiple contacts and the observations helped the researcher develop rapport and gain a deeper understanding of individuals' stories and experiences. Member checks were used during the interviews to confirm the researchers' interpretations of participants' stories and explanations. Peer debriefing was achieved through obtaining feedback on emergent concepts, themes, and processes from a qualitative researcher specializing in food choice and dietary behaviors. The researcher received additional feedback from peers in research and dietetics through seminar presentations.

Results

Weight Loss Outcome Groups

Four weight loss outcome groups emerged based on participants' reports of weight changes following surgery: Losing, Maintaining, Regained but Losing, and Regained. Table 1.2 summarizes participants according to their weight loss group. The four participants in the Losing group were at or approaching their lowest weight since the surgery, and they had been at their current weight for less than three months. All of these participants were 15 months post-surgery. The five participants in the Maintaining group reported stable, personally acceptable weights for five months or more and had not experienced any substantial or unwanted weight regain. Four were less than three years post-surgery. Isabel, seven years post surgery, was nearing the upper limit of her weight range due to recent weight gain. Members of the Regained but Losing group included four participants who experienced unwanted weight regain since achieving their lowest post-surgery weights. With the exception of one participant who gained 50 pounds, all had regained 20 pounds or less. Each of these participants had lost this weight or was in the process of losing weight. All of these participants were between three and a half and six years post surgery. The three participants in the Regained group had regained a personally unacceptable amount of weight and reported no current attempts at weight loss. Their regain ranged from 45 to 68 pounds, or 25% to 69% of the initial weight lost.

Table 1.2. Participants grouped according to self-reported weight status and time since surgery

Self-reported weight outcomes at time of study				
Time since surgery	Losing	Maintaining	Regained but Losing	Regained
Less than 2 years	Cindy (15mo) Heather (15mo) Lynne (15mo) Pam (15mo)	Zach (17 mo)		
2-4 years		Ashley (2yr) Eleanor (2.75yr) June (2.5 yr)	Diana (3.75 yr)	Trevor (3yr)
4+ years		Isabel (7yr)	Dana (6 yr) Marge (5 yr) Vanessa (5 yr)	Courtney (5.5yr) Oliver (10 yr)

Weight Management Periods and Trajectories

Despite their differences in weight outcomes, participants reported a common sequence of weight management phases. In the first year following surgery, all participants experienced an initial “honeymoon period” when weight loss was drastic and rapid. The Honeymoon period began immediately after surgery and continued for six to 12 months, during which time participants reported losing between 80 and 150 pounds. Participants were in agreement that “the surgery does the work of weight loss for you” during the Honeymoon period. Weight loss was “easy” and required “very little effort” due to physical changes in their ability to eat. Participants stated “no matter what you do, you will lose weight.” If their weight loss hit a “plateau,”

participants described “losing inches” or “dropping two sizes,” without having to make any adjustments to their dietary intake.

After the Honeymoon period, participants experienced weight “stabilization,” when weight loss either stopped or slowed to only a few pounds a month. While the participants who were less than 15 months post-surgery did not believe they had reached their lowest weight, they all felt that they had reached the end of their Honeymoon period. Most participants believed that weight loss would not be maintained without continued effort on their part, and this was the period of “the work begins.” During this period participants maintained their weight within a personally acceptable range without unintentional gains.

The 12 participants who were beyond 15 months post-surgery all described continuing in the period of Work Begins as they faced the challenge of weight management after “stabilization.” The four participants who had not begun long-term maintenance likewise anticipated having to “work” at weight loss when they reached this point. The abilities of the 12 others to maintain weight loss in the long-term differentiated their weight outcome trajectories into Maintaining, Regained/ Lost or Regained.

All participants had a personally acceptable weight range. Though the upper limit was of highest importance to all participants, some were concerned about staying above their lower limit as well. Diana, Eleanor, Vanessa, and Marge all reported feeling too thin at their lowest weights and intentionally gaining between five and ten

pounds. Three participants in the Losing group did not wish to lose any more weight. Participants in the Regained trajectory had regained well beyond their upper limit of acceptability.

Acceptable and unacceptable weight regain occurred for most participants who had passed the weight stabilization period. Acceptable regain was considered “bounce back” weight, and even participants who were at or maintaining their lowest weight anticipated a 5-10 pound regain. Participants who were maintaining at an acceptable weight had specific weight ranges they preferred their weight to be within, which was generally between five and ten pounds of their usual weight. Weight regain was unacceptable if it was not intentional or not within the accepted weight ranges.

Dietary Management Phases

Pre-surgery dietary practices had to be abandoned immediately after surgery to accommodate healing and gastrointestinal modifications. Post-operative diet progression followed the same pattern for all participants: clear liquids, full liquids, pureed or blended foods, soft solids, and finally “regular” or “heavy” solid food. The time at each stage was based on a participant’s comfort in advancing and the recommendation of their surgeon or dietitian. Participants described a “trial and error” phase when they had to “experiment” with food selection as they progressed through the stages of the post-operative diet.

The Trial and Error phase of dietary management eating continued through to weight stabilization and the Work Begins period. In this phase, participants had to

handle new food intolerances, restrictions on the volume of food they could eat, as well as painful consequences to eating too much or too fast. In addition, they were faced with new hunger and satiety cues, and as a result they had to develop new meal and snack patterns. The Trial and Error phase was like “being a newborn in your 20s or 30s,” as participants had to “learn how to eat all over again.”

Through “trial and error” participants developed new eating strategies, formed new habits, modified their food selections, and began to actively change their thoughts and behaviors surrounding dietary intake. This Retraining dietary management phase began in the Honeymoon period as participants “re-trained” and “re-taught” themselves how to eat, both behaviorally and cognitively. Participants actively constructed new ways of eating they believed would promote long-term weight loss. Eating less required little effort due to early satiety and intolerance of high sugar and high fat foods made avoiding these foods easy. Participants viewed these changes as part of “setting myself up for success,” emphasizing the importance of “creating good habits” during the Honeymoon period due to the fact to it was “easy to be good” with limits on intake and lack of appetite. Participants described forming “routines,” “structure,” and “regimens” they hoped would persist.

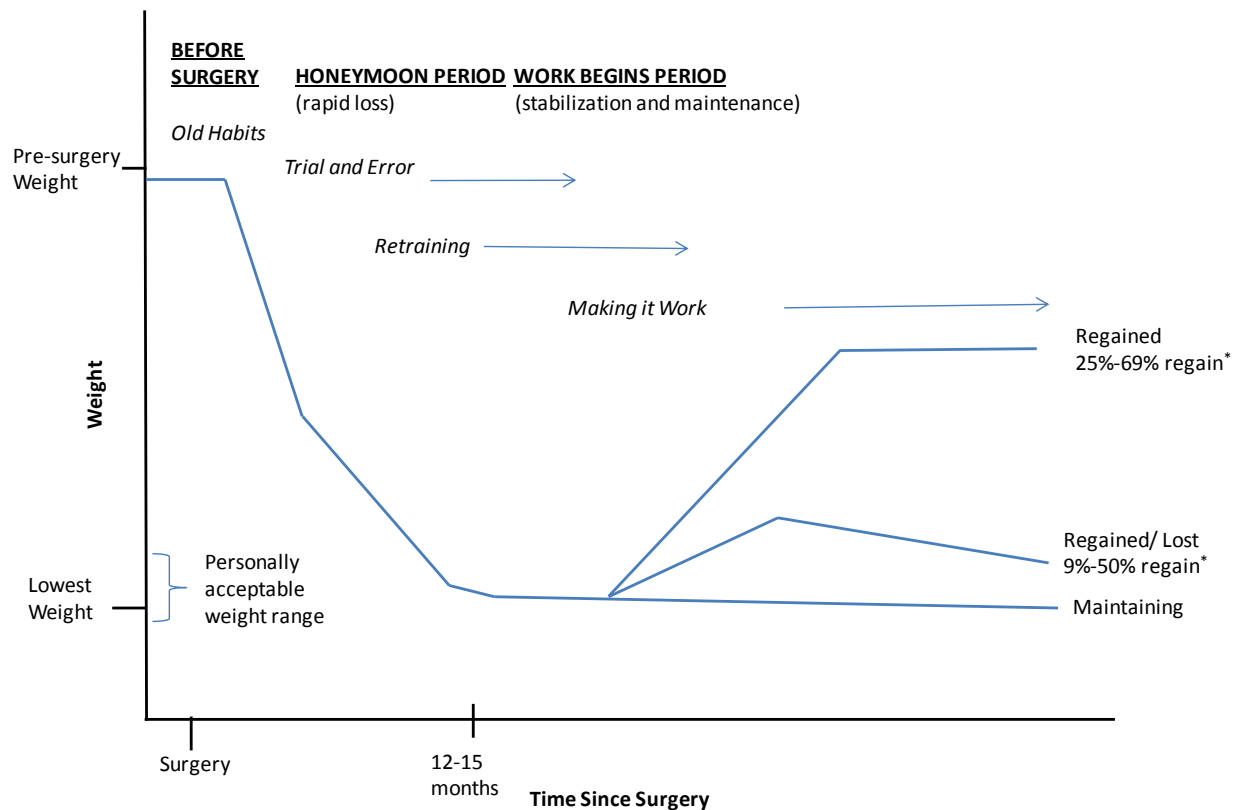
The third dietary management phase was Making It Work. In the earlier phases, most of participants’ food choices were dictated by the limits of their reconstructed digestive tract and weight loss was easy, however, participants eventually faced the reality of having to “work” to maintain their dietary changes and weight loss.

“Starting into that second year, that’s where I call it getting real. That’s where you have to really slow down, be careful, and find out what it is. Because that’s where you start putting the weight on.” June

The Making It Work phase was characterized by efforts to maintain the strategies and practices participants developed during the Honeymoon period. As participants found themselves able to eat more and choose a wider variety of foods, they became less strict in following guidelines at the same time weight was no longer coming off. In addition, their motivation and energy for changes was reduced as the “excitement” and “attention” from weight loss “wore off,” as their new, lower weight became “normal.” They also had to pay attention to weight changes as regain was more likely to occur in this phase.

These three phases of dietary management involved effortful changes in thoughts and behaviors. Throughout their descriptions of dietary transition participants identified pre-surgery eating behaviors and thoughts they associated with their obesity, and contrasted them to those formed after surgery. They referred to these as “old habits” or “old ways.”

Figure 1.2 presents a theoretical representation of the weight outcome trajectories, weight management periods, and dietary management phases that participants described. This figure illustrates the key common themes and reference points that emerged in the ways that participants explained their experiences, even though it is a simplification of the processes and not representative of any one participant’s specific experiences.



* From personally acceptable usual weight; this does not include intentionally regained weight

Figure 1.2. Theoretical representation of weight outcome trajectories and phases of dietary management in the time following gastric bypass surgery based on patients' self-reported experiences

Components of Dietary Management

As participants described their experiences with weight loss and dietary transitions, six main components of dietary management emerged: 1) physical needs, 2) hunger and fullness, 3) relationship with food, 4) strategy use, 5) habit formation, and 6) awareness of eating. These components were interacting elements of the overall process of dietary management that included physical, cognitive, and behavioral elements. While participants' experiences with dietary and weight changes

were individualized, all included these aspects of dietary management in some way. Although the components were the same throughout, the challenges, barriers, and ease of management changed over the phases of weight loss. Table 1.3 summarizes the six components of dietary management over the three weight trajectory periods.

Table 1.3. Components of dietary management across the phases of weight trajectories

Component of dietary management	Period of weight loss		
	Before Surgery	Honeymoon	Work Begins
Physical needs	Few physical needs attended to	Intolerances and taste/texture aversions; learning to handle smaller stomach; trial and error eating	Intolerances and aversions continue but no longer surprise; nutrient deficiencies surface
Hunger and fullness	Rarely full or always hungry; eat beyond the point of fullness, ignore hunger or satiety cues	No desire to eat; lack of hunger, early satiety	Hunger returns for some, fullness persists but less intense; desire to eat, appetite return
Relationship with food	Food as a “friend” or comfort; emotional eating, “live to eat”	Adopt new relationship with food, deal with emotional eating causes, “food is not friend,” “eat to live”	Maintain new view of and relationship with food; work on emotional eating; for some, return to pre-surgery
Strategy use	Strategy use when dieting	Strategies based on post-operative counseling, managing other aspects of eating; “the plan” followed; trial and error and retraining	Continue following “the plan” and strategies; become more “lax,” or abandoned altogether.
Habit formation	Habitual over eating, habitual food choice or no habits	Begin repetition of certain behaviors, develop routines to make eating easier; work on extinguishing bad habits	Maintain habits and continue to avoid old habits, or go back to old habits
Awareness of eating	Rarely thought about food type or quantity unless dieting; either deprived or never controlled	Become aware of eating, food choices, pay attention, monitoring	High awareness continues or become less mindful

Physical needs. Dietary management had to address many different physical needs, such as consequences to eating too much or food intolerances, as well as nutritional needs, such as protein, calories, and vitamins. Prior to surgery participants had few, if any, physical needs they managed with diet, aside from individual dietary restrictions for diseases such as diabetes or hypertension. Before surgery, participants experienced no food intolerances and they had no limitations on the quantity of food they ate, outside their normal stomach capacity. In addition, participants rarely considered the role of nutrients in their health, energy levels, or weight before surgery. Most participants did not factor health into their daily food choices. As Heather stated, “I never thought how what I was eating affected my body.”

The physical aspects of eating changed immediately after surgery, as participants managed the physical and physiological changes that occurred with their altered digestive tract. During the Honeymoon period, physical needs were first managed with the post-operative diet progression, followed by the Trial and Error period, as participants attempted to figure out their “limits.” Surgery created a “forced stopping point” that caused all participants to decrease their intake to servings as small as “sips,” “mouthfuls,” or “tablespoons” to accommodate the reduction of stomach size and avoid “overfilling the pouch.” Over time, intake increased to “ounces” or “half a cup” as participants described eating more “as my stomach allowed.”

Food intolerances during the Honeymoon were common, often severe and unpredictable. Participants might tolerate a food one week and not tolerate it a few weeks later, or vice versa, and hence they would constantly experiment to see if they could tolerate a particular food. Eating too fast, not chewing food well, eating too much, or drinking while eating caused negative reactions such as vomiting or pain. Many participants also experienced changes in food preferences due to taste changes or new aversions to textures. The variety of intolerances and aversions to foods forced participants to reconsider what they included in their diets.

Knowledge of the malabsorptive component of the surgery along with limited intake caused participants to become concerned with getting enough nutrients and maintaining health through their diet. Participants emphasized the importance of taking vitamin, mineral, and protein supplements. Eating was now a necessary act to maintain energy levels, as participants ate less at meals and felt the effects of low blood sugar or low energy if they waited too long between meals. Thus, health became a new motivating factor in eating and food choice during the Honeymoon period and served to motivate participants to make “good choices” during the Work Begins period. Prior to surgery participants “lived to eat” but now “eat to live,” viewing food as “more of a need than a pleasurable sort of thing.” Food was now described as “fuel,” “energy,” and “necessary for health.”

By the time participants had reached the Work Begins period, they were no longer surprised at food intolerances and were able to predict how much food to eat

before becoming full. Supplements continued to be the main way they prevented or treated nutrient deficiencies, and most participants continued to drink protein supplements to ensure adequate protein status. For most, physical needs were considered only in terms of physical comfort or health, and aside from quantity of food eaten, were not an aspect of weight management.

Hunger and fullness. A defining aspect of dietary management between pre-surgery and the Honeymoon period was changes in hunger and fullness, which included both physical and psychological aspects of eating, such as “hunger pangs,” feeling “full,” “desire” to eat, and satisfaction with amounts eaten. About half of the participants stated they never felt hungry prior to surgery because they ate all the time and “never allowed myself to get hungry.” Other participants stated they were hungry all the time. Most participants also ate food “because it was there” and would often eat it until it was gone. Eating was not always influenced by hunger and satiety signals. The presence, smell, or thought of food was enough to motivate participants to eat, despite lack of hunger, having recently eaten, or knowing they were going to eat in the near future.

All participants noted immediate fullness after a “sip” of beverage or “bite” of food post-operatively, which became less intense over the course of the Honeymoon period, allowing participants to eat small meals. For some participants, this was the first time in years they experienced fullness. During the Trial and Error period, participants experienced at least one painful event when they ate too much and very

quickly learned to identify feelings of fullness, or to “listen to my body,” and stop eating when they felt full. However, they also began to actively control the amount of food they ate at meals and snacks, anticipating future changes in fullness. Due to the belief that over time, they could “stretch the pouch” and increase the quantity of food they could eat at a sitting, many participants chose portion sizes they believed were in line with how big their stomach was.

A reduction in hunger accompanied early satiety, which for some participants persisted for over two years, while for others it only lasted nine months. While most participants said they did not “feel hungry,” almost all participants described some sort of hunger signal, such as “feeling woozy,” having “low blood sugar,” or “low energy.” This change in hunger prevented participants from “eating all the time” as they had before surgery.

Lack of hunger also prompted participants to consider why they ate when they were not hungry. Several participants described “going through the motions” of opening the refrigerator or food cupboards immediately upon coming home from work, even though they were not hungry. Lack of hunger increased participants’ awareness of former eating habits that might have led to obesity. In addition, seeing how little food they were eating led participants to reconsider how much food they thought they needed:

“I could eat pounds! [laughs] Before? You know that Denny’s plate? Well I could pack that away no problem and three hours later go out for a hot fudge sundae.... Now when I look at that, it actually makes me sick. To think that I

would ever have consumed that much food...and to know that I didn't need it. My body never needed that much food, cause obviously I'm surviving now on ounces." June

Along with changes in hunger and satiety, participants described an increased satisfaction from eating, "I feel satisfied now," or "a little bit satisfies me." This satisfaction contributed to their ability to eat less because they did not feel like they needed to eat more. Participants also described a lack of "desire" to eat or a lack of interest in food and eating. During the Honeymoon period, participants were not "triggered" by environmental cues, such as cookies at holidays or the smell of freshly baked breads. Changes in hunger and satiety and the decreased desire to eat appeared to act as a catalyst for participants to reevaluate the role of food in their lives and to change the meaning of food and how they incorporated food and eating into their daily schedules.

"Having the hunger change has kind of helped me keep a new normal for me. Um, to eat healthier, to eat smaller amounts. Just cause something tastes good you know, doesn't mean I have to eat the whole thing. That kind of mentality that you have before it's like well it tastes good I'll finish it whether I'm full or not. And now it it's painful if you do that so, and it's, it's so to point that one bite could be too much and make you feel um, nauseous." Cindy

Beginning towards the end of the Honeymoon period and extending into weight stabilization of the Work Begins period, participants gradually began experiencing hunger signals and reduced fullness, stating "it takes more to get me full." In addition, the desire to eat or try out new foods returned for many participants

between six months and a year post-surgery. This challenged participants in the form of cravings or “looking forward too much” to eating.

This returning desire to eat and decreased fullness were main reasons participants had to “work” at weight loss. Eating was no longer as easy because participants had to deal with the fact that they wanted to eat more and could eat more. It was for this reason that participants viewed the honeymoon period as a time to relearn how to eat.

“If you haven’t learned to eat [by the time hunger returns], you aren’t going to make it.” Marge

Relationship with food. Participants portrayed an understanding that they ate for other reasons outside hunger and that food had held other roles and meanings for them prior to surgery. Their relationship with food was complex and included the view of food as a friend, the use of food as a coping mechanism, and feelings of control. It was influenced by decades of emotional eating and feeling guilty for eating. Changing the “mental image” or the “context” of food and eating was an important aspect in maintaining the changes in food selection and portion control which were made easier by the physical effects of surgery.

Almost all participants said they were “emotional eaters” prior to surgery and that they had a “habit” of using food as a “crutch” or as a “coping mechanism.” Participants generally described eating in response to negative emotions, however, many said they either ate for “every” emotion or used food as a reward or in

celebration. They also described viewing food as a “best friend” because it “never let me down” and “was always there.”

“Prior to, that was my comfort. That was the one thing that wouldn’t say no to me, one thing that wouldn’t judge me. The one thing that what you know then, but you don’t pay attention to is that it only gives you a very temporary feeling of happiness or feeling of release.” Diana

Beginning in the Honeymoon period and continuing through the Work Begins, participants actively modified their relationship with food, changing both their interaction with and views of eating. Participants redefined the role of food in their lives, something which “takes work” and “did not happen overnight.” Most participants stated “food is not my friend,” however, Eleanor described her relationship as “friendly,” because it did not “control” her. In contrast, Trevor called food “too much of a friend,” and was currently struggling with his desire to eat certain foods he thought “shouldn’t be my friend.”

Participants struggled with their relationship to food and often likened it to an “addiction,” comparing their drive to eat prior to surgery to alcoholism, drug addiction, and sex addiction. However, participants were faced with the added frustration of having to eat.

“We have to eat. It’s not like cocaine, you can give it up because it’s an addiction. We can’t do that because we have to eat to survive.” June

The urge to eat for emotional reasons did not go away after surgery and during the Work Begins period, participants noted more frequent challenges to their new relationship with food. Many said they could still eat emotionally “if I let myself,” or

they believed “I’ll always be an emotional eater.” Changing emotional eating involved finding a “release” for the emotion in other activities. Other participants stated emotional eating was “not allowed,” describing this change as a force of will or determination. However, most participants also emphasized the need to understand why they turned to food as a coping mechanism, for which most employed therapy. Some were able to come to this realization prior to surgery, but for most it was part of the process of learning how to interact with food again.

Strategy use. Strategies were food and eating behaviors participants consciously planned and enacted to manage various aspects of dietary and weight loss needs. Dietary management strategies were used to manage hunger, fullness, physical needs, and relationship with food. Participants often referred to their strategies as “the rules” or “the plan,” which they first implemented during the Honeymoon period.

Before surgery, participants had few strategies. They described eating “whatever I wanted, whenever I wanted,” following few structured eating patterns, and having no restrictions. The exception was when participants were actively dieting, during which time strategies ranged from liquid fasts to purchasing and eating pre-portioned foods or going to group meetings. These dietary strategies were effective for weight loss, but they did not “train you how to eat right” because once abandoned, weight lost returned.

Participants consistently stated “you have to follow the rules” in order to maintain weight loss after surgery. Rules for success varied among participants, but

centered on maintaining structured meal and snack patterns, eating protein first, avoiding carbohydrates and high sugar foods, chewing food well, and not drinking while eating. Planning meals and snacks, maintaining awareness of food choices, and making efforts at portion control were also key behaviors. Participants focused on being “compliant” and “strict” during the Honeymoon period. After about one year, however, many participants stated they began to “add new foods in” and became more “relaxed in your habits.” Maintaining these strategies in spite of pressures from everyday life was viewed as an important aspect of weight management during the Work Begins period.

“There are specific rules to make our pouch successful long term. And if you don’t follow them from day one, you will fail at this surgery.” June

Habit formation. Participants remarked on the importance of changing their “old habits” as a way to maintain weight loss after surgery. Habits, as described by participants, were routine behaviors or ways of thinking that were “second nature” and “easy.” These behaviors included meal and snack patterns, planning ahead, reading food labels, and eating slowly. They also included repetitive food choices so participants did not “have to think” about what to eat at meals or snacks. Habits were deliberately cultivated through effortful repetition during the Honeymoon period, but these were not established for most participants until weight loss began to stabilize.

“The way I look at it is to develop something into a habit you have to consistently do it for awhile. And for me, I don’t even think about it anymore. It’s almost like second nature.” Cindy

Participants approached the process of changing their habits as a necessary for success, believing that long-term weight loss maintenance was their responsibility. Many of the strategies they developed during the Honeymoon period were intended to become habits, so that during the Work Begins period, participants would have an easier time with weight management. They also worked to eliminate “bad habits” or “old habits” they associated with pre-surgery obesity. These included grazing, emotional eating, and “mindless eating.”

“I set so many good habits for myself that it’s a lot more easy for me to follow, ‘the plan’ verses somebody that doesn’t take that time and build in the good habits and try to push away the bad habits. Because eventually those, eventually those-some of those, if not all of those bad habits will come back to haunt you.” Diana

Awareness of eating. Participants described a new awareness of food and eating behaviors which was the result of having to relearn how to eat and becoming more “aware” of their body. Increased awareness also developed as the result of mental effort required for making and maintaining dietary changes. Participants often stated “I never paid attention” to food choices, eating behaviors, or amounts consumed before surgery. The exception was when participants were actively dieting. When implementing diet strategies, participants paid attention to food intake, making conscious food choices, controlling portion sizes, and using food journals to monitor their intake.

Despite a lack of attention to the act of eating, participants stated that food was “a constant thought process” or an “obsession” prior to surgery. Participants often

stated “food ruled my world” and that they constantly thought about “my next meal.” During the Honeymoon period, participants described actively changing this type of attention to food, and many adamantly stated that they did not want their lives to “revolve around food.” Although lack of hunger caused many participants to “forget” to eat, some participants explained this as a direct result of the surgery:

“It happened when the surgery happened and so am I more conscientious of things, yes because I have to be. Um, but it was like the surgery, the surgery did it and I don’t know if it is because they were slicing and dicing in there and that, that changed my receptors or whatever, I don’t know but I do not obsess about food anymore like I used to.” Dana

Participants also stressed making conscious decisions about what to eat, saying “I have to be aware of everything I eat,” and “It’s an ongoing mental check on yourself to really watch what you are doing.” To balance negative reactions, maintain nutrient intake, and manage weight, participants reported they had to “constantly think about food.” Thinking about food encompassed planning ahead or mentally tracking intake to accommodate past or future eating events into their food choices. It also included being aware of when they were eating for reasons outside of hunger, particularly emotions, boredom, and habit.

During the Honeymoon period, all participants reported thinking about everything they ate, using portion control methods, and writing down what they ate to make sure they were “doing what I was supposed to.” Over time, thinking and planning became easier for participants, however, some participants found it challenging to “always think about food” and found eating to be “a chore,” but

something they “had to do” to stay healthy. Following “the plan” and developing habits provided participants with a “structure” for eating. However, even after certain aspects of behavior became habitual participants still mentally accounted for or mentally tracked what they ate and drank.

Consistent employment of strategies and enactment of habits during the Work Begins period required “vigilance” and participants often described having to “battle” or “fight” against previous ways of eating. Statements such as “You can’t let your guard down,” “You do have to keep on top of it,” and “I have to watch myself for the rest of my life,” were used to describe the belief that old habits did not “go away” with the surgery, and that they can “creep back.” Participants also described having to “remind” themselves to not “fall into” old habits. Thus, awareness of eating was a component of dietary management that participants would always have to maintain.

Explanations for Weight Regain

Staying vigilant when the work begins. A common belief among those who had experienced regain and those who had not, was that regain occurred when individuals did not want to “work” at dietary management. Surgery was viewed as a “tool” that only worked if individuals had “the will to work with it.”

Three Regainers stated that they had originally wanted the surgery “to do all the work,” and they were not “believers” that they “would be able to gain it all back.” They recognized they had to “use the tools” of surgery, but they struggled to implement the “tools” once hunger returned along with their ability to eat. In

addition, three Maintainers were concerned that recent dietary behaviors of emotional eating or grazing might lead to weight regain in the future and were taking steps to prevent these behaviors. All emphasized the high risk of reverting to old habits.

“Surgery is a tool. It’s not like a, it doesn’t fix what, you know, what made you, what brought you to these habits...I get full. I get sick on certain things. I get full fast. You know if I would just like listen to those...you know that’s like shouting out, “Courtney stop!” You know if I would listen to those things, it would work just fine, you know? But I don’t.” Courtney

“The things that brought you to weight loss surgery could do it again. And, and we all fight, we all fight this, we all fight. It’s hard, you know not going to old bad habits. And I’m three years out.” Trevor

Participants explained that remaining “vigilant” about behaviors was often challenged by their life circumstances that caused them to “lapse” into behaviors that resulted in weight gain. Deaths of family members and getting married were two major life events that participants related to prompting emotional eating or promoting shifts in their newly established eating patterns. Other life stressors included marital problems, stress at work, holidays, depression, or anger.

Dietary management components and weight regain. The components of dietary management had differing levels of importance for weight management across the weight outcome groups. All participants dealt with issues related to managing physical needs and managing hunger and fullness over the periods of weight loss. The most intense efforts at managing these aspects of diet occurred during the Honeymoon

period, so that by the time they transitioned to the Work Begins period participants did not have to put as much effort into them. Table 1.4 compares and contrasts the differences in dietary components over the three weight loss outcome trajectories.

Table 1. 4. Summary of components of dietary management by type of weight outcome trajectory among participants 15 months or more post-surgery

Components of dietary management	Weight outcome trajectories		
	Maintaining	Regained/ Lost	Regained
Physical needs	Individual intolerances, taste/texture preferences, blood sugar management, nutritional deficiencies		
Hunger and fullness	Individual variations in hunger and fullness; hunger signals largely low energy; little desire to eat	Variations in hunger and fullness; increased incidences of wanting to eat outside hunger; pay attention to fullness cues	Experience hunger between meals; do not eat when hungry; fullness does not last as long after meals; eat beyond fullness
Relationship with food	New relationship with food, “food is not my friend,” “Food doesn’t control me”	Aware of new vs old relationship with food; struggling to maintain new relationship, develop strategies	Retain pre-surgery emotional relationship with food as “friend,” “comfort,” “coping”
Strategy use	Strategies established and consistently employed	Refine strategies, and/or consistent enactment; lapses in “compliance” with “the rules”	Few new strategies for weight loss maintenance developed or consistently enacted
Habit formation	Strategies becoming habits, enacted consistently	“Old habits” return which have to be dealt with; most new habits maintained	Many pre-surgery habits returned (grazing, emotional eating), few post-surgery habits maintained
Awareness of eating	High awareness of behaviors and weight	Awareness of eating, behaviors increased awareness of certain behaviors with weight regain	Less aware of portion sizes, weight changes, eating behaviors

The components of dietary management that seemed most important in contributing to weight loss maintenance were relationship with food, strategy use, habit formation, and awareness of eating. These components distinguished weight outcome trajectories of those who maintained initial weight loss and those who

regained weight. Their importance was confirmed by the explanations from patients who had regained weight but after addressing one or more of the components, lost weight. Emotional eating and grazing were the most common eating behaviors cited by participants as contributing to real or potential weight gain. Having strategies to deal with these and other “old habits” was required for success. For example, Vanessa explained having “substitutes” for “former crutches” to deal with times of emotional eating, while Trevor attempted to be out of the house to avoid “thinking about food” when bored.

Discussion

This study aimed to gain conceptual understanding of gastric bypass patients’ construction of dietary behaviors related to weight management in the period beyond 12 months of surgery. Using qualitative methods and a constructivist approach, the researcher was successful in gaining insight into patients’ experiences as they graciously provided extensive detail about their dietary management and weight loss experiences after gastric bypass surgery.

Taking a time perspective and applying the concept of trajectory were unique features of this study that yielded theoretical trajectories of gastric bypass patients’ weight loss outcomes as well as periods of weight management and dietary management phases. Viewing gastric bypass surgery as having weight outcome trajectories rather than a fixed weight at one point in time recognizes the individual and dynamic nature of the patient experience. Identifying the weight management

periods and dietary management phases that patients experienced reveals the multiple transitions patients face and their continual need for adaptation as they move ahead.

For these participants, the surgery was a major turning point in their life course (41) followed by several short-term transitional periods during which they had to adjust and adapt quickly. In the Honeymoon period, weight loss was easy, but participants had to learn to cope with new physical needs and eating limitations. Eventually the participants could return to eating many regular foods and over time, larger amounts of foods. When weight loss slowed or stopped, they faced the reality of long-term weight loss maintenance, the period of Work Begins. This work involved another new approach to eating and constant vigilance. A life course perspective (41) places this dynamic experience in the context of a person's overall life, with its varying circumstances and events that influence a person's ability to attend to tasks of long-term weight loss maintenance. The value of the trajectory approach and life course perspective in this study is similar to benefits gained when these approaches were applied to understanding of dietary change experiences for cardiac patients in an intensive heart health program (27).

This study of patients' experiences shows the extensiveness of dietary management after gastric bypass surgery. An immense amount of sustained cognitive and behavioral effort is required. Dietary management for the success of this surgery needs to be viewed as a complex, intense, dynamic, long-term, and internally driven

process, rather than a matter of compliance, which seems static, straightforward, standardized, and as set by an outsider.

While the dietary management of physical needs has been addressed in the literature (6-8, 42), the other components of dietary management have received much less attention. As evidenced in the study, managing hunger and fullness, relationship with food, strategy use, habit formation, and awareness of eating all involve considerable mental effort. The essential task of creating new approaches to eating is not addressed in most studies of dietary changes after gastric bypass, aside from the traditional medical model of the health practitioner prescribing an action the patient should comply with. From trial and error eating, relearning how to eat, retraining to establish habits, and remaining vigilant in the Work Begins period, the patient must have sustained concentration and persistence. This cognitive and behavioral work requires more than willpower or self control (43). Without the establishment of new approaches for dietary management that are practiced and become habits, the patient has no tools to draw upon for long-term weight loss maintenance.

The dietary phases and components identified in this study support the concept of an actively constructed personal food system as the Food Choice Process Model (23, 38) posits. The sequence of phases from Trial and Error through Making It Work provides support for a person's intentional and individualized construction of beliefs and cognitive processes for food decisions. The long-term experiences of gastric bypass patients provided a unique context from which to examine these processes, as

these patients had to develop a whole new way of thinking about and interacting with food in a comparatively short period of time. Through personal experimentation, participants identified strategies effective from their perspective. Then by consciously practicing the effective strategies, they re-trained themselves so these strategies became routine ways of behaving that replaced old habits. The Food Choice Process Model does not include the concepts of eating awareness and relationship with food, important components of dietary management processes based on the study participants' experiences.

Based on the findings of this study, a long-term successful outcome of gastric bypass surgery requires the patient to recognize that surgery is a tool, not a cure or a permanent solution to obesity. Surgery causes rapid weight loss, feelings of success, and promotes heightened awareness of both the physical and mental aspects of eating. The surgery completely disrupts one's personal food system because old dietary strategies and eating habits cannot be employed for physical health reasons. However, unless the patient uses this time to build a new relationship with food and reconstruct their personal food system for effective weight management, he or she will not have the tools to manage weight once weight stabilizes and both hunger and a desire to eat return. Without a heightened awareness of eating, new strategies and habits, the only available tools for eating in the context of a normal diet are the old habits and previous food systems which led to their obesity. For some people, replacing old habits with new strategies will require cognitive and behavioral therapy due to long

standing personal and psychological factors which influence their relationship with food.

Participants identified a number of specific food behaviors associated with weight maintenance, which are consistent with other studies. Grazing has been associated with less excess weight loss and weight regain (13, 44, 45), while the maintenance of structured eating patterns is associated with greater weight loss maintenance (14, 46). Emotional eating has been identified in bariatric surgery candidates (47), found to be present in patients post-operatively (48, 49), and may be related to weight regain over time (48). Participants in this study described not only increased awareness of emotional eating behaviors but also having to find non-food related coping mechanisms, a challenge found in other studies examining patients' perspectives on psychosocial changes after gastric bypass surgery (50). To help patients' manage these behaviors, health care practitioners must be aware of the factors which promote unwanted habits, such as increased hunger or life stressors.

For health professionals, the study findings emphasize the need to prepare gastric bypass patients initially and support them in an ongoing way so they can effectively manage the ups and downs of weight, motivation, and dietary transitions they will experience over the course of their weight trajectory. Long-term weight maintenance is often portrayed as an energy balance model of calorie intake versus calorie expenditure. However, health care professionals need to frame long-term success as a complex interaction among dietary behaviors, cognitions, and physical

and physiological responses to food that occur in the context of an individual's broader life circumstances.

The study findings were based on participants' self-reports of weight, thoughts, feelings, and actions. Their retrospective reports may have been selective or different than their actual experiences and interpretations at the time, including reports of their weight. However, participants' detailed descriptions and commonality of distinct phases across their reports leads credence to this conceptualization. This analysis focused on patients' constructions of dietary management across the phases of weight outcome trajectory, though other factors such as physical activity and social support, were likely involved. This study should be followed with prospective studies that collect actual weight data over time along with detailed data about dietary management and physical activity.

This analysis is based on a small, purposively sampled group of gastric bypass patients in one geographic region who were accessible through support groups and interested in participating. The findings cannot be extended beyond this group of participants, and conceptualization arising from this analysis need to be examined, extended, and elaborated upon through studies with larger and more diverse samples of patients. While the findings report associations between dietary management components and weight loss trajectories, a cause and effect relationship cannot be assumed. Finally, as is the case with all qualitative research, the collection and analysis of qualitative data was subject to the interpretations of the researchers who brought

their own perspectives to the study. Though the researchers took various steps to enhance the quality of the data collection and analysis, other researchers may have elicited different perspectives from participants and/or interpreted their descriptions in different ways.

Conclusion

In undergoing gastric bypass surgery, people embark upon a long, dynamic, and challenging path as they experience transitions with weight and adjustment with how they manage food and eating. This study emphasized the complex cognitive and behavioral aspects of dietary management and weight transitions as patients adapt to different phases of this experience. Weight regain after gastric bypass surgery is not simply a matter of non-compliance, nor is weight maintenance simply occurring due to the “forced changes” of the surgery. Additional research is needed to further understand how these transitions related to long-term weight outcomes and how health professionals can better guide and assist patients’ through these experiences towards their goal of permanent weight loss.

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CHAPTER 3

GASTRIC BYPASS PATIENTS' GOAL-STRATEGY-MONITORING NETWORKS FOR ACHIEVING THEIR GOALS OF WEIGHT MANAGEMENT, HEALTH, AVOIDING NEGATIVE REACTIONS, AND INTEGRATING EATING WITH THEIR DAILY LIVES

Abstract

Following gastric bypass surgery, patients must make dietary and lifestyle changes to maintain weight loss, avoid negative consequences to eating, and prevent nutritional deficiencies, however, little is known about patients' experiences with long-term dietary changes. This grounded theory, qualitative study examined how gastric bypass patients' constructed food and eating beyond 12 months after surgery, after a majority of weight has been lost. Two in-depth interviews were conducted with each of 13 women and three men, who were purposively sampled from bariatric support groups in Upstate New York. Using constant comparative analysis of verbatim interview transcripts, researchers identified four main goals that directed participants' dietary practices: Weight Management, Health, Avoid Negative Reactions to Eating, and Integration. Linked to these main goals was a network of intermediary goals, strategies, and monitoring methods. Fourteen intermediary goals were identified towards which participants directed 37 strategies for goal achievement. Each strategy had multiple methods for enactment, and participants reported using over 84 specific

strategic behaviors. Participants assessed strategy effectiveness and goal achievement through monitoring behaviors, which were uniquely tied to each goal. Recognizing the complex, multilevel goal-strategy-monitoring that gastric bypass patients construct and advances researchers' understanding of how people construct personal systems. These findings provide researchers and practitioners with insight into the long-term dietary and lifestyle issues that gastric bypass patients face.

Introduction

Gastric bypass surgery is the most effective weight loss method compared to both conventional dieting approaches (1) and other forms of weight loss surgery (2). Losses of up to 38% of body weight have been reported within the first year, after which weight loss begins to stabilize (1). Regain occurs between 18 and 24 months (1, 3). Improvements in obesity-related co-morbidities such as diabetes, hypertension, hypercholesterolemia, and sleep apnea coincide with weight loss (1, 2).

Gastric bypass surgery works through the reduction of stomach size and the alteration of the small intestine, resulting in reduced stomach volume (4) as well as altered hunger and satiety signals (5-7) These changes lead to a net reduction in the amount of food one can eat. Due to alterations in the physiology of the digestive system, lifelong vitamin and mineral supplementation is required, with the highest risk of deficiencies existing for iron, B12, folate, and vitamin D (8). In addition, food intolerances are common and can be severe, as in the case of dumping syndrome (9, 10).

Dietary behaviors after gastric bypass surgery have been examined in relation to nutrient intake, eating behaviors, and food selection. Caloric intake decreases to less than half of pre-surgery levels(11), and though calorie consumption increases over time, studies do not suggest a return to pre-surgery levels of intake (12, 13). The percent of calories from protein, carbohydrate, and fat are not significantly different from baseline after one year of surgery (12, 14), though some studies suggest inadequate protein intake (15, 16). Sweets eating, snacking, and grazing have been identified as common eating behaviors following gastric bypass surgery that negatively affect weight loss outcomes (16-19), although the frequencies of these behaviors vary between studies. Studies examining food behavior have found that a majority of patients avoid sweets, desserts, and sodas (19, 20). Intolerances have been identified as a factor influencing the avoidance of foods high in fat (11, 21) or protein (15).

Existing studies of dietary behaviors after gastric bypass surgery only provide information about what patients eat or how specific dietary choices relate to weight loss. With the exception of citing food intolerances, these studies offer few explanations as to why participants choose or avoid certain foods, providing little insight into the reasons for patients' long-term dietary behaviors. Moreover, these studies rely on researcher identified "compliant" or "non-compliant" behaviors of interest, thus limiting the number of dietary behaviors explored.

A different perspective on dietary practices comes from the Food Choice Process Model (22), a grounded theory model that takes a constructivist perspective

on dietary behaviors. According to the model, people construct “personal food systems,” cognitive processes that guide their food and eating practices. Personal food systems are dynamic, change over time, and include food choice values, which are personally meaningful considerations in food decisions, e.g. health, taste, and convenience. Personal food systems also include ways of classifying foods and eating situations (23, 24), strategies to achieve food choice values (25, 26), and ways of balancing conflicting values (27, 28). This model has been used to understand the dietary behaviors of cardiac patients (25, 29, 30), fruit and vegetable consumption of multiethnic adults (31, 32), dietary practices of athletes (27), and situational eating of working adults (33). When applied to gastric bypass patients, this model suggests that after surgery, patients need to reconstruct their personal foods systems such as by revising their food choice values, creating new strategies, constructing new food classifications, and developing new scripts and routines for eating.

The goal of this study was to understand how gastric bypass patients’ construct dietary practices after the first year following surgery, when they would have progressed from the restrictions of post-surgical diets to regular food. The researcher expected that patients would have made changes to address food intolerances, nutrient deficiencies and weight loss, and that these changes would have occurred by this time. With the goal of developing a conceptual understanding of this experience, the researcher used a constructionist perspective (34), a grounded theory approach (35), and qualitative methods.

Grounded theory uses inductive methods to create theory from the concepts and themes which emerge through systematic data collection and analysis (35, 36). Grounded theory emphasizes participants' meanings, but also creates a set of concepts and hypotheses that could be useful in similar research areas (34). Instead of using preconceived ideas of the researcher, grounded theory allows for topics and relationships to come to the forefront as the participants have related them, uncovering a variety topics not limited to the scope of the researcher's knowledge.

Methods

Participant recruitment happened in two waves. The first wave included 10 participants in summer and fall of 2006. These participants were purposively sampled (37) from two different bariatric surgery support groups in separate cities in Upstate New York. Inclusion criteria included having gastric bypass procedure a minimum of 12 months prior and being over the age of 18. Theoretical saturation (35) was thought to have been reached at participant 10, but after initial analysis, the researcher felt that many topics and concerns might be similar because of shared support group participation and similar pre-and post-operative treatments, as all participants went to one of three surgeons operating in local hospitals. Therefore, the researcher chose to recruit from a third support group in a non-urban location to see if any further themes or topics appeared during interviews. As no major advances or changes in bariatric surgery practices had occurred since the first wave of recruitment, it was

assumed that the participants' medical management of their surgery would remain comparable.

Six additional participants were recruited from a support group in a non-urban location in Upstate New York in the summer and fall of 2009. All together, the participants reflected upon experiences from six different surgical practices. Analysis of all 32 interviews indicated no differences in participants' experiences that would have been due to the three year difference in participation. Recruitment stopped after the 16th participant as theoretical saturation was reached (35). The university institutional review board approved all research protocols including recruitment efforts, informed consent processes, and participant involvement.

The final sample was 13 women and three men, ages 32 to 63 years. Table 2.1 summarizes participants' characteristics. Participants varied in their educational background, but only two participants had post-graduate degrees. Twelve participants had full or part-time jobs in fields including education, community health, office management, and veterinary medicine. Twelve participants were married and five had children living at home. Time since surgery ranged from 14 months to 10 years, with an average of 3.75 years post-surgery. All participants had roux-en-y gastric bypass surgery which was covered by insurance. One participant had a gastric bypass as a revision to a gastric banding due to complications with the band, and one participant had a revision to her gastric bypass due to a staple line disruption.

Table 2.1. Summary of participant characteristics (n=16)

	Count
Marital Status	
Married	11
Single/Never Married	3
Widowed	1
Household Composition	
Lives Alone	1
Lives with spouse/significant other only	6
Lives with spouse and children	4
Other	2
Education level	
Diploma	1
Associates Degree	6
Trade School	2
Some College	5
Graduate or Advanced degree	2
Employment	
Full-Time	9
Part-Time	3
Unemployed/Retired/Disability	4
Income¹	
\$10-19,000	1
\$20-29,000	1
\$30-39,000	1
\$40-49,000	1
\$50-59,000	3
>\$70,000	8
¹ one person did not report their income	

Semi-structured, open-ended interviews were used to provide focus in topic and structure in questions while allowing participants to answer with whatever came to mind. This created a conversational format, promoted rapport, enabled participants to freely describe their experiences, and allowed the researcher opportunity to probe for detailed information on behaviors and influences. Questions covered a range of topics on dietary behaviors, weight loss, health, and surgical experiences. Dietary questions included “Take me through a typical day of eating for you,” “What is easy about eating?,” “What is the most important thing to consider when choosing

foods?,” “What are your experiences with hunger and fullness after surgery?”.

Questions also asked participants to compare their current experiences with those prior to surgery and to reflect on changes in behaviors, thoughts, and attitudes. The interview guide was pilot tested by a gastric bypass patient who met the recruitment criteria. As no major changes were made to the guide, this interview was included in the data analysis. Interview guides are presented in Appendix 1. Interviews were conducted in cafeterias, offices, bookstores, and participants’ homes, as mutually agreed upon by the participant and researcher. Interviews lasted between 50 and 120 minutes, were audio-recorded, and transcribed verbatim.

Transcripts were coded using the constant comparative method (35), an iterative process that involves multiple passes of the transcripts, until no new codes emerge. Preliminary analysis of the transcripts suggested that dietary behaviors following gastric bypass surgery were intentional and directed at one or more goals, and were not limited to cause and effect relationships to food intolerances. The researcher then employed self-regulation theory (38-40) to organize emergent themes in the interviews relating to how dietary behaviors were connected to goals. Self-regulation is a dynamic process whereby individuals plan and enact goal directed behaviors and monitor their progress towards goals, making adjustments in behaviors if necessary (39, 41). Goals exist in a hierarchy and the attainment of concrete lower level goals through the use of strategies supports the achievement of higher level goals which are more abstract in nature (42, 43). Monitoring progress towards goal

achievement is an essential component to self regulation, providing individuals with the ability to adjust strategies as needed (39, 44).

Subsequently, the coding of all 32 transcripts focused on the identification of dietary strategies, goals, and monitoring practices by identifying current and past behaviors, reasons and rationales for behaviors, behavior evaluation processes, and participants' thoughts and emotions related to these behaviors. Strategies were defined as intentional actions directed toward a desired end. As the focus of the investigation was on dietary practices, strategies were even more narrowly defined as behaviors involving nutrients, food, or eating as an aspect or outcome of the behavior. Across the 32 interviews, participants mentioned strategies over 524 times. This count includes multiple mentions of the same strategy by a participant in different parts of the interviews. The identification of strategies was not limited to those behaviors currently in use, but also those which participants had tried but abandoned, those which they knew of but never tried, or those which they planned to use in the future.

Strategies were grouped first according to similarities in behavior, regardless of the intended outcome of that behavior. Examples of strategy groups include substitution, limiting carbohydrates, and portion control methods. Next, strategies were sorted by their intended outcome, as similar behaviors were implemented for very different reasons. For example, substitution of sugar-free foods might help one participant avoid dumping syndrome, while for another it provided her with a low-

calorie alternative to promote weight loss. In this way, a hierarchy of goals was identified.

Goals were defined as the intended outcomes of strategies. Main goals were higher order, distal outcomes (e.g. “Weight Management,” “Health”). Intermediary goals were more specific proximal outcomes (e.g. “Eat less,” “Limit Carbohydrates,” “Avoid Nutrient Deficiencies”). Achievement of intermediary goals led to the attainment of main goals. Monitoring methods were behaviors participants used to evaluate the efficacy of their strategies on reaching intermediary and main goals (e.g. “Checking Weight,” Dietary Tracking”). Monitoring methods raised participants’ awareness of how they were doing in terms of meeting their intermediary or main goals.

The researcher drew concept maps to show participants’ links between main goals, intermediary goals, types of strategies, and monitoring practices. These maps demonstrated that multiple strategies were used to attain the same goal, while the same strategy could be used to achieve multiple goals. Moreover, each main goal was supported by multiple intermediary goals, and several intermediary goals were supported by sub-intermediary goals, more specific behavioral outcomes, creating a network for each main goal (45). The concept maps of goals and strategies were constructed in an iterative manner with checking and rechecking of transcripts and subsequent revisions of concept maps to be sure of the identification of goals and strategies and linkages between them. Participants expressed individualized sets of

goals, strategies, and monitoring methods, varying in their goals of concern, strategy preference, monitoring methods, and the linkages between their goals. The final list of goals and strategies accounted for negative cases, as participants did not aim for the same goals nor report use of the same strategies.

Techniques to establish trustworthiness were employed throughout the process of data collection and analysis, as outlined by Lincoln and Guba (37). Credibility was enhanced through the researcher's prolonged engagement with participants in multiple interviews and in the researcher's presence as a nonparticipating observer at support group meetings. In these ways, participants developed rapport with the researcher, and the researcher gained a deeper understanding of individuals' stories and experiences. Peer debriefing was achieved through feedback on emergent concepts, themes, and processes that the researcher received from qualitative researchers specializing in food choice and dietary behaviors. Member checks were used during the interviews to confirm the researchers' interpretations of participants' stories and explanations.

Results

Participants each described a set of multi-leveled and interacting goals that guided their dietary strategies and monitoring behaviors. As a group, they expressed four main goals (Weight Management, Health, Avoid Negative Reactions, and Integration), 14 intermediary goals, 37 strategies, over 84 specific strategic behaviors, and six monitoring methods.

The results present the comprehensive set of goals, strategies, and monitoring behaviors described across participants, including those that were being enacted and those that participants believed would work but had not attempted. All participants strove to achieve the four main goals regularly, and each participant employed multiple strategies to achieve various sub-goals throughout the course of the day, though their sub-goals, strategies, and monitoring behaviors differed somewhat.

Organized by main goals, the following sections describe the intermediary goals, strategies, and monitoring behaviors participants linked with each main goal. Though each main goal network is presented as distinct from the others, in reality the lines between them were blurred, as several intermediary goals and strategies were linked to other main goals.

WEIGHT MANAGEMENT

Gastric bypass surgery was seen by participants as a “last ditch effort” to regain control of weight. They all shared similar intermediary goals and strategies for managing weight regardless of their specific weight goal (e.g. losing weight or maintaining weight). The network of intermediary goals and strategies for weight management was the most elaborate and extensive of the goal networks among the main goals. The additional layer of sub-intermediary goals was developed to accommodate the intricacy of the network’s hierarchy of goals and strategies. Intermediary goals, sub-intermediary goals, and strategies for Weight Management are listed in Table 2.2.

Eat Less

Eat Less was a predominant intermediary goal toward managing weight shared by all participants. Surgery “forced” participants to reduce food intake by promoting “immediate” fullness, decreased hunger signals, and negative consequences to overeating. However, almost all participants developed one or more strategies to control the amount of food they ate in one sitting, as well as over the course of the day. Over time eating less became a more deliberate behavior due to an increased ability to eat more. This intermediary goal was supported by three sub-intermediary goals: Controlling portions, adhering to eating times, and protecting the pouch.

Controlling portions. Portion control strategies served to limit food intake within a specific eating episode. Only four participants did not discuss any method of controlling portion sizes, outside of stopping when full.

Measuring and weighing food. The most common portion control strategies were measuring or weighing food. Nine participants measured or weighed their food in the months following surgery, however, only four participants continued to do so on a regular basis. Six participants consistently used specific bowls or serving dishes that they knew held a certain amount of food. Three participants reported measuring or weighing food upon being reminded about what a “correct” portion size should be, or

Table 2.2. Summary of the intermediary goals, sub-intermediary goals, strategies and specific behaviors, and monitoring behaviors associated with the main goal of Weight Management

Main goal	WEIGHT MANAGEMENT		
Intermediary goal	Eat Less		
Sub-intermediary goal	Controlling Portions	Protecting the Pouch	Adhering to Eating Times
Strategies and specific behaviors	<i>Weighing food</i> <i>Measuring food</i> <ul style="list-style-type: none">• Use same 3oz container• Count out 17 pretzels• Use containers of specific volume• Use “single serving• Use small plate <i>Making visual estimates</i> <ul style="list-style-type: none">• “eyeball” portions• Use portion size guides	<i>Establishing drinking rules</i> <ul style="list-style-type: none">• Don’t drink 30 minutes before or after eating• Don’t drink 10-15 minutes before and after eating• Wait 30-60 minutes after eating before drinking• Don’t drink and eat at same time <i>Measuring/ weighing food</i> <ul style="list-style-type: none">• Measure 1 ½ cups• Measure 5 or 6 ounces <i>Avoiding carbonated beverages</i>	Don’t eat after 8pm Choose calorie free foods at night No snacking between meals
Intermediary Goal	Manage Hunger and Fullness		
Strategies and specific behaviors	<i>Structuring eating times</i> <ul style="list-style-type: none">• 5-6 small meals• Three meals and 1 or 2 snacks	<i>Promoting Fullness</i> <ul style="list-style-type: none">• Eat protein first• Choose filling foods• Include meat with salads at dinner• Having eggs and steak instead of carbohydrates at breakfast• Eat protein before vegetables and carbohydrates	
Intermediary Goal	Limit Weight Promoting Foods		
Sub-intermediary goal	Limiting carbohydrate intake	Limiting sugar	Maintaining Calories
Strategies and specific behaviors	<i>Substituting</i> <ul style="list-style-type: none">• Substitute whole grains• Use low carb wraps• Substitute vegetables for pasta	<i>Limiting grams</i> 0-5g sugar per serving <ul style="list-style-type: none">• Add water to juice <i>Limiting portions</i> <ul style="list-style-type: none">• Eat “snack size” candy bars, sliver of cake	<i>Counting calories</i> <i>Choosing lower calorie foods</i> <ul style="list-style-type: none">• Compare food labels <i>Avoiding high fat foods</i> <ul style="list-style-type: none">• Avoid cream sauces, high-fat dressing

	<i>Limiting intake</i> <ul style="list-style-type: none"> • Eat half a potato <i>Avoiding</i> <ul style="list-style-type: none"> • Keep potato chips in husband's car • Do not purchase crackers, cookies 	<i>Substituting</i> <ul style="list-style-type: none"> • Substitute sugar free ice cream, yogurt, candy <i>Avoiding</i>	
Intermediary Goal	<i>Avoid "Old" or "Bad" Habits</i>		
Sub-Intermediary Goal	Dealing with cravings	Avoiding grazing	Avoiding emotional eating
Strategies and specific behaviors	<i>Talking self out of eating</i> <i>Self-control</i> <i>Limiting craved foods</i> <i>Finding replacements</i> <ul style="list-style-type: none"> • Protein shakes • Protein bars • low sugar alternates 	<i>Adhering to eating times</i> <i>Employing alternative activities</i> <ul style="list-style-type: none"> • Quilting • Exercise • Meditation <i>Self-control</i> <ul style="list-style-type: none"> • "make myself not pick" 	<i>Employing alternative activities</i> <ul style="list-style-type: none"> • Walking • Working out • Gardening • Prayer/Meditation • Knitting <i>Going to therapy</i> <ul style="list-style-type: none"> • Professional counseling • Support group • Friends <i>Eating</i> <ul style="list-style-type: none"> • Drink chocolate protein shakes • Eat foods available
Monitoring	<i>Monitoring Weight Management</i>		
Monitoring method	<i>Checking weight</i> <ul style="list-style-type: none"> • Scale • Body measurements • Clothing size • Fitting into a pair of jeans, pants • Marking belt loops 	<i>Dietary tracking</i> <ul style="list-style-type: none"> • Food diaries • Mental tracking 	

when adding a new food to their usual intake. Portion control was also achieved by choosing single-serving packages of foods or measuring out “one serving” of foods from larger packages, such as cereal, crackers, and pretzels. Three participants used small plates to avoid serving themselves large portions.

Making visual estimates. Participants reported being able to “eyeball” or visually estimate their portion sizes, because they “could picture” what a serving looked like. They often used visual guides for estimating sizes such as “the palm of your hand.” Participants also described intentionally eating half of meals when dining out by dividing their food in half and removing it from their plate.

Adhering to eating times. Participants developed rules for not eating in between meals. Eight participants tried not to “eat late at night” or “after 8 o’clock,” unless it was a low calorie, sugar-free option such as sugar-free Jell-O. Five participants had rules about not eating between planned meals or snacks, and they employed strategies to deal with hunger in non-dietary ways if it occurred before their next meal or snack.

Protecting the pouch. Participants believed the stomach could “stretch,” allowing them to eat more over time, and they wanted to “protect” the size of their “pouch.” Participants had specific ideas of how much they should eat based on how big they thought their stomach was. They described their stomach as “softball sized” or holding “one and a half cups,” and aimed to only consume a specific volume to

avoid enlarging their stomach. Many tried to eat “slightly less” than their stomach could hold, using portion control methods to do this.

Establishing drinking rules. Ten participants had rules about the timing of solid food consumption and liquid consumption as they believed drinking during or immediately after eating would cause the stomach to “stretch.” Participants were generally adamant adhering to the drinking rule. As one participant explained, “That is one rule I hope never, ever, ever to break. ‘Cause that’s where I see—every person that I have seen that has put weight back on drinks with their meals.” Other participants described drinking while eating as “pushing your food through and allowing yourself to eat more,” which could promote hunger soon after eating or prevent fullness.

The exact “rule” for drinking liquids differed among participants. Seven participants drank “right up until” they ate and then waited wait 30-60 minutes after eating before having something to drink. Others were more strict and did not drink liquids 15-30 minutes before and up to 60 minutes after eating. One participant always drank while she ate and did not believe it negatively affected her weight.

Avoiding carbonated beverages. Five participants avoided carbonated beverages based on the belief that the carbonation would cause the stomach to “expand,” which was also uncomfortable.

Manage Hunger and Fullness

Participants' lack of hunger influenced the drastic reduction in how much they ate in the months following surgery. Achieving fullness was important both to end an eating event and to sustain a feeling of satiety until the next meal or snack. Successfully managing hunger and promoting fullness were other ways participants were able to control how much and how often they ate.

Structuring eating times. A majority of participants managed hunger by spacing meals and snacks or by having multiple small meals. This strategy prevented hunger from becoming overwhelming which could lead to overeating or eating undesirable foods. Six participants consumed five or six “mini” meals, while four participants were able to manage hunger with three meals with one or two snacks. One participant did not follow a structured eating pattern, but ate according to her hunger, which worked both for her weight management goal and lifestyle. Finally, one participant had a structured meal pattern of “one and a half” meals per day, which left him feeling “so hungry” in the evening. He was debating increasing his meal sizes or frequencies earlier in the day to control eating after eight o'clock.

Promoting fullness. Promoting satiety was accomplished by selecting specific foods. Protein foods were considered “filling,” and eating protein first at meals was noted as promoting fullness. Protein supplements were also utilized in part because of their satiety promoting qualities. Other “filling” foods included salad, apples, cheese, and beans (legumes), as these foods would promote a comfortable fullness between meals.

Limit Weight Promoting Foods

Participants had strong beliefs about foods that would cause weight gain and developed a variety of strategies to avoid or limit these weight-promoting foods. These beliefs were influenced by foods they frequently overate prior to surgery or foods that they saw others eat who had regained weight after surgery.

Limiting carbohydrate intake. Participants commonly believed that refined carbohydrates or “white carbs,” such as breads, pasta, potatoes, and rice turned into sugar in the body which would cause weight gain. All participants consistently avoided or limited these foods.

Substituting. Participants commonly substituted whole grain foods for those made with white flours, such as such as switching from white bread to whole wheat bread. Other substitutions included choosing low-carbohydrate grain products, such as “wraps,” instead of bread slices, or replacing pasta noodles with vegetables.

Limiting intake. Participants limited portions of weight promoting foods in a variety of ways including taking the top bun off a hamburger, eating a quarter to a half a potato, and scooping out the inside of a bagel when making a sandwich. A majority of participants reported eating carbohydrate dishes “last” at a meal, as they were “least important,” and subsequently participants often were too full to eat them. Participants consistently followed this eating order strategy for all meals and snacks, regardless of where they were eating.

Avoiding. Strategies to avoid carbohydrates included not bringing certain carbohydrates into the home environment or avoiding ordering them while eating out. Participants did not purchase certain high carbohydrate foods and expected the same of spouses and other family members.

Limiting sugar. Participants restricted foods high in sugar, such as candy, cake, cookies, desserts, and regular soda to a greater extent than refined carbohydrates. Ten participants had personal rules for choosing foods with sugar and read food labels carefully to ensure this. Acceptable levels of sugar ranged from 0 to 15 grams per serving, with most participants having 10 grams as an upper limit.

Limiting high sugar foods. When they allowed themselves to eat high sugar foods, limitation strategies were very restrictive. For example, one participant limited herself to three peanut M&Ms a day, while other participants would “have a bite” or “a taste” of their partner’s dessert. Two participants added water to their juice to reduce the sugar content. Milk was considered “liquid sugar” by several participants, and they avoided it as “empty calories.”

Substituting. Seven participants substituted sugar-free versions of foods for the regular version, such as eating sugar-free ice cream and yogurt and-making sugar-free cookies. Having fruit for dessert was another substitution strategy.

Maintaining calories. Most participants reported choosing foods they believed were low in calories, and many reported reading food labels to assess calorie content. “High fat” foods such as fried foods, butter, cream sauces, regular salad

dressings, chicken wings, and chips, were limited because they were high in calories, or contributed to weight gain. High sugar foods were also considered high calorie foods. Choosing low-fat or light versions of food was a common substitution strategy for maintaining calories.

Avoid “Bad” or “Old” Eating Habits

Participants stressed the importance of avoiding “old” habits which they believed had contributed to their obesity by causing them to eat too much, eat too often, or eat high calorie foods. They frequently identified certain foods as “triggers” that might cause them to overeat or eat “negatively” and developed methods to combat “cravings” for these inappropriate foods. Participants reported still struggling to avoid these habits and emphasized being aware of or “on guard” against the behaviors.

Avoiding grazing. Participants described grazing as eating for an extended period of time, as “looking for something to munch on,” or eating many snacks in place of or after dinner. Participants stressed being aware of the behavior and were able to “catch” themselves when they started to graze.

One participant returned to support group meetings for guidance after noticing an increase in grazing behaviors. Another participant thought grazing was “a little bit of an issue,” but because she was still losing weight, she was not actively working against it. However, she was in the process of understanding why she grazed and was considering keeping certain foods out of her home.

Adhering to eating times. Strategies for preventing grazing differed among participants and were linked to structuring and adhering to eating times. One participant limited the amount of time she ate to 15 minutes and three participants stated they would “make” themselves “not pick” at foods. Boredom often led to grazing and participants sought activities to “keep me busy” or “keep my mind off food” to avoid grazing when at home. These alternative activities were most frequently used at home.

Dealing with cravings. Participants described cravings for foods they considered “bad” or which they associated with weight gain such as bread, chocolate, donuts, chicken wings, and cookies. Three participants noted an increased “craving” for sweets following the surgery, which they found challenging to deal with. Three participants believed that the surgery helped them not crave foods they used to, or reduced the desire to eat these foods.

Allowing craved foods. Four participants allowed themselves to have a small amount of craved foods, but these amounts were tightly controlled such as “one or two bites” and they were infrequently eaten.

Using self-talk. Two participants talked themselves out of eating craved foods with rationales such as being “too full for dinner” or that the food would “put the weight back on.” Three participants would not allow certain foods such as cookies or potato chips in the house because they did not “trust” themselves.

Substituting. Four participants used substitution strategies, three of whom turned to protein bars or protein drinks. The other participant found “replacements” when she craved chocolate, such as sugar-free chocolate peanut butter candies and black licorice.

One participant did not have a method for dealing with her cravings because she did not “know where that was coming from.” However, she was considering “cutting out some of the carbs” in her diet, which was similar to a strategy also used by another participant who believed she could combat “sugar craves” by eliminating carbohydrates from her diet and drinking protein shakes instead.

Dealing with emotional eating. Fourteen participants cited emotional eating as a main contributor to their obesity prior to surgery. As participants lost weight, they felt less compelled to eat for emotional reasons, however, these participants still struggled with it from time to time. Emotional eating needed to be controlled because it caused participants to eat too much, eat at inappropriate times, or eat “bad” foods. Negative emotions such as anxiety and anger were most often cited as prompting an eating episode, but several participants stated eating to “celebrate” or if they were in a “good mood.”

Many participants described a mental commitment saying “I couldn’t continue that way,” or “I made the decision” not to eat for emotional reasons. Three participants did “not allow” emotional eating and did not cite employing any other strategies.

Employing alternative activities. The most common strategy to avoid emotional eating was to employ an alternate activity. The purpose of these activities was either to distract the desire to eat or “to find something, some other release for what you are feeling.”

Going to therapy. Nine participants went to therapy or counseling to help them deal with emotional eating. The goal of therapy was to uncover and deal with the causes of the emotions to prevent them from causing distress. As one participant said, “you’ve got to look at the problem and you’ve got to deal with it and move on because it’s not going to get any better.” Often as the result of therapy, participants were able to identify the emotion or the “trigger” and “head it off” or “talk” themselves out of eating.

Four participants reported instances of emotional eating after their surgery. One participant explained that when she craved a hot fudge sundae after several deaths in her family, she made a sugar-free chocolate protein shake as an acceptable alternative. Two participants did not employ any strategies for preventing emotional eating, though one had recently scheduled an appointment with a psychologist. Finally, one participant reported eating for emotional reasons on occasion, but she was “not concerned” because she had not noticed an effect on her weight.

Monitoring Weight Management

Weight monitoring methods centered around checking weight and keeping track of dietary intake as a way to raise awareness of behavior performance. These

monitoring activities alerted participants to changes in their weight status or helped keep them “accountable” for dietary choice, prompting them to evaluate their behaviors in general.

Monitoring weight. The most common method of monitoring weight was self-weighing with a scale, which was done on a regular basis by 12 of the participants. Frequency of self-weighing ranged from daily to weekly to once a month. Other methods of checking weight included taking body measurements, although for the most part, participants only did this when they were in their initial weight loss phase.

Six participants had a particular piece of clothing they tried on to gauge whether or not their weight had changed. Most of these participants used clothing fit to evaluate weight maintenance, however, one participant had a pair of jeans she was trying to fit back into, and she would try them on to see how her weight loss efforts were going. Another participant knew he had gained weight by the loophole he was using on his belt, however, because he had not weighed himself in six months, he did not know how much additional weight he had gained.

Monitoring weight was a method to keep “in check” and “know which way I’m going.” Participants often discussed getting “back on track” when weight had gone beyond a “comfort zone.” If their weight was at the high end of their desired weight range, participants reported eating less, changing a food choice, or increasing physical activity. For example, one participant said if he weighed his usual weight, he might have a donut, if he was 2 pounds heavier, he would not. If weight went beyond an

acceptable amount, participants made more drastic dietary changes. One participant had regained 20 pounds and put herself on a 3-day “detox” drinking only protein shakes, followed by a return to eating foods with restricted carbohydrate intake. In contrast, a similar weight gain prompted another participant to keep food diaries and “go back” to weighing her food.

Monitoring dietary intake. Participants also monitored their intake throughout the day to remain aware of what or how much they were eating. Five participants reported writing down everything they ate and drank in the months following surgery, and four of those participants continued to mentally kept track of what they ate and drank. One participant kept an online food journal to ensure she met her nutrient and calorie requirements while another kept “a mental note” of how many calories she had eaten over the course of the day. One participant stated she also wrote down what she was eating if she was adding a new food to her usual intake, to ensure she remained within her calorie level.

HEALTH

The focus of weight management as a main goal was linked to the goal of promoting their overall health. Participants’ decision to have surgery centered on the desire to improve current health and prevent future health complications, to avoid health problems they witnessed in family members, and to promote longevity. Participants described the link between their weight and chronic conditions such as high blood pressure, high cholesterol, and diabetes. They also attributed their obesity

to back pain and joint pain, difficulty in moving, quickly getting out of breath, and excessive, uncomfortable sweating while doing everyday activities.

After the surgery, participants “never felt better” as they experienced relief from pain, had “more energy,” and had an easier time moving and being physically active. They experienced improvements in their obesity-related diseases such as improved glucose control, lower blood pressure, and decreased lipid levels.

Participants on medications prior to surgery no longer had to take them, or were able to reduce the amount. Most participants also said their “mental outlook” had improved and that they felt better about themselves. However, those who experienced weight regain stated that they felt more tired, with less energy and had started noting a return of previous health issues including higher blood sugar or high cholesterol. Successfully maintaining weight loss was linked to continued improvements in health. Participants also expressed a new desire to “be healthy” that extended to choosing healthy foods and being more physically active. In addition, participants were aware that eating less limited their ability to take in nutrients, and of the effects surgery had on their bodies’ ability to absorb nutrients. As one participant stated, “I’ve kind of worked my life around this surgery...because I know if I don’t do these things, I could become really unhealthy.”

In addition to weight management as a goal toward health, participants had other goals for maintaining health that arose from the surgery. Focusing on protein, eating healthy foods, and monitoring health enabled them to address particular health

concerns they perceived as imposed by their restructured gastrointestinal tracts. Table 2.3 presents the goals, intermediary goals, strategies, and monitoring methods for these health concerns.

Table 2.3. Summary of the intermediary goals, strategies and specific behaviors, and monitoring behaviors associated with the main goal of Health

Main goal	HEALTH		
Intermediary Goal	Focus on Protein		
Strategies and specific behaviors	Choosing high protein foods <ul style="list-style-type: none">Nuts, deli meats and cheese for snackChoose Greek yogurtBring cheese sticks, pepperoni and other high protein foods	Eating protein first <ul style="list-style-type: none">Eat protein first, then veg, then carbEat meat/cheese first in a mixed dish	Using protein supplements <ul style="list-style-type: none">Daily (1-3 times)Weekly
Intermediary Goal	Prevent Nutritional Deficiencies		
Strategies and specific behaviors	Taking vitamin and mineral supplements <ul style="list-style-type: none">Daily MultivitaminSpecific supplement (vitamin C, vitamin D, vitamin E, B12, omega-3, iron, calcium)	Establishing drinking rule <ul style="list-style-type: none">Time liquids between mealsDon't eat and drink	
Intermediary Goal	Choose Healthy Foods		
Strategies and specific behaviors	Adding healthy foods <ul style="list-style-type: none">Add vegetables to mealsEat whole fruits Substituting <ul style="list-style-type: none">Fruit for dessertWhole grain bread, crackers, and pasta instead of whiteSubstitute salad for fries99% fat free ground beef	Preparing foods in healthy ways <ul style="list-style-type: none">Low fat baking methodsCook at home instead of eating outCook with olive oilBroil instead of fry	
	Monitoring Health		
Monitoring Method	Evaluating "How I feel"	Checking labs	
	<ul style="list-style-type: none">Assess energy levelsEase of activityShortness of breathPain with movementFeeling tired or lacking energy	<ul style="list-style-type: none">Check vitamin and mineral levelsB12, Vitamin D, FolateAnemia markers (hemoglobin and hematocrit)	

Focus on Protein

The consensus among participants was that protein was the most important nutrient to consume, exemplified by one participants' statement: "Protein is our life." Protein was viewed as essential for health and healing, for building muscle, and contributing to energy, stamina, and general well-being. Most participants believed it was difficult to get enough protein from the foods they ate, either because of malabsorption or limited intake. Half the participants had specific levels of protein they aimed to get each day. These levels were presented in ranges varying from 60-90 grams per day to 160-180 grams per day.

Choosing high protein foods. Participants preferentially chose protein foods at meals and snacks or made sure there was "protein in everything that I eat." Foods identified as high protein included meat, fish, poultry, beans, cottage cheese, and eggs. Nuts and peanut butter were often eaten as snacks, as were cheese sticks and deli meats. A few participants chose Greek yogurts over other types of yogurt due to the higher protein content. Participants frequently brought high-protein foods with them when eating away from home or asked family members to have high-protein foods available.

Eating protein first. All participants but one stressed eating protein first. One participant explained, "What I do now is I eat my meat first, or cheese, and then follow with vegetables or fruit, or whatever. But for me, the protein is number one even before the vegetables." As participants recognized how quickly fullness occurred, protein was eaten first to make sure was "enough room." If eating a mixed meal such

as lasagna or a salad, participants would eat the meat and cheese first, leaving noodles or salad greens for last, if they ate them at all.

Using protein supplements. All participants drank “protein drinks” after surgery and 13 participants continued to drink these supplements on a regular basis. Supplements were sugar-free, consisted of whey protein, and were made with water, milk, or soy milk. They contributed to daily protein goals, or helped “make-up” for a day when a participant did not eat enough. Participants drank them between meals, often as snacks. Four participants drank one a day, and six drank two or more, while the others drank them several times a week. Two participants reported not taking supplements because they consumed enough protein during the day. A third participant drank the supplements initially after surgery, but stopped once his weight regain began.

Prevent Nutritional Deficiencies

Participants were concerned with preventing nutritional deficiencies or correcting existing deficiencies. Because of their beliefs regarding malabsorption of nutrients and the limited quantity of foods they ate, participants rarely chose foods specifically for nutrient content, with the exception of high protein foods, and occasionally fruits and vegetables. Instead participants relied on vitamin and mineral supplements as necessary. Most viewed this as a lifelong requirement of surgery.

Taking vitamin and mineral supplements. All participants took some form of vitamin or mineral supplement on a regular basis. The most common supplements were a

chewable or liquid multivitamin, iron, and B12. Participants developed regimens for taking supplements based on their beliefs about absorption and what worked for them, such as taking iron separately from the other supplements to “enhance” absorption. Other participants brought their supplements with them to eat at different times during the day taking them with or without food.

Establishing drinking rules. Four participants established drinking rules because they believed the liquids would “push the food through faster” and limit nutrient absorption. The longer food stayed in the “pouch,” the more they would absorb. Two participants also noted drinking liquids with meals would make them too full to eat food that would provide them with important nutrients such as protein. Drinking rules for maximizing absorption were similar to those for protecting the pouch.

Eat Healthy Foods

While many of the foods selected for weight management were also considered healthy, participants focused on eating “healthy foods” for the health benefits, something they did not “care” about before surgery. Participants often said things like, “I’m doing what my body needs” and “I view food as something I need to consume to stay healthy.” Healthy foods were generally high in protein or fiber and low in sugar and fat. They included lean meats like chicken and fish, vegetables, dairy products such as cheese, cottage cheese, and yogurt, olive oil, cereal bars, pretzels, stir fry, salads, and beans. Participants were divided as to the healthfulness of fruits, as many thought they were high in sugar.

Adding healthy foods. To implement healthy eating, participants added foods to their usual diet, particularly fruits and vegetables. One participant did not like vegetables, but she ate them “because they are good for you” and tried to find vegetables or ways of preparing them that were palatable. Other participants made substitutions such as choosing a side salad instead of fries, pretzels instead of potato chips, watermelon in place of dessert, or low-fat dressings in place of full-fat dressings. Substituting whole grains for refined carbohydrates was another common strategy for eating healthy.

Preparing foods in healthy ways. Six participants changed their cooking methods to require less fat such as baking and broiling meats, substituting applesauce for butter, or learning how to bake with sugar substitutes. Many specifically mentioned using olive oil in cooking. Two participants reported eating out less and cooking at home more, to have “more control” over what was in their food. Another participant paid more attention to how his wife’s cooked, and he ate something else if she prepared high fat meals. One participant, on the other hand, struggled with cooking because she did not feel confident in her ability to make food taste good but still be “healthy” and low in fat.

Monitoring Health

Participants monitored their health in two main ways: subjectively based on how they felt and objectively based on their blood tests taken as part of their post-surgical follow-up visits or yearly physicals.

Evaluating “how I feel.” Energy levels, ease of physical activity and movement, and not feeling tired were main ways of evaluating health. In particular, participants often used their feelings of energy as a way of determining whether or not they had eaten enough protein. For example, one participant was told to stop taking her protein supplement because of weight gain, but she “missed” it and “didn’t feel right” so she started taking it again. Similarly, two participants ate high protein foods if they felt “low energy” during the day.

Checking labs. All participants had their nutrient status monitored by blood tests, the results of which dictated what vitamin or mineral supplements participants took, and how much. There was a common belief that their lab values could “fall faster” than a “normal” person’s values. Participants varied from getting their blood work, or “labs,” checked every three months to once a year. Two participants requested lab work from their health practitioners if they “felt funny” or “tired.” Contents of lab work were highly individual. Some participants had extensive tests done, while others only had one or two values checked. Almost half the participants tracked their lab values and requested the blood work of their primary care physician, determining their own supplementation, while the others relied on the doctors or dietitians to tell them which tests to have done, and what supplements to take.

AVOID NEGATIVE REACTIONS

All participants experienced “ramifications” to eating following surgery. Avoiding these negative reactions was an important goal for all participants.

Participants accepted these negative consequences as part of the surgery, a “deterrent” to over eating or “a trigger to stop eating unhealthy things.” Five participants reported choosing gastric bypass over gastric banding because of these “deterrents,” and almost all participants stated they would still eat certain high calorie foods if they did not have the negative reactions.

Most eating behaviors were directed towards avoiding or minimizing uncomfortable and painful episodes. These strategies were developed through the course of “trial and error” in the months following surgery. All participants but one could clearly explain what foods would cause them to have negative reactions and how to best manage them, though several would still occasionally eat a food that made them “sick.” The participant who differed experienced severe and frequent consequences to eating, getting “violently” or “mildly” ill every time he ate. He was “unable to predict” the time, the food, or the ingredients that caused his reactions, and was working with a surgeon and a dietitian to find a solution. Table 2.4 displays the intermediary goals, strategies and specific strategic behaviors for Avoid Negative Reactions.

Avoid Food Getting Stuck

One of the major contributors to pain after eating was having food “get stuck,” which participants found to be “scary” and “horrible.” The consequence to this was either vomiting, “foaming,” or having to wait for the offending food to get “unstuck” or “breakdown.”

Table 2.4. Summary of the intermediary goals, strategies and specific behaviors, and monitoring behaviors associated with the main goal of Avoid Negative Reactions

Main goal	AVOID NEGATIVE REACTIONS		
Intermediary goal	<i>Avoid Food Getting Stuck</i>		
Strategies and specific behaviors	<i>Chew foods well</i> <ul style="list-style-type: none">• Chew 40 times• Chew until juice• Put fork down between bites• Don't eat when distracted• Use small utensils	<i>Avoiding offending foods</i> <ul style="list-style-type: none">• Avoid• Change cooking method	
Intermediary goal	<i>Avoid Dumping Syndrome</i>		
Strategies and specific behaviors	<i>Limiting sugar content</i> <i>Avoiding problem foods</i> <ul style="list-style-type: none">• Avoid refined carbohydrates• Avoid high sugar		
Intermediary goal	<i>Manage Blood Sugar</i>		
Strategies and specific behaviors	<i>Modifying carbohydrate intake</i> <ul style="list-style-type: none">• Eating protein with carbohydrate• Choosing whole grain carbohydrates	<i>Structuring eating times</i> <ul style="list-style-type: none">• Multiple small meals	<i>Avoiding high sugar or carbohydrate foods</i>
Intermediary goal	<i>Minimize Food Intolerances</i>		
Strategies and specific behaviors	<i>Avoiding offending foods</i>	<i>Separating drinking and eating</i> <ul style="list-style-type: none">• Don't drink and eat at the same time	<i>Changing preparation</i> <ul style="list-style-type: none">• Bake instead of broil• Drink milk with food
	Monitoring Negative Reactions		
Monitoring method	<i>Awareness</i> Aware of intake and reaction Keep record of intake, noting reactions	<i>Introduce new food at home</i> Try new food at home to monitor effect	

Chewing food well. The best way to avoid food getting stuck was to chew food very well, or “forty times,” “until it’s juice,” or to “applesauce consistency.” Three participants used small utensils, such as a demitasse fork, to help them take smaller

bites, and one put her utensil down between bites. Avoiding distractions while eating was another important aspect of chewing well.

Avoiding problem foods. Foods commonly associated with being stuck included raw vegetables or salad, although many participants had problems with red meat and doughy breads. Participants avoided these foods or took extra care when chewing to ensure it would “go down” without getting stuck.

Avoid Dumping Syndrome

Dumping syndrome was a main deterrent to eating high-sugar foods or eating too quickly, and had been experienced by 11 participants. Symptoms were highly individual, but in general they were characterized as an unpleasant, often immediate, and long-lasting sickness. Participants described getting hot, sweaty, or shaky, as well as experiencing cramps, diarrhea, dizziness, sleepiness, and nausea or vomiting. Participants often had to lie down and “wait it out” or “let it pass,” sometimes for more than an hour. While most participants never ate a particular food again, a few participants stated it took more than one episode before they avoided that food.

Avoiding problem foods. The main way of avoiding dumping syndrome was to avoid or strictly limit foods containing sugar through portion control methods or by restricting the sugar content of foods to no more than 2-10 grams per serving. Participants also avoided refined carbohydrates, believing they would cause dumping syndrome because they “turn to sugar.” Five participants who had not experienced dumping syndrome limited or avoided high sugar foods so as a precaution or because

they believed one could “build up a tolerance” to high-sugar foods, reducing the severity of symptoms.

Manage blood sugar

Managing blood sugar was a focus for half the participants, either because of blood sugar “low” or “crashes,” which caused participants to feel shaky or tired. Three participants experienced a more severe “hypoglycemic reaction” or a “sugar crash,” and one suspected she did, however, her experiences were brief and not severe enough that she altered her diet. The hypoglycemic reaction was characterized as a “dramatic feeling” when participants would feel “tremendously shaky” and “sluggish” or might have heart palpitations or feel faint.

Structuring eating times. Waiting too long between meals or eating high carbohydrate foods by themselves could cause low blood sugar, which required participants to eat when they had not planned to, or consume undesirable foods. To prevent low blood sugar or to keep blood sugar “even,” participants ate five to six small meals.

Modifying carbohydrate intake. Participants who experienced hypoglycemia also avoided high-sugar foods and refined carbohydrates by using substitution strategies. Eating protein with carbohydrates or eating “complex carbohydrates” also helped manage blood sugar. One participant had such an immediate and severe hypoglycemic reaction that she strictly limited her intake of all carbohydrates, even whole fruit and whole grains.

Minimize Food Intolerances

Participants described getting “sick,” “not feeling well,” feeling nauseous, or feeling “uncomfortable” when eating certain foods. Offending foods were highly individual and included scrambled eggs, hard boiled eggs, beef, plain water, white rice, grits, broccoli, fish, and bagels. Six participants developed lactose intolerance after the surgery. Certain refined carbohydrates, particularly bread and pasta, were described as “heavy” or “very filling,” which were both uncomfortable feelings.

Avoiding offending foods. Participants avoided foods that caused intolerances, either by eliminating them or eating them in very small amounts. In some cases, changing the preparation of a food made it tolerable, such as adding powdered mix to water, broiling fish instead of frying it, or drinking milk with a solid food. Participants sometimes tried a food they previously had not tolerated to see if their tolerance had changed, such as participants who wanted to drink milk or eat fish.

Separating drinking and eating. Four participants felt sick or experienced pain when drinking and eating at the same time. These participants subsequently did not drink and eat at the same time, but had no other limits on when they drank liquids.

Monitoring Negative Reactions

Monitoring negative reactions was a constant process that was most intense during the first six to 12 months when participants added foods back into their diet and experimented with preparation methods or food choices. Participants paid

attention to the type of reaction they experienced and the food or foods that were involved, and they developed one or more strategies to prevent a particular reaction.

Participants followed a rule of trying new foods at home or “in a friendly environment” because “you never know how it’s going to affect you.” Participants also ate a new food very slowly and in small amounts, until they knew it would not make them sick. For most participants monitoring efforts were mentally keeping track of intake and associated feelings after eating. Food diaries were used by some participants in the early post-operative period to track reactions.

INTEGRATION

The Integration goal represented participants’ desires to incorporate new dietary strategies and monitoring behaviors into their lives in ways that would make daily food decisions easy. The Integration strategies of planning and repetition enabled participants to accomplish more than one goal at a time, meshing them with other important personal food choice values, such as the taste of food or eating with others. Table 2.5 displays the strategies and specific behaviors participants used to accomplish Integration.

Table 2.5. Strategies and specific behaviors participants used to accomplish Integration

Main goal	INTEGRATION			
Strategy	<i>Planning</i>			
Specific behaviors	<i>Bringing food</i> <ul style="list-style-type: none"> • Bring lunch on errands • Have protein bars or snacks in purse at all times • Bring low fat salad dressing to restaurants • Bring high protein foods to family gatherings 	<i>Making tradeoffs</i> <ul style="list-style-type: none"> • Anticipate dessert , eat less at dinner • Eat soup or salad for lunch to accommodate bagel for breakfast • Include high protein foods or protein drink if meals low in protein 	<i>Planning meals</i> <ul style="list-style-type: none"> • Make meals for the week on Sunday • Planned leftovers • Prepare lunch for work • Have snacks ready at work 	<i>Allowing treats</i> <ul style="list-style-type: none"> • Strict limitations • Limit brownies to potlucks • Limit cake to weddings and birthdays
Strategy	<i>Repetition</i>			
Specific behaviors	<i>Repeat meals</i> <ul style="list-style-type: none"> • Eat same meals with same components • Eat same meals during the week, deviate on weekends 		<i>Repeat food choices</i> <ul style="list-style-type: none"> • Eat the same foods for snacks or in rotation Always choose same foods	

Planning. Anticipating and being prepared were important elements of planning, the strategy that participants used to ensure that they could enact their other dietary strategies in the eating situations. Planning involved thinking ahead to what one was going to eat for the week, such as for lunch and dinner meals, and it involved taking into account what one had or would eat in order to fit in a food that participants normally avoided, such as cake. Figuring out how to meet daily protein and calorie goals was particularly important to participants. Consequently, planning required a great deal of thinking about food. As one participant stated, “From the minute I wake up until I go to bed, I think about nothing but food. And I really didn’t

expect that part of the surgery. I thought, it'd be like, Oh I wouldn't think of food at all, I would never eat. But that's not a healthy way to approach it.”

Bringing food. Participants who were “on the go” and frequently away from their homes developed the strategy of bringing food with them to avoid having to stop and eat a “greasy burger” or to avoid getting hungry. Bringing food was also employed when participants went to family events or other social gatherings. For example, one participant brought cheese and pepperoni to family gatherings in case other suitable foods were not available. Another participant brought protein shake mixes with her to make while traveling.

Making tradeoffs. Six participants described making trade-offs in food selection as they planned ahead or made after the fact adjustments. Tradeoffs were often made to maintain a particular calorie or protein level. For example, one participant pre-planned a coffee drink in the morning which was 180 calories, and she later balanced this caloric intake by not having something of the same caloric value later. Another participant would “recalculate” her protein intake when planning to eat pizza for dinner so that she could add extra high protein foods throughout the day. Tradeoffs also occurred in the form of meals or foods, such as having a salad for lunch when eating a bagel for breakfast or eating half the carbohydrates at dinner to have a small piece of cake for dessert. Finally, participants made tradeoffs of foods when eating too much by eating less later. One participant did this to eat dessert, while another would eat “better” the day after she ate “too many cookies.”

Planning meals. Planning meals or preparing foods ahead of time allowed participants more time to make healthy foods that had appropriate protein levels as well as ensure no negative reactions. One participant, a single mother of two teenage boys, often spent her Sunday preparing meals for the entire week which she then pre-portioned to take for lunch or serve for dinner. This served the purposes of portion control, saving time during the week, and ensuring adequate protein intake. Similarly, several participants planned their lunches and snacks for work, preparing lunches ahead of time and or having specific foods in their office, such as protein bars. Planning meals provided “structure” allowing participants to adhere to ways of eating that would promote weight maintenance and adequate protein intake.

Allowing treats. Participants often allowed themselves “treats” or foods that they normally would avoid because “you can’t go through life without a treat.” Treats were usually high-sugar or high fat foods, such as cake, ice cream, candy, fried foods, or whole fruit. They were consumed only at special times or under certain circumstances. Participants limited the amounts they ate such as “three French fries,” a “teaspoon of pie,” a “bite of a cookie,” or a “sliver of cheesecake.” Participants also limited when they ate these foods, such as eating brownies only at picnics or eating cake only at special celebration events.

Six participants occasionally made choices of “quality” or taste over calories or other “healthy” criteria. As participants found themselves slowing down to eat they could “really taste” their food and found that “some of it wasn’t that good to begin

with.” Having their food taste good became more important than it had been before surgery when they “didn’t really taste” their food, they “just ate.” Because they were eating “such small” amounts, some participants switched from eating low fat cheese to regular cheese or chose slightly higher calorie options for foods such as yogurt, because they tasted better.

Repetition. Repetition of food choices at meals was a strategy utilized by eight participants because it was “easy” and they “didn’t have to think about it.” These participants ate the same foods at the same meals, most days of the week, and they did not mind the lack of variety. Small changes could be made by having different vegetables at dinner or altering a cooking method. For three participants, weekday foods were repetitive, but weekend meals were not because the structure of the day was different.

The repetition strategy was developed out of the need for simplicity, as well as to ensure that the same amount of calories or other nutrients were being eaten. It was also to ensure that no pain was experienced while eating, as participants only included foods they knew they could tolerate. One participant viewed the consistency as allowing her to have “control” over what she ate.

Discussion

The purpose of this study was to understand gastric bypass patients’ constructions of dietary practices after the first year of surgery, after they had experienced maximum weight loss and presumably had adjusted to new dietary

restrictions and requirements brought on through the surgical modification of their digestive tract. This study identified complex and interrelated networks of goals, strategies, and monitoring behaviors that participants constructed as they adapted to life after gastric bypass surgery.

Though the comprehensive list of goals, strategies, and monitoring behaviors does not represent any one person's way of constructing dietary practices, it highlights the scope and detail of the adaptation processes that these patients engaged in as they strove for their main goals of Weight Management, Health, Avoid Negative Reactions, and Integration. The list highlights the considerable work involved as participants developed new ways of eating. Dynamic and iterative, this effort involved thinking, feeling, acting, observing, evaluating, problem solving, and trial and error. Participants experienced both successes and failures in developing and performing strategies intended to achieve their main and intermediary goals.

Most participants were prepared for some aspects of the long-term dietary change process, such as being able to eat more over time, intolerances, dumping syndrome, and a return of habits, and they purposefully developed behaviors in anticipation of these occurrences. However, few anticipated the extent of ongoing cognitive, behavioral, and emotional effort required in the long-term for weight management, health, and integration. As described in Chapter 2, participants characterized the effort required for weight maintenance as “when the work begins.” Maintaining behavioral changes requires substantial effort in performance and

behavior, but also involves outcome expectancies, self-efficacy, and satisfaction with both outcomes and behaviors (46). The mental capacity for controlling behavior or consciously enacting planned behaviors is known as self-regulatory strength (40). Behavioral control or “willpower” can be considered a mental resource, for which an individual has a finite supply. Strategy formation, particular those which simplify choices may be an important aspect of freeing up mental energy for regulating behavior.

The concept of integrating new behaviors into the context of daily lives was an important finding. Participants made major changes to their dietary behaviors, however, few made concurrent drastic changes to their own lives or work situations. Therefore, strategies had to account for established preferences, routines, and situations. Planning, making trade-offs, and allowing treats were strategies developed by participants to balance current needs with their situations. Repetition in foods, instituting cut-offs for sugar and carbohydrates, and categorizing foods as healthy, unhealthy, treats, and weight promoting provided participants with easy ways of implementing new behaviors in a variety of situations. These processes are consistent with the Food Choice Process Model’s personal food system processes of classification, strategy creation, constructing scripts and routines, and balancing conflicting food choice values in personally meaningful ways (22, 28, 47, 48).

This project advances the concept of personal food system in Food Choice Process Model in several important ways. First, though the concept of strategies

emerged in several other qualitative studies of food choice (25, 26, 28, 47), this is the first study using a clear definition that strategies are behaviors constructed to achieve an intended goal. Second, by examining how members of this understudied population construct dietary practices, the study documented the wide variety of goal-directed behaviors patients constructed as part of their extensive dietary adaptation process. Third, the study presents strategies as not simply lists of behaviors, but instead shows how people think about them as directed toward intermediary and higher order goals. People work with a network of strategies and goals in which a single strategy may serve multiple goals and multiple linkages exist among main and intermediary goals (42, 45). Fourth, by drawing upon self-regulation theory and identifying monitoring behaviors, the study highlights the importance of a person's evaluation processes in constructing and maintaining dietary practices.

Many strategies participants described are commonly recommended approaches to dietary management after the gastric bypass surgery to minimize negative outcomes and nutritional deficiencies including supplementation, chewing food well, reduce portion sizes, eating protein first, drinking liquids between meals, and avoiding high sugar and high fat foods (4, 10, 49-51, 52). However, dietary reviews and recommendations for gastric bypass surgery rarely focus on long-term weight loss strategies, nor offer suggestions on how to deal with eating behaviors such as grazing and emotional eating, both of which have been associated with negative weight loss outcomes (18, 53-56). Participants in this study developed several

strategies to deal with unwanted eating behaviors, such as finding alternative activities, going to counseling, or finding substitutes for commonly craved, high calorie foods. The strategies of portion control, changing food choices, and monitoring weight have been identified as successful strategies in men and women using diet and lifestyle approaches to weight loss (57-60).

Strategies uncovered in this investigation are similar to those identified in previous qualitative investigations of dietary behaviors. Falk and colleagues (26) identified eight healthy eating strategies of substitution, avoidance, limitation, preparation, comparison, addition, location, and compensation. Savoca and Miller (61) identified strategies used by individuals with Type 2 diabetes which included food preparation and selection, meal planning, adjustments for high fat foods, and portion control when eating out. In addition to focusing on specific behaviors, strategies are also used to negotiate conflicting values such as finding a food that tastes good but is also healthy or to simplify food choice decisions (62). This research adds to the existing knowledge about strategy formation by categorizing both strategies and the goals they are directed towards, depicting the dynamic nature of goal attainment.

Participants constructed monitoring behaviors to assess the effectiveness of strategies in goal achievement, as well as to ensure they were “staying on track” and performing behaviors consistently or correctly. Food diaries, portion control methods, self-weighing, and checking lab values emerged as ways participants could assess how well their strategies were enabling them to reach goals. Other studies have also

highlighted the importance of developing methods to assess dietary change or weight loss, particularly the use of food diaries in maintaining dietary changes (63-66) and self-weighing as an effective method of promoting weight loss and weight maintenance (58, 67). The various ways in which monitoring methods are constructed and how effective they are in promoting nutritional status and weight loss after gastric bypass surgery needs further study.

Participants developed strategies based on their understanding of how gastric bypass surgery affected their bodies as well as factors they believed would influence weight gain. Carbohydrates and high sugar foods were consistently avoided by all participants due to beliefs they would promote weight gain, while less emphasis was placed on consuming low fat foods. Drinking rules were followed by some participants because they did not want to “stretch the pouch” while others avoided drinking while eating because it “washed away” nutrients. These personally constructed ideas of how the body worked is similar to the concept of illness representation (68, 69). Illness representation is an individuals’ conceptualization of disease symptoms, the timeline, causes, reversibility, and outcome, as well as their perceived control over the disease, all of which influence self management behaviors.(68, 70). Other studies have supported the role of personal beliefs about diabetes (61), cardiac disease(30), and health (26) in determining food choices and strategy use. Understanding gastric bypass patients’ perceptions of their health status may be an important aspect to understanding their health and dietary behaviors.

The results of this study must be considered in light of the limitations. This study focused on a small, purposive sample of men and women from three support groups in New York State, and the findings are not generalizable beyond this group. Participants may have had similar beliefs and strategies based on their attendance at support group meetings, where they shared information and stories, and based on their pre and post-surgical interactions with health care providers. While interviews were comprehensive and detailed, it is also possible that all of participants' strategies and rationales were not fully described or elucidated, and that other strategies existed. This research focused on the individual and individual's behavioral and mental strategies, and did not delve into the social or physical environment, both of which likely influence strategy choice and implementation. Finally, due to the subjective nature of the methodology both participants' explanations and the researchers' interpretation may not accurately reflect reality due to personal and memory bias.

Conclusion

This study highlights the complex, multilevel goal-strategy-monitoring networks that gastric bypass patients construct and advances researchers' understanding of how people construct personal food systems. These findings provide researchers and practitioners with insights about the long-term dietary and lifestyle issues that gastric bypass patients face. Future research is needed to extend and elaborate upon the lists of goal-strategy-monitoring networks that were uncovered in this investigation. Further inquiry into the influences and reasons behind

choosing particular strategies is also warranted. Finally, future research should focus on the roles the social and physical environment play in the development and utilization of strategies, as well as barriers and facilitators of strategy use. Although participants evaluated the success of their personal strategies, it is unknown whether or not these behaviors actually contributed to positive weight and health outcomes, which are the desired endpoints of gastric bypass surgery.

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CHAPTER 4

UNDERSTANDING SELF-MONITORING AND WEIGHT LOSS AFTER GASTRIC-BYPASS SURGERY: AN EXPLORATORY STUDY

Abstract

To explore factors associated with long-term weight loss outcomes among gastric bypass patients, this study examined dietary and weight monitoring behaviors in a sample of patients who were at least 12 months post-surgery. Thirty-seven (32 female, 5 male) patients living in Upstate New York were recruited through support groups. Participants completed an anonymous, on-line survey about their weight histories, surgical histories, current weights, dietary monitoring practices, weight monitoring practices, and demographic characteristics. Measures were developed to assess frequency of monitoring behaviors (recording food intake, mentally tracking food, weighing/measuring foods, and self-weighing). Weight loss outcomes, based on self-reported weights, were current BMI, percent excess BMI lost, and percent weight loss maintained. Mean pre-surgical BMI was 49.5 ± 6.6 . Participants were an average of 32 months post surgery with a BMI 31.2 ± 6.6 . Participants maintained $89.2\% \pm 14.1\%$ of their weight loss and $76.3\% \pm 26.0\%$ excess BMI lost. Higher scores for dietary monitoring behaviors, being unmarried, and lower pre-surgery BMI were associated with lower current BMI and greater excess BMI lost, when controlling for age, sex, and time since surgery. This study yielded constructs, measures, and relationships that warrant further examination in a larger sample of gastric bypass patients.

Introduction

Gastric bypass surgery is a medical intervention for morbid obesity that reduces both stomach size and the length of the small intestine involved in digestion with the net effect of a total reduction in the amount of food one can eat (1). It causes extensive weight loss, improvements in obesity related co-morbidities, and changes nutritional status (2-6). While initial weight loss is substantial, long-term studies have indicated that weight regain begins between one and two years after surgery (4). Research remains contradictory relating to factors that influence weight loss maintenance (7). Studies have found that patients who are female (8) or have lower socioeconomic status (9) lose less weight than their counterparts, however, other studies show no association of either sex (10, 11) or socioeconomic status (12). Pre-surgery BMI has been found to be both a positive predictor of absolute weight lost (13) and a negative predictor of BMI status at 16 months (14).

Studies of how eating behaviors are related to weight loss among gastric bypass patients also report mixed findings. Many studies find no relationship between eating behaviors and weight loss outcomes (15, 16). However, evidence points towards a negative association with post-surgery binge eating (9, 17) and grazing (9) and weight loss outcomes. Evidence is contradictory regarding the role of meal patterns in weight loss, with snacking associated with less excess weight loss (18), a meal pattern of three meals and two snacks associated with weight maintenance (19), and at least one study finding no relationship between eating patterns and weight loss (20).

While more research is needed to clarify relationships between dietary factors, eating behaviors, and weight loss, other behavioral factors warrant attention as potential influences on weight loss after gastric bypass surgery. The literature on weight loss maintenance in dieters using traditional lifestyle modification for weight loss suggests that monitoring behaviors may positively affect weight loss (21). More frequent and consistent habits of self-weighing have been associated with greater weight loss maintenance among dieters (22, 23). Dietary monitoring has been associated with greater weight loss, but only in men and women who kept food records 75% or more of the time (24). Other studies support the finding that dietary monitoring in the form of food records or checklists enhances weight loss efforts (25, 26).

The role of monitoring has infrequently been studied in the gastric bypass population. A survey study found that one of the habits of gastric bypass recipients who maintained 74% of their weight loss was self-weighing at least weekly and that participants took “personal responsibility” for their weight (19). However, details of questions regarding self-weighing frequency or personal responsibility were not presented. Another study found that a majority of participants weighed themselves monthly or one to two times a week (20), though this behavior was not assessed in relation to weight loss or current BMI. As presented in Chapter 2, participants in a qualitative study of gastric bypass surgery described keeping food records and checking weight with a scale as monitoring methods related to weight control.

According to self-regulation theory (27, 28), self-monitoring is a key component of behavior change which can bring about goal attainment. Self-monitoring is part of a “feedback loop” in the self-regulation of behavior, allowing for adjustments in behavioral performance (29, 30). Two types of monitoring behaviors facilitate goal achievement. Self-observation (29) involves tracking performance, such as in the form of record keeping, in order to allow for adjustments in behavioral performance. Self-evaluation (29), or a comparison function (30), involves monitoring outcomes, such as weight, and comparing the current state with desired goal endpoints to assess efficacy of chosen behaviors. From this perspective, self-monitoring behaviors following gastric bypass surgery would focus on dietary actions and weight status. Keeping food records or measuring food intake provides patients with a check on their dietary choices and quantity of intake, while checking weight with a scale would alert post-gastric bypass patients to changes in their weight. Both monitoring behaviors would ideally prompt patients to make salient and timely changes.

This exploratory study developed an on-line survey to examine the relationship between dietary and weight monitoring practices of gastric bypass patients and their self-reported weight outcomes. The hypotheses were that increased use of dietary and weight monitoring practices would be associated with better long-term weight loss outcomes in gastric bypass patients at least 12 months post-surgery.

Methods

Participant recruitment. A convenience sample of participants was recruited from five bariatric surgery support groups in Upstate New York that met in person, but also had electronic list-servs. Three support groups were associated with surgical centers and two were peer-run and organized. Groups varied in size from 12 to over 40 members. Support groups were open to both pre- and post-surgery patients and included gastric bypass recipients as well as patients receiving gastric banding or other bariatric operations. Only one group leader was able to send e-mails only to gastric bypass recipients, and the response rate from these patients was 33%. Leaders for the other four groups did not have access to participants' bariatric surgical status. Therefore, it was not possible to know the number of members in these groups who met the requirements for participation in the survey, and a response rate for these groups could not be determined.

Following a modified Tailored Design Method (31) group members were contacted three times, with each contact being through the group leader or list-serv manager. The first contact informed participants of the study and alerted them to a future e-mail containing a link to the survey. The second contact again described the study and contained an active link to the survey. A third and final contact was sent a week after the first e-mail to thank participants who filled out the survey and remind those who had not that they could still participate, if they wished. Again the study was described and a link to the survey provided. To ensure anonymity, the researcher had

no direct contact with the participants, only with the group leader, who then forwarded the messages to the group. The researcher received confirmation from group leaders after each e-mail was sent to the group. See Appendix 2 for recruitment e-mails. The institutional review board of the researchers' sponsoring university as well as hospital review boards approved all aspects of the study including the questionnaire, recruitment method, and consent process.

An electronic consent form, presented as the first page of the survey was provided as the form of consent. Only participants who chose "continue" were permitted to fill out the survey. See Appendix 2 for the consent form.

Survey questions and constructs. The survey consisted of 58 questions and took an average of 16 minutes and 45 second to complete, as indicated by timestamps on the surveys. This study reports on the close-ended questions related to weight history, dietary monitoring practices, weight monitoring practices, and demographic characteristics. Findings from questions about support group participation and weight ideals and perceptions will be reported elsewhere.

Information about weight outcomes was gathered through questions asking participants to report (in pounds) pre-surgery weight, lowest post-surgery weight, current weight, and highest adulthood weight, as well as how many months after surgery participants reached their lowest weights and how long participants had been at their current weight. Participants were asked to report their height (in feet and inches).

Dietary monitoring was defined as the behavioral and mental efforts of keeping track of what and how much one ate. Behaviors assessed were keeping food records, mentally tracking food and drink consumed, and weighing or measuring food. Weight monitoring was defined as any effort to keep track of weight. Items were developed to assess the frequency with which individuals checked their weight with a scale.

Each dietary and weight monitoring behavior of interest was assessed in two different ways. One question asked how many days in the past week the participant had performed a monitoring behavior. A second question asked participants how frequently they performed monitoring behaviors (never, once a year, several times a year, once a month, several times a month, once a week, several times a week, once a day, several times a day). Questions were developed by the researcher with input from weight monitoring surveys (32).

Demographic questions included sex, age, education level, income, marital status, and employment. Participants were asked to indicate the type of surgery they had most recently and the date of their surgery.

An expert panel was used during the process of drafting and finalizing the questionnaire to ensure content validity (33). The expert panel consisted of nutrition professionals familiar with survey development, self-regulation and self-monitoring, obesity, and weight loss. One member also had experience counseling pre-gastric bypass surgery patients. A former gastric bypass group leader who had the surgery three years prior was also on the expert panel. The expert review ensured that items

were relevant to the constructs, that other salient constructs or topics had not been overlooked, and that items were clear and concise (33). Questions were revised according to expert panel suggestions. The final questionnaire can be found in Appendix 2.

On-line survey. The final questionnaire was transferred to an on-line format following guidelines of Dillman (31). This method uses social exchange theory as the basis for understanding influences and motivations for participant compliance in answering surveys. Guidelines address the design of the survey, the messages attached to the survey, and the procedure for soliciting and following up with potential participants to increase participation (31).

Checkbox ® 4.4.0.5 (Prezza Technologies, Inc.) was used to host the on-line survey and was approved by the university insitutional review board as a secure and accepted online survey program. Prior to sending the survey to the group leaders, the researcher enlisted volunteers to evaluate the online survey for readability and accessibilty. These pre-pilot testers took the survey on several different computers and operating systems to ensure consistency in appearance and usability. Through this process the researcher identified and fixed issues related to readability, item selection, open-ended response input, and problems with link activations within e-mails.

Weight outcome variables. Current BMI, percent excess BMI lost, and percent weight loss maintained were examined due to their relationship with different indicators of success after gastric bypass surgery. Current BMI can be compared to

the reference standards of healthy weight (BMI 18.5-24.9), versus overweight (BMI 25-29.9) and obese (BMI >30) (34). Although a controversial measure of health and body fat (35-37) its prominence as a reference to health makes BMI an appropriate outcome to assess after gastric bypass surgery.

Percent excess BMI lost has been identified as an ideal standard for comparing weight loss across studies of bariatric surgery (38), as change in BMI is a better indicator of loss of body fat than change weight in kilograms. Excess BMI is the difference between an individual's BMI and the upper limit of healthy BMI, 25. Percent excess BMI is the difference between pre-surgery BMI and current BMI divided by pre-surgery excess BMI (38). It provides a measure of how much weight patients lost compared to how much they needed to lose to reach a healthy BMI, or how close they came to reaching a goal of a healthy BMI. Percent excess BMI lost would ideally be 100% or more.

Percent weight loss maintained was identified as an outcome because it captures how successful an individual was at maintaining their weight loss, irrespective of how much they lost or what their BMI is. The goal of surgery is not just to lose weight, but also to maintain that weight loss. In addition, this is a “value” free outcome, in that it does not define success based on medical parameters. Gastric bypass patients might not reach a BMI of 25, but may be satisfied with their weight and maintain 100% at a higher than desired (by health care professionals) BMI.

To compute the weight outcome variables, weight data provided by participants was converted to kilograms and height data was converted to meters. The calculations for weight outcome variables are shown in Table 3.1.

Table 3.1. Calculations for weight outcome variables

Variable	Calculation
BMI	Weight(kg)/height (m) ²
Total weight lost(kg)	Pre-surgery weight– Lowest post-surgery weight
Net weight lost (kg)	Pre-surgery weight–Current weight
% weight loss maintained	Net weight lost/ Total weight loss
Excess BMI	BMI–25
% excess BMI lost	$\frac{\text{Pre-operative BMI}-\text{Current BMI}}{\text{Pre-surgery excess BMI}} \times 100$

Self-monitoring measures. To develop the scales for self-monitoring behaviors, item frequencies for dietary recording, mental tracking, weighing and measuring food, and checking weight with a scale were assigned values 0 (never) to 8 (several times a week). Number of days in the past week that these same behaviors were performed were coded as the actual number of days, with a possible range of 0 to 7.

A scale was developed for dietary monitoring by summing the item responses (33). Initially the six dietary monitoring variables were included, but the mental tracking items were negatively correlated with the other dietary monitoring variables. Therefore, a 4-item scale (2 record keeping items, 2 weighing/measuring items) was created. The 4-item dietary monitoring scale had a Cronbach's alpha internal consistency reliability of 0.85, a mean of 8.35 ± 10.14 and a range of 2-32. The weight monitoring scale included the two weight monitoring items and had an internal

consistency reliability of 0.87, a mean of 7.83 ± 4.06 , and a range of 3 to 16. The dietary and weight monitoring scales were not significantly correlated with one another ($r=.24$, $p=0.17$).

Demographic characteristics. The analysis considered the sex (male vs female), age (years), and time since surgery (months). Marital status was transformed into a dichotomous variable (married vs unmarried) by combining the “single, never married” and “single divorced” because there was no significant difference (using LSD comparison) between these two groups. Income was treated as a categorical variable with eight categories, with each category representing the annual household income in increments of \$10,000 starting from \$10,000- \$19,000. Education was also treated as a categorical variable, with four categories: high school diploma, some college, college graduate, and graduate degree.

Analytical models. SPSS 18 (IBM, 2010) for Windows was used for all analyses. Mean and standard deviations were calculated for quantitative descriptive variables and frequencies and percents for categorical variables. General linear models were used to assess relationships between weight outcomes and the independent variables at the level of significance of $p \leq 0.05$, with co-variates or co-factors added in as noted. Interactions were tested for dietary monitoring, weight monitoring, and marriage, but were not found to be significant.

Initially, associations with the three weight outcome variables were examined separately for each of the following variables: 4-item dietary monitoring scale, 2-item

weight scale, pre-surgery BMI, marital status, sex, income, and education using ANOVAs. Then simultaneous regressions were run to examine the relationships of the two monitoring scales with the other variables that had significant associations with weight outcome variables. Next these models were examined controlling for time since surgery, age, and sex. Finally, all the models were examined with the data only from the 30 participants who were over 18 months post-surgery, as the group differed in weight regain compared to participants between 12 and 17 months.

Results

Participant characteristics. Of the 37 participants, 32 were female and 5 male. The average age of participants was 48.6 ± 7.6 years. Sixty-eight percent were married, 84% lived with a spouse or significant other, and 75% were employed full time. Table 3.2 shows demographic characteristics of the participants. The average time since surgery was 32.6 ± 22.1 months, with a range of 12-129 months. Two participants had surgery times beyond two standard deviations: one was 86 months post surgery and the other 129. When removed from calculations, the average time since surgery dropped to 28.3 ± 11 months. These two outliers were kept in the data analysis, as this was the only value in which they were extreme.

Participants represented five different support groups, but all participants did not regularly attend support group meetings, with only 22% ($n=8$) attending group meetings once a month or more. About half of the participants also utilized on-line support groups. Twenty-two participants reported that a gastric bypass patient ran the

group they most often attended, three reported a registered dietitian as a leader, and one reported a social worker. Seven participants reported the group they most frequently attended was run by more than one type of leader. The combinations of a patient leader with a registered dietitian, social worker, nurse practitioner, and/or psychiatrist were reported.

Table 3.2 Demographic characteristics of gastric bypass patients participating in an on-line survey (n=37)

	Frequency
Age, mean (\pm st dev) 48.6 years \pm 7.6, range 30-62	
Sex	
Female	32
Male	5
Marital status	
Married	25
Single/divorced	7
Single/never married	5
Education	
High school diploma/GED	8
Some college (1-3 years)	11
College degree	13
Post-graduate degree	5
Employment	
Full-time	28
Part-time	3
Unemployed	3
Income	
\$10,000-19,000	1
\$20,000-29,000	2
\$30,000-39,000	2
\$40,000-49,000	3
\$50,000-59,000	3
\$60,000-69,000	6
\$70,000-79,000	9
Over \$80,000	10

Weight outcomes. Mean pre-surgery BMI was 49.5 ± 6.6 , and mean weight was 136.1 ± 24.2 kg. Mean maximum reported weight loss was $55.8\text{kg} \pm 20$, with participants

reporting reaching their lowest weight at approximately 15.7 ± 7.3 months. Mean lowest post-surgery BMI was 29.0 ± 0.9 . At this time, participants had achieved a mean decrease of 20.4 ± 7.0 BMI units. Table 3.3 summarizes participants' weight loss outcomes.

Table 3.3. Summary of gastric bypass patients' weight loss outcomes based on participants' self-reported data in an on-line survey (n=37)

Variable	Mean \pm standard deviation (range)
Current BMI Weight(kg)/height (m) ²	31.2 ± 6.6 (17.1-45.8)
Total weight lost(kg) Pre-surgery weight– Lowest post-surgery weight	55.9 ± 20.1 kg (25.0-101.4)
Net weight lost (kg) Pre-surgery weight–Current weight	50.1 ± 19.9 kg (25-101.4)
Weight regained (kg) Current weight–Lowest presurgery weight	5.8 ± 7.5 kg (00-26.82)
% Total weight loss Total weight lost/ Pre-surgery weight	$40.6 \pm 11.1\%$ (18%-65%)
% Weight loss maintained Net weight lost/ Total weight loss	$89.2\% \pm 14.1\%$ (45%-100%)
Total change BMI Pre-surgery BMI–Lowest Post-surgery BMI	20.4 ± 7.0 (8.38- 37.94)
Net change BMI Pre-surgery BMI–Current BMI	18.2 ± 7.1 (5.5-36.7)
Current excess BMI Current BMI–25	6.2 ± 6.6 (-7.59-20.83)
% Excess BMI lost Presurgery BMI-current BMI/ Presurgery Excess BMI	$76.3\% \pm 26.0\%$ (23.0%-145.0%)

Mean current BMI was 31.2 ± 6.6 with a range from 17.1 to 45.8. Figure 3.1 represents each participant's weight loss pattern in BMI units at three times: pre-surgery, at surgery, lowest weight since surgery, and current weight. At the time of the

study, four (10.8%) participants reported current weight and height data that placed them in the healthy BMI range, 14 (38%) were overweight, and 18 (49%) were obese. One participant was underweight with a BMI 17.4.

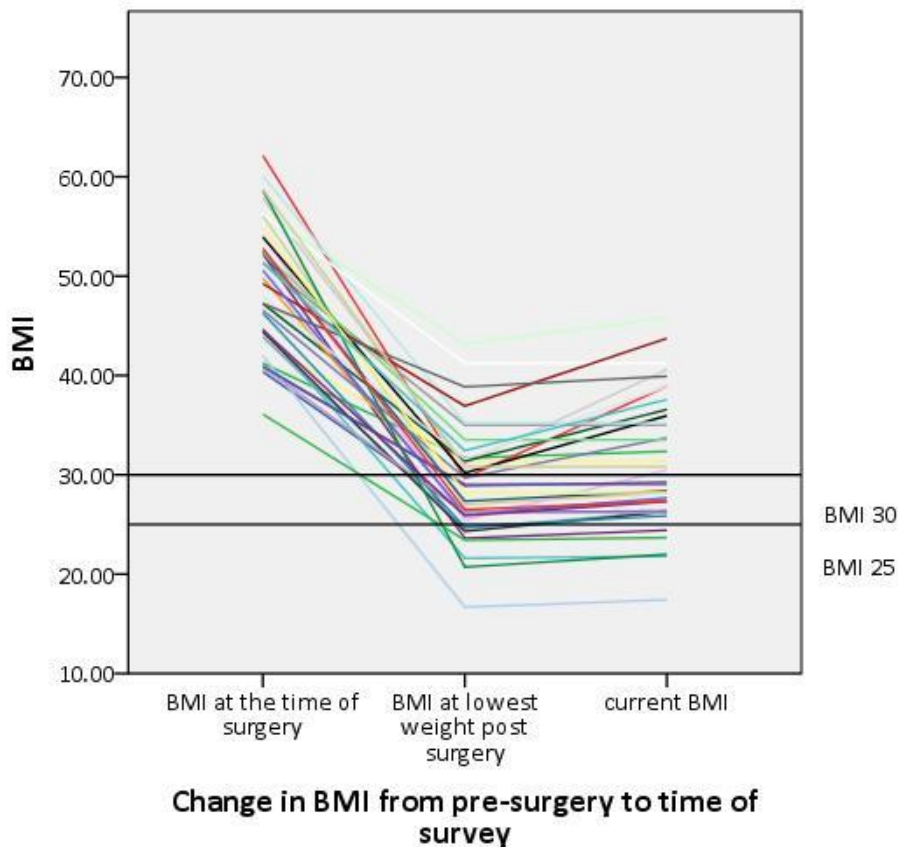


Figure 3.1. Weight loss outcomes among gastric bypass patients presented as BMI before surgery, at lowest weight post surgery, and at time of survey (n=37)

At the time of the survey, mean percent excess BMI lost was $76.3 \pm 26.0\%$ with a range from 23% to 145%. This was based on a net change in BMI of 18.2 ± 7.1 units and a current mean excess BMI of 6.2 ± 6.6 units.

The mean percent of weight loss maintained was $89.2 \pm 14.1\%$ at the time of the survey. Figure 3.2 displays a scatterplot of the percent weight loss maintained of participants according to their time since surgery.

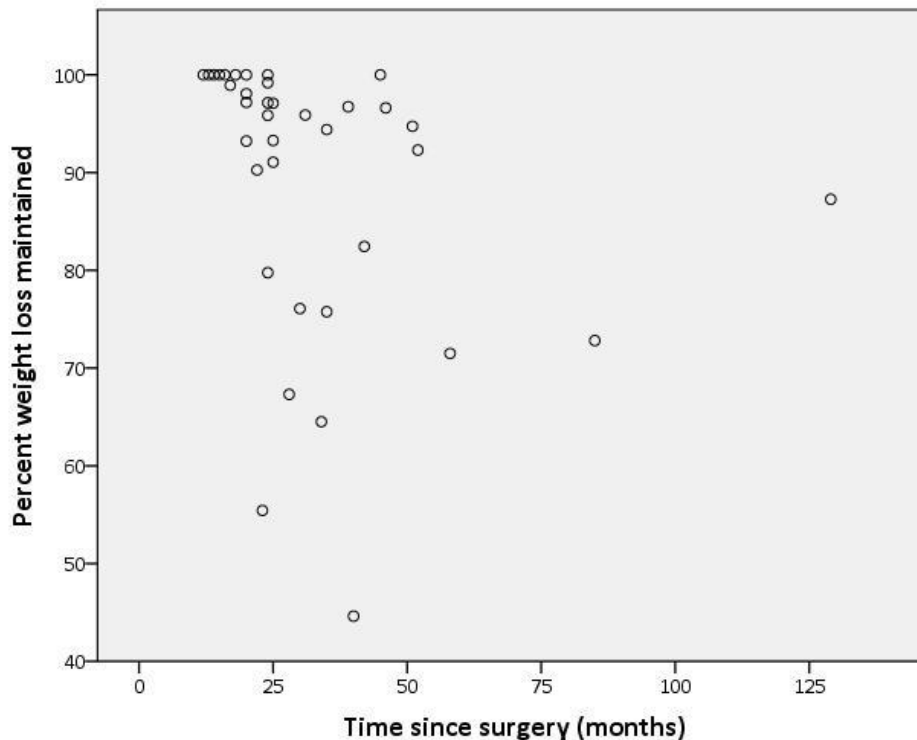


Figure 3.2. Percent weight loss maintained of 37 gastric bypass patients at the time of survey

Monitoring Behaviors

Dietary monitoring. Participants varied in their dietary monitoring behaviors, which are summarized in Tables 3.4 and 3.5. Twenty-five (68%) participants said they never wrote down what they ate or drank, while only seven (19%) said they did this several times a week or more. In contrast, 28 (76%) said that they mentally kept track of what they ate and drank at least several times a week. The popularity of mentally

tracking intake versus keeping food records was also shown in participants' reports of the number of days per week on which they used these ways of keeping track of their intake. Sixteen (43%) participants reported measuring or weighing their food several times a week or more. Twenty five (54%) never weighed or measured their food.

Table 3.4. Self-reported frequencies of days in the past week post-gastric bypass patients used dietary monitoring behaviors as reported in an on-line survey (n=37)

Monitoring behavior	Days per week							
	0	1	2	3	4	5	6	7
Recording food and drink	81% (30)	2.7% (1)	0	0	2.7% (1)	0	0	13.5% (5)
Mentally tracking food and drink	5.4% (2)	5.4% (2)	2.7% (1)	2.7% (1)	5.4% (2)	2.7% (1)	5.4% (2)	70.2% (20)
Weighing or measuring food	70.2% (20)	2.7% (1)	2.7% (1)	8.1% (3)	2.7% (1)	0	2.7% (1)	27.0% (10)

Table 3.5. Self-reported frequencies of dietary monitoring behaviors by gastric bypass patients participating in an on-line survey (n=37)

	How often do you currently write down or record what you eat and drink in a day?	Currently, how often do you mentally keep track of what you eat and drink in a day?	How often do you currently weigh or measure your food?
Several times a day	5.4 % (2)	70.3 % (20)	24.3 % (9)
Once a day	10.8 % (4)	10.8 % (4)	2.7 % (1)
Several times a week	2.7 % (1)	10.8 % (4)	16.2% (6)
Several times a month	2.7 % (1)	2.7%(1)	0
Once a month	0	2.7% (1)	0
Several times a year	8.1% (3)	0	0
Once a year	2.7% (1)	0	2.7% (1)
Never	67.6 % (25)	2.7% (1)	54.1% (20)
Total	100.0% (37)	100.0% (37)	100.0% (37)

Weight monitoring. Twenty-seven (73%) participants reported weighing themselves once a week or more, and only ten (27%) participants stated they had not

weighed themselves in the past week. The mean number of days per week participants weighed themselves was 2.6 ± 2.6 , with a range of zero to seven days a week. Table 3.6 and Figure 3.3 details the frequencies of self-weighing. One participant did not report the number of days in the past week they weighed themselves, and they were excluded from the analyses of weight outcomes.

Table 3.6. Self-reported frequencies of dietary monitoring behaviors by gastric bypass patients participating in an on-line survey (n=37)

Frequency of using a scale to check weight	Percent (frequency)
Several times a day	2.7 % (1)
Once a day	24.3 % (9)
Several times a week	21.6 % (8)
Once a week	24.3 % (9)
Several times a month	8.1 % (3)
Once a month	13.5 % (5)
Several times a year	5.4 % (2)

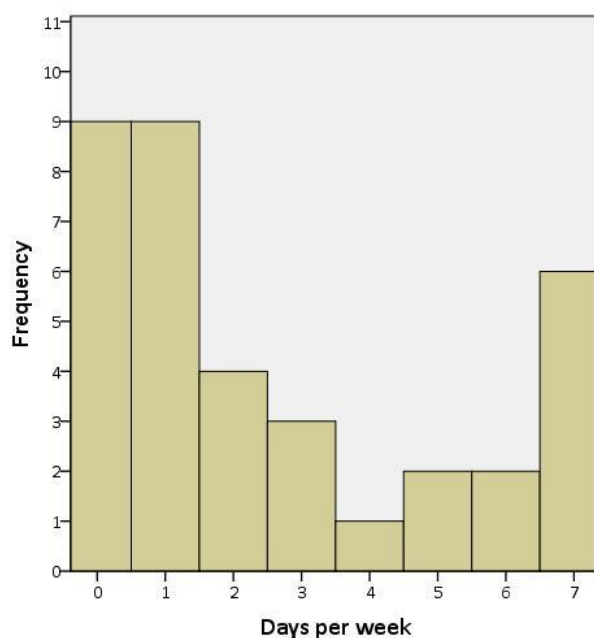


Figure 3.3. Self-reported frequency of days in the past week participants checked their weight with a scale (n=36)

Monitoring behaviors and weight outcomes. The 4-item dietary monitoring scale was negatively related to current BMI ($p=0.019$) and positively related to both percent excess BMI lost ($p=0.007$) and percent weight loss maintained ($p=0.015$). The weight monitoring scale was not significantly related to current BMI nor percent excess BMI lost, however, it was positively related to percent weight loss maintained ($p=0.025$).

When dietary and weight monitoring scales were entered into the model together (as main effects), only dietary monitoring was significantly related to current BMI ($p=0.034$) and excess BMI lost ($p=0.012$). Neither was significantly related to percent weight loss maintained.

Demographic characteristics and weight outcomes. Being married was positively associated with current BMI ($F(1,35)=8.974$, $p=0.005$, $B=6.292$) and negatively associated with percent excess BMI lost ($F(1, 35)=12.751$, $p=0.001$, $B=-0.283$). Marital status was not associated with percent weight loss maintained. Pre-surgery BMI was positively associated with current BMI ($F(1,35)=7.597$, $p=0.009$, $B=0.426$) but was not significantly related to excess BMI lost or percent weight loss maintained. Time since surgery, sex, age, frequency of support group attendance, income, and education were all unrelated to current BMI, percent excess BMI lost, and percent weight loss maintained.

Direct regressions were run to first examine how the three weight outcomes were explained when the dietary monitoring scale, weight monitoring scale, marital status, and pre-surgery BMI were considered together. These models were examined while controlling for time since surgery, followed by models that also controlled for age and sex. Therefore, three models were examined for each of the three weight outcome variables.

Current BMI. Dietary monitoring, pre-surgery BMI, and marital status were significantly related to current BMI ($F(4, 31)=7.277, p<0.001, r^2=0.418$) and remained significant when controlling for time since surgery, age, and sex ($F(7,28)=3.821, p=0.008$). In the final model, higher current BMI was associated with lower dietary monitoring scores ($B= -0.221, p=0.022$), being married, ($B=5.062, p=0.013$), and having a higher pre-surgery BMI ($B=0.427, p=0.003$). The adjusted r^2 for the final model was 0.418, indicating that 41.8% of the variance in current BMI was explained by pre-surgery BMI, marital status, and dietary monitoring when controlling for time, age, and sex. Weight monitoring was not related to current BMI in any of the models.

Percent excess BMI lost. Dietary monitoring ($B=0.962, p=0.011$), pre-surgery BMI ($B=-1.181, p=0.032$), and being married ($B=-22.60$) were significantly related to percent excess BMI lost ($F(4,31)=6.051, p=0.001, r^2=0.366$). The relationship remained significant when controlling for time for surgery, age, and sex only for dietary monitoring ($B=0.917, p=0.018$) and marital status ($B=-22.8, p=0.006$)

($F(7,28)=4.12$, $p=0.003$, $r^2=0.384$). Higher scores on dietary monitoring were associated with greater percent excess BMI lost, while being married was associated with less percent excess BMI lost. Pre-surgery BMI was significantly and negatively related to percent excess BMI lost when controlling for time, but was no longer significant when controlling for age and sex. Weight monitoring was not significantly related to percent excess BMI lost in any of the models.

Percent weight loss maintained. None of the variables were significantly associated with percent weight loss maintained in any of the models, though dietary monitoring approached significance when controlling for time since surgery ($p=0.056$).

Controlling for time since surgery. These sequences of regressions were repeated only with the 30 participants who were more than 18 months post surgery. This group reported a mean weight regain of 13%, compared to less than 1% regain reported among those less than 18 months post surgery. In addition, 19 months was the earliest time following surgery that any participant reported experiencing regain.

ANOVAs comparing percent weight loss maintained of participants between 12 and 18 months post-surgery and those beyond 18 months indicated that there was a significant difference between the groups ($F(1,35)=5.618$, $p=0.023$). Mean percent weight loss of the 12-18 month group was $99.9\% \pm 0.05$ (mean regain: 0.1%), and mean percent weight loss maintained of the other group was $86.7\% \pm 0.024$ (mean regain: 13.3%). The two groups did not differ in excess BMI lost, pre-surgery BMI, or monitoring scores.

Excluding participants less than 18 months post-surgery in the regression models yielded results similar to the models with these participants included. When controlling for time, age, and sex, dietary monitoring ($B=-0.243$, $p=0.047$) and pre-surgery BMI ($B=0.497$, $p=0.015$) were significantly related to current BMI ($F(7, 21)=3.821$, $p=0.008$, $r^2=0.414$), though marital status was not related ($p=.104$). In the model examining excess BMI lost, dietary monitoring ($B=1.01$, $p=0.034$), pre-surgery BMI ($B=-1.48$, $p=0.041$), and marital status ($B=-22.03$, $p=0.039$) were significantly related to excess BMI lost ($F(4,24)=5.266$, $p=0.003$, $r^2=0.379$). When controlling for time since surgery, only dietary monitoring ($B=1.06$, $p=0.023$) remained significantly related to excess BMI lost ($F(4,24)=3.432$, $p=0.013$, $r^2=0.378$). This relationship was no longer significant when controlling for age and sex ($p=0.053$).

Only dietary monitoring ($B=0.537$, $p=0.049$) was significantly related to percent weight loss maintained for patients beyond 18 months post-surgery ($F(4, 24)=3.111$, $p=0.034$, $r^2=.232$). When time, age, and sex were added to the model, the relationship between dietary monitoring and percent weight loss maintained was no longer significant ($p=0.081$).

Discussion

This study explored the relationships between self-monitoring behaviors and weight loss outcomes following gastric bypass surgery in patients who were more than one year post-surgery. Participants were recruited from local support groups to complete an on-line survey including questions about dietary monitoring practices,

weight monitoring practices, weight history, and demographic information. A dietary monitoring scale was developed from items assessing the frequency with which participants kept food records and weighed and measured their food. A weight monitoring scale was developed based on items asking participants the frequency with which they checked their weight with a scale. Multiple regressions were used to examine the relationships between the monitoring scores and the weight outcomes of current BMI, excess BMI lost, and percent weight loss maintained.

Results indicated a relationship between dietary monitoring, marital status, and pre-surgery BMI with current BMI and excess BMI lost. Participants who more frequently monitored their diet, had lower pre-surgery BMIs, and who were not married had lower BMIs and lost a greater percent excess BMI compared to those who less frequently monitored their diet, were married, and had higher pre-surgery BMIs. When only including participants who were more than 18 months post surgery in the analysis, relationships were maintained. None of the independent variables were significantly related to percent weight loss maintained when all participants were included in the analysis; however, among those beyond 18 months, dietary monitoring was significantly and positively related to percent weight loss maintained.

The finding that pre-surgery BMI is positively related to current BMI and negatively related to excess BMI lost is consistent with other findings (9, 15, 20, 39). Those with higher BMIs have a greater amount of excess BMI to lose, and, thus, even

if they experience the average reduction in BMI, this will still place them at a higher BMI and with less excess weight loss (40, 41).

In this study, marital status had the largest impact on current BMI and percent excess BMI lost. Being married was associated an increase of five BMI units and a 22% decrease in excess BMI lost. The finding that marital status is positively related to current BMI is consistent with findings that married persons are heavier than single persons in general (42, 43). The “marriage market hypothesis” contends that single persons have thinner BMIs which are desirable to potential mates, and once married, the drive to maintain this weight lessens (44). Among studies of gastric bypass patients, single persons achieve greater excess weight loss than their married counterparts (45), which is consistent with the marriage market hypothesis.

However, the marriage market hypothesis may not fully explain the weight differences between single and married gastric bypass recipients. One study suggests that marriage satisfaction may play a role in successful weight loss outcomes among female gastric bypass recipients(7). This suggests the importance of supportive spouses, as married gastric bypass patients have to manage their new dietary restrictions within the context of a shared food environment. Lack of support from spouses or increased stress in marriage that may come as one spouse loses weight, could negatively impact weight loss by limiting the patients’ ability to make changes in the shared food environment. Conversely, it may be difficult to change shared habits and behaviors within the context of marriage. Madan and colleagues (46) found obese

spouses of gastric bypass patients experienced weight gain, while non-obese spouses were more likely to lose weight, after the patient's surgery. Given the relationship between an individual's BMI and the BMI of their spouse (47), it may be if one's spouse gains weight, the patient may lose less weight. Reasons for differential weight loss in married versus unmarried persons is an area for future inquiry.

Dietary monitoring was negatively associated with current BMI and positively associated with excess weight loss. Increases in dietary monitoring frequency could have small but meaningful changes in weight outcomes. When the regression model coefficients for dietary monitoring are interpreted in a hypothetical example, the following theoretical impact emerges: Moving from never recording intake to recording once a week (an increase of 5 points in the dietary monitoring scale) would be associated with a decrease in BMI of 1 unit and an increase of 4.8% excess BMI lost. The act of recording intake or controlling portions raises awareness of food choices and quantity of food consumed, which in turn can directly impact calorie consumption. This type of behavior monitoring allows for immediate feedback.

Dietary monitoring was the only independent variable associated with percent weight loss maintenance, and only once those less than 18 months post-surgery were excluded. Vigilance in dietary intake may become more important as time goes on, and in non-surgical populations dieters who more frequently keep food records lose more weight than their less frequent record keeping counterparts (24, 25). Weight regain begins between 2 and 3 years post-surgery (4, 48), possibly due to the return of

previous eating habits or hunger (49). Dietary monitoring may play a role in alerting individuals to changes in behavior, or could prevent the recurrence of these behaviors by promoting the newly established eating behaviors.

Only one other study has examined the role of dietary monitoring after gastric bypass surgery. Odom and colleagues (50) found keeping records and regular self-weighing was associated with weight loss maintenance among gastric bypass patients 2 years post-surgery. As the the two monitoring methods were combined in their analysis, it is unclear if there were separate effects of the two methods, as were found in this study.

Weight monitoring was not related to current BMI or excess BMI lost. It was related to percent weight loss maintained only when other independent variables were not included in the models. This is in contrast to consistent reports of the positive relationship between self-weighing and weight loss outcomes (absolute weight loss and weight loss maintained) among non-surgical dieters using lifestyle modification (32, 51, 52). The lack of relationship of weight monitoring may be due to the lack of statistical power, the lack of variability in participants' self-weighing habits, and lack of variability in percent weight loss maintenance. Weight monitoring may only be beneficial for those who are maintaining, as opposed to those who are trying to lose weight.

Differences in the effects independent variables had on the dependent variables of current BMI, percent excess BMI lost, and percent weight loss maintained may be

due to a variety of factors. Current BMI and percent excess BMI lost are related to the amount of weight an individual lost as a result of surgery, pre-surgery BMI, and other factors which might promote a heavier weight, such as marriage. They are direct outcomes of the surgery itself, which is designed to promote maximum weight loss, and are likely influenced by the extent of post-surgical dietary restrictions. On the other hand, percent weight loss maintained is not dependent on the amount of weight lost, BMI units lost, or factors which might lead a patient to lose more or less weight. Maintaining weight loss would be due to the ability to persist in dietary and lifestyle changes, which may explain why dietary monitoring was the only variable related to percent weight loss maintenance. As presented in Chapter 2, qualitative interviews have uncovered that post-gastric bypass patients perceive the surgery as promoting weight loss, but that they have to make significant lifestyle changes to maintain the weight loss. Maintaining weight loss may rely on monitoring, but it may also rely on other behaviors not assessed in this study.

The findings support the study's hypothesis that dietary monitoring plays a role in positive weight loss outcomes in patients 12 months or more beyond surgery. The results also highlight the complexity of understanding long-term weight loss outcomes related to patients' behavior. Statistical modeling of this phenomenon requires consideration of multiple factors including time, multiple behaviors, and social contexts. As revealed in a qualitative study of gastric bypass patients' long-term dietary and weight loss experiences presented in Chapter 2, this surgery sets patients upon

individualized and dynamic paths of weight loss that requires ongoing behavioral adaptation to weight changes.

The small, non-random sample, from a select set of support groups in one location limits the applicability of the results to the gastric bypass population in general. There may have been self-selection bias in survey response that cannot be accounted for. With a larger sample, more relationships may have emerged, which could not be detected in the current sample. Although study participants were from both peer-run and practitioner-run groups and had diverse educational and economic backgrounds, the sample was predominantly white females and, therefore, not representative of the experiences of minorities or men. Data were based on self-reported heights and weights, which introduces bias and error. Future studies should include actual heights and weights, measured over time for more precise documentation of weight loss patterns and outcomes.

The relationships uncovered in the analysis do not provide evidence for a causal effect. It cannot be ascertained if dietary monitoring is a newly developed behavior, only recently begun as weight stabilized or if participants had been monitoring their intake from the beginning. Conversely, participants who have regained weight might have other reasons for not keeping track of their intake, and the two are not related. In addition, this study did not take into account other influencing factors, such as physical activity, food selection, other eating behaviors

such as grazing and meal patterns, support group attendance, or social support, all of which could impact weight loss and monitoring behaviors.

Conclusion

Dietary and weight monitoring behaviors warrant further investigation toward understanding patients' different weight loss outcomes after gastric bypass surgery. Studies to understand the factors that contribute to successful weight loss outcomes must consider the complexity of patients' experiences, the involvement of time, individual dietary behaviors, and social factors, such as marital status. As researchers seek to better understand predictors of gastric bypass weight loss outcomes, they must consider how different outcome measures reflect different meanings of the patients' experiences (e.g. achievement of healthy BMI vs percent weight loss maintained). Future studies should include a larger, more diverse sample, followed over time with accurately reported weight and dietary behaviors. Including qualitative interviews along with surveys could shed light on perceptions and rationales for performing monitoring behaviors.

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CHAPTER 5

CONCLUSION

Gastric bypass surgery is an effective obesity treatment that is increasingly being used as a method for weight reduction in the United States. It leads to dramatic weight loss and improvements in obesity related co-morbidities, but it also causes food intolerances, negative consequences to eating, and nutrient malabsorption. Dietary management following gastric bypass surgery must encompass both new restrictions on eating, new nutrient requirements, as well as behavior changes to facilitate weight loss maintenance.

Despite increases in the number of gastric bypass surgeries performed, relatively little is known about patients' perceptions and experiences with dietary and weight changes following the surgery. Using a mixed- methods approach, this project aimed to uncover gastric bypass patients' experiences with long-term dietary change and weight loss to gain insight into their dietary practices and weight management behaviors. Qualitative interviews were used to gain detailed descriptions of patients' experiences, while emergent hypotheses from the qualitative analysis were explored in greater detail using an on-line survey.

In-depth, semi-structured qualitative interviews were conducted to gain detailed descriptions of dietary practices, dietary changes, weight loss, and weight perceptions from gastric bypass patients who were at least one year post-surgery. Sixteen participants (13 female, 3 male) were purposively sampled from three different

bariatric support groups in Upstate New York and participated in two interviews. Participants were between 15 months and ten years post-surgery and had maintained between 100% and 30% of their weight loss. Interviews were audio-recorded and transcribed verbatim. Transcripts were analyzed using the constant comparative method and a grounded theory, constructivist perspective. Two analyses were conducted, one which focused on weight loss outcomes and explanations and second which focused on dietary strategies.

The first analysis explored gastric bypass patients' descriptions and experiences with weight loss and dietary change, revealing common weight loss patterns and components to dietary management. Participants all experienced an initial rapid weight loss followed by weight stabilization, and then a period of maintenance, during which time some participants regained weight. These weight changes were accompanied by dietary transitions, and together they characterized different periods of a weight outcome trajectory. During the Honeymoon period, weight loss was easy and participants went through a dietary transition of Trial and Error, when they had to "relearn how to eat" within the constraints of their surgically modified body. Participants then transitioned to Relearning how to eat, when they developed new strategies and consciously changed their behaviors to manage weight. Five components of dietary management emerged in relation to weight management: Hunger and Fullness, Relationship to Food, Awareness of Eating, Strategy Use, and Habit Formation. As weight stabilized, participants began the Work Begins period, as

they transitioned to Making it Work, a dietary phase requiring participants to remain vigilant of their dietary behaviors and to work to establish and maintain habits. The ability of participants to maintain weight loss and/or reverse weight regain differentiated their weight outcomes into one of three long-term weight outcome trajectories: Maintained, Regain/Lost, or Regained.

Viewing weight outcomes as a trajectory that comprises both weight changes and dietary transitions emphasizes the complexity of weight management, even after a surgery designed to promote dramatic, rapid, and relatively effortless weight loss. Changing dietary behaviors to promote weight-loss maintenance required participants to make substantial and purposeful changes in awareness of food and relationship to food as well as develop, enact, and attend to food and eating behaviors. These findings add important insight into patients' experiences with weight loss following surgery. It also points towards the need for dietary counseling to include not only specific behaviors but also to promote an understanding of motivations for eating, the importance of creating habits, and maintaining awareness of behaviors.

The second analysis explored gastric bypass patients' dietary strategies, goals, and self-monitoring behaviors. Participants described a complex, multi-leveled network of goals and strategies, where the completion of lower level goals contributed to the achievement of higher level, main goals. Four main goals emerged: Weight Management, Health, Avoid Negative Reactions, and Integration. Each main goal was supported by lower level goals, which in turn were accomplished through a multitude

of strategies, which were intentional actions directed towards a desired endpoint. Each goal-strategy network was associated with monitoring behaviors that participants used to assess the effectiveness of their strategies at achieving goals.

The extensive strategy-goal networks that participants developed to manage their weight, health, and avoiding negative reactions demonstrate the variety of behavioral efforts participants must make to manage their post-surgery needs. In addition to performing strategies, participants also continually monitored the outcomes of their behaviors to ensure they were meeting their needs. This suggests, as in the first analysis, that participants must exert substantial cognitive effort to maintain changes in food and eating behaviors. As participants had multiple ways of meeting similar goals, this study also suggests there is no “one size fits all” method for managing dietary and weight loss needs after surgery.

The discovery of participants’ utilization of dietary tracking and self-weighing as methods to monitor and influence weight led to the emergent hypothesis that monitoring behaviors promote weight loss maintenance. To explore this relationship, the researcher developed an on-line survey to assess dietary monitoring (keeping food records and portion control methods) and weight monitoring (self-weighing with a scale) behaviors and their association with weight loss outcomes.

Thirty-seven participants were recruited from five bariatric support groups in Upstate New York to complete an on-line survey which included questions about weight loss history, current weight, dietary monitoring practices, weight monitoring

practices, and demographic characteristics. The outcomes of interest were current BMI, excess BMI lost, and percent weight loss maintained. Weight outcomes were current BMI, percent excess BMI lost, and percent weight loss maintained. Survey participants were an average of 32 months post surgery, and had a BMI of 31.2. They maintained 89.2% of their weight loss and 76.1% excess BMI lost. Higher scores for dietary monitoring behaviors, being unmarried, and lower pre-surgery BMI were associated with lower current BMI and greater excess BMI lost, when controlling for age, sex, and time since surgery. Both dietary and weight monitoring were positively related to percent weight loss maintenance, however, this relationship was not maintained once other variables were controlled for in the statistical models.

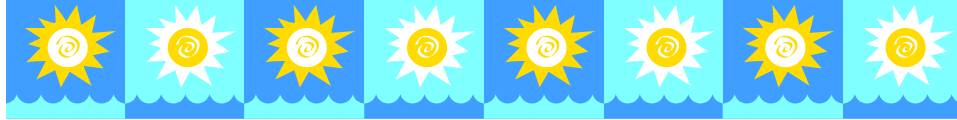
Results from this study demonstrate a relationship between dietary monitoring and long-term weight loss outcomes, suggesting that more frequent dietary monitoring leads to lower post-surgery weight and greater excess weight loss. Dietary monitoring may act as immediate feedback for caloric intake, allowing individuals to make meaningful changes in their intake to prevent weight gain. As married participants were heavier and lost less excess BMI than their single counterparts, there may be a need for special attention and counseling to married patients to promote maximum weight loss. Future studies with a larger sample size should explore these relationships to confirm these findings and further understanding of the influences these factors and behaviors have on weight loss outcomes following gastric bypass surgery.

These three studies emphasize the extensive cognitive and behavioral efforts put forth by gastric bypass patients as they manage diet and weight after surgery. While all patients experienced drastic weight loss, there was diversity in the maintenance of that weight loss, and this diversity may, in part, be explained by differences in dietary management, the use of dietary strategies, and enactment of monitoring strategies.

APPENDIX 1

Materials for qualitative study

1. Recruitment flyer
2. Consent form
3. Semi-structured interview guides and demographic form
4. Excerpt of cross-case display matrix



Experiences with Food and Eating after Gastric Bypass Surgery

- **Have you had gastric bypass surgery?**
- **Are you interested in telling your story?**

If you are over the age of 18, are not pregnant or lactating, and if it has been at least one year since your surgery, you may be eligible to participate in a study about gastric bypass surgery.

This study is being done by a graduate student in the College of Human Ecology at Cornell University. It will examine the ways in which gastric bypass surgery has affected your eating behaviors, your weight, your health, and your life. It involves nothing but your time and your willingness to tell your story in *two* private, confidential interviews. For participating in the study, you will receive a compensation of twenty dollars. All aspects of the research have been reviewed and approved by Cornell's Institutional Review Board Committee on Human Subjects.

If you would like to learn more about this study, or would like to sign up to participate please contact:

Amanda Lynch
ail7@cornell.edu
607-351-9572

Experiences with Food and Eating after Gastric Bypass Surgery

You are being asked to take part in a research study of people's experiences with food and eating after gastric bypass surgery. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

What the study is about: The purpose of this study is to explore how men and women manage food and eating following gastric bypass surgery, and to understand the influences on their food choices and eating behaviors. To take part in this study you must be at least 18 years of age and have had gastric bypass surgery at least one year ago. If you are pregnant or lactating, you are not eligible for participation.

What I will ask you to do: If you agree to be in this study, you will participate in two interviews. The interviews will include questions about your past and present food choices and eating behaviors, your experiences with weight loss after surgery, and your sources of support before, during, and after gastric bypass surgery. There are no right or wrong answers, as I am only interested in your personal experiences. The interviews will take 60-90 minutes to complete, or for however long you feel comfortable talking. At the conclusion of the second interview, you will be asked to complete a questionnaire asking about personal characteristics such as height, weight, education, income, and smoking habits.

With your permission, I would also like to tape-record the interview. Your name will not be associated with the tapes or the interviews.

Risks and Benefits: I do not anticipate any risks to you participating in this study other than those encountered in day to day life. There are no benefits to you.

Compensation: You will be compensated for your time in the form of 20 dollars, which will be given to you at the conclusion of the second interview.

Your answers will be confidential. The records of this study will be kept private. In any sort of report I make public, I will not include any information that will make it possible to identify you or anyone you mention in the course of the interviews. Interview transcripts will not contain any personally identifiable information in them. These transcripts will be kept in a locked file; only myself and research assistants will have access to the transcripts. Interview tapes will be destroyed at the conclusion of the study, which I anticipate will be within a year of the taping.

Taking part is voluntary: Taking part in this study is completely voluntary. You may choose not to answer any question that you do not want to answer. If you decide not to take part or to skip some of the questions, it will not affect your current or future relationship with Cornell University. If you decide to take part, you are free to withdraw at any time.

If you have questions: The researcher conducting this study is Amanda Lynch, a graduate student in the College of Human Ecology at Cornell University. Please ask any questions you have now. If you have questions later, you may contact Amanda Lynch at ail7@cornell.edu or at 607-351-9572.

If you have any questions or concerns regarding your rights as a subject in this study, you may contact Cornell University's Institutional Review Board (IRB) at 607-255-5138 or access their website at <http://www.irb.cornell.edu>.

Experiences with Food and Eating after Gastric Bypass Surgery

You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Your Signature _____ Date _____

Your Name (printed) _____

In addition to agreeing to participate, I also consent to having the interview tape-recorded.

Your Signature _____ Date _____

Signature of person obtaining consent _____ Date _____

Printed name of person obtaining consent _____ Date _____

This consent form will be kept by the researcher for at least three years beyond the end of the study and was approved by the IRB on March 6, 2009.

FIRST INTERVIEW

Date: Time: Location:
ID#

First we will be talking about your current and previous experiences with food and eating.

Take me through a typical day of eating for you.

What is easy about eating?

When and where does this happen?

What is difficult about eating?

Are there any foods you can't eat? Tell me about them.

Tell me about your experiences with hunger.

How do you know when you are hungry? Example.....

How do you deal with hunger? Example...

Tell me about your experiences with being full.

How do you know when you are full?

How do you deal with fullness?

What have your experiences been taking nutrition supplements?

Protein, Vitamin/Mineral, Herbal, Other (as they define them)

What supplements are you taking now?

How is that working for you?

What type of eater would you describe yourself as? (What type of an eater are you?)

How would you describe yourself as an eater before gastric bypass surgery?

What is the most important thing to consider when deciding what to eat?

How have these factors changed since surgery?

What are some eating habits you have?

How did you develop those habits?

How do you manage food and eating?

In social situations?

How do others influence your eating behaviors, or how you eat?

How do others influence your food choices, or what you eat?

Tell me about a time when this happened.

Tell me about a time when this happened.

How do you view food?

In what ways has this view/approach changed since surgery?

Tell me why you think you view food and eating in this way.

How would you describe your relationship to food now?

How is that different from before surgery?

What is positive about eating?

What is negative about eating?

Going back to the typical day we talked about before.... How is this different from a typical day of eating prior to gastric bypass surgery?

Tell me more about.....

How have your *food choices* changed?

Give me an example of something you used to do but do not do any more.

Give me an example of something you do now, that you never used to do.

What are some reasons for these changes?

How have your meals and snacks changed?

Patterns?

Size?

How have your *drinking habits* changed?

How has the way you eat changed?

What are the things you usually do? What are the things you avoid doing?

If not volunteered, probe for: chewing, drinking, etc.

Tell me about the process of changing what and how you eat.

What was easiest to change in regards to food and eating?

Tell me why that was easy

What was hardest to change in regards to food and eating?

Tell me why that was hard

What are some reasons for these changes?

How do you feel about the changes you have made?

How do others help the dietary changes you have made?

How do others hinder the dietary changes you have made?

Is there anything else, in regards to food and eating you might change?

Do you have any other comments or thoughts related to food and eating before or after gastric bypass surgery, that we haven't covered so far?

SECOND INTERVIEW

Date: Time: Location:
ID#

In this interview we are going to discuss your experiences with weight and with gastric bypass surgery. First , I would like to talk about your weight and dieting history.

Tell me about your experiences with dieting for weight loss.

What types of diets have you tried in the past? Give me an example.

Why do you think these approaches didn't work for you?

Why do you think you had a problem (or issue?) with weight?

Tell me about your decision to have surgery:

Who were your sources of support after surgery?

How did you learn about what to eat after surgery?

What sources of information did you use?

Tell me about your weight loss after surgery.

How was that experience for you? How did you feel? How did others react?

How do you feel about your current weight?

Tell me why you lost weight after surgery?

Tell me about any strategies for weight loss (or weight maintenance)? Tell me about them.

How did you form these strategies?.

How has your health changed since surgery?

Why do you think your health has changed?

How has your life changed since surgery?

Positives? Negatives?

How do others help the changes you have made?

How do others hinder the changes you have made?

How do you feel about your decision to have surgery?

If you were to give someone who was thinking about having gastric bypass some advice, what would you tell them?

SELECTED DEMONGRAPHIC INFORMATION

Participant #: _____

Are you: ☐ Male ☐ Female

What is your age: _____ years

When did you have your surgery? ____ month ____ year

How old were you when you had your surgery? ____ years

Do you currently attend a support group? Yes ____ No ____

How often do you go?

If you don't go, when was the last time you attended? _____ months/years ago

Are you currently:

☐ Working at a job or business full time

☐ Working at a job or business part-time

☐ Retired

☐ Student

☐ Not working/ Unemployed

☐ Other _____

If employed:

What is your current occupation: _____

What are your prior occupations:

What is the highest level of education you completed?

☐ No schooling completed

☐ Nursery school to 6th Grade

☐ 7th or 8th Grade

☐ 9th to 11th Grade

☐ 12th Grade – No Diploma

☐ High School Graduate – High School diploma or Equivalent (Ex. GED)

☐ Some college credit, less than one year

☐ 1 or more years of college – no degree

☐ Associate Degree

☐ Bachelor's Degree

☐ Graduate/Professional Degree

What is your marital status?

☐ Never Married

☐ Married

☐ Married and separated

☐ Divorced

☐ Widowed

What is your current living arrangement?

- ☐ Live alone
- ☐ Live with spouse/partner
- ☐ Live with roommate/unrelated adult
- ☐ Live with relatives (not spouse/partner)

How many other adults over age 18 live in your household? _____

How many children live in your household who are:

Less than 2 years old? _____

2-5 years old? _____

6-12 years old? _____

13-18 years old? _____

What is your Race/Ethnicity (check all that apply):

- ☐ White
- ☐ Black, African American, or Negro
- ☐ Spanish, Hispanic, or Latino
- ☐ American Indian or Alaska Native (Print name of enrolled or principle tribe)

-
- ☐ Japanese
 - ☐ Korean
 - ☐ Vietnamese
 - ☐ Native Hawaiian
 - ☐ Guamanian or Chamorro
 - ☐ Samoan
 - ☐ Other Pacific Islander
 - ☐ Asian Indian
 - ☐ Chinese
 - ☐ Filipino
 - ☐ Other (print race) _____

Selected Other Information

How much do you currently weigh? _____ pounds

a. What was your weight prior to surgery? _____ pounds

b. What is your lowest weight, since your surgery? _____ pounds

What is your current height? _____ ft _____ in

Place an X next to the category that best fits your current smoking status.

_____ current smoker _____ nonsmoker (never smoked)
_____ nonsmoker (former smoker)

Place an X next to the category of your total household income.

_____ Less than \$10,000
_____ \$10,000 to \$19,000
_____ \$20,000 to \$29,000
_____ \$30,000 to \$39,000
_____ \$40,000 to \$49,000
_____ \$50,000 to \$59,000
_____ \$60,000 to \$69,000
_____ More than \$70,000

Excerpt of cross case display matrix

Psuedo	WT group	View of Food	Relationship to Food	Surgery is a tool	Habits
Ashley	Maintain	Food "not as important" but "keeps your body going"; world doesn't revolve around food; education important; food doesn't control her; more conscientious; enjoys what she eats	"not my best friend", everything used to revolve around food	can't eat as much, need to learn to change habits "failed so many times that I'm making this work for me", not reversible; need to use the tool to change lifestyle;	important to change habits and "not go back to the way I was before"
Cindy	Loss	loves food and enjoys eating more and feels less guilty; food is not the center of life "food for the sake of food", eg. nutrients; feels in control	food was "best friend"; no longer controls emotions	to "make stomach smaller so I couldn't overeat", stop hunger; made her more aware, not "a magic bullet"; allowed her to take control and prompted her to "use other tools"	consciously made walking a habit (bought treadmill before surgery), formed portion size habit early; old habits promote weight gain
Courtney	Regain	"I don't forget [eating]; I get up and that's the first thing I think about...It rules my world". Eating is pleasurable, is social and comfort. Food has no meaning it's "just food" and "it better taste good"	"love hate": loves food, hates what it has done. Food is pleasurable and comfort	can "dictate" what to do but doesn't "open the toolbox"; fixes stomach, but not head, "still 90% responsible", wishes she took surgery more seriously	didn't make any changes; surgery doesn't fix "what brought you to these habits"
Dana	Regain-loss	loves food but no is about "eating the right things"; food is fuel, no longer controls her was "bad obsession" feels satisfied, not deprived; less guilt	Not an obsession	needed a "drastic measure", need the limitation and consequence; changed obsession with food, trigger to stop eating unhealthy; is satisfied with smaller amounts	needed surgery to adjust

APPENDIX 2

Materials for the On-line Survey

- 1. Recruitment letters (3)**
- 2. On-line consent form**
- 3. Questionnaire**

Initial Contact and Pre-notice E-mail

Subject Line: Invitation to take a Survey about Gastric Bypass Surgery

Dear Members of _____ Weight Loss Surgery Support group:

I am a graduate student at Cornell University conducting research for my PhD. I am interested in weight and dietary behaviors of men and women who have had gastric bypass surgery, and would like to invite you to participate in my study.

Participation involves completing an on-line survey containing questions about support groups, dietary practices, weight-related behaviors, and your experiences with weight loss following gastric bypass surgery. The survey should take about 15 minutes to complete. Participation in this survey is voluntary. Your responses will be anonymous and will be kept confidential.

Within the next couple of days, you will receive another e-mail regarding this study, this time including a link to a secure website containing the survey. If you have had gastric bypass surgery at least one year ago, are over the age of 18, and are not currently pregnant or lactating, you are invited to complete the on-line survey. If you have any questions, feel free to contact the primary investigator, Amanda Lynch, at 607-255-3435, or via e-mail, at ail7@cornell.edu.

Thank you for your time.

Sincerely,
Amanda Lynch

Amanda Lynch, MS
PhD Candidate
337 MVR
Cornell University
Ithaca, NY 14850

Second contact E-mail, containing survey

Subject Line: Invitation to take a Survey about Gastric Bypass Surgery

Dear Members of _____ Weight Loss Surgery Support group:

A few days ago, you received an e-mail inviting you to take part in an online survey about the weight and dietary behaviors of men and women who have had gastric bypass surgery. As described earlier, participation involves completing an on-line survey containing questions about support groups, dietary practices, weight-related behaviors, and your experiences with weight loss following gastric bypass surgery. Participation in this survey is voluntary. The survey should take about 15 minutes to complete. Your responses will be anonymous and kept confidential.

If you have had gastric bypass surgery at least one year ago, are over the age of 18, and are not currently pregnant or lactating, I invite you to take part in this research. Please follow the link below, and it will take you to the survey website.

(link)

If the link to the survey does not work, please cut and paste the following into the web-browser bar: (http://...) You may also type the link in to the web browser bar.

If you have any questions, feel free to contact the primary investigator, Amanda Lynch, at 607-255-3435, or via e-mail, at ail7@cornell.edu.

Thank you in advance for your participation.

Sincerely,
Amanda Lynch

Amanda Lynch, MS
PhD Candidate
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Third Contact e-mail: Reminder and Thank-you

Subject Line: Reminder: Survey about Gastric Bypass Surgery

Dear Members of _____ Weight Loss Surgery Support group:

About a week ago, you received an e-mail containing a survey about the weight and dietary behaviors of men and women who have had gastric bypass surgery. This e-mail also contained a link to a secure on-line survey. If you completed this survey, I thank you very much. If you have not yet completed the survey, I would like to again present the opportunity to participate, as I am still looking for volunteers. If you have had gastric bypass surgery at least one year ago, are over the age of 18, and are not currently pregnant or lactating, you are eligible to take part in this survey.

As described earlier, this survey contains questions about support groups, dietary practices, weight-related behaviors, and experiences with weight loss following gastric bypass surgery. The survey should take about 15 minutes to complete. Participation is voluntary. Your responses to the survey will be anonymous and kept confidential.

If you would like to complete this survey, please click the link provided, and it will take you to the survey website.

(link)

If the link to the survey does not work, please cut and paste the following into the web-browser bar: (http://...) You may also type the link in to the web browser bar.

If you have any questions, feel free to contact the primary investigator, Amanda Lynch, at 607-255-3435, or via e-mail, at ail7@cornell.edu.

Thank you for your participation.

Sincerely,

Amanda Lynch

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CONSENT FORM

Welcome to the Gastric Bypass Surgery Web-Survey!

The purpose of this study is to explore dietary and weight behaviors of men and women who have had gastric bypass surgery. To take part in this study you must have had gastric bypass surgery at least one year ago, be over the age of 18, and must not currently be pregnant nor lactating.

Participation involves answering questions about support groups, dietary practices, weight behaviors, and your experiences with weight loss after gastric bypass surgery. At the end of the survey you will be asked questions about your background such as marital status and age. Your answers will be anonymous and will remain confidential. Taking part in this study is completely voluntary. You may choose not to answer any question that you do not want to answer and may stop taking the survey at any time. Due to the anonymous nature of participation, it may not be possible to remove your responses once you complete the survey, should you wish that information be withdrawn.

There are no anticipated risks to you participating in this study, other than those encountered in everyday use of the internet.

The researcher conducting this study is Amanda Lynch. If you have any questions or concerns, you may contact her at ail7@cornell.edu or at 607-255-3435. This study has been approved by Cornell University's Institutional Review Board. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Cornell University Institutional Review Board (IRB) at 607-255-5138 or access their website at <http://www.irb.cornell.edu>. You may also report your concerns or complaints anonymously through [Ethicspoint](#) or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

By completing this survey, you are giving your consent to participate and certify that you meet the eligibility criteria as described above. Please click "Continue" to begin the survey.

"Continue"

Questionnaire

Message to participants: Please be aware that if you begin the survey and need to stop for any reason and close the survey, your answers will be lost. To complete the survey, you will need to start the survey again.

The following questions will ask you about your weight loss surgery.

1. What type of weight loss surgery did you most recently have?

Please select the weight loss surgery you had. If you most recently had a revision to or a re-operation for a previous surgery, please choose the original surgery.

Answer Choices:

Gastric Bypass (Roux-en-Y Gastric Bypass)
Lap-Band (Gastric Banding)
Gastroplasty
Biliopancreatic Diversion
Gastric Sleeve
Other surgery, please explain

2. When did you have this weight loss surgery?

Please indicate the month, day, and year that you had your weight loss surgery. If you do not know the exact date, please give your best estimate.

Click on the calendar to choose a date or type in the date (MM/DD/YYYY).

Answer response: Date (MM/DD/YYYY)

3. Was this the first weight loss surgery you had?

Answer Response: Yes No

4. If you answered "No" above, what type of weight loss surgery did you have first?

Please select the original weight loss surgery you had.

Answer Responses:

Gastric Bypass (Roux-en-Y Gastric Bypass)
Lap-Band (Gastric Banding)
Gastroplasty or Stomach Stapling
Biliopancreatic Diversion
Gastric Sleeve
Other surgery, please explain

PAGE BREAK

Message to participant: The following set of questions will ask you about your experiences with weight loss surgery support groups.

5. How often do you currently attend a support group for your weight loss surgery?

Answer Response:

Weekly

Twice a month
Once a month
Once every other month
Less than 6 times a year
Never

6. Who runs or leads the support group that you most often attend?

Subtext: Check all that apply.

Answer response:

Someone who has had obesity surgery
Nurse Practitioner or Physician's Assistant
Dietitian or Nutritionist
Psychologist
Social Worker
Other (please explain)

7. Please describe the reasons you attend a weight loss surgery support group. If you do not currently attend a weight loss surgery support group, please describe reasons you do not attend.

Answer Response: Open-ended response

8. Do you attend any other support groups, not related to weight loss surgery?

Answer Responses: Yes No

9. If you answered "Yes" above, what support groups do you also attend?

Answer Response: Open-ended

10. How often do you currently use on-line weight loss surgery support groups, discussion boards, forums, or chat rooms?

Answer Responses:

Daily
Weekly
Monthly
Several times a year
Yearly
Never

11. What information do you seek from these on-line weight loss surgery support sources?

Answer response: Open-ended

PAGE BREAK

Message to participant: The following questions will ask you how you keep track of what you eat.

12. How often do you currently write down or record what you eat and drink in a day?
For example, how often do you keep a food diary or use an on-line food log?

Answer Responses:

Several times a day
Once a day
Several times a week
Once a week
Several times a month
Once a month
Several times a year
Once a year
Never

13. Thinking back over the past week, how many days did you write down or record what you ate and drank?

Answer Responses:

0 1 2 3 4 5 6 7 Days

14. Please describe the reasons you write down or record what you eat and drink. If you do not write down or record what you eat and drink, please describe the reasons you do not.

Answer Response: Open-ended

15. Currently, how often do you mentally keep track of what you eat and drink in a day?

Answer Responses:

Several times a day
Once a day
Several times a week
Once a week
Several times a month
Once a month
Several times a year
Once a year
Never

16. Thinking back over the past week, how many days did you mentally keep track of what you ate and drank?

Answer Responses:

0 1 2 3 4 5 6 7 Days

17. Please describe the reasons you mentally keep track of what you eat or drink during the day. If you do not mentally keep track of what you eat or drink, please describe reasons you do not.

Answer Response: Open-ended

18. How often do you currently weigh or measure your food?

Answer Responses:

Several times a day

Once a day

Several times a week

Once a week

Several times a month

Once a month

Several times a year

Once a year

Never

19. Thinking back over the past week, how many days did you weigh or measure your food?

Answer Response:

0 1 2 3 4 5 6 7 Days

20. Thinking back over the past week, how often did you use the following methods to decide how much to eat?

Answer Responses:

	Always	Often	Sometimes	Rarely	Never
Food scale					
Measuring cups or spoons					
Bowl or container that holds a known amount					
Small plate					
Visual estimate					

PAGE BREAK

Message to participant: The following set of questions will ask you about how you check your weight.

21. How often do you check your weight with a scale?

Answer Responses:

Several times a day

Once a day

Several times a week

Once a week

Several times a month
 Once a month
 Several times a year
 Once a year
 Never

22. Thinking back over the past week, how many days did you check your weight with a scale?

Answer responses:

0 1 2 3 4 5 6 7 Days

23. What are the reasons you check your weight with a scale? If you do not check your weight with a scale what are the reasons you choose not to?

Answer Response: Open-ended

24. Before your weight loss surgery, how often did you check your weight with a scale?

Answer Responses:

Several times a day
 Once a day
 Several times a week
 Once a week
 Several times a month
 Once a month
 Several times a year
 Once a year
 Never

25. How often do you use the following methods to check your weight?

Answer Responses

	Several times a day	Once a day	Several times a week	Once a week	Several times a month	Once a month	Several times a year	Once a year	Never
Clothing size or clothing fit									
Body measurements (waist, hips, thighs, etc)									
How you look in the mirror									
How you feel									

PAGE BREAK

Message to participants: The following questions will ask you about your weight and weight perceptions. If you do not know your exact weight or how much you weighed, please give your best guess.

26. How much do you currently weigh?

Answer response:

_____Pounds

27. How long have you been at your current weight?

Answer Responses:

1 month or less

1 to 3 months

3 to 6 months

6 to 9 months

9 to 12 months

1 to 2 years

2 years or more

28. How satisfied are you with your current weight?

Subtext: Please rate your satisfaction with your weight on a scale of 1 to 7, with 1 being Very Satisfied and 7 being Not at all Satisfied.

Answer Responses:

Very Satisfied

Somewhat Satisfied

Not at all Satisfied

1

2

3

4

5

6

7

29. What range of weights are you most comfortable weighing?

Subtext: If you do not have a specific weight range, please type in: 0000 (four zeros).

Answer Response

Example: 160-165

_____Pounds

30. What weight would you consider "too heavy" for you?

Subtext: If you do not have a weight you consider "too heavy," please type in: 0000 (four zeros).

Answer Response:

_____Pounds

31. What weight would you consider "too thin" for you?

Subtext: If you do not have a weight you consider "too thin," please type in: 0000 (four zeros).

Answer Response:

_____Pounds

32. What is your personal goal weight?

Subtext: If you do not have a personal goal weight, please type in: 0000 (four zeros).

Answer Response:

_____ Pounds

PAGE BREAK

Message to participants: The following questions will ask you about your weight history. If you do not know your exact weight or how much you weighed, please give your best guess.

33. What has been your lowest weight since your weight loss surgery?

Answer Response:

_____ Pounds

34. How many months after surgery did you reach your lowest weight?

Subtext: If you do not know the exact number of months, please give your best guess.

Answer Response:

_____ Months

35. How long did you stay at your lowest weight?

Subtext: If you do not know the exact number of months, please give your best guess.

Answer Response:

_____ Months

36. Did you experience any "rebound" or "regain" in weight, once you reached your lowest weight?

Answer Response: Yes No

37. If you answered "Yes", how much weight did you regain?

Answer Response:

_____ Pounds

38. Was this amount of weight acceptable to you?

Answer Response: Yes No

39. How many months after surgery did this weight regain occur?

Subtext: If you do not know the exact number of months, please give your best guess.

Answer Response:

_____ Months

40. Since your weight loss surgery, have you gained weight on purpose because you felt "too thin"?

Answer Response: Yes No

41. If you answered "Yes", how much weight did you gain?

Answer Response:
_____ Pounds

42. How much did you weigh right before your weight loss surgery?

Answer Response:
_____ Pounds

43. Were you required to lose weight before your weight loss surgery?

Answer Response: Yes No

44. If you answered "Yes", how much weight did you lose?

Answer Response:
_____ Pounds

45. Before weight loss surgery, what was your highest weight in adulthood?

Answer Response:
_____ Pounds

46. Before weight loss surgery, what was your lowest weight in adulthood?

Answer Response:
_____ Pounds

47. Which statement best describes your current weight goal?

Answer responses:
I would like to maintain weight.
I would like to lose weight.
I would like to gain weight.
None of these describes my weight goal. (Please explain)

PAGE BREAK

Message to participants: The following questions will ask you information about yourself and your background.

48. What is your sex?

Answer response:

Female

Male

49. How tall are you?

Answer response:

_____ Feet _____ Inches

50. How old are you?

Answer Response:

_____ Years

51. What is the highest level of education you have completed?

Answer Responses:

Kindergarten

Grades 1 to 8

Grades 9 to 11

Grade 12 or GED

1 to 3 years of college

College graduate

Graduate degree (e.g. Masters, PhD, MD)

52. What is your approximate yearly household income?

Answer Responses:

Less than \$10,000

\$10,000-\$19,000

\$20,000-\$29,000

\$30,000-\$39,000

\$40,000-\$49,000

\$50,000-\$59,000

\$60,000-\$69,000

\$70,000-\$79,000

More than \$80,000

53. What is your current living situation?

Answer Responses:

Live alone

Live with spouse or romantic partner

Live with roommate (unrelated adult)

Live with relatives (not spouse or partner)

Live with spouse/ romantic partner and other relatives

Live with other (please specify)

54. What is your marital status?

Single, never married
Single, divorced
Married
Separated
Widowed

55. How many children live in your household who are:

Subtext: Please indicate the number of children. If no children of a certain age group live in your home, please put 0.

Answer Responses:

____ Less than 2 years old?
____ 2-5 years old?
____ 6-12 years old?
____ 13-18 years old?

56. What is your race/ethnicity?

Subtext: Check all that apply.

Answer Responses:

White
Black, African American
Asian
Spanish, Hispanic, or Latino
American Indian or Alaska Native
Native Hawaiian, Samoan, or Pacific Islander
Other (please describe)

What best describes your employment status?

Answer Responses:

Employed full time
Employed part time
Out of work for less than a year
Out of work for more than a year
Homemaker
Student
Retired
Unable to work

Was your weight loss surgery covered by insurance?

Answer Responses: Yes No

Message to participants at conclusion of survey:

Thank you for taking the time to complete the Gastric-Bypass Web Survey!
Your survey is complete.