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ORIGINAL CONTRIBUTIONS

A Pilot Study on Telephone Cognitive Behavioral Therapy for Patients Six-Months Post-Bariatric Surgery

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Abstract
Objective This study aimed to determine the feasibility and preliminary efficacy of a post-operative telephone-based cognitive behavioral therapy intervention (Tele-CBT) in improving eating pathology and psychosocial functioning.
Methods Six-month post-operative bariatric surgery patients (n = 19) received six sessions of Tele-CBT. Study outcome variables included binge eating (BES), emotional eating (EES), depressive symptoms (PHQ-9), and anxiety symptoms (GAD-7).
Results Retention was 73.7 % post-intervention. Tele-CBT resulted in significant reductions in mean difference scores on BES, EES-Total, EES-Anxiety, EES-Anger, PHQ9, and GAD7. Tele-CBT patients experienced a mean weight loss of 8.62 ± 15.02 kg between 6-months post-surgery (pre-Tele-CBT) and 12-months post-surgery.
Conclusions These preliminary results suggest that post-surgery Tele-CBT is feasible and can improve post-surgery symptoms of psychopathology in this uncontrolled study, supporting the need for a randomized controlled trial.

Keywords Cognitive behavioral therapy · Telephone therapy · Bariatric surgery · Gastric bypass

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Introduction

Given concerns with weight regain after bariatric surgery, several studies have examined the effectiveness of pre- or post-bariatric surgery psychosocial interventions, including cognitive behavioral therapy (CBT), to address psychological distress and eating psychopathology with the goal of improving weight loss outcomes post-bariatric surgery. Systematic reviews and meta-analyses of pre- and post-bariatric surgery individual and group psychotherapeutic interventions, have shown greater weight loss in comparison to control groups, with a moderate effect size (pooled effect size correlation = 0.18) for weight loss after bariatric surgery [1, 2]. Stewart and Avenell included eight pre-surgery and post-surgery behavioral intervention studies in their meta-analysis and concluded that patients receiving behavioral interventions resulted in greater weight change when added to bariatric surgery in comparison to surgery alone [3]. This review also suggested that post-operative interventions had greater evidence than pre-surgery interventions for improving weight loss outcomes [3], which is further reinforced by a meta-analysis of five randomized controlled trials demonstrating greater weight loss with post-operative behavioral lifestyle interventions compared to surgery alone [2]. However, these reviews cautioned interpretation of their results and called for greater research in this area.

To date, many of the empirically examined psychosocial interventions after bariatric surgery have relied on face-to-face psychosocial treatments, which can be problematic given that traveling for appointments can pose several barriers due to long distances from patients' homes to treatment centers and/or mobility challenges secondary to obesity [4]. Moreover, high follow-up appointment non-attendance after bariatric surgery can further complicate face-to-face psychosocial interventions [4]. Telephone interventions offer an alternate to face-to-face treatments that may overcome these challenges in delivering psychosocial support. Telephone-based psychotherapy has been shown to be effective in treating depression and anxiety [5], and has been beneficial in a range of clinical populations, including patients with Parkinson disease, chronic insomnia, and traumatic brain injury [6–8].

Several studies have used adjunct telephone-based behavioral and psychological interventions to improve weight loss outcomes after bariatric surgery. Kalarchian et al. studied a combined face-to-face and telephone-based behavioral lifestyle intervention before surgery and were unable to show a significant difference in weight loss at 24-months post-surgery in comparison to no psychological intervention. Gade et al. delivered six of 11 sessions of CBT via telephone before surgery and also showed no significant improvement in depression, anxiety, and eating psychopathology at 1 year post-surgery in comparison to patients receiving nutritional support and education [9]. During their study of a brief (15-min) dietary counseling intervention, Sarwer and colleagues offered a telephone version of their face-to-face counseling intervention for those patients who could attend in person after bariatric surgery and demonstrated significant improvement in eating behaviors post-intervention [10]. Our research group previously developed a Telephone CBT (Tele-CBT) manual and 6-session intervention for bariatric surgery patients to address these delivery challenges [11]. Despite this preliminary evidence, no studies to date have examined the efficacy of a Tele-CBT only intervention in bariatric surgery patients during the post-operative phase.

The aim of our current pilot study was to determine the feasibility, acceptability, and efficacy of a post-operative Tele-CBT intervention in improving eating pathology (primary outcome) and psychosocial functioning. We used a previously developed 6-session Tele-CBT only intervention for bariatric surgery patients, which showed efficacy in reducing eating psychopathology and depressive symptoms prior to surgery in a randomized-controlled trial [11, 12]. These previous studies did not focus on Tele-CBT feasibility and acceptability at 6 months post-surgery, which was the rationale for this study. In this current study, we hypothesized that post-bariatric surgery Tele-CBT would result in significant improvements on eating pathology and psychosocial functioning domains, specifically depressive and anxiety symptoms.

Methods

Participants

Adult bariatric surgery candidates were recruited from the Toronto Western Hospital Bariatric Surgery Program for this post-surgery study. Study exclusion criteria included ineligibility for bariatric surgery, lack of computer access (to receive between session homework sheets), significant language barrier, poorly controlled psychiatric illness (defined as severe psychopathology based on psychiatric or psychological assessment, active suicidal ideation or a psychiatric admission within the past year), or severe medical illness limiting participation in Tele-CBT. All patients with 6-months post-bariatric surgery, who expressed interest in the study, were eligible to participate, and there was no threshold of psychiatric symptoms as part of the inclusion criteria.

This uncontrolled single-arm prospective pilot study was conducted as part of a larger pilot study on Tele-CBT [12]. Patients were informed about the study during the pre-surgical assessment process. The research coordinator obtained informed consent and screened potential participants by telephone to determine study eligibility prior to surgery. Participants were randomly assigned to receive Tele-CBT either pre-surgery or post-surgery. The post-surgery group served as a standard bariatric care control group during the pre-operative period. At 5-months post-surgery, these participants were contacted to initiate Tele-CBT 6-months post-surgery. Participants initiated Tele-CBT approximately 1 week after completing their baseline questionnaires. The current study reports on changes from baseline to post-treatment in those receiving post-operative Tele-CBT. The total time interval between the baseline and post-treatment questionnaires was 7 weeks. This study received ethic approval from the University Health Network Research Ethics Board.

Telephone-Based Cognitive Behavioral Therapy Intervention

Participants received six sessions of Tele-CBT scheduled weekly and lasting approximately 55 min in duration. The focus of the Tele-CBT intervention is overeating and obesity. The sessions include an introduction to the cognitive behavioral model of obesity, food records and scheduling of meals, scheduling pleasurable activities, managing difficult eating scenarios, problem solving strategies to reduce vulnerability, and challenging negative thoughts. Tele-CBT sessions were delivered by two Master's-level psychologists who were trained on the Tele-CBT protocol and supervised by two doctoral level registered clinical psychologists. Full details

of the Tele-CBT protocol has been previously described [11].

Measures

Patient demographic data, body mass index, and weights were collected prior to bariatric surgery. Percent total weight loss (%TWL) at 12-months post-surgery was calculated by the following formula: (Pre-op weight (kg) − Post-op weight (kg))/Pre-op weight (kg). Given that eating pathology, depression, and anxiety are common obesity-related co-morbidities, we selected the following symptom measures assessing these co-morbidities to evaluate Tele-CBT efficacy.

1. *Eating pathology*. Eating pathology was assessed using the Binge Eating Scale (BES), a 16-item self-report measure designed specifically for use with obese individuals [13]. The BES assesses binge-eating behaviors as well as associated cognitions and emotions, such as guilt or shame [13]. Emotional eating was assessed using the Emotional Eating Scale (EES), a 25-item self-report that measures the tendency to cope with negative affect by eating (3 subscales: urges to eat in response to anger/frustration, anxiety, and depression) [14].
2. *Psychosocial distress*. Depressive and anxiety symptoms were assessed using the Patient Health Questionnaire-9 (PHQ9) [15] and the Generalized Anxiety Disorder 7-item (GAD7) scale [16], respectively. Both measures have been used in bariatric surgery populations to assess changes in psychological distress [17]. The maximum scores on the PHQ9 and GAD7 scales were 27 and 21, respectively, with higher scores indicating increased symptom severity.

Statistical Analysis

Data was analyzed using the SPSS Statistics for Windows (Version 22.0; SPSS, IBM Corp, Armonk, NY). Mean difference scores (M) for Tele-CBT were calculated by comparing session 6 to baseline (prior to session 1) results. Independent *t* tests and chi-square were used to compare demographic variables between Tele-CBT completers and non-completers, and differences in clinical variables before and after Tele-CBT. Cohen's *d* effect size was computed (.2 = small effect, .5 = medium effect, .8 = large effect) to report the magnitude of the Tele-CBT effect. One-year weight loss data was available for ten post-surgery Tele-CBT patients, and results were compared to ten patients who were randomized to pre-surgery Tele-CBT (n = 10) [12] using an independent *t* test.

Results

Participant Flow and Characteristics

The CONSORT diagram outlines participant flow for this post-surgery intervention (Fig. 1). Of the 24 participants who were consented for the post-surgery intervention of this study, 19 commenced Tele-CBT 6 months following bariatric surgery. The remaining five individuals either did not respond to phone calls (n = 2) or chose not to receive Tele-CBT because they were doing very well following surgery (n = 3). Of the 19 participants who commenced Tele-CBT, five withdrew for a variety of reasons: time constraints (n = 1), severe mental/physical illness, (significant pain and analgesic medications and severe depression warranting acute psychiatric treatment) (n = 2), or other reasons (i.e., not responding to phone calls; n = 2). Tele-CBT non-completers had a significantly lower %TWL in comparison to Tele-CBT completers (22.61 ± 2.73 vs. 34.34 ± 8.02, p = 0.01) at 6-months post-bariatric surgery. There was no significant difference between Tele-CBT non-completers and completers on the remaining demographic and symptom variables. Table 1 compares mean differences in weight for Tele-CBT completers at pre-surgery, 6-months post-surgery, and 12-months post-surgery. There was no significant difference in weight from 6-months to 12-months post-bariatric surgery.

We conducted data analyses only with study completers (n = 14). The mean age for Tele-CBT completers was 46.21 ± 9.03 years and 12 (86 %) were female. Ten (71 %) patients were in a relationship. All 14 participants underwent Roux-en-Y gastric bypass surgery.

Psychosocial Outcomes Following Post-Operative Tele-CBT

Participants' symptom scores improved in several domains following completion of the Tele-CBT intervention (see Table 2). Mean difference scores for BES (mean difference = −12.64, 95 % CI [−15.88, −9.40], effect size = 8.69), EES-total (mean difference = −17.10, 95 % CI [−30.37, −3.83], d = 2.95), EES-anxiety (mean difference = −4.82, 95 % CI [−9.28, −0.35], d = 2.40), and EES-Anger (mean difference = −8.45, 95 % CI [−13.85, −3.06], d = 3.49) scores were significantly reduced following Tele-CBT. Participants also experienced significant decreases in PHQ9 (mean difference = −4.09, 95 % CI [−7.23, −0.95], d = 2.90) and GAD7 (mean difference = −2.64, 95 % CI [−4.23, −1.04], d = 3.68) scores after Tele-CBT. One-year %TWL outcomes were available for ten out of 14 patients who received Tele-CBT and these patients had a 24.3 % total weight loss 12-months post-surgery. There was no significant difference in 12-month weight loss between pre-surgery Tele-

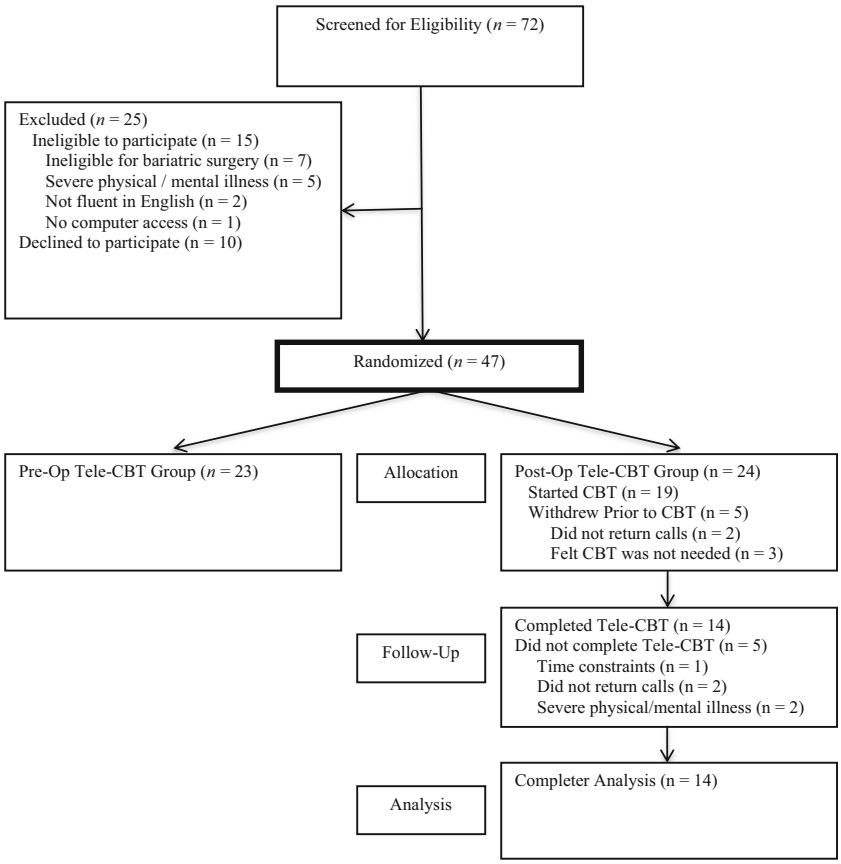

Fig. 1 CONSORT Diagram of participant flow

CBT [12] and post-surgery Tele-CBT groups (Pre-surgery: −32.16 ± 5.60 kg vs. Post-surgery: −36.60 ± 11.42 kg, $p = 0.28$).

Discussion

Our study demonstrated significant improvements in binge eating, emotional eating, depressive symptoms, and anxiety symptoms following Tele-CBT, with large effect sizes for symptom reduction across these symptom domains. The withdrawal rate in the current study was 26 %, which is slightly higher than rates reported in a previous review of eight randomized-controlled Tele-CBT trials [18]. It should be noted that patients recruited to participate in our study did not need to endorse significant eating psychopathology, which differs from previous research and may explain our withdrawal rate [19]. The telephone-based intervention mitigated distance as a barrier to treatment, and three of the five patients who withdrew reported that they were doing well 6-months post-surgery and did not require intervention. Data from a 6-session CBT and DBT based group intervention showed slightly higher attrition rates (32 %) in patients who experienced weight regain [20]. General studies on bariatric visit follow-up suggest that visit completion approximated 66 % at 2-years post-surgery [21]. Therefore, in comparison to previously published research, Tele-CBT acceptability was equivalent or higher than existing data from psychological treatment studies for bariatric patients.

Tele-CBT offers an additional modality for delivering psychological treatment to post-bariatric surgery patients experiencing exacerbation of eating psychopathology and distress. Few bariatric surgery patients live in close proximity to bariatric surgery centers [4], which can limit access to experienced clinicians with expertise in

Table 1 Changes in Tele-CBT completers' weight pre-surgery, 6-months post-surgery, and 12-months post-surgery

Weight loss interval	Mean difference ± standard deviation (kg)	Effect size	*p* value
Pre-surgery—6-months post-surgery	45.25 ± 17.41	1.99	<0.001
Pre-surgery—12-months post-surgery	54.81 ± 25.08	2.68	<0.001
6-months post—12-months post-surgery	8.62 ± 15.02	0.48	0.103

Table 2 Pre-post Tele-CBT changes in eating pathology and psychological functioning ($n = 14$)

Measure	Mean difference (post-therapy—pre-therapy)	95 % CI	p value
BES*	−12.64	−15.88, −9.40	$p < 0.001$
EES-anxiety*	−4.82	−9.28, −0.35	$p = 0.04$
EES-depression	−2.73	−5.84, 0.38	$p = 0.08$
EES-anger*	−8.45	−13.85, −3.06	$p = 0.01$
EES-total*	−17.10	−30.37, −3.83	$p = 0.02$
PHQ9*	−4.09	−7.23, −0.95	p = 0.02
GAD7*	−2.64	−4.23, −1.04	$p < 0.01$

Only Tele-CBT completers included in analyses

*Statistical significance at $p < 0.05$

treating mental health concerns after bariatric surgery. The rationale for using Tele-CBT in bariatric surgery patients is supported by the efficacy of Tele-CBT in treating common psychiatric conditions in bariatric surgery candidates, such as binge eating [22] and depression [23].

The strengths of this study include the use of a specific CBT intervention designed for bariatric surgery patients and previously studied in pre-surgery patient populations [11]. However, the study results should be interpreted in the context of the following limitations. First, this pilot study had a small sample size. Nonetheless, the effect sizes were large. Second, a control group was not included, which limits the study conclusions including the specific impact of Tele-CBT above and beyond bariatric surgery. Therefore, it is difficult to differentiate the effects of surgery alone versus Tele-CBT on symptom improvement and long-term weight loss. Based on symptom improvement data from a comparable sample [17], it is likely that the improvements observed after 6-sessions of Tele-CBT are directly related to the psychological intervention as opposed to improvements with surgery. Third, the effect of this intervention on long-term weight loss and psychosocial functioning remains unknown. Lastly, given our general inclusion criteria, we are unable to determine if Tele-CBT would be more beneficial for patients meeting a threshold of binge eating or psychological distress symptoms.

In summary, this study is the first post-operative study in bariatric surgery patients to utilize Tele-CBT. The preliminary results suggest that Tele-CBT may be a beneficial intervention for supporting bariatric surgery patients in a large geographic region. These results justify the need for larger, randomized controlled trials using Tele-CBT in post-bariatric surgery patients to support sustained weight loss and metabolic benefits.

Compliance with Ethical Standards

Conflicts of Interest The authors declare that they have no conflicts of interest.

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

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

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