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Targeting body dissatisfaction among women with overweight or obesity: A proof-of-concept pilot study

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Abstract

Objective—This proof-of-concept study was designed to replicate the effects of the empirically-supported Body Project intervention on body dissatisfaction when combined with behavioral recommendations for weight loss among women with overweight or obesity.

Methods—Women with overweight or obesity who reported body dissatisfaction and a desire to lose weight were randomized to one of two 4-week treatment conditions. Individuals assigned to the Standard group ($n=15$) were directed to track diet and activity level daily. Body Project ($n=17$) participants tracked daily diet and activity, in addition to attending four weekly, group-based Body Project intervention sessions. Body Mass Index, body dissatisfaction, body appreciation, and internalization of thin ideal and weight stigma were evaluated before and after the treatment period.

Results—Feasibility data suggest the Body Project can be implemented with this novel sample. Preliminary estimates suggest greater effects on body appreciation in the Body Project group than in the Standard group ($ES=.43$), but no group effects for other body image variables.

Conclusions—With minor modifications, the Body Project was successfully implemented among women with overweight or obesity. The effect on body appreciation is encouraging and worthy of further investigation. Modification to the intervention may be necessary to enhance treatment effects on other body image variables.

Keywords

Body dissatisfaction; body image; obesity; weight loss; weight management

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Conflicts of interest: None.

Introduction

Negative body image (NBI) is a transdiagnostic risk factor for unhealthy weight-related behaviors (Stice, 2002). Although common among women with overweight or obesity (Weinberger, Kersting, Riedel-Heller, & Luck-Sikorski, 2016), NBI has primarily been conceptualized as a quality of life factor in the context of weight loss treatment (Ramirez & Rosen 2001; Schwartz & Brownell, 2004). However, to the extent that NBI interferes with initiation of healthy changes in eating and activity level, it may be an overlooked risk factor for poor weight loss outcomes. To date, NBI interventions are under-developed for adult women, especially those who would medically benefit from weight loss treatment. Historically, NBI has been considered a clinical concern among young women at risk for eating pathology rather than among individuals with overweight or obesity. However, accumulating evidence indicates that in addition to interfering with quality of life, elevated NBI interferes with weight loss success (Buchanan, Sheffield, & Tan, 2017; Kiernan, King, Kraemer, Stefanick, & Killen, 1998), thus there is a need for interventions that address NBI in the context of weight loss treatment.

This proof-of-concept pilot study was designed to replicate the effects of an evidence-based body image intervention among women with overweight or obesity. The Body Project (Stice et al., 2013) decreases NBI by reducing internalization of societal pressures to be extremely thin (thin ideal internalization). It was designed for eating disorder prevention among normal weight, adolescent females. Because engaging in weight loss treatment influences NBI positively (Foster, Wadden, & Vogt, 1997), it is essential that any new intervention improve NBI above and beyond reactive NBI improvements that occur while attempting weight loss. This study was designed to determine if the Body Project treatment effects could be replicated in a novel sample of women with overweight or obesity when combined with behavioral weight loss recommendations. Consistent with the Obesity-Related Behavioral Intervention Trials (ORBIT) model (Czajkowski et al., 2015), small-scale preliminary testing is a cost-effective way to determine if the intervention has a clinical effect on treatment targets under ideal conditions. We also collected data to inform feasibility and fidelity of delivering the intervention and assessed internalized weight bias and body appreciation as additional constructs relevant to body image among women with overweight or obesity.

Methods

A randomized controlled pilot design was utilized to evaluate the 4-week Body Project intervention in combination with key components of weight loss treatment compared to an active control condition focused only on weight loss recommendations. All study procedures were completed between July, 2015 and April, 2016 including recruitment, intervention, and assessment. This study was approved by The Ohio State University Institutional Review Board (Protocol Number: 2015B0077) and all participants provided written consent prior to enrollment in the study.

Participants and Recruitment

Women with overweight or obesity (BMI ≥ 25 and <35 ; NIH) who were interested in weight loss were recruited from the metropolitan Columbus community for the Logging Exercise And Nutrition (LEAN) into Health Study. Because body image is studied extensively among adolescent and young adult females, we aimed to address this concern in an understudied age group (<25 years; see inclusion and exclusion criteria in Table 1). Sources of recruitment included 1) NIH-funded Researchmatch, an internet site designed to allow researchers to identify potentially eligible subjects, 2) Studysearch, an internet site coordinated by the OSU Center for Clinical and Translational Science to allow individuals to identify studies in which they might be eligible for participation, and 3) community flyers.

Procedures

Eligible participants completed an individual baseline assessment before receiving random assignment to one of two conditions: standard instructions for weight loss (Standard) or standard instructions plus Body Project (Standard+Body Project). A random number generator was used to identify a unique randomization sequence for each cohort. The first author generated the sequence and prepared sequentially numbered envelopes prior to enrolling participants. Study staff and participants were blinded to group assignment until the end of the baseline assessment when assignment was revealed. All participants then received personalized, one-on-one psychoeducation addressing standard approaches to healthy weight loss. The baseline assessments and delivery of recommendations were conducted by the first author (KLO) and an advanced research assistant using scripted content for standardized delivery. See Table 1 for a description of this content. Participants in the Standard condition had no additional contact with intervention staff between the baseline and follow-up assessment. Individuals assigned to Standard+Body Project received the Body Project which consists of four weekly, in-person, group meetings lasting approximately one hour. The Body Project was delivered by the first author in accordance with manual instructions (available online at www.bodyprojectsupport.org). The group leader completed a training video online and practiced delivering the intervention to confederates prior to initiating the study. Minimal revisions were made to ensure that content was appropriate for adult women (e.g., rewording “spring break” to “vacation”). All participants completed a second assessment scheduled four weeks after the baseline assessment was completed. Diet and activity logs were collected from all participants at the second assessment.

Measures

Demographic and medical history questionnaires were administered at baseline.

Height and weight were measured for calculation of BMI (kg/m^2) at the beginning and end of the 4-week intervention period.

The following measures were administered at the baseline and at the second assessment, with Cronbach’s Alpha calculated for each measure using data from the current study sample:

1. Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) measures the degree to which an individual internalizes the current societally prescribed standards of attractiveness or beauty. The thin ideal internalization subscale was used for this study and higher scores reflect greater internalization (Cronbach's $\alpha=0.83$).
2. Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) is a 34-item self-report questionnaire designed to assess body image concerns related to 'feeling fat'. Questionnaire items are rated on a 6-point likert scale indicating frequency of experiencing the feelings during the prior four weeks. Higher scores reflect greater distress related to weight and shape. (Cronbach's $\alpha=0.96$).
3. Body Appreciation Scale (BAS; Avalos et al., 2005) is a 13-item self-report measure designed to assess body appreciation, a positive facet of body image. Higher scores reflect greater body appreciation. (Cronbach's $\alpha=0.92$).
4. Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008) is an 11-item questionnaire designed to assess the degree to which an individual believes negative weight-related attributes are accurate and applicable to him/herself. Consistent with current standards in the field (Hilbert et al., 2014), the first item ('As an overweight person, I feel that I am just as competent as anyone else') was excluded due to low inter-correlation (Cronbach's $\alpha=0.83$ for 10-item measure).

Data Analysis

Consistent with the ORBIT Model, this phase of intervention development is meant to determine if an intervention has a clinically meaningful effect on treatment targets. As such, the results are primarily descriptive in nature to inform feasibility and fidelity of intervention delivery. Repeated measures Analyses of Variance (ANOVA) were conducted to provide an initial test of the intervention on all body image variables and BMI, and to calculate effect size estimates. A per-protocol-analysis was conducted to evaluate the effect of the treatment package in this novel sample. Statistical Analysis Software (SAS 9.2) was used to complete all descriptive statistics and analyses.

Results

Of 221 individuals screened, 160 were screened out (50 due to BMI being out of range; 30 due to not endorsing body image screening items; 62 failed to follow through with screening or scheduling; and 18 due to other exclusion criteria). Sixty-one women were enrolled across four cohorts ranging from 13-17 in size. The sample was primarily Caucasian (77%) with an average age of 41.8 years (SD: 10.7, range: 25-69) and average BMI of 30.7 (SD: 3.0, range: 25-36.8). Attrition from the study was approximately 24% and did not significantly differ by condition (Standard +Body Project: 10/32; Standard: 5/29; $\chi^2(1)=1.61$, $p=0.20$). Within the Standard +Body Project condition, 68% completed all 4 sessions. Of the remaining 32%, one individual attended two sessions, five attended one session, and four did not attend any sessions. As previous research on the BSQ suggests that a score less than 80 indicates no

body image disturbance (Taylor, 1987), the sensitivity of the screening procedures were evaluated using this cutoff. Accordingly, 72% (n=44) of enrolled individuals reported significant body dissatisfaction.

Two independent raters (research assistants within the lab where the study was conducted but who joined the lab after all study procedures were complete) viewed and scored adherence to the Body Project protocol using fidelity rating forms from the manual (on a 1-No adherence to 10-Perfect adherence scale). Each rater viewed and scored all sessions. Fidelity ratings from the two reviewers ranged from 8-10 and the modal score was 10 indicating a high level of fidelity to the manualized protocol. Subjective feedback about the Body Project sessions was collected from participants at the Time 2 assessment, using a 1-5 scale (strongly disagree to strongly agree) on the following descriptors: helpful (3.9 ± 0.92), relevant (3.95 ± 0.84), worthwhile (3.86 ± 0.94), unproductive (2.0 ± 1.07), and unnecessary (2.23 ± 1.11).

Consistent with a per-protocol-analysis, individuals who did not meet criteria for body dissatisfaction (n=17), did not attend all Body Project sessions (n=10 total), or did not complete both assessments (n=15) were excluded to ensure greatest power to detect treatment effects. The resulting sample included 32 individuals (n=15 in Standard, n=17 in Standard +Body Project). As shown in Table 2, there was a time main effect for body dissatisfaction, internalized weight bias, body appreciation and BMI with both conditions experiencing reduced body dissatisfaction, weight bias, and BMI, as well as increased body appreciation. The group*time interaction effect size for body appreciation indicated that Standard +Body Project participants reported a greater increase than Standard participants, with the 90% confidence interval for the change score confirming this effect.

Discussion

Women with overweight or obesity remain undertreated for body image concerns, which threatens quality of life and may interfere with achieving healthy weight loss. This first implementation of the Body Project intervention among adult women with overweight or obesity demonstrates initial feasibility and acceptability of combining the intervention with behavioral weight loss strategies. The intervention was delivered with a high degree of fidelity, attrition did not differ across conditions, and the content was rated favorably by participants. The most compelling effects of the intervention were observed for body appreciation, which improved more in the Standard +Body Project group than the Standard group, despite both groups reporting increased body appreciation. This result is promising because body appreciation may serve as a buffer against the negative effects of body dissatisfaction on quality of life as well as weight-related behaviors (Andrew, Tiggemann, & Clark, 2016). Across all other psychosocial variables, the interaction effects were not statistically significant. However, the magnitude of improvements on all outcomes was greater among Standard+Body Project participants than among Standard participants, which is consistent with the ORBIT goal of documenting clinical signal on variables of interest. Further, the differences were observed despite similar weight change in both groups. These results provide preliminary support for targeting body image in combination with engaging in behavioral weight change strategies.

The results suggest that additional intervention development is warranted, as the magnitude of treatment effects was less robust than effects observed among adolescent females ($d=.90-.99$ for body dissatisfaction and thin ideal; Stice, Rohde, Durant, Shaw & Wade, 2013), and the average BSQ scores in this study remained above the clinical threshold in both conditions indicating persistent body dissatisfaction. Women with overweight or obesity must navigate more complicated messages about their bodies than normal weight adolescent females (Schwartz & Brownell, 2004). In addition to pressure to be thin, many experience obesity stigma and a weight history (e.g., onset of overweight or obesity, previous weight loss attempts, weight regain) that may influence how they think and feel about their bodies as well as their approach to weight loss treatment (Annis, Cash & Hrabosky, 2004). Modifying the Body Project to target the multifaceted influences on body image in this population may be important to enhance suitability and increase the strength of the treatment effects. From a feasibility standpoint, 23% of individuals screened were enrolled and an even smaller proportion were included in analyses. Modifying the recruitment materials to emphasize body image (only weight loss was highlighted in the current study) will facilitate a more targeted recruitment and enrollment pipeline. Additionally, the screening questions utilized to identify individuals who endorse both body dissatisfaction and internalization of the thin ideal came from the study manual. However, these questions did not exclusively capture the target group for this study. Using the BSQ to screen and monitor intervention outcomes may be a more valid and appropriate alternative.

There were several relevant limitations of the study. Although an active control condition was utilized to control for effects of weight loss education and information, participants in this condition did not attend weekly group sessions. Thus, there were group differences in the amount of time spent engaging in study procedures as well as social contact. Further, the sample size is small. As such, the inferential statistics should be interpreted cautiously and the resulting effect size estimates are less stable.

This study suggests that the Body Project can be adapted for use among adult women with overweight or obesity starting behavioral weight loss treatment. Using the ORBIT model to guide flexible movement through the intervention development and refinement phase will increase the likelihood of preparing a robust treatment package that can be tested in an efficacy trial combined with a full dose of behavioral weight loss treatment. As NBI remains under-addressed in this population, this study provides an important first step in developing treatment for this clinical concern.

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Table 1

Inclusion and exclusion criteria for study participation and weight loss recommendations provided to all participants.

Inclusion Criteria	• Female • 25 years or older • BMI 25 and <35 • Desire to lose weight • Answered yes to the following body image screener questions; 1. Do you feel dissatisfied with your body because of your weight or your shape? 2. Do you feel like your life would be better if you were thinner?
Exclusion Criteria	• Currently pregnant or planning to become pregnant within 2 months • Breast feeding • Within 9 months of childbirth • Participating in or planning to participate in a formal weight loss program in the next two months • Self-reported an eating disorder or substance abuse • Physically disabled or reported a chronic condition that would impact ability to exercise or lose weight (e.g., injury to lower extremity limiting mobility) • Mental or cognitive disorder that would preclude following instructions.
Standard Behavioral Weight loss psychoeducation and recommendations	• Individual's current and target BMI was reviewed • Individualized caloric goal was provided for weight loss (based on 500-1000 calorie/day deficit) • Information regarding the importance of including a variety of nutrients in a low-calorie/low-fat diet (with focus on fruit and vegetable intake) • Physical activity was recommended (150 minutes of moderate to vigorous intensity activity per week). Gradual increases were encouraged. • Reduced sedentary time was recommended (by increasing daily step count). • Participants were encouraged to adhere to the recommendations provided in order to lose weight at a rate of 1-2 pounds per week. • Importance of self-monitoring weight-related behaviors was discussed. • All participants were given a diet log, physical activity log, and a pedometer, and instructions for daily tracking were reviewed.

Table 2

Mean values for baseline demographics and for outcome variables at baseline and time 2 assessments among Standard and Standard+Body Project participants

Variable	Standard n=15	Standard+Body Project n=17	
Age (years)	40.6 (9.8)	41.9 (8.8)	
BMI (kg/m ²)	30.6 (3.1)	29.5 (3.1)	
Education (years)	16.2 (2.0)	17.2 (2.1)	
Race (% white)	80%	88%	
	Mean (SD)	Mean (SD)	d _{ppc2} (Morris, 2008) Cohen's d (90% CI)
Internalization of thin ideal			
Time 1	3.2 (0.9)	3.0 (1.0)	
Time 2	3.3 (1.1)	2.9 (0.9)	0.25
%	-6.93 (28.8)	0.21 (26.9)	0.26 (-0.33 to 0.84)
Body dissatisfaction [†]			
Time 1	113.9 (28.1)	114.1 (17.8)	
Time 2	96.0 (32.6)	87.8 (24.8)	0.36
%	16.27 (15.1)	22.6 (20.1)	0.35 (-0.23 to 0.94)
Internalized weight bias [†]			
Time 1	4.4 (1.2)	4.5 (0.9)	
Time 2	4.2 (1.4)	4.0 (1.2)	0.35
%	3.17 (22.5)	12.4 (20.5)	0.43 (-0.16 to 1.02)
Body appreciation ^{†‡}			
Time 1	3.0 (0.7)	2.9 (0.7)	
Time 2	3.2 (0.7)	3.4 (0.7)	0.43
%	8.1 (11.62)	19.4 (22.1)	0.63 (0.03 to 1.23)
Body Mass Index [†]			
Time 1	30.6 (3.1)	29.5 (3.1)	
Time 2	30.2 (3.0)	29.2 (2.9)	0.03
%	1.3 (2.4)	1.0 (1.8)	0.14 (-0.73 to 0.44)

Note.

[†] indicates the time main effect was significant at p<.05.

[‡] indicates the group by time interaction was p<.10.

Change scores were calculated by subtracting each participant's value at time 2 from the baseline value, the difference value was then divided by the baseline value and multiplied by 100 (except for body appreciation where baseline was subtracted from time 2 so that all change scores reflect change in a therapeutic direction). Effect size (d_{ppc2}) calculations were conducted using Morris (2008)'s recommendation for addressing different

sample sizes. This approach uses pooled pretest standard deviation for weighting the differences of the pre-post means. Cohen's d (with 90% CI) is presented for group differences in change scores.

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