

A Qualitative Analysis of Post-operative Nutritional Barriers and Useful Dietary Services Reported by Bariatric Surgical Patients

Jessica C. Peacock¹ · Charlene E. Schmidt² · Kathy Barry²

Published online: 9 February 2016
© Springer Science+Business Media New York 2016

Abstract

Background Outcomes studies show many bariatric patients fail to lose optimal weight or regain significant weight post-surgery. One reason for weight regain may be difficulty adhering to the postoperative diet.

Methods Cross-sectional survey methodology collected text data on perceived postoperative nutritional barriers and helpful dietary services reported by bariatric patients. Participants were solicited from an online obesity support website, and 440 responses related to perceived barriers and 330 responses regarding postoperative services were examined using inductive content analysis.

Results Barriers were categorized as being Internal, External, and None. Internal barriers were classified as Psychological, Physiological, and Psychophysiological, with Psychophysiological being the most commonly reported (85.9 %). Helpful services reported included categories of None, Provided, and On their Own. Sixty-two percent of participants reported receiving at least one Provided service that

was helpful, including knowledge and support from professionals like registered dietitian nutritionists (RDNs). However, 22 % of participants reported seeking out at least one service On their Own such as through the Internet, and 27 % of participants reported not receiving or not using any helpful services.

Conclusions The physiological nature of post-surgical changes and the mental stamina required of positive eating habits contribute to postoperative adherence difficulties. Many patients likely exhibit poor habits pre-surgery, and without added help to change these behaviors may regain weight. Participants in this study indicated that convenient access to an RDN was helpful. Bariatric facilities should include staff well-trained in the specific nutritional barriers patients face and provide availability of staff beyond the initial postoperative phase.

Keywords Obesity · Diet · Adherence · Services · Bariatrics surgery

University of Tennessee at Chattanooga is where work was performed.

✉ Jessica C. Peacock
jpeacock@su.edu

Charlene E. Schmidt
Charlene-schmidt@utc.edu

Kathy Barry
Kathy-barry@utc.edu

¹ Exercise Science Department, Shenandoah University, 1460 University Drive, Winchester, VA 22601, USA

² Health and Human Performance Department, University of Tennessee at Chattanooga, 615 McCallie Avenue, Chattanooga, TN 37403, USA

Introduction

Bariatric surgery is widely regarded as an effective treatment for obesity, with around 220,000 procedures performed in the USA and Canada in 2008 [1]. However, despite its acceptance and utilization, research indicates that weight regain among bariatric patients is common; approximately 20–30 % of individuals do not achieve typical post-operative weight loss or otherwise regain weight, often beginning in the first or second year following surgery [2]. A major contributor to these outcomes may be eating behaviors and the difficulty of adhering to the restrictive postoperative diet. Research has shown poor adherence to dietary recommendations following surgery, including an increase in overall calorie consumption, increased

percentage of calories from sweets/desserts and decrease in protein consumption over time [3, 4]. Among a review of dietary behaviors in 200 subjects, Sarwer et al. [4] found that even those individuals initially described as “high” in dietary adherence saw significant declines in their adherence to the postoperative diet across the 92 weeks of the study. Adherence to diet was also a significant predictor of weight loss, with those categorized as “high” in adherence losing 43.2 % of their body weight after the 92 weeks compared to 37.7 % for those categorized as “low” in adherence. More long-term, Freire et al. [3] found that among a group of 100 patients having had gastric bypass surgery, 84.8 % had gained weight back by the 5-year postoperative mark, with more than half (60.6 %) regaining over 10.1 % of their minimum weight loss after surgery; poor diet and lack of nutritional follow-up care were associated with this weight regain. Therefore, assisting bariatric patients in improving and maintaining improvements in eating behaviors is likely to have a positive impact on long-term weight outcomes; unfortunately, this area of research has only received modest attention to date.

An audit of nutritional outcomes among bariatric patients in the UK found that the majority of survey respondents (~60 %) had difficulty tolerating some foods, even more than 2 years post-surgery. In addition, almost half of respondents (47 %) reported experiencing strong food cravings, and 41 % identified struggling with eating for comfort. Given that on average these respondents were 2.4 years post-surgery, it is clear that patients face difficulties with positive eating behaviors even once they are past the early and most restrictive stage of the recommended postoperative diet [5]. Sarwer et al. [6] noted in a review of eating behaviors post-surgery that many bariatric patients struggle with cognitive restraint, or the ability to moderate efforts to limit consumption in order to lose or maintain weight losses, and disinhibition or the lack of control over one’s consumption of food. Research has shown that many patients report increases in cognitive restraint and decreases in disinhibition following surgery [4]; however, not experiencing these changes could be one explanation for suboptimal weight outcomes among so many patients.

In a qualitative assessment of patient eating behaviors, difficulties managing emotional stress were identified as a trigger for overeating, which could be one factor that makes restraint harder to maintain and may lead to some patients losing control of food intake. A conclusion drawn within this study was that greater support for patients on multiple levels might help patients maintain weight losses and prevent weight regain [7]. Standardization of care has led to protocols for follow-up services within accredited facilities, and the “growing role” for registered dietitian nutritionists (RDNs) within bariatric surgical care has been acknowledged [8]. However, research also shows that compliance with follow-up care even when it is

offered may be low [9], which limits opportunities for medical, dietary, and other professionals to provide support to patients.

The following study utilized survey methodology and qualitative analysis to identify bariatric patients’ most commonly reported postoperative nutritional barriers. In addition, survey respondents were also asked to comment on services received to assist them in managing diet after surgery. Understanding nutritional barriers specific to the bariatric population, as well as perceptions of patients’ experiences with support services received to help them manage postoperative diet, are crucial for helping to further enhance provision of care and weight loss outcomes.

Methods

Cross-sectional survey methodology was utilized, in which participants were asked to report on preoperative and postoperative services they completed related to the surgery itself and dietary and exercise behaviors. For detailed information on overall survey design and results, see Peacock and Zizzi [10]. In brief, survey data was collected via both quantitative and qualitative methods, and was open for a period of 1 month. Subjects were solicited via recruitment notice in a monthly newsletter and posts by the first author in individual forums on the online support website ObesityHelp.com; inclusion criteria for this data analysis included having had bariatric surgery. The survey’s opening page included informed consent, and all responses were confidential and submitted without personal identifying information. Informed consent was obtained from all individual participants included in the study. All sections of the survey included summaries at the start of each page to assist patients in identifying different types of services completed (i.e., dietary and nutritional, psychological, and exercise). Principles of tailored design were used to construct the survey [11], and measures with established validity and reliability were utilized when possible. The survey took about 15–20 min to complete and no incentives were offered.

To examine nutritional barriers following surgery, participants were asked, “What has been the most difficult thing for you to manage related to your diet following weight loss surgery?” An open text box was provided for participant responses in order to obtain in-depth data on these perceived barriers. A total of 448 responses were generated, of which $N=440$ were included in analyses. Participants were asked, “What dietary services were most beneficial or helpful to you following weight loss surgery?” to assess for services utilized by patients postoperatively to help them manage diet and nutrition. Participants were only able to access and respond to this question if they indicated previously in the survey that they had received consultation or counseling related to

management of nutrition. Three hundred forty-eight responses were acquired, of which $N=330$ were included in analyses.

Participant responses were examined using inductive content analysis. Inductive content analysis is a qualitative method wherein researchers group data with similar meaning into categories in order to derive insight into phenomena [12, 13]. The three authors each completed independent open coding of participant response transcripts, creating subcategories as needed in order to encompass and describe data. Following this coding, the authors identified repeated themes in order to create higher-order headings; data was then collapsed into these headings and a coding manual was created and utilized for appropriate classification using the constant comparative method [14]. Agreement had to be found among all three researchers in order for a response to be categorized, thus achieving triangulation of data. Finally, names were given to each higher-order heading and subcategory, thus providing abstraction of the overall research results.

Approval was received by the Institutional Review Board at West Virginia University prior to data collection, and documentation of approval is on file. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Results

Barriers to Diet and Nutrition

Three primary higher-order headings were determined for barriers to diet and nutrition: None, External, and Internal. A total of $n=18$ participants (4.1 %) reported no nutritional barriers following their weight loss surgery. Under the heading External, categories included Social and Logistical barriers. Twenty-seven (6.1 %) participants reported a Social barrier to nutrition, with the most commonly reported Social barrier relating to lack of support ($n=16$; 3.6 %). Participants also commented on the role that Others (2.5 %; $n=11$) played in difficulties with nutrition, such as cooking separate meals for family members due to differences in diet. Among Logistical barriers, Dining Out was the most frequently reported barrier (3.9 %; $n=17$) followed closely by lack of Time (3.0 %; $n=13$). Overall, 64 of 440 respondents reported at least one External barrier to diet and nutrition (14.5 %).

More commonly, participants overwhelmingly reported experiencing Internal barriers, with 338 of 440 participants citing at least one (76.8 %). Internal barriers were broken down further into categories of Psychological, Physiological, and Psychophysiological. Thirty participants reported experiencing a Psychological barrier (6.8 %), including difficulty related to Emotions (9 %; $n=17$) such as emotional

eating, and lack of Knowledge/Self-Efficacy (3.0 %; $n=13$). Fifty-three participants (12.1 %) reported Physiological barriers, including Negative Effects associated with surgery (10.9 %; $n=48$) such as food intolerances, dumping syndrome, and other complications, and Difficulties with Weight (1.1 %; $n=5$) such as not losing the expected amount of weight or gaining weight back. Psychophysiological barriers were the most frequently reported barrier overall, (85.9 %; $n=378$) and were divided into Temptations/Logistics (64.3 %; $n=283$) and Mindfulness/Cues (21.6 %; $n=95$). Temptations/Logistics included difficulties participants reported in managing the restrictive nature and/or macronutrient requirements of the postoperative diet, changing habits, and dealing with cravings for foods or quantities of foods that were perceived to fall outside of postoperative dietary guidelines. Mindfulness/Cues included responses related to difficulty managing hunger, satiety, lack of awareness of eating behaviors such as eating out of boredom, grazing, and chewing too quickly. For complete headings and example participant responses related to nutritional barriers, see Tables 1 and 2. All provided example quotes were chosen because they illustrated a typical response for the individual category or heading and are presented verbatim.

Dietary and Nutritional Services

Three higher-order headings were determined related to the services participants reported receiving post-surgery that were helpful: None, Provided, and On Own. Due to the wording of the survey question, “What dietary services were most beneficial or helpful to you following weight loss surgery?” it was assumed that unless stated otherwise, the participant’s response inferred a service provided by the surgical facility or staff. Overall, 90 of the 330 participants who answered this question (27 %) reported either not receiving services at all or receiving services that were either unhelpful or that they did not use. Forty-four (13.3 %) reported receiving no services, while $n=24$ (7.3 %) indicated that the question was N/A (“not applicable”) to them. Seventeen (5.2 %) participants commented specifically that the services they received were not helpful, and $n=6$ (1.8 %) reported not using services though some were available.

In total, 62 % ($n=203$) of participants reported receiving at least one helpful dietary service Provided by the facility where they had surgery or by one of that facility’s staff members. Under the heading Provided, categories of

Table 1 Qualitative responses of bariatric patients not reporting postoperative nutritional barriers, $N=440$

	Number	Percent	Example
None	18	4.1 %	“It really hasn’t been difficult to manage.”

Table 2 Qualitative responses of bariatric patients reporting external postoperative nutritional barriers, *N* = 440

External	Number	Percent	Example
Social	27	6.1	
Support	16	3.6	“I had no guidance of what food I could eat or how much.”
Others	11	2.5	“Getting others to understand that I am not anorexic!”
Logistical	41	9.3	
Travel	6	1.4	“Finding good food choices when away from home, at a conference, etc.”
Dining Out	17	3.9	“Eating out at restaurants.”
Time	13	3.0	“Cooking – still have very little time and need quick meal ideas...”
Finances	2	0.45	“...expense of some proteins powders and variaties (sic) and some taste yuck!!”
Exercise	3	0.68	“Regular exercise.”

Internet, Other/Unknown, and Personal were created. A small number of participants reported receiving a provided helpful service that was Internet-based ($n=2$; .61 %), and 24.8 % of participants ($n=82$) reported some type of useful service that while was determined to have been provided by the individual's surgical facility or staff, either did not fall under another category or was unclear who provided the service or how it was provided. Subcategories for Other/Unknown included receiving Knowledge ($n=71$; 21.5 %), Support ($n=3$; .91 %), and a method for Journaling ($n=8$; 2.4 %). The most frequently reported category of helpful dietary services that were Provided were those participants identified as being delivered in person or via telephone, and was labeled Personal (41.2 %; $n=136$). Participants again reported receiving both Knowledge (13.3 %; $n=44$) and Support (27.9 %; $n=92$), with Registered Dietitians

(RD) being the most frequent provider of these services (7.0 %; $n=23$ and 16.7 %; $n=55$, respectively). In addition to receiving Support from an RD, participants also frequently cited Groups (6.1 %; $n=20$) such as support groups.

In addition to receiving dietary services that were Provided by the surgical facility and staff, 22 % ($n=71$) of participants reported seeking out some type of helpful service On their Own. Categories beneath this heading also included Internet, Personal, and Other/Unknown. Fifty-four (16.4 %) respondents indicated using a service that was Internet-based, most frequently in order to garner Support (8.8 %; $n=29$) primarily via a Website (5.5 %; $n=18$). Participants also reported going online to seek out Knowledge (7.0 %; $n=23$), also doing so primarily via Website (3.9 %; $n=13$). Among helpful dietary services that participants sought On their Own, 6.1 % ($n=20$) were reported

Table 3 Qualitative responses of bariatric patients reporting internal postoperative nutritional barriers, *N* = 440

Internal	Number	Percent	Example
Psychological	30	6.8	
Emotions	17	3.9	“Sometimes I eat for emotional reasons.”
Knowledge/Self-Efficacy	13	3.0	“I am a terrible cook...but have ordered wls cookbook for dummies...lol hopefully this helps.”
Physiological	53	12.1	
Negative Effects	48	10.9	“Eating foods that I can no longer eat because they make me sick...Some of my favorite foods that I grew up eating now make me terribly sick...”
Difficulties with Weight	5	1.1	“I'm still dissappointed (sic) that I have a great deal of trouble losing weight and I have not reached goal or even a healthy weight yet although I am doing all of the right thing...”
Psychophysiological	378	85.9	
Temptations/Logistics	283	64.3	“They call it a life-style change but that is just another word for diet. I will be dieting for the rest of my life. But this is what my psychologist says thin women do.”
Mindfulness/Cues	95	21.6	“Knowing when I'm done eating even though I'm not done tasting.”

to have been completed as Personal, or in-person or by telephone. Most frequently, these services were reported as being Support related (4.5 %; $n = 15$) via Family/Friend (1.8 %; $n = 6$) or for increased Knowledge (1.5 %; $n = 5$).

Only a small number of participant responses related to beneficial services sought On one's Own fell under the category Other/Unknown (2.7 %; $n = 9$), with most of these subjects indicating that they sought some sort of outside source of Written Knowledge (2.4 %; $n = 8$) but it was unclear where or from whom this information was received. See Tables 3, 4, 5, and 6 for a full list of headings and sample typical participant responses related to dietary services.

Discussion

The results of the current study lend credence to findings from earlier research that indicates adherence to the postoperative bariatric diet is a difficulty for many patients. However, the analysis of patient responses regarding specific nutritional barriers further highlights just how complex of an issue diet is for the postoperative patient, and supports that patients may require greater frequency and intensity of a variety of tailored services to change and maintain positive eating behaviors after weight loss surgery.

Throughout the analysis of patient responses, common dietary barriers within weight management were identified, including lack of time, dining out, and lack of support. In addition, themes were evident related to barriers like managing appropriate portion control, modifying long-standing negative dietary habits, avoiding certain types of foods (i.e., carbohydrates, sugar) or getting enough of recommended macronutrients (protein), and adhering to the restrictive postoperative diet. Initially these barriers were separated into Psychological (Temptations) and Physiological (Logistics), but ultimately it became clear there was significant overlap between these two categories, leading to the creation of the Psychophysiological heading. For example, one participant wrote, "Thinking I can eat more than what I can! This is not a bad thing, it was just hard to adjust to the really small portion sizes" in response to the dietary barriers prompt. This response illustrates how the nature of the postoperative diet is sometimes as much mental as it is physical; a reduced stomach

size makes it hard to eat as much as many patients may have been used to, but changing the habit of consuming large portions is also difficult. Another participant's comment further elucidates this concept: "The first few months after surgery, your insides are healing and you CAN'T eat very much. Sugar and fat cause the "dumping" effect. The more the body heals, the more (quantity and variety [sic]) you're able to eat and that's the hard part. That's when you have to use your brain and say NO." Clearly, the biology of the surgery limits what can be eaten, especially initially; but over time many patients find their tolerance for foods that may have contributed to increased preoperative weight status can be consumed in larger quantities. As this occurs, patients may require greater levels of cognitive restraint in order to adhere to the recommended diet. Sarwer et al. [4] found that preoperative levels of cognitive restraint were associated with percentage of postoperative weight loss; patients with greater ability to limit their food intake lost more weight. However, if patients lack this cognitive restraint prior to having surgery, without assistance in learning how to change existing eating habits or better manage behaviors within the obesogenic environment, many patients may struggle with weight regain. As one participant put it, the difficulty lied in, "Changing my eating habits. The old Pavlov dog keeps rearing it's (sic) ugly head."

The subcategory Mindfulness/Cues was also included in the heading Psychophysiological because of the commonalities found among responses having to do with awareness of one's eating behaviors and bodily responses. One of the most common themes within this subcategory was "head hunger." This idea was illustrated by a participant who noted his or her difficulty as, "Listening to my stomach instead of my head. Just because it's time for lunch, doesn't mean I should eat." This response shows how some patients may lack the ability to notice and effectively read physiological cues for hunger, and instead eat based on other social or psychological cues like the time of day or boredom. Another participant even stated his or her barrier as, "Knowing when I'm full either in my head or physically." Clearly, managing the postoperative diet not only requires learning how much one's new stomach can consume, but also retraining the individual to self-monitor and self-regulate in ways that might be foreign given preexisting eating habits. In total, around 86 % of this study's

Table 4 Qualitative responses of bariatric patients reporting no useful postoperative dietary services, $N = 330$

None	Number	Percent	Example
N/A	24	7.3	"Not applicable."
None	44	13.3	"None, they didn't have any Bariatric dietary services."
Unhelpful	17	5.2	"None. The required appts did not involve people educated on the requirements of my physical changes vs standardized nutrition information."
Didn't Use	6	1.8	None. I moved out of state before I could use the services."

Table 5 Qualitative responses of bariatric patients reporting helpful postoperative dietary services provided by their surgical facility, *N* = 330

Provided	Number	Percent	Example
Internet	2	0.61	“Email services.”
Personal	136	41.2	
	44	13.3	
Knowledge			
RD	23	7.0	“Consultations with the Dietitian.”
Medical	7	2.1	“Reading literature provided by my doctor.”
Other	14	4.2	“One on ones are important to stay on track and get new information and ideas for continued success.”
Support	92	27.9	
RD	55	16.7	“My dietician was very helpful...I could email her if needed...when I went back to her when I was rejected for a second surgery, at the time, she was still very supportive.”
Medical	7	2.1	“The surgical team was always encouraging even when there was not any weight loss, pointing out my successes instead of failures...”
Other	10	3.0	“... the support teams they put together.”
Group	20	6.1	“I didn’t find much use from the dietary services - the lady that my health program uses just doesn’t seem to get it. I personally find it more helpful at my patient support group - we have all been there so we are better able to help each other sort it out.”
Other/	82	24.8	
Unknown			
Knowledge	71	21.5	
Written	25	7.6	“A guide to eating post-op.”
General	46	13.9	“What to eat and what not to eat.”
Support	3	0.91	“Dealing with head hunger.”
Journaling	8	2.4	“Keeping a food log.”

participants indicated one or more barriers categorized as Psychophysiological in nature. Therefore, the complexity of barriers impacts the majority of patients and may necessitate greater support for long-term success.

Another component of this study was to analyze the services participants reported completing after surgery that were helpful for managing diet and nutrition. What quickly became evident was that despite most participants (62 %) reporting at least one useful service provided by their bariatric facility, a significant number of participants were not necessarily getting the full help they needed. Twenty-seven percent of participants indicated they either received no services, received services that were not helpful, or did not use services that were offered. In addition, 22 % of respondents reported seeking out some sort of service on their own; while some of these individuals did so to supplement what they received from their bariatric facility, many reported soliciting these services because they did not get adequate support from staff postoperatively. For example, one participant stated, “None really—I did a lot of research on the internet and read a lot I guess these were the most beneficial to me.” Unfortunately, some participants found that even though staff members were available postoperatively, they may not have been trained to assist bariatric patients and their specific barriers or issues. One patient

noted, “I don’t know that the dietician helped me much at all. I did not find her very knowledgeable about my particular problem.” Given the previously discussed complexity of the barriers that patients experience, it seems paramount that facility staff, and in particular RDN’s working with patients, be educated and trained on how to more effectively address postoperative dietary and nutritional issues. These include not only the psychophysiological barriers such as managing “head hunger” and improving cognitive restraint but also the physiological barriers specific to bariatric patients including “dumping syndrome,” strictures, incontinence, and nausea among others.

Those patients who reported helpful services provided by their facility most frequently cited personal services such as contact with the RDN as being beneficial, and these consultations were most frequently related to garnering knowledge, support, or both. As one patient put it, the most helpful service was “Personal guidance from a dietitian. I know what I should eat, I know what healthy eating is, but making those choices on a continual basis is what is difficult.” In addition, it was evident that the ease and frequency of contact with these individuals was highly important to participants. The terms “frequently,” “regular,” and “on-call” were found often among responses indicating personal service was helpful, and participants indicated appreciation for the ability to contact RDN’s

Table 6 Qualitative responses of bariatric patients reporting helpful postoperative dietary services sought on their own, $N=330$

On Own	Number	Percent	Example
Internet	54	16.4	
General	2	0.61	“Ordering of my bariatric foods online.”
Knowledge Website	23	7.0	
General	13	3.9	“Online information. I could access at anytime, and look up the topics that were relevant (sic) to my journey at that very time. Things like Daily Plate, or Fit Day were great, as they helped me identify things like sneaky carbs, and learn to be mindful of the little stuff that you can forget about.”
General	7	2.1	“I also did a lot of reading and researching on the Internet.”
Support Website	29	8.8	
General	18	5.5	“Recipes and ideas on bariatric websites and message boards were of great help.”
Support group	2	0.61	“I also follow several online support group forums that help keep me on track.”
General	3	0.90	“Since I have not been able to attend support group, I go online for support.”
Journal	6	1.8	“livestrong.com for food journaling.”
Personal Knowledge RD	20	6.1	
General	5	1.5	
RD	2	0.61	“I made an appointment with an independent Dietitian familiar (sic) with WLS and we discussed healthy eating habits and so forth.”
Medical	1	0.30	“Lots of books and info from my personal doctor and cardiologist. Also talks with my doctor and nurse help much. Mostly my personal doctor and pamphlets or web sites etc. he suggests. (sic)”
Other	2	0.61	“Boot camp. I got a lot of tips about food, measuring foods, exercise.”
Support RD	15	4.5	
General	1	0.30	“I sought out nutritional counseling individually.”
Medical	3	0.90	“Pam from Family Health services at my family doctors office.”
Family/Friend	6	1.8	“My boyfriend who is a chef.”
Other	5	1.5	“I only had dietary services before the surgery. The only post surgery help I had was people I know at work that had the surgery and they helped me more than the “professionals”. It helps that I work in a hospital, too.”
Other/Unknown Knowledge	9	2.7	
General	9	2.7	
Written	8	2.4	“...books on wls.”
General	1	0.30	“Research on my own.”

with questions either by phone or email. For example, one participant wrote that, “Seeing my dietician and being able to call or email her at any time was invaluable,” while another stated “The dietician I saw post op helped create meal plans and was easy to reach when I had questions.”

While accreditation standards recommend that participants receive consistent postoperative surgical follow-up, many facilities may not have ongoing care in place specifically dedicated to diet and nutrition [15]. In fact, some studies have shown that between 47 and 90 % of patients receive no postoperative nutritional counseling [3, 16], despite research that indicates continuity of care leads to improved outcomes [6].

Therefore, increased use of electronic methods for contact might be appropriate as a method for providing increased frequency and intensity of communication with surgical patients in order to provide both knowledge and support for positive dietary behaviors. Utilizing the Internet and technology such as text messaging could limit some of the barriers to in-person follow-up and care that were cited both in this study and in others [7, 17]. For example, many bariatric patients live in rural areas that make travel to a surgical facility in a larger city more difficult, or as one patient in this study explained, “I moved out of state before I could use the services.” Teleconferencing could also be utilized to provide increased

personal services to patients and would help prevent interruptions in care for those with difficulty accessing their facility due to driving impediments or alternative barriers like lack of childcare or inability to take time off from work. Sarwer et al. [17] completed a pilot study that investigated the use of weekly dietary counseling during the first 4 months after surgery and found that barriers such as these prevented many of their participants from attending in-person counseling sessions. The authors also recommended the use of interactive Web-based technology in order to deliver and maintain consistency of care, and noted the potential benefit of extending the frequency of this communication farther into the postoperative period when patients may be likely to experience increased barriers to healthy eating behaviors. Another small pilot study examined the use of a cognitive-behavioral intervention to improve eating pathology among bariatric patients, and the study authors found preliminary evidence to support successful delivery via telephone [18].

However, one factor that should be considered even with increased use of telecommunications is cost to the patient; not all services provided to patients through their facility are services that can be utilized given the role of third-party payment and insurance coverage. For example, one participant in this study wrote, “I did not go back to the dietitian as it wasn’t covered by my insurance and I wasn’t really happy with the staff,” and another said, “... they have a program for a year of 30 minute phone appointments with a registered dietitian. This started about a month before surgery and will continue until almost a year after. The dietitian is also available through email as needed. The cost of this (\$1400) was not covered by insurance, but I have found it very valuable, as have most of the people in support groups I attend.” Increased continuity of care between dietary staff and patients has the opportunity to help improve outcomes, but may not be feasible for all patients without cooperation from insurance providers.

This study had several limitations. First, the sample of convenience was comprised primarily of White women who reported a high level of weight loss success; while still largely representative of the bariatric population as a whole [19], this sample’s perceptions of weight loss success may have impeded participants’ abilities to accurately recall barriers associated with diet and nutrition. In addition, this sample may be biased due to its solicitation from an online support website; participants in this study may have been more apt to cite Internet-based services sought on their own due to their existing utilization of Web-based groups. To date, only a small amount of literature exists specific to nutritional barriers among bariatric patients, and the current study adds significantly to this body of research given the methodology and number of participants included. A final limitation is inherent to qualitative methodologies, and that is the subjectivity of analysis. To reduce the effects of this limitation, the three authors each completed independent coding of response transcripts and triangulation

had to be achieved in order for data to be categorized; if agreement could not be found, the response was not included in analyses.

Conclusions

Successful treatments for obesity such as bariatric surgical procedures will continue to be a focus of research given the current rates of obesity in the USA. As more is learned about the chronic nature of obesity as a disease, treatments will likely also continue to include multidisciplinary professionals such as RDNs. Results of the current study indicate that barriers to nutrition among bariatric patients are highly complex and may require a significant level of training and education to be addressed adequately. Facilities should ensure that all staff providing follow-up care are qualified to assist patients in targeting these barriers, and can utilize electronic methods of communication such as text messaging and email in order to boost frequency and intensity of contact with patients in the postoperative period. Future research is warranted that examines the role that nutritional counseling to improve cognitive restraint and use of telecommunications play in enhancing long-term weight loss outcomes among bariatric patients.

Compliance with Ethical Standards

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest Jessica Peacock has no conflict of interest. Charlene Schmidt has no conflict of interest. Kathy Barry has no conflict of interest.

References

1. Buchwald H, Oien DM. Metabolic/bariatric surgery worldwide. *Obes Surg*. 2009;19:1605–11.
2. Sjöström L, Narbro K, Sjöström D, et al. Effects of bariatric surgery on mortality in Swedish obese subjects. *N Engl J Med*. 2007;357:741–52. doi:10.1056/NEJMoa066254.
3. Freire RH, Borges MC, Alvarez-Leite JL, et al. Food quality, physical activity, and nutritional follow-up as determinant of weight regain after Roux-en-Y gastric bypass. *Nutrition*. 2012;28:53–8.
4. Sarwer DB, Wadden TA, Moore RH, et al. Preoperative eating behavior, postoperative dietary adherence, and weight loss after gastric bypass surgery. *Surg Obes Relat Dis*. 2008;4:640–6.
5. Harbottle L. Audit of nutritional and dietary outcomes of bariatric surgery patients. *Obes Rev*. 2010;12:198–204.

6. Sarwer DB, Dilks RJ, West-Smith L. Dietary intake and eating behavior after bariatric surgery: threats to weight loss maintenance and strategies for success. *Surg Obes Relat Dis*. 2011;7:644–51.
7. Benson-Davies S, Davies ML, Kattelman K. Understanding eating and exercise behaviors in post Roux-en-Y gastric bypass patients: a quantitative and qualitative study. *Bariat Surg Pract Patient Care*. 2013;8:61–8. doi:10.1089/bri2013.9989.
8. Kulick D, Hark L, Deen D. The bariatric surgery patient: a growing role for registered dietitians. *J Am Diet Assoc*. 2010;110:593–9.
9. Gould JC, Beverstein G, Reinhardt S, et al. Impact of routine and long-term follow-up on weight loss after laproscopic gastric bypass. *Surg Obes Relat Dis*. 2007;3:627–30.
10. Peacock JC, Zizzi SJ. Survey of bariatric surgical patients' experiences with behavioral and psychological services. *Surg Obes Relat Dis*. 2012;8:777–83.
11. Dillman DA. Mail and internet surveys: the tailored design method. New York: Wiley; 2000.
12. Chinn PL, Kramer MK. Theory and nursing: a systematic approach. 6th ed. St. Louis: Mosby Year Books; 1999.
13. Elo S, Kynga SH. The qualitative content analysis process. *J Adv Nurs*. 2008;62:107–15.
14. Glaser BG, Strauss AL. The discovery of grounded theory: strategies for qualitative research. New York: Aldine; 1967.
15. Peacock JC, Zizzi SJ. An assessment of patient behavioral requirements pre- and post-surgery at accredited weight loss surgical centers. *Obes Surg*. 2011;21:1950–7.
16. Warde-Kamar J, Rogers M, Flancbaum L, et al. Calorie intake and meal patterns up to 4 years after Roux-en-Y gastric bypass surgery. *Obes Surg*. 2004;14:1070–9.
17. Sarwer DB, Moore RH, Spitzer JC, et al. A pilot study investigating the efficacy of postoperative dietary counseling to improve outcomes after bariatric surgery. *Surg Obes Relat Dis*. 2012;8:561–8.
18. Cassin SE, Sockalingam SS, Wnuk S, et al. Cognitive behavioral therapy for bariatric surgery patients: preliminary evidence for feasibility, acceptance, and effectiveness. *Cogn Behav Pract*. 2013;20:529–43.
19. Flum DR, Khan TV, Dellinger EP. Toward the rational and equitable use of bariatric surgery. *JAMA*. 2007;298:1442–4.