A study of bariatric surgery patients’ weight management habits, quality of life and social support

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Abstract
Weight loss surgery (WLS) has become an effective treatment for severe obesity. After rapid weight loss, WLS patients need to adjust their psychosocial functioning, as well as deal with weight loss maintenance. Bariatric support groups are recommended to help maintain weight loss and may improve patients’ quality of life (QOL). Online bariatric support groups have recently become available but their effectiveness has not been well researched. This study was aimed at examining the effect of attendance of in-person and/or online groups on weight loss, measured as a change in body mass index (BMI) and QOL. It was hypothesized that weight loss and quality of life would vary based on attendance and the type of support group. It was predicted that attendance of any type of support group would increase QOL and weight loss. Contrary to what was predicted, it was found that while attendance of in-person support groups has a positive effect on psychological and bariatric QOL as compared to not attending any groups at all, participation in online groups alone does not have this effect. Environmental, social and physical QOL or change in BMI do not appear to be moderated by group attendance. Clinical implications and limitations of these findings, as well as recommendations for future research, are discussed.

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A STUDY OF BARIATRIC SURGERY PATIENTS’ WEIGHT MANAGEMENT HABITS, QUALITY OF LIFE AND SOCIAL SUPPORT

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Abstract

Weight loss surgery (WLS) has become an effective treatment for severe obesity. After rapid weight loss WLS patients need to adjust their psychosocial functioning, as well as deal with weight loss maintenance. Bariatric support groups are recommended to help maintain weight loss and may improve patients’ quality of life (QOL). Online bariatric support groups have recently become available but their effectiveness has not been well researched. This study was aimed at examining the effect of attendance of in-person and/or online groups on weight loss, measured as a change in body mass index (BMI) and QOL. It was hypothesized that weight loss and quality of life would vary based on attendance and the type of support group. It was predicted that attendance of any type of support group would increase QOL and weight loss. Contrary to what was predicted, it was found that while attendance of in-person support groups has a positive effect on psychological and bariatric QOL as compared to not attending any groups at all, participation in online groups alone does not have this effect. Environmental, social and physical QOL or change in BMI do not appear to be moderated by group attendance. Clinical implications and limitations of these findings, as well as recommendations for future research, are discussed.

Keywords: bariatric support groups, online bariatric support groups, in-person bariatric support groups, bariatric quality of life, weight loss surgery
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Introduction

Obesity

Obesity is a global and national epidemic which affects individuals’ health, psychological well-being and has far-reaching impacts on global and American society, with 1.7 billion people affected world-wide and the highest percentage of overweight individuals in the United States (Buchwald et al., 2004). The prevalence of obesity in adults in the United States was estimated to be 32.2% in 2003-2004 (Ogden et al., 2006). Severe obesity is at least 100 lbs. over the ideal body weight or body mass index (BMI) greater or equal to 40 kg/m$^2$. It has been estimated that 0.5% of the overweight population are severely obese (Brownell, 1995). Severe obesity is associated with increased risk for developing hypertension, hypertrophic cardiomyopathy, pulmonary insufficiency, degenerative arthritis, dyslipidemia, non-insulin-dependent diabetes mellitus, gallbladder disease, certain types of malignancies, and plays a role in individual’s socio-economic and psychosocial impairment (Buchwald et al., 2004; National Institutes of Health Consensus Development Conference Panel, 1991; Yalom, 1995). It is also associated with increased mortality (Drenick, Bale, & Seltzer, 1980; Lew & Garfinkel, 1979; VanItallie & Lew, 1992).

Bariatric surgery

Because of the lack of efficacy of nonsurgical interventions for severe obesity, the National Health Institutes Consensus Development Panel in 2004 recommended that gastric restriction or bypass surgery should be considered for well-informed, motivated, severely obese individuals in whom surgical operative risks are acceptable (Buchwald, 2005). The panel also recommended that some less severely obese patients with BMI between 35 and 40 kg/m$^2$ should be considered for surgery if they have developed high-risk, comorbid conditions or conditions
that interfere with lifestyle as a result of their obesity. This decision has a far-reaching impact, as approximately 8 million Americans have a BMI between 35 and 40 kg/m$^2$, and 1.5 million have a BMI over 40 kg/m$^2$ (Buchwald, 2005). The number of bariatric surgeries conducted in the United States increased nearly 450% between 1998 and 2002 (Nguyen, Root, & Zainabadi, 2005) and further doubled over the following two years (Wadden, Sarwer, & Williams, 2006). After conducting an extensive meta-analysis of available literature Buchwald et al. (Buchwald et al., 2004) concluded that bariatric surgery was an effective treatment for weight loss and obesity co-morbidities.

Demographics

Poulose et al. (2005) found that the demographics of bariatric surgery utilization do not parallel 2000 U.S. census morbid obesity trends. This large national use study which included 69,000 patients demonstrated bariatric patients are 85% female and live mostly in the North East and the West coast of the United States. Kolotkin et al. (2008) described similar findings of women being approximately five times more likely to seek bariatric surgery than men. In studies involving bariatric patients women usually comprise 73-94% (Fezzi et al., 2011; Hildebrandt, 1998; Hwang et al., 2010; Kolotkin et al., 2008; Lier, Biringer, Stubhaug, Eriksen, & Tangen, 2011; Orth, Madan, Taddeucci, Coday, & Tichansky, 2008; Poulose et al., 2005; Steinmann et al., 2011; Sutton & Raines, 2008a).

Psychological problems and QOL after surgery

It is important to note that there is no consensus in the field of bariatric psychology as to whether obesity by itself is associated with psychiatric disturbances. Studies on psychopathology among the obese found no increase in psychiatric disorders among the mild to moderately
overweight individuals, whether or not they sought treatment for weight reduction (Stunkard & Wadden, 1992; Suzuki, Haimovici, & Chang, 2010). In contrast, several studies have found a high rate of psychopathology among severely obese subjects seeking treatment for weight loss: the life-time prevalence of major depression among this population varied from 29% to 51% (Glinski, Wetzler, & Goodman, 2001; Hildebrandt, 1998; Maddi et al., 2001; Steinmann et al., 2011). Although these studies did not analyze control groups and hence must be interpreted with a great deal of caution, these numbers are noticeably higher than the prevalence of major depression in the general population, estimated between 4.2 and 17.1% (Kessler, McGonagle, & Zhao, 1994; Robins, Helzer, & Weissman, et al, 1984). Several investigators have found that preexisting major depression and other Axis I disorders did not affect the weight-loss outcome of bariatric surgery (Hsu et al., 1998; Valley & Grace, 1987). However new episodes of depression may occur in some individuals after surgery. In one study 40% of severely obese patients with no history of depression developed depression after surgery and 50% of those required treatment for depression (Ryden, Olsson, & Danielsson, 1989). A high rate of suicide in post bariatric surgery patient population is an alarming outcome of psychological problems present in these patients. Hsu et al. (1998) reviewed four cohorts of patients followed after bariatric surgery for a period of 1 to 14 years. Among 1785 subjects there were 8 suicides (0.4%), which is in stark contrast to suicide rate among the general population, reported to be 0.014% (Caruso, 2010; Caruso, 2010; National Institute of Mental Health, 2009).

Many researchers found that bariatric population might have a greater prevalence of psychopathology in general (Glinski et al., 2001; Maddi et al., 2001; Steinmann et al., 2011). Lier et al. (2011) found 43% of pre-operative bariatric patients had an Axis I disorder (mood, anxiety and eating disorders the most prevalent), 18% had social phobia, 11% - agoraphobia, and
24% had avoidant personality disorder. Bariatric surgery, although being effective for short-term weight loss, can sometimes have adverse effects on psychological well-being in a significant minority of patients, especially for those dealing with multiple medical and psychological complications and co-morbidities (Fezzi et al., 2011; Hildebrandt, 1998; Mechanick et al., 2009; Ryden et al., 1989; van Hout, 2005; van Hout, Boekestein, Fortuin, Pelle, & van Heck, 2006). Van Hout et al. (2006) described up to 40% of bariatric patients had psychiatric problems post-surgery and up to 25% were seeing a mental health professional. Other findings, however, show the opposite positive effect of bariatric surgery on psychological functioning and quality of life (Maddi et al., 2001; Sutton & Raines, 2008a; van Hout, 2005; van Hout et al., 2006). Women appeared to have more psychosocial problems and psychopathology prior to surgery and sought surgery more often than men (Kolotkin et al., 2008). Some researchers examined the relationship between psychopathology and psychosocial problems prior to surgery and success of surgery, defined by the amount of weight loss. Depression, personality disorders, and binge eating disorder seemed to be associated with poorer surgery outcomes, a lower quality of life after surgery and weight regain at 18-24 months post-surgery (Dixon, Dixon, & O'Brien, 2001; Hildebrandt, 1998; Hsu et al., 1998). Substance abuse, age, sex, some physical conditions, including diabetes Type II and Bipolar disorder had no effect or increased the improvement in the quality of life and psychosocial functioning after surgery (Fezzi et al., 2011; Steinmann et al., 2011; Suzuki et al., 2010). Concerns about psychopathologies and quality of life problems among post-bariatric surgery population include anxiety disorders, substance abuse, including relapses of previous substance abuse disorders, depression and suicide and divorce and relationship problems (Hildebrandt, 1998; Hsu et al., 1998; Mechanick et al., 2009). Bariatric patients may turn to food to alleviate their depression and anxiety or turn to other addictions to
substitute their addiction to food if they don’t learn new adaptive coping mechanisms (Hildebrandt, 1998). Quality of life was demonstrated to improve rapidly in the first year after bariatric surgery during the period of significant weight loss and possible associated feeling of success and euphoria, but waned and dropped off after the first year (Dixon et al., 2001; Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2007; Mechanick et al., 2009). After the first year following bariatric surgery patients also have much less frequent visits to bariatric clinics which may explain this finding (Hildebrandt, 1998). After patients successfully move through the initial stage of weight loss in the first year marked by frequent medical follow up appointments, rapid weight loss and changes in body shape, diet changes and new physiological requirements, they begin the process of reintegrating into social and professional roles with a new identity which can be difficult because of stigmatization and social isolation (Fezzi et al., 2011; Ryan, 2005). During this long-term challenging period a significant minority of patients which cannot be ignored can experience problems with compliance with diet and behavioral recommendations, new psychosocial problems and psychopathologies and weight regain (Orth et al., 2008; Sarwer, Fabricatore, & Wadden, 2006; Steinmann et al., 2011). It is therefore reasonable to propose that this population should be more carefully followed by mental health professionals and that more data is necessary to identify individuals at risk and intervene successfully at appropriate stages (Nicolai, Ippoliti, & Petrelli, 2002).

Support groups in general

In a classic text on the practice of group psychotherapy Irvin Yalom (1995) explains how health-related support groups can help people with chronic illnesses improve their psychosocial functioning. Despite the prevalence of peer support groups in the community, the evidence for their effects on well-being is mixed at best (Davison, Pennebaker, & Dickerson, 2000). Support
groups for people with cancer (Ussher, Kirsten, Butow, & Sandoval, 2006), caregivers (Bourgeois, Schulz, & Burgio, 1996; Lavoie, 1995), people facing the transition to parenthood (Cowan & Cowan, 1986), people recently divorced (Hughes, 1988), and people who have been victimized (Coates & Winston, 1983) do not show clear benefits. One possible explanation for mixed results might come from the fact that some individuals benefit from the support group intervention, some are unaffected, and some are even harmed. Biased or unbiased selection of particular individuals therefore affects the studies’ outcomes.

Effects of participating in groups after surgery

Support groups might play an important role in the psychological well-being, psychosocial functioning and even long-term weight loss maintenance and medical outcomes for bariatric patients.

Most studies use the amount of weight loss and weight loss maintenance as a measure of success of bariatric surgery (Hildebrandt, 1998; Livhits et al., 2011; Orth et al., 2008; Sutton & Raines, 2008). Hildebrandt (1998) pointed out it was also important to consider other criteria of success of bariatric surgery in addition to weight loss, including reduced mortality and morbidities, other medical factors, positive change in the quality of life, increased ability to work, other social and psychological factors, lasting changes in behaviors and eating habits, a feeling of satisfaction with surgery and positive changes in sexual functioning. Similarly, most studies examining effects of group participation following bariatric surgery also focused on the amount of weight loss as a measure of that effect and demonstrated a positive relationship between participating in a support group and success in weight loss and weight loss maintenance (Kreft, Montebelo, Fogaca, Rasera, & Oliveira, 2008; Lier et al., 2011; Orth et al., 2008; Renjilian et al., 2001; Wild et al., 2011). However, some authors pointed to the need to provide
holistic care through group therapy and support focused on self-responsibility, relapse prevention, making lasting lifestyle changes, shift to an internal locus of control, body image and new identity formation, adaptive coping mechanisms, family and relationships, and quality of life (Larimer, Palmer, & Marlatt, 1999; Marcus & Elkins, 2004a; Sutton & Raines, 2008a; Yalom, 1995).

Initial stages of group participation before and following bariatric surgery are usually focused on surgery and diet-related education, psychoeducation and medical issues (Marcus & Elkins, 2004a). This kind of support may assist patients and physicians in the recovery period, during which rapid weight loss often occurs. Surgical Review Corporation’s requirements for “Bariatric Centers of Excellence” include the availability of support groups for all patients who have undergone bariatric surgery at that institution (Orth et al., 2008). After the first several months following surgery the focus shifts to quality of life issues and psychosocial functioning. Patients report deriving a sense of community and support and learn from other group members about life values, long-term goals, body image, identity formation, control issues and coping mechanisms (Marcus & Elkins, 2004b). Clark et al. (2003) demonstrated long-term positive effects on psychosocial functioning related to support group attendance following bariatric surgery.

Bariatric support groups’ structures vary and include in-person professional and peer-led groups and internet professional and peer-led support groups (Clark et al., 2003; Karlsson et al., 2007; Kreft et al., 2008; Lier et al., 2011; Ryan, 2005; Sutton & Raines, 2008a; Wild et al., 2011). Marcus and Elkins (2004a) proposed a bariatric group model focused on weight loss and quality of life issues drawing from Yalom’s (1995) process group therapy approach and Marlatt’s (Larimer et al., 1999) addictions behavioral groups approach. When breaking the
construct of quality of life into mental and physical quality of life. Sutton & Raines (2008a) discovered in-person groups had a more positive effect on the physical quality of life, while internet support groups had a more favorable effect on the mental quality of life of participants. Sutton and Raines (2008a) cautioned there may be a self-selection bias in this finding as those who need more mental health support may gravitate toward internet groups, while those who are focused on physical changes choose to attend in-person educational groups.

While attendance of support groups is always recommended after bariatric surgery, not all patients may attend support groups and there may be some attrition after the first year following surgery. There are no existing data describing the rate of attendance of bariatric support groups in the first year after surgery or in the long-term. In a study by Orth et al. (2008) patients for the most part reported they did not attend groups because of family obligations and not believing group attendance would help. These patients commented they thought it would increase attendance to offer more flexible group meeting times and to include structured discussions of personal issues. Orth et al. (2008) suggested there may be a self-selection bias present, as those who refuse to attend support groups may also be non-compliant with clinic follow up visits and regain more weight as a result. Lier et al. (2011) found that bariatric patients with social phobia and avoidant personality disorder are likely to not attend a support group. 31% of Lier et al.’s (2011) study sample chose not to attend the support group offered as part of the study.

Some researchers have suggested that offering alternative support methods to those who choose not to attend in-person support groups made available at bariatric clinics may be helpful for weight loss and weight loss maintenance as well as improving patients’ psychosocial functioning (Lier et al., 2011; Sutton & Raines, 2008a). In a study comparing internet use of
colorectal cancer and bariatric patients Hamoui et al. (2004) found that more bariatric patients used the internet for health information and 9% used a chat room. This was associated with the level of education and income, but not with gender or age. The authors discussed that bariatric patients were more likely to use the internet for health information because of their long-standing limited mobility. Internet support groups may offer better convenience and privacy compared with in-person groups and make them attractive sources of support for patients who do not participate in traditional in-person groups. A recommendation for one or another source of support may be made to patients based on their individual needs and circumstances.

The research on bariatric internet-based support groups is lacking, with the existing literature focusing primarily on weight loss outcome. Wing et al. (2006) found the amount of weight regain was significantly greater in the control group compared with face-to-face or internet-based intervention groups. However, this was a directed intervention by method of an internet-based communication, and not an analysis of a self-formed community created around the theme of weight loss. People who use internet bariatric support groups are mostly white, married, educated women who are employed full-time (Shepsis, 2010; Sutton & Raines, 2008b). Approximately 60% of online group participants said they did not also participate in an in-person support group (Shepsis, 2010; Sutton & Raines, 2008b). If it is established that internet support groups are a valid source of support for bariatric patients, medical and mental health professionals can make recommendations for the use of this medium as an alternative to in-person support groups and individual counseling. While they are freely available for anyone it is important for physicians and other health care workers to know about these resources so as to inform their patients about the benefits and warn about potential harmful effects, including unreliable information (Hamoui et al., 2004).
Other health-related online groups

Social support groups exist in all spheres of health and psychological environments, including the internet. Support groups using computer-mediated communication offer a new delivery mechanism for psychological services, yet the functioning and efficacy of these electronic support groups remain largely unexamined. In the early 1990s, internet-based support groups for specific medical conditions emerged (Ferguson, 1996). An estimated 33 million Americans have used the internet as a health resource (Miller & Reents, 1998). By the year 2000 internet access had expanded to reach 41.5% of American households (National Telecommunications and Information Administration, 2000). People participate in virtual communities and find the opportunity to converse electronically with others they might never meet face-to-face. Studies show that individuals using internet groups communicate more frequently, emphasize the merit of message over the status of communicator, encourage wider participation from group members, and express greater candor in their communication than people who communicate face-to-face (Kim, 1994). Electronic communication offers many advantages over face-to-face support group format. The greatest advantage is that members need not be physically present for the group to function. These groups can be used conveniently by people worldwide, and users can participate at any time.

With continuous availability participants are able to obtain support whenever necessary without burdening their own existing support system, such as family, relatives, coworkers and friends, at inconvenient times. Reluctant or shy members can also feel more comfortable by inactive participation until they gain confidence to request or provide support directly. These groups do not require financial support, minimize differences in social status among the participants, allow for uninhibited discussion, and provide significant anonymity to participants
At the same time, internet-based forums are not without potential problems. Low motivation, lack of personal and immediate contact and longer time periods required to develop trust in the group may interfere with the effectiveness of the support group intervention. Because members of internet group may not receive immediate feedback on their comments, a climate of warmth and concern may take longer to develop in internet-based forums than in face-to-face groups. More important, however, as participation is largely open to anyone with access to the server, there is little control over who may participate in the group, the regularity and length of a member’s participation, and the accuracy of information and feedback provided to group members.

Given the potential benefits and the rapid growth in the number of internet-based support groups, it is surprising how little is known about the functioning and the efficacy of these groups. The first report was published in 1986, evaluating the effectiveness of an online behavioral smoking cessation program (Schneider & Tooley, 1986) which lacked control arm and therefore its largest merit was the introduction of the novel methodology. In the Alzheimer’s caregivers’ study the use of the internet-based support group led to a greater perceived confidence in the ability to care for family members (Gallienne, Moore, & Brennan, 1993). In an AIDS trial, use of the computer-based communication system reduced self-reported isolation (Brennan, Ripich, & Moore, 1991). Analysis of messages posted on eating disorder electronic support group revealed that self-disclosure was the main reason for posting, amounting to 31%, followed by requests for information (23%) and the direct provision of emotional support (16%) (Winzelberg, 1997). Bariatric patients reported they used the online support group to receive information and emotional support (Shepsis, 2010; Sutton & Raines, 2008b). A study of an internet support group for patients with depression revealed that users had high depression severity scores, were socially
isolated and perceived considerable benefit from the group. Moreover, heavy users of the internet groups were more likely to have resolution of depression during follow-up than less frequent users, whereas social support scores did not change during follow-up (Houston, Cooper, & Ford, 2002).

Eysenbach et al. (2004) reviewed 45 publications on the effect of health related virtual communities and electronic support groups and found a lack of studies which focused on isolating the effects of online support groups controlling for other interventions. Smoking cessation was by far the most common theme analyzed with some mixed results, but overall a positive trend. Depression, social support in general, healthcare use, eating disorders, weight loss, cancer and diabetes control were additional domains in which studies have been conducted. Cancer online support groups were described to have many features of traditional in-person support groups and were reported to help patients reduce depression, experience of pain and assisted people in the seeking and giving of information, especially catering to those from rural areas with poor access to healthcare systems (Eysenbach et al., 2004; Klemm et al., 2003; Lieberman et al., 2003; Weinberg, 1996). These publications most often studied depression and social support as outcomes and the majority of them did not find an effect. Authors also concluded that there was no evidence to support concerns over virtual communities harming people (Eysenbach et al., 2004). Advantages and disadvantages of online support groups were described to include easier access, flexibility, privacy as positive features and decreased accountability, unreliable information and time delay in receiving feedback as challenges (Eysenbach et al., 2004; Hwang et al., 2010).
Weight loss and eating disorders

In the literature examining internet support groups for weight loss it has been demonstrated that these internet groups were helpful as the role of social support in weight loss was great and people with eating disorders and obesity often had little social support (Hwang et al., 2010). People reported they found encouragement and motivation, empathy, information, validation and shared experiences to be helpful factors (Hwang et al., 2010; Sanford, 2010). When comparing internet support groups to in-person support groups for weight loss Harvey-Berino et al. (2002) found that people who attended in-person groups had better outcomes on weight loss maintenance, but in a subsequent study it was demonstrated that long-term weight loss maintenance was equal in the two study groups (Harvey-Berino J., Pintauro S., Buzzell P., & Gold E., 2004). Just as in-person support groups internet support groups differ in approach and structure. Tate et al. (2001) concluded that people were more successful with weight loss in a structured behavioral internet support group compared with an educational weight-loss website. Sanford (2010) found that blogging was an effective means of support for obese people for the improvement of psychosocial functioning and weight loss. Overall, it is fair to assume that online support groups can serve an important function for weight loss and eating disorders in addition to the in-person contact (Turner, Grube, & Meyers, 2001).

Online survey - Psychological research online

A convenient and inexpensive methodology for reaching members of online groups and conducting a study of online and in-person support groups is via an electronic survey. However, electronic surveys have distinctive technological, demographic, and response rate characteristics that affect their design, distribution, and response rates (Sohn, 2001). Surveys are imperfect vehicles for collecting data. They require participants to recall past behavior that can be more
accurately captured through observation (Schwarz, 1999). The lack of internet central registries prevents researchers from identifying all the members of an online population along with multiple email addresses for the same person and invalid or inactive email address. Most important, electronic survey selection is limited to nonrandom, probabilistic and biased sampling (Cooper, 2000; Dillman, 2000; Kraut et al., 2004). Nevertheless, web-based surveys are the most appropriate format for surveys when research costs are a constraint, timeliness is important and the nature of the research requires it (Andrews, Nonnecke, & Preece, 2003). Piloting and preliminary analysis was shown to improve the participants’ response rates and increase compliance among hard-to-involve online population (Andrews et al., 2003).

Statement of the Problem

While it is well established that social support and attendance of in-person support groups helps bariatric patients to achieve greater weight loss and to maintain that weight loss, the effect of joining internet bariatric support groups has not been well-studied. Because online support groups in general and bariatric online support groups in particular are becoming more widely available and popular, it is necessary to establish their effectiveness for weight loss, as compared with traditional in-person support groups. In addition, it is known that patients experience a multitude of challenges when they successfully lose weight after bariatric surgery and must adjust their social, psychological, occupational and other areas of functioning. Support groups of both types, in-person and online, may play an important role in improving bariatric patients’ quality of life. This study aimed, in part, at describing and quantifying bariatric patients’ experience with social support following bariatric surgery. Patients’ reports related to their social support, as well as participation in in-person and online support groups and not attending any groups at all were explored. Structure and content of in-person and online types of support
groups, as well as people’s motivations for seeking a support group and their satisfaction or reasons for not joining, were investigated through various descriptive. Effects of support group attendance on scores on measures of bariatric quality of life and general health-related quality of life, as well as the amount of weight loss, were examined.
Statement of the Hypotheses

It was predicted that:

Hypothesis 1.
Bariatric quality of life would be highest in the group of people who attend in-person support groups, followed by lower scores in the group of people who attend both online and in-person groups, followed by those who attend online support groups, and lowest in the group of those who do not attend any groups, keeping significant covariates constant.

Hypothesis 2.
Health-related quality of life (i.e., psychological, social, environmental and physical domain scores) would be highest in the group of people who attend in-person support groups, followed by lower scores in the group of people who attend in-person and online groups, then by those who attend online support groups, and lowest in the group of those who do not attend any groups, keeping significant covariates constant.

Hypothesis 3.
The average reduction in body mass index (BMI) from before surgery to the current status would be highest in the group of people who attend in-person support groups, followed by lower reduction in BMI in the group of people who attend both types of groups, then those who attend online support groups, and lowest in the group of those who do not attend any groups, controlling for significant covariates.
Hypothesis 4.

There would be no significant differences in terms of satisfaction with the group for those who attend in-person support groups, online support groups or both types of groups.
Method

Participants

Members of in-person bariatric support groups were recruited to participate in this study by means of advertising at local bariatric clinics at Oregon Health and Sciences University (OHSU) and Southwest Washington Medical Center (SWWMC) and contacting group coordinators. Bariatric patients who attend different types of support groups as well as those who do not attend any groups were also recruited by advertising at the local bariatric clinics, contacting clinic coordinators and posting on craigslist.org in large and small communities and cities across the US in all states. Men and women over the age of 18 were eligible to participate. An approval of the Pacific University Institutional Review Board was obtained. An approval from OHSU’s Institutional Review Board was also obtained as required by that institution. An approval from the bariatric clinic at SWWMC was obtained in writing.

This study included 238 bariatric patients who did not participate in any support groups (75% of the total sample) and 83 patients who participated in online, in-person or both types of support groups (26% of the total sample). Demographic data for each sample is summarized in Table 1. Characteristic of all four conditions participants were predominantly female (80-89%), between the ages of 20 and 72 ($M = 43$), predominantly White/Non-Hispanic (67-85%), employed (67-89%), in a relationship (58-77%), with some college or graduate education, and earning $40K-60K. Participants in all four conditions engaged in physical activity on average between 2 and 8 hours per week and had a mean pre-surgery BMI of 46-51.

Data from a previously surveyed sample of bariatric patients participating in online support groups were also used.
Table 1

*Demographic characteristics, pre-surgery BMI, and physical activity by group participation type*

<table>
<thead>
<tr>
<th>Support Group Type</th>
<th>In-person only (n=27)</th>
<th>Online only (n=30)</th>
<th>In-person and online (n=26)</th>
<th>None (n=238)</th>
<th>Test p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% male)</td>
<td>11.1%</td>
<td>20.0%</td>
<td>19.2%</td>
<td>15.5%</td>
<td>p=.782</td>
</tr>
<tr>
<td>Age in years</td>
<td>44.6 (9.39)</td>
<td>43.0 (9.21)</td>
<td>43.3 (9.15)</td>
<td>43.9 (11.3)</td>
<td>p=.966</td>
</tr>
<tr>
<td>Race/ethnicity (% White/non-hispanic)</td>
<td>66.7%</td>
<td>73.3%</td>
<td>84.6%</td>
<td>79.4%</td>
<td>p=.340</td>
</tr>
<tr>
<td>Employment Status (% employed)</td>
<td>88.9%</td>
<td>66.7%</td>
<td>88.0%</td>
<td>79.4%</td>
<td>p=.131</td>
</tr>
<tr>
<td>Relationship Status (% partnered)</td>
<td>57.7%</td>
<td>69.0%</td>
<td>76.9%</td>
<td>69.7%</td>
<td>p=.499</td>
</tr>
<tr>
<td>Pre-surgery BMI [Mean (SD)]</td>
<td>47.9 (4.71)</td>
<td>50.8 (7.46)</td>
<td>46.1 (9.05)</td>
<td>51.0 (10.97)</td>
<td>p=.284</td>
</tr>
<tr>
<td>Time since surgery in months [Mean (SD)]</td>
<td>40.0 (55.88)</td>
<td>55.2 (33.99)</td>
<td>28.0 (25.61)</td>
<td>69.5 (57.82)</td>
<td>p=.022</td>
</tr>
<tr>
<td>Education (median)</td>
<td>Some graduate</td>
<td>Some college</td>
<td>Some college</td>
<td>Some college</td>
<td>p=.323</td>
</tr>
<tr>
<td>Income (median)</td>
<td>$40K-60K</td>
<td>$40K-60K</td>
<td>$40K-60K</td>
<td>$40K-60K</td>
<td>p=.631</td>
</tr>
<tr>
<td>Physical activity</td>
<td>2-8hrs/week</td>
<td>2-8hrs/week</td>
<td>2-8hrs/week</td>
<td>2-8hrs/week</td>
<td>p=.804</td>
</tr>
</tbody>
</table>

*Note:* Group differences were tested using chi-square tests and independent-samples Kruskal-Wallis test. *p*-values provided in the above table.
Procedure

Participants were invited to complete the measures described below online using surveymonkey.com software. Local bariatric clinic patients who attend in-person support groups and those who did not attend any support groups were invited to participate based on a convenience sampling technique. A description of the study along with an agreement to conduct research form was e-mailed to group leaders or clinic coordinators when required and appropriate. Upon receipt of an e-mail response and agreement to conduct research from group leaders or clinic coordinators by the investigator an invitation to participate in a survey along with a link to the survey was distributed to the patients by the group leaders or clinic coordinators through electronic means. A paper advertisement with an invitation to take a survey and a link to the online survey was also posted at the local bariatric clinics. Copies of these advertisements along with a link to the online survey were distributed to multiple large and small bariatric clinics nationally for posting at the clinics, after obtaining clinics’ administrators’ permission. Similar invitations to participate in this study were posted on craigslist.org and remained as active postings for several months. Upon following the link to the survey participants first read and acknowledged the study description and the informed consent giving their permission to the researcher to gather data. The participants then took the survey containing several questionnaires.

Measures

Both in-person and online group participants and those who do not attend any groups completed the following measures:
1. Demographics questionnaire gathering basic demographic information. This questionnaire was developed by the principal investigator. Information gathered in this questionnaire included age, gender, relationship status, ethnic background, income, educational level and employment status. (Appendix A)

2. Questionnaire on weight gathering information about participants’ current and previous weight, their weight loss practices and attitudes, and their experience with bariatric surgery (Appendix B) - developed by the principal investigator.

3. Several measures assessing aspects of quality of life including:
   a) Social support and quality of life questionnaire (Appendix D) – developed by the principal investigator. This questionnaire included informal questions about participants’ perceived social support and general quality of life.
   b) WHOQOL-BREF (World Health Organization Quality of Life Index) (WHOQOL group, 1996) (Appendix E)
      This instrument was used to measure general health-related quality of life of bariatric patients. This measure was used to measure post-surgical bariatric quality of life in a study by Chang et al. (2010). It consists of 26 items which ask respondents to indicate their satisfaction with factors of health-related quality of life in psychological, social, environmental and physical areas, on a 5-point Likert type scale. Different anchor points are used for different sections of the questionnaire and some items are reverse-scored. A scaled score (0-100) is derived per publisher’s scoring instructions in each of the four domains. Skevington (2004) found that this measure’s internal consistency as measured by Cronbach’s $\alpha$ was acceptable ($\alpha > .70$). Specifically, for WHOQOL-BREF domains Cronbach’s $\alpha$ coefficients were .82 for Physical, .81 for...
Psychological, .80 for Environmental and .68 for Social domain. Discriminant validity was tested by comparing means of well and ill people using t-tests. Hierarchical multiple regression analyses were used to determine the impact of age and gender on domain scores of ill and well people; results were significant and explained 2.7% of the overall variance ($F(2, 7007) = 96.3, p < .0001$). Authors found that discriminant validity was good and best demonstrated in Physical domain, followed by Psychological, Social and Environmental domains. Construct validity was examined across separate items and domains, as well as the overall QOL score and was demonstrated to be very strong across all domains and items ($R^2 = .49 - .67$). Scores on the WHOQOL-BREF were found to correlate strongly with scores from WHOQOL-100, its more comprehensive counterpart. (Skevington et al., 2004)

c) BQL (Bariatric quality of life questionnaire) (Weiner et al., 2005) (Appendix F)

This questionnaire consists of two parts. Part 1 consists of 24 items which ask respondents about their medical problems, including common bariatric co-morbid conditions, medications and alcohol use. Part 1 responses are designed for an individual assessment of a person and were not used in this study’s analyses. Part 2 is a questionnaire which consists of 11 items which asks participants to indicate, on a 5-point Likert-type scale ($1 = \text{very bad}$ to $5 = \text{very good}$), their satisfaction with different aspects of bariatric quality of life, including physical, social, psychological and occupational factors as they relate to a person’s weight. A mean score from 1 to 5 is calculated for Part 2 with higher scores corresponding to a higher bariatric quality of life. Internal consistency / reliability was found to be very good, Cronbach’s $\alpha = .90$. The BQL also showed good retest reliability ($r = .90$). This measure was found to
correlate well with other health-related quality of life measures and to negatively correlate with BMI. (Weiner et al., 2009)

4. Psychological co-morbidities questionnaire gathering basic information about possible psychological co-morbidities (Appendix G) – developed by the principal investigator. This questionnaire consists of six basic questions in a “Yes / No” format asking participants whether they have ever been diagnosed with or told they might have some common psychological conditions, including depression, anxiety, social anxiety and alcoholism.

5. The questionnaire for in-person group participants also included the Questionnaire About the Support Group gathering information about participants’ current participation in a specific bariatric support group and their past experiences participating in other bariatric support groups. Information about the structure and content of groups was gathered. This questionnaire was developed by the investigator. (Appendix C)

6. The questionnaire for those who do not attend any support groups also included the Questionnaire for Those Who do not Participate in Support Groups gathering information about their rationale and preferences and their interaction with the medical system. Information on reasons for choosing not to attend a group and potential barriers was gathered. This questionnaire was also developed by the investigator. (Appendix H)

Data analysis

This was a correlational, cross-sectional, non-experimental, descriptive study. The data were examined for missing data points. Missing data on validated measures were handled according to the publisher’s scoring instructions. Descriptive statistics and summaries of data were used to interpret the information about the sample.
Because of the small size of support group samples, some demographic categories were collapsed. Specifically, race/ethnicity was collapsed in to White/non-Hispanic versus other; employment was collapsed into full or part-time employed versus unemployed; and relationship status was collapsed into married, cohabitating, or “in relationship” versus divorced, widowed, or single.

Given the non-experimental design of the study (i.e., no random assignment), participants in the four conditions (in-person support group, online support group, online and in-person support group, no support group) were compared using one-way four group ANOVAs on a number of characteristics that could be associated with the study outcomes. Group differences on categorical variables (e.g., gender) were tested using chi-square tests. Differences on ordinal variables (e.g., education) were tested using independent-samples Kruskal-Wallis test. Differences on continuously measured variables (e.g., BMI) were tested using independent-samples Kruskal-Wallis test, given that the homogeneity of variances assumption was not met for ANOVA (p = .005 and .085 for BMI and age, respectively).

In order to test hypotheses 1, 2 and 3, one-way ANOVAs and ANCOVAs were used for analyses of scores on quality of life measures (WHOQOL and BQL) and BMI change, as dependent variables, between those attending in-person support groups, participating in online support groups, participating in both types of groups and those who do not attend any groups. Demographic factors, pre-surgery BMI and time since surgery, as well as amount of physical activity were considered as potential covariates using correlations. Specifically, Pearson’s product-moment correlations (r) were used for interval or ratio level continuous variables; Spearman’s rank correlations (rho) were used for correlations involving ordinal variables; and point-biserial (r_{pb}) correlations were used to test associations between continuously measured
and dichotomous variables. Different covariates were used in ANCOVA analyses for WHOQOL, BQL and BMI change depending on statistical significance.

Before testing group differences on the outcomes, Levene’s tests of homogeneity of variances in the group conditions were conducted for each outcome, given the unbalanced group sizes, in order to ensure that this statistical assumption of ANOVA was not violated. When the assumption was violated, a non-parametric test was used instead. Post-hoc tests were used to examine pairwise relationships among the adjusted means for each analysis, according to the Bonferroni procedure. To test hypothesis 4, a one-way ANOVA was used to compare the in-person only, online only, and combined groups on satisfaction with the group. For all analyses a significance level of 0.05 was used. The size of the experimental effect was calculated for all ANOVA and ANCOVA findings utilizing eta squared, $\eta^2$. 
Results

Descriptive Statistics

As shown in Table 1, there were no significant group differences on pre-surgery BMI, rates of physical activity, or demographic factors including age, gender, race/ethnicity (White non-Hispanic vs. other), employment status, education, income, or relationship status (partnered vs. non-partnered). When participants in any of the three active group participation conditions were combined and compared to participants in the no-group condition, the latter group had significantly higher pre-surgery BMI, $t (df = 140.95, \text{unequal variances}) = 2.19, p < .05$; no other group differences were significant when examined this way, however. Patients in different group conditions reported significantly different time since surgery with those who had surgery the most recently participating in both types of groups, followed by those in in-person groups, online groups and those whose surgeries were performed furthest back not attending any groups. Across all group conditions people reported engaging in the same amount of physical activity, were of approximately the same age and their incomes were similar. Men tended to attend either online groups or both in-person and online groups. Participants indicated an approximately equal preference for attending online and in-person groups assuming that access is not an issue (47.7% and 48.6% respectively).

A summary of outcomes for participants in the four support group conditions is reported in Table 2. Table 3 lists Pearson zero-order correlations between variables used in analyses. BQL score was negatively associated with BMI change and positively associated with all four WHOQOL-BREF domains. Group satisfaction was negatively associated with BQL score, all four WHOQOL-BREF domain scores and with BMI change. Finally, change in BMI was not significantly correlated with any of the WHOQOL-BREF domains.
Table 2

Means, standard deviations, skewness, and kurtosis for primary outcomes by support group condition

<table>
<thead>
<tr>
<th>Group type</th>
<th>Current BMI</th>
<th>BMI change</th>
<th>Group satisfaction</th>
<th>BQL score</th>
<th>WHOQOL-BREF domains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Phys</td>
</tr>
<tr>
<td>In person</td>
<td>Mean 34.38</td>
<td>-16.10</td>
<td>2.38</td>
<td>3.26</td>
<td>.6188</td>
</tr>
<tr>
<td></td>
<td>SD 9.28</td>
<td>8.57</td>
<td>1.47</td>
<td>.84</td>
<td>.2370</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.78</td>
<td>.83</td>
<td>-.61</td>
<td>-1.03</td>
<td>-1.02</td>
</tr>
<tr>
<td>SE of kurtosis</td>
<td>.87</td>
<td>1.01</td>
<td>.92</td>
<td>.94</td>
<td>.87</td>
</tr>
<tr>
<td>Skewness</td>
<td>.81</td>
<td>-99</td>
<td>.90</td>
<td>.05</td>
<td>.02</td>
</tr>
<tr>
<td>SE of skewness</td>
<td>.45</td>
<td>.52</td>
<td>.47</td>
<td>.48</td>
<td>.45</td>
</tr>
<tr>
<td>Online</td>
<td>Mean 33.53</td>
<td>-18.99</td>
<td>2.43</td>
<td>3.09</td>
<td>.6107</td>
</tr>
<tr>
<td></td>
<td>SD 6.86</td>
<td>8.88</td>
<td>1.03</td>
<td>.88</td>
<td>.2579</td>
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<tr>
<td>Kurtosis</td>
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<td>-1.01</td>
<td>1.08</td>
<td>-.09</td>
<td>-1.33</td>
</tr>
<tr>
<td>SE of kurtosis</td>
<td>.87</td>
<td>.95</td>
<td>.86</td>
<td>.87</td>
<td>.83</td>
</tr>
<tr>
<td>Skewness</td>
<td>.78</td>
<td>.09</td>
<td>.75</td>
<td>-.24</td>
<td>-.22</td>
</tr>
<tr>
<td>SE of skewness</td>
<td>.45</td>
<td>.49</td>
<td>.44</td>
<td>.45</td>
<td>.43</td>
</tr>
<tr>
<td>Online and</td>
<td>Mean 32.36</td>
<td>-15.56</td>
<td>2.04</td>
<td>3.69</td>
<td>.7200</td>
</tr>
<tr>
<td></td>
<td>SD 7.85</td>
<td>8.32</td>
<td>1.22</td>
<td>.83</td>
<td>.2011</td>
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<tr>
<td>Kurtosis</td>
<td>.59</td>
<td>-1.35</td>
<td>.09</td>
<td>.65</td>
<td>.68</td>
</tr>
<tr>
<td>SE of kurtosis</td>
<td>.92</td>
<td>.99</td>
<td>.89</td>
<td>.94</td>
<td>.89</td>
</tr>
<tr>
<td>Skewness</td>
<td>.73</td>
<td>.22</td>
<td>1.08</td>
<td>-.44</td>
<td>-.90</td>
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<tr>
<td>SE of skewness</td>
<td>.47</td>
<td>.51</td>
<td>.46</td>
<td>.48</td>
<td>.46</td>
</tr>
<tr>
<td>No group</td>
<td>Mean 34.38</td>
<td>-16.93</td>
<td>2.26</td>
<td>3.26</td>
<td>.6243</td>
</tr>
<tr>
<td></td>
<td>SD 9.44</td>
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<td>.92</td>
<td>24.48</td>
<td>22.74</td>
</tr>
<tr>
<td>Kurtosis</td>
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<td>1.21</td>
<td>-.58</td>
<td>-.55</td>
<td>-.53</td>
</tr>
<tr>
<td>SE of kurtosis</td>
<td>.32</td>
<td>.33</td>
<td>.33</td>
<td>.32</td>
<td>.31</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.09</td>
<td>-.43</td>
<td>-.13</td>
<td>-.51</td>
<td>-.33</td>
</tr>
<tr>
<td>SE of skewness</td>
<td>.16</td>
<td>.17</td>
<td>.17</td>
<td>.16</td>
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</table>
Table 3

Pearson zero-order correlations between all variables used in analyses

<table>
<thead>
<tr>
<th></th>
<th>ΔBMI</th>
<th>BQL score</th>
<th>Physical</th>
<th>Psychological</th>
<th>Social</th>
<th>Environment</th>
<th>Group satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABMI</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BQL score</td>
<td>-.25*</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHOQOL-BREF domain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>-.11</td>
<td>.72**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological</td>
<td>-.06</td>
<td>.80**</td>
<td>.73**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>.01</td>
<td>.59**</td>
<td>.47**</td>
<td>.73**</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>-.05</td>
<td>.66**</td>
<td>.63**</td>
<td>.68**</td>
<td>.56**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Group satisfaction</td>
<td>-.28*</td>
<td>-.25*</td>
<td>-.29*</td>
<td>-.26*</td>
<td>-.30**</td>
<td>-.28*</td>
<td>--</td>
</tr>
</tbody>
</table>

Note. **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

Preliminary analyses

As per a priori planned preliminary analyses, correlations between demographic variables, pre-surgery BMI, time since surgery, amount of physical activity and BQL scores, WHOQOL domain scores and BMI change were examined in order to identify significant covariates to be included in ANCOVA analyses. Higher BQL scores were associated with lower pre-surgery BMI ($r = -.179, p < .01$), higher income ($r = .247, p < .001$), and more frequent physical activity ($r = .179, p < .01$). Similarly, higher scores on the four WHOQOL-BREF domains were associated with higher income ($r = .20-.46, p < .001$), higher levels of physical activity ($r = .13-.19, p < .001$), lower pre-surgery BMI ($r = -.16 to -.24, p < .01$), and with the exception of the Social domain, with being employed ($r_{pb} = .19-.21, p < .001$); the Psychological and Environmental domains each were positively associated with education ($r = .12$ and $.13$, respectively.)
respectively, \( p < .05 \), and the Social and Environmental domains were higher among those in a relationship \((r = .18 \text{ and } .12, \text{ respectively, } p < .05)\). Finally, greater decreases in BMI from pre- to post-surgery were significantly associated with male gender \((r = .138, p < .05)\) and less education \((r = .146, p < .05)\). However, it must be noted that higher pre-surgery BMI was associated with male gender \((r = -.140, p < .05)\), lower income \((r = -.150, p < .05)\), lower education \((r = -.173, p < .01)\) and unemployment \((r = -.119, p < .05)\). BMI change was not significantly correlated with time since surgery \((r = -.034, p = .651)\). These findings guided the selection of covariates in subsequent ANCOVA models, more specifically income and pre-surgery BMI were included as covariates in an ANCOVA testing group differences on the BQL and gender and education were included as covariates in an ANCOVA testing group differences on the BMI change. In ANCOVAs testing group differences on the WHOQOL employment, education, income and pre-surgery BMI were included as covariates for Physical and Psychological domains; relationship status, income and pre-surgery BMI were included as covariates for Social domain; and employment, education, relationship status, income and pre-surgery BMI were included as covariates for Environmental domain. As planned, Levene’s tests of homogeneity of variances in the group conditions were conducted for each outcome. Unless specified, none of these tests was significant, implying that variances did not differ significantly by group and that this statistical assumption of ANOVA was not violated. When the assumption was violated, a non-parametric test was used instead. Otherwise, one-way, four group ANCOVAs were used to test group differences, adjusting for covariates identified as significantly associated with the outcomes in preliminary analyses. As the pattern of significant covariates differed by outcome, as described above, separate ANCOVAs were used, rather than an overall MANCOVA. Results of these tests are described below. Group differences in changes
BARIATRIC WEIGHT MANAGEMENT, QOL & SOCIAL SUPPORT

in BMI from pre-surgery to current were tested using repeated measures ANCOVA; group
condition was the independent (between-subjects) variable, and the within-subjects change in
BMI from pre-surgery to current was the outcome, adjusting for between-subjects covariates
identified in preliminary analyses.

Tests of group differences on study outcomes

**BQL.** To test Hypothesis 1, a one-way four group ANCOVA was run to evaluate the
effects of support group participation type (i.e. in-person, online, in-person and online, and no
group) on scores on the BQL measure, while controlling for significant covariates of income and
pre-surgery BMI. A preliminary analysis evaluating the homogeneity of slopes assumption
indicated that the relationship between the covariate and the dependent variable did not differ
significantly as a function of the independent variable, $F(3, 239) = 3.01, MSE = .681, p = .03$.
Consistent with Hypothesis 1, the overall ANCOVA was significant, $F(5, 239) = 7.23, p < .001$,
adjusted $R^2 = .113$, as was the overall main effect of group condition, $F(3, 239) = 3.01, MSE = .681, p < .05$. Lower pre-surgery BMI, $F(1, 239) = 4.912, p < .05$, and higher income, $F(1, 239) = 16.52, p < .001$, remained significantly associated with higher BQL scores. Means for each
group are summarized in Table 4. The strength of relationship between the independent variable
and dependent variable was small to medium ($\eta^2$), with group attendance type accounting for 4%
of the variance of the dependent variable (BQL scores), holding constant income and pre-surgery
BMI. In partial support of Hypothesis 1, a priori pairwise tests determined that the adjusted
means of the BQL scores were ordered as follows in the four groups: the combined in-person and
online group had the highest adjusted mean ($M = 3.87$), the in-person group had a somewhat
smaller adjusted mean ($M = 3.52$), and the no group cohort had an even smaller adjusted mean
($M = 3.30$). However, contrary to what was predicted by Hypothesis 1, the online group had the
smallest adjusted mean \((M = 3.21)\) which was smaller than the no group adjusted mean, in the opposite direction than expected.

Also in partial support of Hypothesis 1, post-hoc follow-up tests were conducted to evaluate pairwise differences among these adjusted means. Based on the Bonferroni procedure the adjusted mean for the combined “online and in-person” group was significantly higher than the adjusted mean for the no group cohort \((p = .033)\). However, the adjusted means for the in-person and online, the online and combined, the in-person and combined, the in-person and no group, online and no group cohorts did not differ significantly.

Table 4

*Estimated BQL scores for participants in each support group condition*

<table>
<thead>
<tr>
<th>Group type</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Online</td>
<td>3.213</td>
<td>0.185</td>
<td>2.850</td>
</tr>
<tr>
<td>no group</td>
<td>3.299</td>
<td>0.060</td>
<td>3.182</td>
</tr>
<tr>
<td>in person</td>
<td>3.519</td>
<td>0.214</td>
<td>3.098</td>
</tr>
<tr>
<td>in person and online</td>
<td>3.873</td>
<td>0.196</td>
<td>3.488</td>
</tr>
</tbody>
</table>

*Note:* the following covariates are included: income and pre-surgery BMI. Results ordered in the direction of increasing means.
**WHOQOL-BREF.** To test Hypothesis 2, separate one-way four group ANCOVA’s were conducted to evaluate the effects of support group participation type (i.e. in-person, online, in-person and online, and no group) on scores on the WHOQOL-BREF measure and its four domains (i.e. physical, psychological, social and environmental domains), while controlling for significant covariates listed above in the *Preliminary analyses* section. The homogeneity of variances assumption was violated for the WHOQOL-BREF Physical domain [Levene’s $F(7, 261) = 2.574$, $p < .05$]. Therefore, non-parametric tests of group differences on distributions and medians were run for this outcome; however, neither were significant [Independent samples Kruskal-Wallis test ($df = 3, 320$) = 3.72, $p = .293$; Independent samples median test ($df = 3, 320$) = 1.745, $p = .627$]. For those outcomes that were appropriate for ANCOVA, Hypothesis 2 was partially supported, as a significant main effect of group participation type was found only for the Psychological domain, $F(3, 264) = 3.55$, $MSE = 439.73$, $p < .05$, [overall ANCOVA $F(6, 264) = 9.48$, $p < .001$, adjusted $R^2 = .159$]; education was omitted from the final model, as it was no longer a significant covariate, once income, pre-surgery BMI, and employment were controlled. ANCOVA results for the other three domains of WHOQOL-BREF, including physical, social, and environmental domains were not significant [$F(3, 264) = 1.53$, $MSE = 490.92$, $p = .21$ - physical; $F(3, 264) = 1.65$, $MSE = 695.58$, $p = .18$ – social; $F(3, 264) = 1.92$, $MSE = 282.43$, $p = .13$ – environmental]. It was predicted by Hypothesis 2 that there would be a significant main effect of group participation type on the other three domains of WHOQOL-BREF; however, this was not supported as no significant effect of group participation type was found for any of the other three domains, including Physical, Social and Environmental domains.

Also in partial support of Hypothesis 2, post-hoc analyses indicated significantly higher WHOQOL-BREF Psychological domain score among participants in the combined “in-person
and online” group than among those in no group ($p < .05$), according to the Bonferroni procedure. Lower pre-surgery BMI, $F (1, 239) = 4.912$, $p < .05$, and higher income, $F (1, 239) = 16.52$, $p < .001$, remained significantly associated with higher WHOQOL-BREF Psychological domain scores. The means for each group are summarized in Table 5. The strength of relationship between the independent variable and dependent variable was small to medium ($\eta^2$), with group attendance type accounting for 4% of the variance of the dependent variable (WHOQOL-BREF Psychological domain scores), controlling for income, employment and pre-surgery BMI. In partial support of Hypothesis 2, the adjusted means of the WHOQOL Psychological domain scores were ordered as follows in the four groups: the combined “in-person and online” group had the highest adjusted mean ($M = 67.24$), the in-person group had a somewhat smaller adjusted mean ($M = 63.39$), while the online group and the no group cohort had the smallest adjusted means ($M = 54.18$ and $M = 53.05$, respectively). Hypothesis 2 predicted that WHOQOL-BREF Psychological domain mean score would be higher for the online group than for the no-group cohort; however, this was not supported by the results. Post-hoc follow-up tests were conducted to evaluate pairwise differences among these adjusted means. Based on the Bonferroni procedure the adjusted mean for the combined “online and in-person” group was significantly higher than the adjusted mean for the no group cohort ($p = .039$). All the other pairwise comparisons between the adjusted means were not statistically significant.
Table 5

*Estimated WHOQOL-BREF Psychological domain scores for participants in each support group condition*

<table>
<thead>
<tr>
<th>Group type</th>
<th>Mean</th>
<th>Std. error</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no group</td>
<td>53.121</td>
<td>1.726</td>
<td>49.723</td>
<td>56.519</td>
<td></td>
</tr>
<tr>
<td>Online</td>
<td>54.246</td>
<td>4.526</td>
<td>45.334</td>
<td>63.157</td>
<td></td>
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<tr>
<td>in person</td>
<td>63.374</td>
<td>5.120</td>
<td>53.291</td>
<td>73.456</td>
<td></td>
</tr>
<tr>
<td>in person and online</td>
<td>67.231</td>
<td>5.128</td>
<td>57.134</td>
<td>77.328</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* the following covariates are included: Pre-surgery BMI, income and educational level.

Results are ordered in the direction of increasing means.
Change in BMI. To test Hypothesis 3, a repeated measures ANCOVA was conducted to evaluate the effects of support group participation type (i.e. in-person, online, in-person and online, and no group) on change in BMI from pre- to post-surgery, while controlling for gender and education, which were significant covariates. Hypothesis 3 was not supported, as there was no statistically significant main effect of group participation type on BMI change found, $F(3, 268) = .692, \text{MSE} = 70.43, p = .56$. The means for each group are summarized in Table 6. The extent to which participants’ BMI decreased, $F(1, 268) = 182.8, p < .001$, was not moderated by group condition. Males, $F(1, 268) = 5.05, p < .05$, and less educated participants, $F(1, 268) = 5.20, p < .05$, generally had higher pre-surgery BMI but not current BMI; thus, BMI tended to decrease significantly more in these groups. It should be noted that groups differed in terms of time since surgery reported in months, $F(3, 191) = 3.29, p < .05$, with those who had weight loss surgery the most recently participating in both types of groups, followed by in-person groups, online groups and those whose surgery was furthest back not participating in any support groups. However, there was no correlation between BMI change and time since surgery ($r = -.034, p = .65$).
Table 6

*Estimated BMI change scores for participants in each support group condition*

<table>
<thead>
<tr>
<th>Group type</th>
<th>Mean</th>
<th>Std. error</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>online</td>
<td>-19.081</td>
<td>1.790</td>
<td>-22.605 -15.558</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in person and online</td>
<td>-16.829</td>
<td>.575</td>
<td>-17.962 -15.696</td>
<td></td>
<td></td>
</tr>
<tr>
<td>no group</td>
<td>-16.606</td>
<td>1.932</td>
<td>-20.410 -12.801</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in person</td>
<td>-15.504</td>
<td>1.878</td>
<td>-19.201 -11.806</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* the following covariates are included: gender and educational level. Results are ordered in the direction of increasing means.

Satisfaction with group. Finally, to test Hypothesis 4, a one-way ANOVA was used to compare the in-person only, online only, and combined groups on satisfaction with the group. As predicted by Hypothesis 4, there were no significant differences, $F(2, 75) = .764; p = .47$, and satisfaction with the support group was not moderated by the type of group.

Exploratory analyses

Descriptive information about in-person and online groups collected in the surveys is summarized in Table 7. Participants’ motivation and goals for joining, their experience in the group, as well as group structure are presented. Frequency of discussing common topics in each type of groups is presented in Figure 1. Descriptive information presented is based on the most common responses, with the next most common response included in the description whenever appropriate. Survey questions ranged from “Yes/No”, to Likert-type scale to multiple-choice.
### Table 7

**Descriptive information on each type of group**

<table>
<thead>
<tr>
<th></th>
<th>In-person (N=47)</th>
<th>Online (N=43)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal when joined</td>
<td>Receive support</td>
<td>Receive support</td>
</tr>
<tr>
<td>Achieved goal?</td>
<td>Somewhat / extremely successful</td>
<td>Somewhat / fairly successful</td>
</tr>
<tr>
<td>Reason for choosing</td>
<td>Recommendation</td>
<td>Discussion content / recommendation</td>
</tr>
<tr>
<td>How found?</td>
<td>Recommended by a medical professional</td>
<td>Searched online</td>
</tr>
<tr>
<td>How long in group</td>
<td>&gt; 1 year</td>
<td>1-6 months</td>
</tr>
<tr>
<td>Attendance per month</td>
<td>Once</td>
<td>Once</td>
</tr>
<tr>
<td>Opportunity to “ask the experts”</td>
<td>75%</td>
<td>24%</td>
</tr>
<tr>
<td>Presence of a group leader</td>
<td>75% (dietician or peer)</td>
<td>57% (peer)</td>
</tr>
<tr>
<td>Discussion participation</td>
<td>62% usually / always speak up</td>
<td>46% sometimes / usually post comments</td>
</tr>
</tbody>
</table>
Figure 1. Frequency of discussing common topics in each type of group.
Survey respondents participating in groups were also asked to indicate whether they receive tips about the following topics during group discussions: diet, cooking, eating habits, exercise, wound care, plastic surgery, relationships and coping. Responses are summarized in Figure 2.
Figure 2. Content of group discussions – receiving tips on relevant topics.
Survey respondents who do not attend any groups currently but indicated that they attended and left a group in the past were given an opportunity to provide non-structured narrative responses to the question “Why did you leave that group?” Their responses are summarized in Figure 3. Similarly, those who took the survey for those who do not attend any groups and indicated that they never joined a group were asked to provide non-structured responses as to their reasons for not joining any groups. Responses were generalized and placed into five categories, as determined by the investigator, including “Access (time, location)”, “Embarrassed”, “Did not know or did not think about it” and “Do not need it / no interest” and “Other.” Their responses are summarized in Figure 4.
Figure 3. Reasons for leaving a group.
Figure 4. Reasons for not participating in a support group.
62% of participants reported that they are very or somewhat content with their post-surgery weight loss and 59% find it very easy or somewhat difficult to keep the weight off. One half of patients indicated that they have told their doctor about their participation in a support group and 59% did not believe that their participation in a support group improves communication with their doctor. Overall, 57% of participants reported that they are somewhat or extremely satisfied with their follow up medical care.

74% of people reported that they are somewhat or extremely satisfied with the support from their family and friends and just over half of participants, 51%, do not feel isolated. Put in another way, a significant minority of participants, 49%, reported that they do feel isolated. 92% indicated that their social life did not change or improve a lot after surgery.

No significant differences were found among people on psychological variables, including self-reported depression, social and “other” anxiety, alcoholism, and suicidal thoughts with regard to the group attendance type.
Discussion

Characteristics of the samples

The goal of this study was to describe bariatric patients’ experience with social support following bariatric surgery and to examine their participation in support groups and its effect on quality of life. 74% of patients who responded to this study survey did not participate in any support groups. Patients who participated in online, in-person, both types of groups and those who did not participate in any groups did not differ significantly on demographic variables. Of those who attended different types of support groups their satisfaction with the group did not differ significantly. Participants indicated equal preferences for online and in-person groups when assuming access was not an issue. In other words as many as half of all participants expressed a preference for in-person groups, while the other half of all participants indicated a preference for online groups. Despite the lack of statistically significant differences on demographic variables among the four cohorts of patients examined we observed some differences at a trend level. For example there were more females, non-Caucasians and people who were not in a relationship among those who attended in-person groups. People with the most education tended to attend in-person groups. It was also noted that patients who reported lower employment rates participated in online groups. Most participants reported that they were content with their post-surgery weight loss and it was very easy to only somewhat difficult to keep it off, regardless of their participation in support groups.

Patterns and relationships

It was hypothesized that people attending in-person or online support groups would achieve better weight loss and higher quality of life following bariatric surgery than patients who
do not attend any groups. Although past literature has suggested that online support groups may possibly serve as a valid source of support for bariatric surgery patients (Lier et al., 2011; Sutton & Raines, 2008a) this study found that participating in online support groups may not be an adequate substitute for attending in-person support groups when considering patients’ bariatric and general quality of life, as well as the overall change in their BMI.

More specifically, contrary to what was hypothesized, this study found that physical, social and environmental components of quality of life are not moderated by group attendance. However, in partial support of Hypotheses 1 and 2, psychological and bariatric qualities of life were shown to be higher among people who attend in-person support groups, especially when they also participate in online groups. Lier et al. (2011) who examined post-surgery bariatric quality of life found that patients with social phobia and avoidant personality disorder are less likely to attend support groups and in a separate study Lier et al. (2011) also found that post-surgical bariatric patients who have psychiatric disorders report a lower psychological quality of life. This may suggest that those who attend support groups have fewer psychiatric conditions which correlates with a higher psychological quality of life. However, the present study found no statistical differences in the reported psychiatric conditions depending on support group attendance while indicating a difference in the reported psychological quality of life.

Contrary to what was hypothesized, while patients who have undergone bariatric surgery experience dramatic reduction in their BMI it was not found to be dependent on their attendance of support groups, unlike demonstrated in previous research. (Elakkary, Elhorr, Aziz, Gazayerli, & Silva, 2006; Hildebrandt, 1998; Livhits et al., 2011; Orth et al., 2008). Welch et al. (2011) also found no significant effect of group attendance on BMI change after surgery. Livhits et al. (2011) suggested that the difference in BMI reduction in those who attend support groups and
those who do not may be based on the time since their surgery and the number of support group meetings attended. In this study time since surgery was found to be significantly different for patients attending different types of groups, but was not significantly correlated with BMI change. Harvey-Berino et al. (2004) found conflicting results for the influence of online and in-person groups on weight loss in two subsequent studies, in that initially attendance of in-person groups appeared to assist in losing more weight, but overtime the two groups achieved an equal amount of weight loss. Length of participation and weight loss overtime was not controlled for in this study. Pohle-Krauza et al. (2011) claim that marital status effect on BMI change is moderated by depression. The present study did not take these two factors into account.

While patients who participated in online support groups alone did not differ from patients who did not attend any groups at all on measures of quality of life and BMI change, those who participated in both online and in-person groups achieved higher scores on measures of bariatric quality of life and psychological quality of life than those who attended only in-person groups. Bariatric quality of life was also highest in the combined group. This may suggest that people seeking and receiving different types of support achieve the highest level of success. This group of patients may have different reasons for seeking multiple sources of support, from higher motivation for change, to better access, to increased availability, to more complications and challenges to participation in a program that encourages participation in both types of groups. These patients may also receive different benefits from each type of support groups - in the end providing them with more multifaceted instruction and a more comprehensive support model. These factors were not examined as part of this study.

Environmental, social and physical quality of life when measured using the WHOQOL was unaffected by group attendance. This fits in with the finding of Sutton & Raines (Sutton &
Raines, 2008a) that internet support groups had a more favorable effect on the mental quality of life of participants than in-person groups as participants of both kinds of groups received the benefit of the content of internet and in-person groups. When reporting on a recent examination of a large internet weight loss support group Hwang et al. (2010) found that it played a prominent role in participants’ weight loss. They suggested evaluating the effect of social support through such internet weight loss support groups and how professionals can harness this resource. According to the results of the present study, social quality of life was not affected by group attendance, suggesting that socialization and social support can be found outside of support groups as well as through them. Likewise, physical and environmental parts of quality of life were not moderated by support group participation. Patients probably derive satisfaction with these aspects of their lives from their general lifestyles as well as from what support groups can offer.

On all measures of quality of life respondents who participated in both online and in-person types of groups at the same time scored the highest. In a descriptive study examining experiences of bariatric patients Stolzenberger et al. (2013) described the construct of bariatric quality of life as a complex, multifaceted and individual. The present study finding that participation in both types of support groups is correlated with a higher quality of life could be due to the benefit of learning about components of quality of life from the content of both types of groups which may be complementary. While attending in-person groups has a positive effect on quality of life, participating in an online group at the same time appears to potentiate this effect. This could be potentially related to learning about different topics in each type of groups or could be due to different psychological needs addressed through each means. The positive effect of combined online and in-person group participation on quality of life can also be due to
the self-selection bias of being especially motivated to take advantage of support groups or other services or support and, thus, achieving better weight loss results and higher quality of life.

There was a surprising lack of statistical differences on demographic variables among different group participation cohorts. It may be explained by the finding that participants of the present study were of sufficient SES and educational level for computer and internet use in that population to be widespread. Thus, within this population bariatric patients likely have an opportunity to use online support groups and a choice of whether to attend an in-person group, provided there is convenient access, or join an internet group. Similar finding was demonstrated and discussed by Sutton & Raines (2008b).

Orth et al. (2008) suggested that patients are reluctant to attend in-person groups mostly due to family obligations and not believing it would help. This study examined people’s motivations for not attending groups and found similar responses. Non-participants indicated that access in terms of location or time was a problem, they were embarrassed, did not know or think about support groups and did not think that attendance would be helpful. Lier et al. (2011) found that bariatric patients with social phobia and avoidant personality disorder are less likely to attend a support group; however, our study results showed that patients’ informal self-reports of social phobia and other psychological disorders, including depression, suicidal thoughts, other anxiety, and alcoholism, did not differ among those who participated in different types of support groups and those who did not.

Internet support groups may offer better convenience and privacy compared with in-person groups and make them attractive sources of support for patients who do not participate in traditional in-person groups. One of the clinical purposes of this study was to examine whether a recommendation for one or another source of support may be made to patients based on their
individual needs and circumstances. Overall, the present study results indicated that attending in-person support groups, especially when patients also participate in online support groups has a positive effect on quality of life factors. It is difficult to support a recommendation for attending an online support group as an equally effective alternative to attending an in-person group based on the results of this study due, in part, to the small sample size and other methodological limitations. It is important to note, however, that 50% of participants indicated a preference for attending an online group over an in-person group and 30%, a significant minority of patients, reported that they did not attend in-person groups because they felt embarrassed. Finally, as was hypothesized, patients reported equal satisfaction with internet and in-person support groups.

Limitations

Sohn (2001) suggested that electronic surveys have distinctive technological, demographic, and response rate characteristics that affect their design, distribution, and response rates. Other previous researchers also cautioned that electronic survey selection is limited to nonrandom, probabilistic and biased sampling (Cooper, 2000; Dillman, 2000; Kraut et al., 2004). Samples of patients who participated in the present study were subject to a self-selection bias. It is possible that there is a difference in the weight loss experience, quality of life and help-seeking preferences between people who chose to respond to this survey and those who did not. In addition, invitations to take the survey for this study were widely advertised for an extended period of time but yielded a relatively small number of participants. It is impossible to know the exact participation rate, but it is reasonable to assume it was low and, thus, it raises concern about whether the final sample was representative.

Statistical analyses of data collected in this study were limited by the largely unequal sample sizes between those who did not attend any groups and group attenders. This might have
been due to the existing social stigma against weight problems and consequent difficulty in collecting data about a sensitive issue (Tourangeau & Yan, 2007). However, percentage of survey responders who reported group attendance may also be representative of a significantly smaller percentage of bariatric patients who attend support groups, as compared to those who do not participate in any form of support groups (Livhits et al., 2011; Orth et al., 2008). There do not appear to be research studies describing support group attendance rates specifically or that provide such statistics.

In describing bariatric patients’ participation in support groups and their possible effects on weight loss and quality of life this study did not track specific models used to conduct support groups or their short-term or long-term orientation. While BMI change was evaluated through patients’ self-report, no measure of weight loss maintenance was utilized.

In addition, data for online group participants were collected internationally from English-language websites, while in-person group participants’ data were collected nationally in the United States. Due to this difference in samples results of this study may not be generalizable to national bariatric populations.

Suggestions for future research

Given that this study found no effect of group attendance on post-surgical weight loss and the existence of conflicting data in previous research, it is suggested to conduct additional randomized control trials to determine whether group participants achieve greater weight loss after bariatric surgery and which components of group participation, including frequency, number of meetings attended, group structure and content and other factors, influence amount of weight loss. Including a measure of weight loss maintenance overtime is also suggested, to obtain a more complete picture of the effect on weight loss.
It is also suggested to obtain comparable sample sizes of those who do not participate in groups and people who attend various types of groups in order to achieve greater statistical power in future analyses. Because weight loss is a sensitive topic, recruitment strategies taking into consideration people’s reservations about participating in such research should be developed.

Conclusion and clinical use

In summary, post-surgical bariatric support groups appear to be a beneficial adjunct to other bariatric medical care in supporting patients in improving their physical and psychological health, including weight loss and quality of life. Patients appear to receive the greatest benefits when they participate in traditional in-person, as well as online support groups. Bariatric clinicians are in the position to encourage patients to obtain support from these sources. Moreover, because support groups in general and especially a combination of in-person and online support are so useful, and yet only a minority of patients take advantage of them, it is important to work to increase the use of these resources through education, encouragement, and accommodating common barriers to attendance, including access and convenience, personal fit, and information about reputable groups that are available.
Appendixes

[APPENDIX A: DEMOGRAPHICS QUESTIONNAIRE]

1. What is your age?
   ____ years old

2. What is your gender?
   
   a) male
   
   b) female
   
   c) transsexual / transgendered

3. What is your relationship status?
   
   a) married
   
   b) co-habitating
   
   c) in relationship
   
   d) single
   
   e) divorced
   
   f)widowed
   
   g) other (specify) ____

4. How would you describe your employment?
   
   a) employed full-time
   
   b) employed part-time
   
   c) unemployed
   
   d) other (specify) ____

5. What is your household income?
6. What is your race / ethnicity?
   a) Hispanic
   b) American Indian or Alaska Native
   c) Asian
   d) Black or African American
   e) Native Hawaiian or Other Pacific Islander
   f) White
   g) Other (specify) ____

7. With whom do you currently live?
   a) Significant other / spouse
   b) Parents / relatives
   c) Roommates
   d) Alone
   e) Other (specify) ____

8. What is the highest education level you have completed?
   a) High school or GED
   b) Some college (undergraduate)
   c) Some graduate (post-Bachelor, for example Master’s, Doctorate)
   d) Other (specify) ____
[APPENDIX B: QUESTIONNAIRE ON WEIGHT]

1. What is your current weight?
   ____ lbs

2. What is your current height?
   ____ ft  ____ in

3. What was your weight when you joined the group?
   ____ lbs

4. For how long have you been trying to lose weight?
   ____ years  ____ months

5. How difficult do you find it to lose weight?
   Not at all  Slightly  Moderately  Extremely
   difficult  difficult  difficult  difficult
   1  2  3  4

6. Did you have weight loss surgery?
   a). Yes  b). No (skip to question 14)

7. What kind of weight loss surgery did you have?
   a) Lap band
   b) VBG (Vertical Banded Gastroplasty)
   c) BPD (Biliopancreatic Diversion)
   d) RYGBP-E (Extended (Distal) Roux-en-Y Gastric Bypass)
   e) Roux-en-Y Gastric Bypass
   f) Other (specify) ____

8. What was your pre-surgery weight?
   ____ lbs

9. How long ago was your weight loss surgery?
10. What was the most important reason you decided to have weight loss surgery?
   a) Medical reasons
   b) Medical preventative reasons
   c) Improve self-esteem
   d) Improve physical quality of life
   e) Improve social quality of life
   f) Improve a relationship
   g) Other (specify) _____

11. What was a secondary reason you decided to have weight loss surgery (if any)?
   h) Medical reasons
   i) Medical preventative reasons
   j) Improve self-esteem
   k) Improve physical quality of life
   l) Improve social quality of life
   m) Improve a relationship
   n) Other (specify) _____
   o) No secondary reason

12. Did you lose the weight you intended to lose post surgery?
   a). Yes  b). No

13. How difficult do you find it to keep the weight off post surgery?

<table>
<thead>
<tr>
<th>Very easy</th>
<th>Somewhat difficult</th>
<th>Moderately difficult</th>
<th>Very difficult</th>
<th>Impossible</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
14. How content are you with your weight loss?

<table>
<thead>
<tr>
<th>Very content</th>
<th>Somewhat content</th>
<th>Not sure</th>
<th>Not very content</th>
<th>Not at all content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

15. How often do you engage in physical activity?

a) < 2 hours/week
b) 2-8 hours/week
c) 2 hours / day
d) > 2 hours / day
1. What was the main goal you were hoping to achieve by joining this support group?
   a) Receive support and encouragement
   b) Provide support and encouragement
   c) Learn about weight loss
   d) Learn about medical care or procedure (e.g. surgery)
   e) Share your experience with others
   f) Other (specify) ____

2. How successful are you in achieving this goal?

   Not at all | Somewhat | Unsure | Fairly successful | Extremely successful
   ---------|--------|--------|------------------|-------------------
   1         | 2      | 3      | 4                | 5

3. How long have you been in this support group?
   ____ days   ____ months   ____ years

4. Are there opportunities to “ask the experts” in this support group?
   a). Yes       b). No

5. Do you have a group leader?
   a). Yes       b). No

6. If you answered “Yes” to the previous question, who is the leader (if you answered “No” skip to question 7)?
   a) Peer
   b) Nurse
c) Dietician

d) Doctor

e) Psychologist

f) Social worker

g) Religious leader

h) Other (specify) ____

i) Don’t know

7. How did you find this group?

a) Referred by a medical professional

b) Searched online

c) Referred by a friend

d) Saw an advertisement

e) Other (specify) ____

8. Why did you choose this group?

a) Structure

b) Size

c) Recommendation

d) Discussion content

e) Other (specify) ____

9. On average, how often did you attend group meetings in the past month?

a) once

b) twice

c) weekly

d) twice a week

e) other (specify) ____

10. How often do you speak up in the group?
11. How often are the following topics present in this group’s discussions?

<table>
<thead>
<tr>
<th></th>
<th>Very rarely</th>
<th>Occasionally</th>
<th>Half of all discussions</th>
<th>Significant portion of discussions</th>
<th>Present in all discussions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a). Socializing</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b). Sharing experiences</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c). Providing emotional support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d). Requesting emotional support</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e). Advice giving</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f). Discussing diet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g). Discussing exercise</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>h). Discussing medical care</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>i). Other discussions</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

12. How much does your participation in this support group help with weight loss?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Very little</th>
<th>Not sure</th>
<th>Some</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

13. In this support group do you get tips from experts about diet?
14. In this support group do you get tips from experts about cooking?
   a). Yes  b). No

15. In this support group do you get tips from experts about eating habits?
   a). Yes  b). No

16. In this support group do you get tips from experts about exercise?
   a). Yes  b). No

17. In this support group do you get tips from experts about wound care?
   a). Yes  b). No

18. In this support group do you get tips from experts about plastic surgery?
   a). Yes  b). No

19. In this support group do you get tips from experts about relationships?
   a). Yes  b). No

20. In this support group do you get tips from experts about coping?
   a). Yes  b). No

21. How satisfied are you with this group?

   Extremely satisfied  Somewhat satisfied  Not sure  Somewhat dissatisfied  Extremely dissatisfied
   1  2  3  4  5

22. Do you also participate in an online support group?
   a). Yes  b). No
23. Assuming access is not an issue, what would you prefer?
   a). internet support group
   b). weekly in-person support group

   If you had weight loss surgery, answer the following questions, if not, skip to question 31.

24. Do you receive your follow-up care at a weight loss (bariatric) surgery clinic?
   a). Yes frequency ____ / month   b). No

25. Do you see a primary care physician?
   a). Yes frequency ____ / month   b). No

26. Do you participate in a mentoring program?
   a). Yes frequency ____ / month   b). No

27. Do you participate in an online support group?
   a). Yes frequency ____ / month   b). No

28. How satisfied are you with the quality of your follow-up medical care?

<table>
<thead>
<tr>
<th>Extremely satisfied</th>
<th>Somewhat satisfied</th>
<th>Not sure</th>
<th>Somewhat dissatisfied</th>
<th>Extremely dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

29. Have you told your doctor about this support group?
   a). Yes   b). No

30. Does participating in this support group improve your communication with your doctor?
   a). Yes   b). No
31. Have you participated in other bariatric support groups?
   a). Yes  b). No

32. If you answered “Yes” to question 31, are you still an active member of any other support groups?
   a). Yes  b). No

33. If you answered “No” to question 31, why did you leave that (or those) group / groups?
   Explain_________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________

34. What is usually your state of mind, or mood, when you are going to this group’s meetings?
   (Please use the following rating scale to rate your mood from 1 = very negative to 7 = very positive)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>

The following questions ask you how you perceive your quality of life and the social support you receive.

1. Do you feel isolated?

<table>
<thead>
<tr>
<th>Completely isolated</th>
<th>Somewhat isolated</th>
<th>Not sure</th>
<th>Slightly isolated</th>
<th>Not at all isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Was your social life affected by surgery?

<table>
<thead>
<tr>
<th>Significantly improved</th>
<th>Somewhat improved</th>
<th>Unchanged</th>
<th>Somewhat worsened</th>
<th>Significantly worsened</th>
<th>N/A, did not have surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

3. How satisfied are you with the social support you get from friends and family currently?

<table>
<thead>
<tr>
<th>Extremely satisfied</th>
<th>Somewhat satisfied</th>
<th>Not sure</th>
<th>Somewhat dissatisfied</th>
<th>Extremely dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
4. Would you be able to use online support groups, considering access to internet?
   a). Yes  b). No

5. Would you describe yourself as having a “go getter” attitude?
   a). Yes  b). No
The following questions ask how you feel about your quality of life, health, or other areas of your life. Please choose the answer that appears most appropriate. If you are unsure about which response to give to a question, the first response you think of is often the best one. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life in the last four weeks.

1. How would you rate your quality of life?
   - Very poor
   - Poor
   - Neither poor nor good
   - Good
   - Very good

2. How satisfied are you with your health?
   - Very dissatisfied
   - Dissatisfied
   - Neither dissatisfied nor satisfied
   - Satisfied
   - Very satisfied

The following questions ask about how much you have experienced certain things in the last four weeks.

3. To what extent do you feel that physical pain prevents you from doing what you need to do?
   - Not at all
   - A little
   - A moderate amount
   - Very much
   - An extreme amount
4. How much do you need any medical treatment to function in your daily life?

5. How much do you enjoy life?

6. To what extent do you feel your life to be meaningful?

7. How well are you able to concentrate?

8. How safe do you feel in your daily life?

9. How healthy is your physical environment?

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

10. Do you have enough energy for everyday life?

11. Are you able to accept your bodily appearance?

12. Have you enough money to meet your needs?

13. How available to you is the
information that you need in your day-to-day life?

14. To what extent do you have the opportunity for leisure activities?

1  2  3  4  5

Very poor Poor Neither poor nor good Good Very good

15. How well are you able to get around?

1  2  3  4  5

16. How satisfied are you with your sleep?

1  2  3  4  5

17. How satisfied are you with your ability to perform your daily living activities?

1  2  3  4  5

18. How satisfied are you with your capacity for work?

1  2  3  4  5

19. How satisfied are you with yourself?

1  2  3  4  5

20. How satisfied are you with your personal relationships?

1  2  3  4  5

21. How satisfied are you with your sex life?

1  2  3  4  5

22. How satisfied are you with the support you get from
your friends?

23. How satisfied are you with the conditions of your living place?
24. How satisfied are you with your access to health services?
25. How satisfied are you with your transport?

The following question refers to how often you have felt or experienced certain things in the last four weeks.

26. How often do you have negative feelings such as blue mood, despair, anxiety, depression?

(The WHOQOL Group, 1998)
[APPENDIX F: BQL (BARIATRIC QUALITY OF LIFE QUESTIONNAIRE)]

**Part 1**

Do you drink alcohol? Yes  No

**Do you suffer from:**

- Vomiting Yes  No
- Acid reflux Yes  No
- Heartburn Yes  No
- Nausea Yes  No
- Diarrhea Yes  No
- Flatulence Yes  No
- Foul odor feces Yes  No
- Bladder problems / urinary incontinence Yes  No
- Hair loss Yes  No
- Gallstones (or gallbladder removed) Yes  No
- Diabetes Yes  No
- High blood pressure / hypertension (also if treated) Yes  No
- Asthma / sleep apnea Yes  No
- Arthritis / joint pain Yes  No
- Gout Yes  No
- Other (please specify) __________

Do you take any medication regularly? Yes  No

**If yes, what kind of medication do you take?**

- Antidiabetics Yes  No
- Antihypertensives Yes  No
- Antidepressants Yes  No
Appetite suppressants  | Yes | No  
Diuretics            | Yes | No  
Insulin              | Yes | No  
Pain killers         | Yes | No  
Others: ____

**Part 2**

<table>
<thead>
<tr>
<th>Absolutely wrong</th>
<th>Wrong</th>
<th>Half/half</th>
<th>True</th>
<th>Absolutely right</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I like my weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I can accept my weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I am participating in social activities (theaters, etc.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I often meet friends or family</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I feel excluded from social life</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I feel under pressure because of my weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Sometimes, I feel depressed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. All in all, I feel satisfied in my life</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I feel restricted because of my weight</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>a) at home</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b) at work</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c) privately</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
10. I feel self-confident 1 2 3 4 5

11. How is your actual quality of life?  
   Very bad  Bad  OK  Good  Very good 1 2 3 4 5

(Weiner et al., 2005)
1. Have you ever been told or thought you might have
   a). Depression Yes No
   b). Suicidal thoughts Yes No
   c). Alcoholism Yes No
   d). Social anxiety Yes No
   e). Other anxiety Yes No
   f). Other (specify) Yes No
[APPENDIX H: QUESTIONNAIRE FOR THOSE WHO DO NOT PARTICIPATE IN SUPPORT GROUPS]

1. Have you ever sought a support group?
   a). Yes  b). No

2. Have you ever participated in a support group?
   a). Yes  b). No

3. Why did you leave that group?
   Explain: ______________

4. Why are you NOT participating in a support group?
   a). access (time, location)
   b). embarrassed
   c). did not know or think about it
   d). do not need it
   e). other, explain _____

5. Do you think participating in a support group would help you with
   a). Your weight loss
   b). Social support
   c). Answering questions

6. If you decided to participate in a support group would you be more likely to join an
   a). Online support group
   b). In-person support group?

7. Do you receive your medical care at a weight loss (bariatric) surgery clinic?
   a). Yes frequency _____ / month
   b). No
8. Do you see a primary care physician?
   a). Yes frequency ____ / month
   b). No

9. Do you participate in a mentoring program?
   a). Yes frequency ____ / month
   b). No

10. How satisfied are you with the quality of your follow-up medical care?

    Extremely satisfied Somewhat satisfied Not sure Somewhat dissatisfied Extremely dissatisfied
    1 2 3 4 5

11. Have you talked with your doctor about joining a support group?
    a). Yes b). No

12. If you and your doctor had a discussion about joining a bariatric support group who initiated that discussion?
    a). I did
    b). My doctor did

References


Sarr, M. G. (2003). Psychosocial factors and 2-year outcome following bariatric surgery for


Quarterly, 65*, 464-494.

In C. F. Boukydis (Ed.), *Research on support for parents and infants in the postnatal period*


Wiley.

Influence of time, weight loss, and comorbidities. *Obesity Research, 9*(11), 713-721.


Ussher, J., Kirsten, L., Butow, P., & Sandoval, M. (2006). What do cancer support groups provide which other supportive relationships do not? The experience of peer support groups for people with cancer. *Social Science and Medicine, 62*(10), 2565-2576.


