

Binge Eating and Weight Loss in a Self-Help Behavior Modification Program

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Abstract

DELINSKY, SHERRIE SELWYN, JANET D. LATNER, AND G. TERENCE WILSON. Binge eating and weight loss in a self-help behavior modification program. *Obesity*. 2006;14:1244–1249.

Objective: To examine the occurrence of binge eating and its impact on weight loss outcomes among obese participants in the Trevoise Behavior Modification Program, a lay-administered, lay-directed self-help weight loss program offering continuing care.

Research Methods and Procedures: Participants completed questionnaires, and weight loss data were recorded prospectively.

Results: Although objective bulimic episodes were reported by 41% of the sample, objective bulimic episodes were not associated with worse weight loss outcomes. Mean weight loss after 12 months was 18.2 kg (18.8% of initial body weight) for the treatment completers and 10.3 kg (10.5% of initial body weight) for the full sample (using intent-to-treat analyses, with baseline scores carried forward).

Discussion: Substantial long-term weight loss, resulting from a continuing care treatment program, occurred in individuals both with and without frequent binge eating.

Key words: disordered eating, continuing care, weight management, self-help, binge eating

Introduction

Obesity is an increasingly common health problem in the United States, associated with significant adverse health consequences (1,2). Binge eating is relatively frequent

among obese populations because 23% to 46% of obese patients seeking weight loss treatments suffer from binge eating disorder (BED)¹ (3). Furthermore, higher levels of binge eating have been linked to increased adiposity (4,5).

Significant differences between obese individuals with and without BED have been demonstrated consistently (6); those with BED display higher levels of eating disorder psychopathology, including weight and shape concerns (7–9), more significant obesity histories (10), and higher psychiatric comorbidity, including Axis I and II diagnoses (10–14). Given the associated comorbid physical and psychiatric illness and decreased quality of life (15), BED is argued to be a disorder of clinical significance (6).

Researchers have debated whether psychological treatment for binge eating or behavioral weight control is the better approach for obese binge eaters (6,16). Obese binge eaters seem to respond as favorably to standard behavioral weight loss treatments as do obese non-binge eaters (6), although the data are not conclusive (17). Weight loss during treatment and weight maintenance at 1-year follow-up are comparable for BED and non-BED groups (18–20). However, binge eating may be associated with premature drop-out, resulting in smaller weight losses among binge eaters using intent-to-treat analyses (20), although other studies have found no relationship between binge status and attrition (18,21). Notably, attrition in weight loss studies varies widely; at 1 year, 18% of participants dropped out of a behavioral program (21), whereas 45% of participants dropped out of a liquid diet program (22).

Pretreatment predictors of weight loss have been “elusive” (23, p. 525), accounting for only a small proportion of variance in weight loss outcomes. In their recent review of psychosocial predictors, Teixeira et al. (24) concluded that binge eating, depression, and dietary restraint do not predict

Received for review September 1, 2005.

Accepted in final form May 8, 2006.

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¹ Nonstandard abbreviations: BED, binge eating disorder; TBMP, Trevoise Behavior Modification Program; EDE-Q, Eating Disorder Examination-Questionnaire; OBE, objective bulimic episode; QEWP-R, Questionnaire on Eating and Weight Patterns-Revised; BDI, Beck Depression Inventory; RSE, Rosenberg Self-Esteem Inventory; SBE, subjective bulimic episode.

weight loss. In contrast, greater weight loss is predicted by higher initial BMI, more positive body image, and greater self-esteem, although the evidence is mixed. Among successful weight losers, long-term weight loss maintenance is linked to low levels of depression and dietary disinhibition and continued adherence to diet and exercise (25).

The role of body image disturbance as a predictor of weight loss outcomes is controversial. It has been suggested that mild to moderate levels of body image distress may be beneficial and serve to motivate healthy lifestyle behaviors among those with average to above-average BMIs (26). In contrast, Cooper and Fairburn (27), in their cognitive-behavioral model of obesity, argue that weight regain occurs when weight and shape distress cause individuals to abandon their weight control efforts. Similarly, Friedman et al. (28) suggest that “directly addressing body-image dissatisfaction may decrease psychological distress and facilitate weight reduction” (p. 39). This hypothesis was based on their finding that the relation between weight and depression/self-esteem was partially mediated by body image distress.

To date, studies of obese binge eaters in weight loss treatments have mainly comprised university-based treatment programs administered by professionals; only one study regarding binge eating among participants in a commercial weight loss program has been reported, whereas no studies of self-help weight loss programs appear in the literature. In their study of binge eating among Weight Watchers participants in Brazil, Borges et al. (29) found that binge eating occurred in 43% of their sample and was associated with more overweight and depression. The authors, however, did not examine whether binge eating was a predictor of weight loss outcomes.

Thus, the aim of the present study was to assess the occurrence of binge eating and its impact on weight loss outcomes in a self-help program, the Trevoze Behavior Modification Program (TBMP), a lay-administered, lay-directed, self-help weight loss program offering continuing care. TBMP has been shown to produce large long-term weight losses and offers the benefit of being low-cost and ongoing (30) and suitable for replication (31). As for predictors of weight loss, individuals who lose more weight early in treatment, stay longer in treatment, and have more weight to lose at the outset achieve greater weight losses (average treatment duration was 27.9 months) (31). Examination of the impact of binge eating on weight loss outcomes, however, is needed to better inform treatment decisions among overweight or obese individuals with comorbid binge eating.

Research Methods and Procedures

Participants

Participants were 136 women and 25 men enrolled in TBMP during 1999 to 2002. Only two TBMP members who

were approached declined participation in the study. Like most behavioral weight loss programs, TBMP's weekly sessions include weigh-ins, self-monitoring of food intake and physical activity, and social support; however, unlike most programs, attendance and achievement of weight loss goals are strictly enforced, especially during an initial trial period when participants are not yet accepted as full members. Failure to meet attendance or weight loss requirements results in immediate dismissal from the program during the early phase of treatment (first 4 months) and in grace periods followed by dismissal during the later phases of treatment if requirements are still not met. Members also adhere to a one-time rule; if their membership is terminated, they are never permitted to rejoin TBMP. However, also unlike most other programs, treatment is offered on a continuing basis at no monetary cost for the lifetime of the member. The history and further details of TBMP have been reported elsewhere (30).

Measures

Within the first 3 weeks of attending TBMP, participants completed the following measures.

Eating Disorder Examination-Questionnaire (EDE-Q) (32). The EDE-Q was derived directly from the EDE interview (33). The EDE-Q focuses on the past 28 days and is comprised of four subscales: restraint, weight concern, shape concern, and eating concern. The reliability of the EDE-Q has been well-documented (32,34). The EDE-Q has received empirical support for use in assessing objective bulimic episodes (OBEs) and eating disorder attitudinal psychopathology (EDE subscales) (35); it has good concurrent validity with the EDE and acceptable criterion validity (36).

Questionnaire on Eating and Weight Patterns-Revised (QEWP-R) (37). The QEWP-R assesses a range of features associated with obesity and eating disorders, such as dieting and weight history, and the presence or absence of binge episodes and features related to BED. The measure has psychometric support (38) and has been used with binge eating and obese samples (39).

Beck Depression Inventory (BDI) II (40). The BDI-II is a widely used 21-item inventory designed to measure symptoms of depression, including alteration in mood, self-blame, vegetative changes, and changes in activity levels. The BDI-II has good test-retest reliability and good discriminant and convergent validity.

Rosenberg Self-Esteem Inventory (RSE) (41). The RSE is a 10-item measure of global self-esteem. The RSE has been in existence for many years, and it has been shown to have good reliability and validity (42).

Body weight during Week 1 of treatment and during months 1 to 12 in TBMP was measured by program leaders on a balance beam scale. These data were mailed directly to

investigators. These procedures were approved by the Institutional Review Board of Rutgers University.

Statistical Analyses

Participants reporting OBEs at least eight times in the past month on the EDE-Q were classified as binge eaters, and Student's *t* tests were conducted comparing this group with participants with fewer than eight OBEs (non-binge eaters). (Student's *t* tests using a cut-off of four OBEs per month instead of eight OBEs per month yielded equivalent findings on all variables, with the exception of self-esteem; for self-esteem, the difference between binge eaters and non-binge eaters emerged as a trend when eight OBEs were used, whereas it was statistically significant when four OBEs were used.) Pearson correlations were used to examine relationships among continuous variables that were normally distributed, and Spearman correlations were used for variables that were dichotomous or not normally distributed. Weight loss was examined in two ways: with the treatment completers only and with the full sample (intent-to-treat, substituting missing values with baseline scores carried forward). Linear step-wise regression analysis was used to estimate predictors of weight loss (using completer, not intent-to-treat, data), and logistic regression analysis was used to estimate predictors of attrition. Predictors tested in regression analyses were initial BMI, EDE subscales, BDI score, and self-esteem.

Results

During the 1st week of treatment, participants were a mean age of 46.7 (±11.2) years and had a mean BMI (kilograms per meter squared) of 34.9 (±4.9). Ninety-two percent of participants were white, 6% were African-American, and 2% were Hispanic. Forty-eight percent of participants completed college, 28% completed some college, 20% completed high school, and 4% completed some high school.

Forty-one percent of the sample reported OBEs, and 48% reported subjective bulimic episodes (SBEs) at least once in the past month (according to the EDE-Q). (OBEs and SBEs are characterized by loss of control over eating. OBEs involve consumption of objectively large amounts of food, whereas SBEs do not. The EDE-Q and QEWP-R yielded equivalent prevalence rates of OBEs. Also, the regression and correlational analyses showing no significant effects for binge eating did not differ when using the binge frequency yielded by the QEWP-R rather than that yielded by the EDE-Q. Therefore, binge frequency from the EDE-Q is used here for all statistical analyses.) Seventeen percent of the sample reported at least eight OBEs in the past month, averaging twice weekly, which is the binge frequency criterion for BED. Thirteen percent reported at least eight SBEs during the past month. Of participants reporting

OBEs, the mean number of episodes was 8.1 (±6.5); among participants reporting SBEs, the mean number of episodes was 6.0 (±7.0).

Frequency of OBEs was significantly positively correlated ($p < 0.05$) (using Spearman ρ) with frequency of: objective overeating ($\rho = 0.44$), eating concern ($\rho = 0.46$), shape concern ($\rho = 0.35$), and weight concern ($\rho = 0.34$) subscales of the EDE-Q, yo-yo dieting (frequency of 20+ pound fluctuations in body weight, according to the QEWP-R) ($\rho = 0.20$), and proportion of lifetime on diet ($\rho = 0.23$). Frequency of OBEs was positively correlated with BDI score ($\rho = 0.23$) and negatively correlated with self-esteem ($\rho = -0.19$) and attrition ($\rho = -0.17$).

Results of the comparison between binge and non-binge eaters are presented in Table 1. Binge eaters scored significantly higher than non-binge eaters on the eating concern, shape concern, and weight concern subscales of the EDE-Q, but not the restraint subscale. They also reported significantly higher BDI scores. No statistically significant differences were found either for initial BMI or weight loss outcomes at 1 or 12 months in the program.

Attrition

A total of 58 of 161 members (36.0%) who joined between 1999 and 2002 dropped out during the first 12 months of membership in the program. Student's *t* tests indicated no significant differences between drop-outs and completers on age or initial BMI, and χ^2 tests indicated no significant differences in terms of race, sex, and education. Student's *t* tests indicated that drop-outs reported significantly fewer OBEs [$t(147) = 2.18, p = 0.03$], greater self-esteem [$t(112) = -3.25, p = 0.002$], and less weight concern [$t(139) = 2.05, p = 0.04$].

Table 1. Mean (standard deviation) scores of participants with and without OBEs (≥8/mo)

	Binge eaters	Non-binge eaters	Student's <i>t</i> -test
Initial BMI	34.31 (6.66)	34.98 (4.53)	-0.56
WL Month 1 (kg)	5.12 (1.27)	4.96 (1.59)	0.34
WL Month 12 (kg)	12.45 (1.02)	18.71 (8.09)	-1.32
EDE-eating concern	12.14 (5.39)	5.55 (4.34)	6.20**
EDE-restraint	12.64 (7.08)	13.53 (5.64)	-0.68
EDE-weight concern	19.33 (4.94)	15.73 (4.47)	3.36**
EDE-shape concern	37.10 (9.88)	30.62 (9.72)	2.80**
BDI score	14.92 (10.66)	8.95 (7.96)	2.66*
Self-esteem	27.10 (5.78)	29.66 (5.38)	-1.90

OBE, objective bulimic episode; WL, weight loss; EDE, Eating Disorder Examination; BDI, Beck Depression Inventory.

* $p < 0.05$; ** $p < 0.01$.

In logistic regression analysis of attrition at Month 12, only self-esteem emerged as a significant predictor (odds ratio = 1.125, confidence interval = 1.04 to 1.21, $p = 0.001$), such that greater self-esteem predicted higher likelihood of attrition.

Weight Loss Outcomes

For the 64% of participants remaining in treatment at 12 months, mean weight losses after 1 and 12 months in the program were 5.2 (± 1.6) and 18.2 (± 7.9) kg, respectively. The percentage of initial body weight lost was 5.2% ($\pm 1.3\%$) and 18.8% ($\pm 5.6\%$) at Months 1 and 12, respectively. BMI lost was 1.8 (± 0.58) and 6.3 (± 2.4) BMI points at Months 1 and 12, respectively. The difference in initial BMI and BMI at Month 12 was statistically significant [$t(36) = 15.86, p = 0.000$].

For the full sample (intent-to-treat, with baseline scores carried forward), mean weight loss at Month 12 in the program was 10.3 (± 11.1) kg. The percentage of initial body weight lost at Month 12 was 10.5% ($\pm 10.8\%$). BMI lost at Month 12 was 4.8 (± 4.2). After controlling for initial BMI, BMI lost at Month 12 was significantly negatively correlated with two variables: BDI score ($r = -0.41$) and EDE shape concern ($r = -0.35$).

Predictors of Outcome

Step-wise regression analysis indicated that BMI lost at Month 12 was predicted by two variables [$R^2(39) = 0.40, F = 10.96, p = 0.000$]: initial BMI ($\beta = 0.51, p = 0.001$) and BDI score ($\beta = -0.35, p = 0.013$). Thus, higher initial BMI and lower BDI score predicted greater BMI lost at Month 12.

Discussion

Forty-one percent of participants in this sample reported binge eating, a prevalence rate consistent with that reported in other weight loss programs (5,29). A significant subsample (17%) reported OBEs averaging twice weekly, the BED frequency criterion. Compared with participants with fewer than eight OBEs, participants who reported eight or more OBEs during the past month reported greater concerns about eating, weight, and shape and were also more depressed. These findings are consistent with the growing evidence that binge eating is associated with more eating and body image-related distress and greater psychopathology (6,9,10,14). It appears that binge eating in an obese sample is related to this distress.

Despite the frequent occurrence of binge eating in this sample, binge eating did not impede weight loss outcomes. These results are consistent with previous research (18,19) reporting similar weight loss outcomes between binge eaters and non-binge eaters. The present findings suggest that binge eating may not interfere with the ability to lose weight

in a self-help, behavioral weight loss program. Behavioral weight loss treatment may have reduced or eliminated binge eating for participants, so that binge eaters became just as likely to benefit from treatment as non-binge-eating participants. This possibility is consistent with a body of research showing that behavioral weight loss programs effectively reduce binge eating in obese patients in the short term (26,43). It is also possible that participants continued to experience OBEs but compensated by increasing dietary restriction or physical activity to attain the goal weight losses required and strictly enforced in TBMP, although the current study did not assess binge eating after 12 months in the program.

The weight loss outcomes produced by the TBMP were substantial. The average initial body weight loss of 18.8% at 12 months is much greater than the average weight loss of 7% to 10% reported among group behavioral weight loss programs (44,45). Even intent-to-treat analysis, using baseline weight carried forward, yielded a mean weight loss of 10.5% at 12 months. Higher initial BMI and lower BDI scores predicted greater weight loss at Month 12. The finding that higher initial BMI predicted weight loss is consistent with a previous report on TBMP, in which weight lost during the 1st month of treatment, the duration of treatment, and the initial BMI were highly predictive of long-term weight loss (6 to 60 months) (30). Despite the suggestion that greater obesity is associated with greater success, it should be noted that prospective applicants with >100 pounds to lose are excluded from TBMP, thereby providing an upper limit to the weight range of the sample.

The finding that baseline BDI predicted weight loss at Month 12 is consistent with two studies showing that depression is related to long-term weight loss outcomes (20,25), but contrasts with the conclusion of Teixeira et al. (24) that baseline levels of depression do not predict subsequent weight loss. The result that lower shape concern correlated with better weight loss outcome is somewhat consistent with the hypothesis that acceptance of shape and weight may lead to better weight maintenance (27); however, support is limited by the fact that shape concern was not retained in the multivariable linear regression of weight loss.

In contrast to two previous reports (18,21), less frequent OBEs were associated with attrition in correlational analyses and Student's t tests. Features specific to the TBMP program, such as member social support, may account for the lower drop-out among more frequent binge eaters, although the current study did not assess these factors. Only higher self-esteem, however, predicted treatment drop-out in logistic regression analysis, contrasting with the notion that positive self-esteem and weight management are linked (46). The current study has several limitations. TBMP participants are a self-selected group, making it difficult to compare the present findings with those of controlled stud-

ies in which patients were randomly assigned to treatment conditions. The participants in this study were predominantly white, which significantly limits the generalization of the findings. Also, binge eating was assessed by questionnaire only. Nonetheless, this prospective study strongly suggests that, even for participants with frequent binge eating, a self-help program that provides continuing care is an effective weight loss intervention.

Acknowledgments

We thank Mary L. Jackson (Director of the TBMP) for assistance in facilitating this project and Murray R. Selwyn for assistance with statistical analysis. There was no funding/outside support for this study.

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