

# Early intervention of eating- and weight-related problems via the Internet in overweight adolescents: A randomized controlled trial

## Abstract

**Background:** Overweight in adolescence is associated with elevated body dissatisfaction and eating disordered behaviors. It is important to identify novel, cost-effective methods for early intervention in treating obesity and preventing eating disorders, due to the refractory nature of both. This multisite RCT evaluated an innovative Internet-delivered program concurrently targeting weight loss, body dissatisfaction, and eating disordered behaviors in adolescent boys and girls. **Methods:** Eighty-one 12- to 17- year olds (BMI %ile  $M=97.7\pm 2.6$ ) were randomly assigned to Student Bodies 2 (SB2), a 16-week Internet program utilizing a cognitive-behavioral approach, or typical care (TC). **Results:** A statistically significant reduction in BMI z-scores was observed in the SB2 group as compared to the TC group from pre- to post-intervention ( $p = .047$ ;  $ES=0.13$ ), but differences were not sustained at 4-month follow-up due to improvement in the TC group ( $ES=0.12$ ). No statistically significant differences were noted between groups on eating disordered attitudes and behaviors, with the exception of an increase in dietary restraint in the SB2 group at post ( $p = .002$ ), which reflected program recommendations to reduce caloric intake. SB2 participants increased eating- ( $p<.001$ ) and physical activity-related skills use ( $p=.001$ ) at post, but this was not sustained at 4-month follow-up. **Conclusion:** Findings suggest that an Internet-delivered intervention yielded a modest reduction in weight status that continued four months following treatment and that body image and eating behaviors were not negatively impacted. It appears that group differences on weight loss were not sustained at 4-month follow-up due to parallel improvements in the SB2 and TC groups. Future studies are needed to replicate and evaluate the clinical significance of the current findings.

## Introduction

More than one out of six adolescents are currently overweight or obese, and the majority of these adolescents are expected to experience compromised mental and physical health over their lifetimes. In particular, the literature suggests that overweight adolescents are often dissatisfied with their weight and frequently turn to unhealthy methods in their pursuit of weight loss, ultimately putting them at even higher risk for increased adiposity and eating disorders. Body dissatisfaction and the elevated rates of eating disordered behaviors in this population have rarely been addressed in obesity treatment programs. Indeed, few randomized controlled trials of behavioral weight loss programs for adolescents have been reported, and there are no known integrated interventions for weight management and eating disorder prevention described in the literature. The present study aims to test the efficacy of an integrated, Internet-delivered, early intervention approach targeting weight loss, body dissatisfaction, and reduction of eating disordered behaviors in an overweight adolescent sample. Potential implications of the proposed research include the prevention of adult obesity and eating disorders using a novel method of early intervention.

## Methods

Eighty-one adolescents (63% female) aged 12-17 ( $M=14.0\pm 1.7$ ) with a body mass index (BMI) at or above the 85<sup>th</sup> percentile for age and sex (BMI %ile  $M = 97.7\pm 2.6$ ) from the San Diego and St. Louis metropolitan areas were recruited to participate in an innovative Internet-delivered program concurrently targeting weight loss, body dissatisfaction, and eating disordered behaviors. Participants were excluded if they had a current or past diagnosis of an eating disorder; had medical conditions resulting in significant weight changes or precluding moderate physical activity; used medication significantly affecting weight; or had a reading level below the sixth grade.

Upon meeting study criteria, participants were randomly assigned to Student Bodies 2 (SB2), a 16-week Internet program utilizing a cognitive-behavioral approach, or typical care (TC). The weekly content on the SB2 website included basic education on nutrition, physical activity, body image, eating disorders, and healthy weight control, as well as guided behavior modification around the issues of weight control and body image. Participants were expected to spend approximately 2 hours each week and no more than 30 minutes per day using the program. Adolescents recorded their weight, food intake, and amount of physical activity each week using a private, on-line journaling feature. A moderator used e-mail to provide individualized feedback regarding each adolescent's food self-monitoring diaries, physical activity, and weight change. Additionally, an on-line body image journal was used in the program for participants to record triggers to their body dissatisfaction as they learned how to challenge negative thoughts. The website also served as the forum for moderated discussion groups among the adolescents. To encourage compliance, adolescents who completed program components each week were eligible for a monthly lottery for small prizes. Parents of adolescents using SB2 were mailed monthly newsletters providing a summary of SB2 program content and specific suggestions for ways to assist their child in making behavior changes and improving body image.

Adolescents assigned to TC were provided basic information on nutrition and physical activity, consistent with Department of Health and Human Services guidelines (<http://www.hhs.gov>). The TC group was given access to the Internet program at the conclusion of the study.

## Results

The SB2 group demonstrated a statistically significant reduction in BMI z-score as compared to the TC group from pre- to post-intervention ( $p = .047$ ;  $ES=0.13$ ). These differences were not sustained at 4-month follow-up due to improvement in the TC group ( $ES=0.12$ ). Weight changes over time are depicted in Figure 1. No statistically significant differences were noted between groups on eating disordered attitudes and behaviors, with the exception of an increase in dietary restraint in the SB2 group at post ( $p = .002$ ). SB2 participants increased eating- ( $p<.001$ ) and physical activity-related skills use ( $p=.001$ ) at post, but this was not sustained at 4-month follow-up.

## Discussion

Student Bodies 2, a novel and innovative Internet-based, cognitive-behavioral weight-loss intervention targeting nutrition, physical activity, and body dissatisfaction, demonstrated efficacy in producing weight loss in overweight teens over a 4-month period. Adolescents randomized to the intervention demonstrated statistically significant weight loss at post-treatment that was also evident at 4-month follow-up. At post-treatment, both the SB2 and the TC groups had reduced their BMI z-score, however, the SB2 group exhibited a significantly greater weight loss than the TC group. At 4-month follow-up, the SB2 group had maintained their weight loss, however, the TC group's weight loss had persisted such that there were no longer statistically significant differences between the groups. These results are in contradistinction to findings from other studies, which have demonstrated weight *gain* in control groups in the absence of an intervention. The SB2 group did not differ from the TC group on any eating disordered behaviors or attitudes, negating concerns that dieting could promote the development of an eating disorder in vulnerable populations (e.g., overweight adolescents). Indeed, the only observable difference between the SB2 and TC groups in eating disorder symptoms was an increase in dietary restraint in the SB2 group, an encouraging findings which reflects that SB2 participants implemented program recommendations to decrease intake of fat- and calorie-dense foods. The increases in eating- and physical activity-related skills use observed in SB2 participants at post-treatment as compared to TC participants also reflects the implementation of program recommendations. Indeed, these behavioral changes appear to indicate that SB2 participants internalized program teachings, possibly portending a greater likelihood of weight-loss maintenance, as opposed to the TC participants who did not achieve such changes.

Strengths of this intervention include its cost-effectiveness and the relative ease of dissemination, given its standardized, Internet-based delivery. The online format allows participants access and support at times and locations when traditional therapy is generally unavailable. In addition, this format is ideally suited for adolescents, whose busy schedules often impose time restrictions on participation in treatment. Indeed, examination of log-ins revealed that a great many participants utilized the program late at night, providing evidence that tailoring participation to one's schedule may be a desirable component of treatment for adolescents.

The current study represents a vital first step in developing of comprehensive and accessible interventions for overweight youth. Identification of participant outcome predictors could assist in future applications of this intervention by allowing for treatment matching and/or tailoring. Larger and lengthier trials of SB2 should also be undertaken in order to determine whether the sustained weight loss seen at 4-months post-treatment endures over longer-term follow-up periods. Future applications of this program may seek to improve the effects of the body image component of the intervention, and to determine whether the asynchronous chat room provided sufficient support or if a synchronous chat room would be more effective. Additional tests of this intervention could also enable exploration of process variables, or the critical components by which this treatment achieves its effects. In conclusion, SB2 appears to be a safe and efficacious intervention for promoting weight loss in overweight adolescents and future

examinations of its efficacy are warranted. Through its substantial contributions to the adolescent weight loss literature, and to clinical science in general, this study promises to pave the way for future research and to provide new insights into methods for combatting the childhood obesity epidemic.

Figure 1. Mean weights for intervention and control groups at each timepoint

