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ORIGINAL CONTRIBUTIONS

Examination of the Effectiveness of a Brief, Adapted Dialectical Behavior Therapy-Skills Training Group for Bariatric Surgical Candidates

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Abstract

Background Bariatric surgery is the most effective treatment for morbid obesity, yet 20 to 30% of such patients regain weight approximately 2 years post-surgery. A psychological intervention adjunctive to bariatric surgery that addresses eating pathology often observed in bariatric populations may improve outcomes. In the present study, a brief, adapted DBT-ST group for bariatric surgical candidates was evaluated as an adjunctive intervention to bariatric surgery in the pre-surgical period to reduce eating pathology and clinical impairment.

Methods Participants included 95 bariatric surgery candidates, with 50 candidates in the DBT-ST plus treatment as usual (TAU) group and 45 candidates in the TAU (i.e., comparison) group. Participants completed measures of eating pathology at three time points (i.e., T_1 = pre-DBT-ST program; T_2 = post-DBT-ST program; T_3 = 4 months post-DBT-ST; comparable time points employed for TAU group). Average wait time for surgery following the pre-surgical program was approximately 2 to 4 months.

Results A series of 2 (group: DBT-ST + TAU versus TAU) × 3 (assessment time: T_1, T_2, and T_3) mixed-model ANOVAs were completed. Participants in the DBT-ST plus TAU group showed significant reductions in binge eating, emotional eating, global eating pathology, and clinical impairment related to eating difficulties over time in comparison to TAU.

Conclusions Findings demonstrated that a brief DBT-ST group integrated as an adjunctive intervention to TAU in a bariatric pre-surgical program could aid in addressing eating pathology. Bariatric participants in a DBT-ST plus TAU group may be on a better weight loss trajectory than those who only receive TAU.

Keywords Bariatric surgery · Dialectical behavior therapy · Bariatric pre-surgical program · Eating pathology · Clinical intervention

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Introduction

Bariatric surgery (i.e., gastric bypass) is the most effective treatment for morbid obesity, demonstrating long-term weight loss results [1–6]. Despite these promising findings, between 20 to 30% of patients undergoing bariatric surgery regain weight approximately 2 years post-surgery [7, 8]. Although weight regain following bariatric surgery is demonstrated in numerous studies, many studies only report mean weight values in their analyses [9, 10] and there appears to be a lack of consensus as to what is the size of weight regain post-bariatric surgery [7, 11, 12]. Additionally, there is variability in whether individuals will regain weight and how much weight they will regain [13]. The amount of weight regain may be based on several factors (e.g., type of surgical procedure, pre-surgical BMI, the presence of eating pathology, patient adherence to support groups and follow-up, reduction in physical activity, hormonal adaptations) [14–21].

There is some evidence to support sustained eating pathology (i.e., binge eating, night eating, and uncontrolled overeating) has been associated with long-term weight regain [3, 16, 22, 23], increased psychopathology [24], and post-surgical medical complications [25] in bariatric populations. Several studies have demonstrated eating pathology may contribute to suboptimal weight loss and may influence the effectiveness of bariatric surgery [26–29]. Lower levels of cognitive restraint [30], increased emotional eating [31] prior to surgery have also been identified as predictors for less optimal post-surgical weight loss outcomes or weight regain. Further, psychological risk factors such as unrealistic weight loss expectations [32] and maladaptive emotional eating patterns [33] prior to surgery also negatively impact bariatric pre-surgical programs (e.g., weight gain, increased binge eating, and symptoms of depression), outcomes which may serve as indicators for poor long-term weight loss. Weight loss during a bariatric pre-surgical program may lead to improvements in some long-term post-surgical outcomes [34]; however, an adjunctive psychological intervention is likely required to affect appropriate, immediate, and more long-term weight change [35]. Psychological interventions have been integrated into bariatric surgery services (both pre- and post-surgery) and have demonstrated promising success in reducing levels of psychopathology [36–44]. Although research remains inconsistent concerning the timing of an adjunctive psychological intervention in the bariatric surgery process [45], there is some evidence to suggest bariatric candidates may benefit from acquiring coping skills prior to surgery in order to prepare them for surgery and the adjustment after surgery [46]. Integration of appropriate psychological interventions to existing bariatric surgery programs in the pre-surgical period would allow bariatric surgery candidates to acquire the skills needed to gain control over their eating pathology prior to surgery and potentially achieve successful long-term weight loss results.

Emotion regulation models suggest that maladaptive emotion regulation skills may underlie eating pathology [47–51]. Studies that focus on emotion regulation and eating behaviors emphasize that eating is a strategy or affective response to emotional distress [52–54]. Affect dysregulation is demonstrated to be positively associated with eating pathology in obese samples [52, 55, 56]. Bariatric populations have shown to experience difficulty with emotion regulation [57], with one to two thirds of candidates for bariatric surgery suffering from one or more affective disorders [58, 59]. Dialectical behavior therapy (DBT) is an efficacious intervention developed to treat affect dysregulation [60] and is integrative as it combines cognitive behavioral strategies with techniques from other orientations such as mindfulness [61]. There is some preliminary empirical support for standard DBT in the treatment of eating pathology [62–66], and more particularly the exclusive use of DBT skills training (DBT-ST) groups adapted from the DBT model [49, 67–73]. The skills training component focuses on teaching individuals how to regulate or manage their emotional states or impulses through core mindfulness, emotion regulation, distress tolerance, and interpersonal effectiveness training.

Sustained treatment gains in reduction in eating pathology are difficult to achieve as there are high relapse rates for eating disorder symptomatology, independent of the type of treatment employed to address eating pathology [70, 74–76]. Implementing a brief, adapted DBT-ST group as an adjunctive intervention during a bariatric pre-surgical program may facilitate acquisition of emotion regulation strategies, which may aid in reducing eating pathology prior to surgery and a better weight loss trajectory with sustained post-surgical outcomes. The purpose of this study was to evaluate the effectiveness of a brief, adapted DBT-ST group for bariatric surgical candidates in the pre-surgical period as an adjunctive intervention to bariatric surgery to reduce eating pathology and clinical impairment. We hypothesized that bariatric surgical candidates in the DBT-ST plus TAU group would demonstrate significantly greater reductions in eating pathology (i.e., global eating pathology, binge eating, and emotional eating) and clinical impairment compared to those in the TAU group.

Methods

Participants and Procedure

Participants were bariatric surgical candidates recruited from the Regina Qu'Appelle Health Region (RQHR; now Saskatchewan Health Authority) Bariatric Surgical Assessment Clinic pre-surgical program. Participants were ineligible if they were unable to access a computer with the Internet, as the intervention was delivered using an Internet-delivery platform (i.e., *GoToMeeting*) due to widespread location of residence. Eligible participants were invited to participate in one of two groups: (1) an 8-week DBT-ST group intervention as an adjunct to TAU prior to surgery (DBT-ST + TAU) or (2) receive TAU prior to surgery (i.e., comparison). If the candidate did not wish to, or was unable to partake in the DBT-ST group intervention, they were invited to participate in the comparison group (i.e., TAU). Participants in the TAU group participated in the bariatric pre-surgical program that includes dietary counseling and education, psychological assessment and brief solution-focused intervention, exercise therapy, and medical support. The adapted DBT-ST group intervention (see below for description) was implemented for the DBT-ST + TAU group and compared to TAU. The study was approved by the University of Regina and RQHR Research Ethics Boards. All participants provided verbal and written informed consent.

Pre-surgical assessment points were consistent across the two groups and included three time points: T_1 (start of the

DBT-ST group/start of the Bariatric Surgical Assessment Clinic pre-surgical program), T_2 (post-DBT-ST group/8 weeks), and T_3 (4 months post-DBT-ST group/end of the 6-month bariatric pre-surgical program). Comparable time points were employed for TAU group. The battery of self-report psychological measures (see below for description of measures) was administered online at each assessment point via *SurveyMonkey*. The average wait time for bariatric surgery following the pre-surgical program was 2 to 4 months for both DBT-ST + TAU group and TAU groups.

Intervention

A brief, adapted 8-week DBT-ST group was developed. This program included modules based on the DBT-ST manual [60], modules utilized in Wiser and Telch and outlined in Safer et al. [49, 73]. Adaptations to the four skills training modules were comprised of tailoring the content to the specialized needs of this population (i.e., eating pathology). These modules included (in order of delivery) (1) interpersonal effectiveness skills, (2) core mindfulness, (3) distress tolerance skills, and (4) emotion regulation skills. To accommodate participants from across the province, the DBT-ST intervention groups were delivered once a week, each session lasting 1 h and 45 min in length, for a total of 8 sessions to participants online via a secure video conferencing website (i.e., *GoToMeeting*). In total, seven DBT-ST groups were implemented, with each group comprising 7 to 10 members.

Measures

Eating Disorder Examination-Questionnaire 6.0 (EDE-Q 6.0) [77] The EDE-Q is one of the most widely utilized self-report measures designed to assess different dimensions of eating pathology. The EDE-Q consists of 29 items and generates an overall global score of eating pathology. Each item is rated on a 7-point Likert scale. Total scores range from 0 to 6, with higher scores reflecting greater severity or frequency. The EDE-Q has been used extensively in bariatric samples, [78–81] demonstrating adequate test-retest reliability ($r = .66$ to .77) [82] and adequate internal consistency for the subscales ($\alpha = .61$ to 78) [83]. In the current study, good internal consistency was demonstrated across all three points of administration for the global score ($\alpha = .87$ to .88).

Binge Eating Scale (BES) [84] The BES is a 16-item self-report questionnaire designed to assess binge eating symptoms and behaviors. Items on the BES each present three or four differently weighted statements. Total scores range from 0 to 46, with higher scores reflective of greater levels of binge eating symptoms and behaviors. The BES has been used extensively in the bariatric literature [85, 86] and has demonstrated good test-retest reliability ($r = .87$, $p < .001$) and good internal consistency [84]. In the current study, the BES demonstrated good internal consistency at all three time points of administration ($\alpha = .76$ to .89).

Emotional Eating Scale (EES) [87] The EES is a 25-item self-report questionnaire designed to measure the extent to which specific negative emotional states (anger, anxiety, and depression) invoke an urge to eat. Items are rated on a 5-point Likert scale, indicating the extent to which 25 different feelings influence an individual to feel an urge to eat. Total scores range from 0 to 100, with higher scores indicative of more emotional eating. Research has not determined a cut-off score for the EES. The EES total score demonstrated good internal consistency ($\alpha = .81$), moderate test-retest reliability ($r = .79$) [87], and has been used in bariatric research [41, 88]. In the current study, the EES demonstrated good internal consistency for the total score ($\alpha = .96$ to .97).

Clinical Impairment Assessment Questionnaire-3.0 (CIA-3.0) [89] The CIA-3.0 is a 16-item self-report instrument designed to assess the severity of psychosocial impairment due to eating disorder features present in the past 28 days. Items are rated on a 4-point Likert scale, with a higher rating indicating a higher level of impairment. The CIA-3.0 provides a simple index (ranges from 0 to 48) of the severity of psychosocial impairment secondary to eating disorder features and aids in clinical assessment before and after treatment. A global impairment score of 16 has been identified as the best cut-off for predicting eating disorder status [89]. The CIA-3.0 has demonstrated excellent internal consistency ($\alpha = .97$) and acceptable test-retest reliability (intraclass correlation coefficient = .86) [89]. In the current study, the CIA-3.0 demonstrated good internal consistency at all three time points of administration ($\alpha = .93$ to .95).

Statistical Analyses

Statistical analyses were performed using the IBM SPSS Statistics software package (SPSS: version 23). Descriptive statistics were computed for demographic information and questionnaire subscales and total scores. Two primary sets of analyses were completed: (1) a series of independent sample *t* tests and chi-square analyses were completed to examine between group differences (DBT-ST + TAU versus TAU) for demographic data, and (2) a series of between and within groups, 2 (group: DBT-ST + TAU versus TAU) × 3 (assessment time: T1, T2, and T3) mixed model ANOVAs were completed to examine change in primary outcome variables (i.e., EDE-Q, BES, EES, and CIA-3.0). Post-hoc analyses were completed where appropriate.

A sample size calculation was completed a priori for the two groups using analysis of variance estimates. Given a medium effect size (i.e., f = 0.25), a power of 90%, and an alpha

statistic of .05, approximately 50 participants were needed in each group.

Results

Preliminary Analyses

Ninety-five bariatric surgical candidates participated [i.e., DBT-ST + TAU ($n = 50$) and TAU ($n = 45$)] in the study (see Fig. 1 for flow of participants through study). Baseline demographic variables were comparable between groups (Table 1). Descriptive statistics were computed for total scores of measures of eating pathology at baseline and clinical impairment for the entire sample and treatment groups (see Tables 2 and 3). Across the entire sample, approximately 40% ($n = 38$) demonstrated above average to extreme global eating difficulties. Furthermore, approximately 15% demonstrated severe binge eating symptoms. With respect to emotional eating, the mean EES total score across the entire sample in the current study was 28.91 (SD = 20.78; range = 0 to 79). Lastly, the CIA-3.0 total scores across the entire sample indicated that approximately 34% ($n = 32$) of the entire sample exceeded the cut-off score (i.e., 16) indicative of the presence of an eating disorder.

Effectiveness of the Adapted DBT-ST Program: Eating Pathology

Results for the EDE-Q demonstrated no statistically significant main effect of group, $F(1, 93) = 0.04$, $p = .834$, partial $\eta^2 < 0.001$. There was a statistically significant main effect of time, $F(1.782, 165.714) = 9.65$, $p < .001$, partial $\eta^2 = 0.094$, demonstrating a medium effect size. The interaction effect, $F(1.782, 165.714) = 2.65$, $p = .080$, partial $\eta^2 = 0.028$, was not statistically significant. Although not statistically significant, the data suggests a trend towards the EDE-Q 6.0 scores varying across time differently for the two groups. To examine this interaction further, two interaction contrasts were performed. The interaction contrast comparing T1 and T2 mean difference for the DBT-ST + TAU group with that of the TAU comparison group was not statistically significant, $t(93) = 0.86$, $p = .392$, partial $\eta^2 = 0.008$. However, participants in the DBT-ST + TAU group demonstrated a greater reduction in eating pathology between T1 and T3, $t(93) = 2.00$, $p = .048$, partial $\eta^2 = 0.041$, than participants in the TAU comparison group.

Results for the BES demonstrated no statistically significant main effect of group, $F(1, 93) = 0.58$, $p = .449$, partial $\eta^2 = 0.006$. There was a statistically significant main effect of time, $F(1.821, 169.397) = 75.16$, $p < .001$, partial $\eta^2 = 0.447$, demonstrating a large effect size. The interaction effect, $F(1.821, 169.397) = 2.63$, $p = .080$, partial $\eta^2 = 0.027$, was not statistically significant. Although not statistically significant, the data suggests a trend towards the BES total scores varying across time differently for the two groups. Two interaction contrasts were performed to further examine this interaction. There was no significant difference between the T1 and T2 means for the DBT-ST + TAU group and the TAU group, $t(93) = 1.13$, $p = .264$, partial $\eta^2 = 0.013$. However, participants in the DBT-ST + TAU showed greater reduction in binge eating symptoms between T1 and T3, $t(93) = 2.03$, $p = .045$, partial $\eta^2 = 0.042$, than participants in the TAU comparison group.

Results for the EES demonstrated no statistically significant main effect of group, $F(1, 93) = 1.74$, $p = .191$, partial $\eta^2 = 0.018$, but did demonstrate a small effect size. There was a statistically significant main effect of time, $F(2, 186) = 44.84$, $p < .001$, partial $\eta^2 = 0.325$, demonstrating a large effect size. The interaction effect, $F(2, 186) = 4.01$, $p = .020$, partial $\eta^2 = 0.041$, was statistically significant and demonstrated a small to medium effect size. To examine this interaction further, two interaction contrasts were performed. Participants in the DBT-ST + TAU group demonstrated a greater reduction in emotional eating between T1 and T2, $t(93) = 2.06$, $p = .042$, partial $\eta^2 = 0.043$ and T1 and T3, $t(93) = 2.15$, $p = .014$, partial $\eta^2 = 0.063$, than participants in the TAU comparison group.

Effectiveness of the Adapted DBT-ST Program: Clinical Impairment

Results for the CIA-3.0 demonstrated no statistically significant main effect of group, $F(1, 93) = 0.04$, $p = .836$, partial $\eta^2 = 0.000$. There was a statistically significant main effect of time, $F(1.687, 156.92) = 38.06$, $p < .001$, partial $\eta^2 = 0.290$, demonstrating a large effect size. The interaction effect, $F(1.687, 156.92) = 2.61$, $p = .086$, partial $\eta^2 = 0.027$, was not statistically significant but did demonstrate a small effect size. This finding suggests there was a trend towards the CIA-3.0 total scores varying across time differently for the two groups. To examine this interaction further, two interaction contrasts were performed. The interaction contrast comparing T1 and T2 mean difference for the DBT-ST + TAU group with that of the TAU comparison group was not statistically significant, $t(93) = 0.02$, $p = .987$, partial $\eta^2 = 0.000$. Similarly, the interaction contrast comparing T1 and T3 mean difference for the DBT-ST + TAU group with that of the TAU group was not statistically significant, $t(93) = 1.78$, $p = .078$. Although not statistically significant, the data suggests a trend towards participants in the DBT-ST + TAU group demonstrating a slightly greater reduction in clinical impairment related to eating difficulties between T1 and T3 than participants in the TAU comparison group.

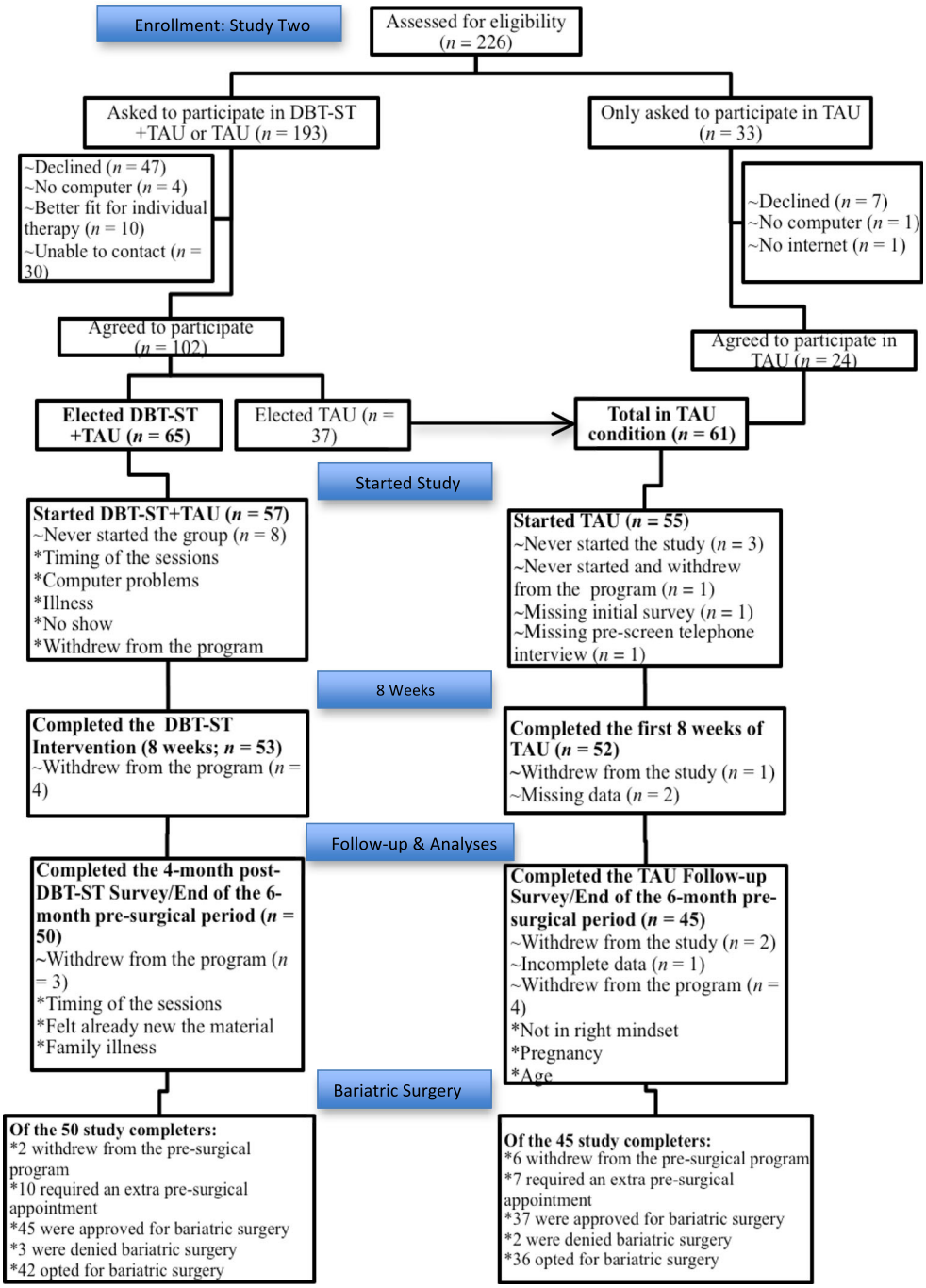

Fig. 1 Participant flow. *DBT-ST* dialectical behavior therapy-skills training, *TAU* treatment as usual.

Discussion

Our findings provide preliminary support of a brief, adapted DBT-ST group as an adjunctive intervention to existing TAU in bariatric pre-surgical programs in reducing eating pathology often present in a bariatric population. The DBT-ST + TAU group demonstrated greater reductions in emotional eating from T1 to T2 and binge eating, emotional eating, and global eating pathology (i.e., shape and weight concerns) from T1 to T3 in comparison to TAU. It is anticipated that participants in the DBT-ST plus TAU group may be on a better weight loss trajectory than those in the strictly TAU group, given greater reductions in areas of eating pathology commonly associated with weight regain post-surgery [22, 80], albeit this is purely speculative at this time as we do not have the post-operative data to substantiate this notion.

In addition to reductions in eating pathology, adjunctive psychological support, such as DBT-ST, may be important to address the potential self-harm risks commonly seen in individuals who have undergone bariatric surgery [90].

Table 1 Baseline demographic information for participants overall and by group

Demographic variable	Total ($N = 95$)	DBT-ST + TAU ($n = 50$)	TAU ($n = 45$)	t (93)	p	Cohen's d
BMI (kg/m^2)	50.7 (9.1)	50.5 (8.26)	50.9 (9.9)	0.26	.798	0.05
Weight (kg)	142.6 (30.4)	143.3 (31.3)	141.8 (29.7)	0.25	.807	0.05
EBW (kg)	72.6 (27.6)	73.0 (26.5)	72.3 (29.1)	0.14	.893	0.03
Age (years)	44.4 (10.1)	45.9 (10.4)	42.7 (9.5)	1.60	.114	0.33
Years of education	13.8 (1.7)	14.0 (1.6)	13.7 (1.9)	0.95	.345	0.20
Time to Surgery (days)	99.4 (43.8)	105.7 (36.9)	92.0 (50.3)	1.383	.171	0.31
				x^2 (df)	p	Cramer's V
Gender				0.00 (1)	1.00	0.00
Female	76 (80.0%)	40 (80.0%)	36 (80.0%)			
Male	19 (20.0%)	10 (20.0%)	9 (20.0%)			
Ethnicity				0.27 (2)	.875	0.05
Caucasian	82 (86.3%)	44 (88%)	37 (82.2%)			
African American	2 (2.1%)	1 (2.0%)	1 (2.2%)			
First Nations or Métis	11 (11.6%)	5 (10.0%)	6 (13.3%)			
Individual therapy						
Current	6 (6.3%)	5 (10.0%)	1 (2.2%)	2.42 (1)	.120	0.16
Past	59 (62.1%)	32 (64.0%)	27 (60.0%)	0.16 (1)	.688	0.04
Psychiatric medication						
Current	36 (37.9%)	20 (40.0%)	16 (35.6%)	0.20 (1)	.656	0.05
Antidepressant	28 (29.47%)	15 (30.0%)	13 (28.9%)			
Anxiolytic	3 (0.032%)	1 (0.02%)	2 (0.044%)			
Antipsychotic	4 (0.042%)	3 (0.06%)	1 (0.022%)			
Analgesic	1 (0.011%)	0 (0.0%)	1 (0.022%)			
Past	51 (53.7%)	25 (50.0%)	26 (57.8%)	0.58 (1)	.448	0.08

Note. Number (%) or mean (standard deviation)

EBW excess body weight, *BMI* body mass index, *DBT-ST* dialectical behavior therapy-skills training, *TAU* treatment as usual

Studies have demonstrated hospitalization for deliberate self-harm in bariatric patients was more common than the general public [91] and have also shown an increased risk of self-harm emergencies after bariatric surgery [92]. These results highlight an important role for psychological interventions to support these patients in order to prevent the potential self-harm risks.

The overall investigation has several notable strengths. First, the current study was the first trial of its kind to implement and examine the effectiveness of a brief, adapted DBT-ST group in conjunction with TAU in comparison to strictly TAU within a bariatric setting. Second, the inclusion of a comparison group allows us to have stronger confidence in our conclusion that DBT-ST was an additive benefit to TAU.

Table 2 Means, standard deviations, and between-group differences on baseline outcome measures

Measures	Total (N = 95)	DBT-ST + TAU ($n = 50$)	TAU ($n = 45$)	t (93)	p	Cohen's d
EDE-Q global	2.64 (0.97)	2.73 (0.94)	2.54 (1.01)	0.96	.339	.20
BES	17.73 (8.38)	18.88 (8.87)	16.44 (7.71)	1.42	.159	.29
EES	28.91 (20.78)	33.18 (21.16)	24.16 (19.51)	2.15	.034*	.45
CIA-3.0	12.79 (10.60)	13.44 (10.29)	12.07 (11.00)	0.63	.531	.13

Note. Mean (standard deviation)

DBT-ST dialectical behavior therapy-skills training, *TAU* treatment as usual, *EDE-Q global* Eating Disorder Examination-Questionnaire 6.0 global score, *BES* Binge Eating Scale, *EES* Emotional Eating Scale, *CIA-3.0* Clinical Impairment Assessment Questionnaire-3.0.

*$p < .05$

Table 3 Frequency of severity and classification ratings on baseline outcome measures for the overall sample and by group

Measure and severity	Total ($N = 95$)	DBT-ST + TAU ($n = 50$)	TAU ($n = 45$)
EDE-Q			
Global (≥ 1 SDs)	28 (29.1%)	15 (30.0%)	13 (28.9%)
Global (≥ 2 SDs)	10 (10.5%)	6 (12.0%)	4 (8.9%)
BES			
Absent or minimal (< 17)	46 (48.4%)	19 (38.0%)	27 (60.0%)
Mild to moderate (18–26)	35 (36.8%)	21 (42.0%)	14 (31.1%)
Severe (≥ 27)	14 (14.7%)	10 (20.0%)	4 (8.9%)
CIA-3.0			
Not predictive of an eating disorder (< 16)	63 (66.3%)	33 (66.0%)	30 (66.7%)
Predictive of an eating disorder (≥ 16)	32 (33.7%)	17 (34.0%)	15 (33.3%)

Note. Number (%).

DBT-ST dialectical behavior therapy-skills training, *TAU* treatment as usual, *EDE-Q global* Eating Disorder Examination-Questionnaire 6.0, *BES* Binge Eating Scale; *CIA-3.0* Clinical Impairment Assessment Questionnaire-3.0

Third, including three measurement time points across the pre-surgical program period (i.e., 6 months) was a methodological improvement over previous studies where pre- and post-interventions were implemented [36, 93]. The latter allowed for examination of changes in eating pathology and clinical impairment in relation to group membership overtime. Fourth, the administration of the adapted DBT-ST program via an online medium allowed for accommodation of participants with rural and province wide residence by increasing accessibility while maintaining the standardization of the intervention.

There were also limitations that should be considered. First, we did not randomize participants into groups. Participant's self-selection into the study groups may have resulted in a greater likelihood of improved outcome as they may have more spare time to engage in the intervention or could be more motivated. Additionally, self-selection may have increased the likelihood of those in the DBT-ST group having higher levels of psychopathology because these individuals may have thought the intervention, which targets eating pathology, may be helpful to them. Further, participant's self-selection into the TAU group as a result of being non-able or non-willing to participate in the intervention may have provoked a bias in terms of outcome worsening. Second, we did not include an additional comparison group (i.e., sham DBT-ST + TAU group) in our study. Inclusion of such a comparison group would have allowed us to strengthen the validity of our findings. Third, this design relied on self-report via a web-based data collection methodology (i.e., *SurveyMonkey*), which has some limitations, (e.g., random responding and software issues) [94]. Finally, the long-term effects of pre-surgical DBT-ST on post-surgical eating pathology and weight loss outcomes were not reported; however, this data will be available at a later date. The long-term effects of pre-surgical DBT-ST on post-surgical eating pathology will be necessary to determine the cost-effectiveness of this approach, as there are high relapse rates for eating disorder symptomatology regardless of treatment modality used [74–76].

Conclusion

Our findings in the study offer empirical evidence showing trends for the effectiveness of a brief, adapted DBT-ST group in an existing bariatric pre-surgical program. Since the program developed is brief, implementation is likely a cost-effective option for various health care systems. Further research is necessary to determine if these findings can be replicated and to subsequently assess the long-term impact on post-surgical weight loss outcomes. With broad application of this value-added intervention, wide-spread reductions in morbid obesity may be observed (i.e., post-surgical outcomes), which in the long term benefits the physical health, mental health, and quality of life of bariatric patients.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Statement Ethical approval to conduct this study was obtained through the University of Regina and RQHR Research Ethics Boards.

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

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