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Cost-Effectiveness Comparison of Delivery Modalities for a Dissonance-Based Eating Disorder Prevention Program over 4-Year Follow-Up

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Abstract
The cost-effectiveness of delivery methods for an eating disorder prevention program is reported. In an effectiveness trial (enrollment 2013–2015) comparing three formats (clinician-led, peer-led, and Internet-delivered) for delivering the *Body Project* eating disorder prevention program to college women versus an educational video control, the peer-led method was more effective than the three alternatives at preventing onset of eating disorders over 4-year follow-up. Eating disorder incidence was 19.3% for clinician-led groups, 8.1% for peer-led groups, 15.5% for Internet-based *eBody Project* participants, and 17.6% for educational video controls. Delivery costs per person are reported for the *Body Project*, including participant time, and the cost-effectiveness is calculated for peer-led groups versus the video control. Data analyses were conducted in 2019–2021. Delivery costs per person for the *Body Project*, including participant time, were approximately $96 for clinician-led groups, $80 for peer-led groups, and $22 for the *eBody Project*, compared with $9 for the educational video control. For each additional case of eating disorder onset that was prevented by the peer-led groups, compared with the video control, the cost was about $740. There were no differences in health care utilization across condition. Eating disorder prevention costs via the *Body Project* compare very favorably with the costs for treating an eating disorder, which previously have been estimated to range from approximately $20,300 for cognitive-behavioral therapy for bulimia nervosa to approximately $119,200 for adequate care treatment of anorexia nervosa. These analyses demonstrate the economic value of the *Body Project* for preventing eating disorders among college-age women when delivered in peer-facilitated groups. ClinicalTrials.gov Identifier: NCT01949649

Keywords Eating disorders · Prevention · Cost-effectiveness analysis · Delivery formats

Introduction

Approximately 13% of young women develop an eating disorder (Allen et al., 2013; Stice et al., 2013b), but 80% of individuals with eating disorders do not receive treatment (Swanson et al., 2011), supporting the premise that implementation of effective eating disorder prevention programs is a public health priority. Eating disorders represent a significant economic burden, with annual direct costs to an individual with an eating disorder estimated at $8042 (Stuhldreher et al., 2012). The aggregate cost for US hospital stays in 2008–2009 involving eating disorders was $277 million (Zhao & Encinosa, 2011). Neither estimate accounts for additional costs including lost productivity, comorbid psychopathology, future obesity, and premature morbidity. Preventing eating disorder onset is a high priority because of their higher mortality rate than other psychiatric disorders that afflict college students (e.g., depression and substance misuse; Arcelus et al., 2011). Furthermore, as noted, over 80% of afflicted individuals do not receive treatment, existing treatments are effective for less than 50% of individuals, and relapse occurs in up to 32% of treated individuals (Hay, 2013; Swanson et al., 2011).

Although three prevention programs have been found to reduce future onset of eating disorders (Martinsen et al., 2014; Stice et al., 2008, 2013c), only the *Body Project*, a

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dissonance-based eating disorder selective prevention program, has been found to reduce future eating disorder onset in multiple independent trials and produce effects relative to alternative credible interventions (Stice et al., 2019). The *Body Project* consists of 4 weekly 1-h group sessions with 5–9 participants using a scripted manual. Participants voluntarily engage in verbal, written, and behavioral exercises critiquing the beauty ideal espoused by Western culture in and between sessions (see Stice et al., 2013a for details regarding session content) and is either clinician-led or peer-led. Voluntarily critiquing the thin beauty ideal presumably held by participants is hypothesized to generate cognitive dissonance and result reduced pursuit of this appearance ideal. The *eBody Project* is an Internet-based version that includes 6 40-min modules (equal in time to the group intervention) involving user-driven self-education activities and games that parallel the activities in the group program (see Stice et al., 2012 for details regarding intervention content).

A recent effectiveness evaluation of the *Body Project* provided the first test of whether delivery could be task-shifted from mental health clinicians to college peer educators or unmoderated Internet delivery through 4-year follow-up (Stice et al., 2020). Most high schools and colleges do not have clinicians designated to implement prevention programs, and using peer- and Internet-delivery methods would likely cost less than clinician-led groups. The term "peer education" refers to staffed programs on college campuses in which students teach or share health information, values, and behaviors related to topics (typically physical safety, sexual behavioral, nutrition, substance use, mental health) with other students similar in age or experience (White, 1994; White et al., 2009). Research suggesting that the peer-led *Body Project* produced greater reductions in risk factors and eating disorder symptoms than credible alternative interventions (e.g., Becker et al., 2010) and that peer educators produced larger effects than adult teachers and clinicians who implemented substance abuse prevention programs and an asthma management intervention (e.g., Botvin et al., 1984; Rhee et al., 2011). Theoretically, peers have more credibility because participants view them as more similar, and as per social learning theory (Bandura, 1986), people are more likely to change or modify attitudes and behaviors as a function of modeling when the source of that information is perceived as more credible. Eating disorder onset over 4-year follow-up was significantly lower for peer-led *Body Project* participants (8.1%) than for video control participants (17.6%) and clinician-led *Body Project* participants (19.3%), and marginally lower ($p = 0.056$) than for participants receiving the Internet-delivered *eBody Project* (15.5%). Participants in all three active interventions showed larger reductions in risk factors and eating disorder symptoms than video controls, though peer-led groups did not produce larger reductions in these outcomes than clinician-led groups. In the present report, costs for the various intervention delivery methods are estimated, and cost-effectiveness of the three delivery modalities is examined versus video control, with the primary outcome of preventing eating disorder onset.

To date, very few studies have examined the cost-effectiveness of eating disorder prevention (Le et al., 2018). In a previous study using different data, we found that the clinician-led *Body Project* program was estimated to cost $70 per participant to deliver and cost $838 for each additional at-risk person reducing eating disorder symptomology to a clinically meaningful degree, compared with educational brochures (Akers et al., 2017). However, because that past study did not find that *Body Project* groups implemented by clinicians significantly reduced future eating disorder onset relative to educational controls, economic benefits were difficult to estimate. Consistent with the Society for Prevention Research Guidelines on reporting standards for evidence (Gottfredson et al., 2015), the present study provides clear cost information for the *Body Project*. This study is the first (and only) study to examine the cost-effectiveness of peer-led prevention groups and to compare in-person groups versus unmoderated Internet delivery.

Methods

This study meets the standards of evidence for economic evaluation of prevention, as developed by the MAPS III Task Force of the Society for Prevention Research (Crowley et al., 2018) for all topics except valuation of the accruing benefits, which is discussed below in the project limitations as currently inappropriate for eating disorder prevention. Furthermore, a Consolidated Health Economic Evaluation Reporting Standards (CHEERS) Checklist (Husereau et al., 2013) is included as Supplemental material.

Participant Characteristics and Randomization

Participants were 680 young women (M age = 22.2, SD = 7.1, median age = 19) from 3 universities in Oregon and Texas. The sample was 60% White, 17% Latina, 14% Asian, 5% African-American/Black, 3% American Indian or Alaska Native, and 1% Pacific Islander. Average parental education was 38% graduate or professional degree, 34% college graduate, 16% some college, and 13% high school graduate. Participants in the 4 conditions did not differ on race, ethnicity, age, year in school, parental education, or pretest outcome measures. They received $40 for each follow-up assessment. The study was registered at ClinicalTrials.gov (NCT01949649), and additional study details are available elsewhere (Stice et al., 2017).

Participants were randomized to one of four conditions: (1) clinician-led *Body Project* groups, (2) peer-led *Body Project* groups, (3) the *eBody Project*, or (4) video control. For the two group modalities, participants received four weekly 1-h sessions with 5–9 participants delivered on the college campus in a space available to the group leaders at no cost either by two clinicians or two peer educators using a scripted manual (the session content was identical for clinician- and peer-led groups). Clinicians were mental health care providers on the participating campuses, and peer educators were recruited from campus peer educator groups. In total, 17 clinicians (95% female; 82% white; age M [SD] = 33.8 [10.1] years; range = 24–55) and 21 peer educators (94% female; 81% white; age M [SD] = 20.9 [0.9] years, range = 19–22) were recruited. Clinicians were recruited from student mental health counseling centers and three of the clinicians (18%) were graduate students who provided mental health care as part of their training. Almost all clinicians were Masters-level therapists from a mental health field (88%, clinical psychology, counseling psychology, social work); 1 had a master's degree in nutrition and 1 had a law degree (JD). The peer educators were recruited from peer educator programs at the colleges. Peer educators were majoring in a variety of disciplines (33% public health, 29% nutrition, 24% psychology, 14% other), and none had been trained in the *Body Project* before this study. Groups were delivered by pairs of leaders (clinicians also delivered the intervention in pairs). Peer and clinician group leaders were trained and supervised by Rohde, Shaw, and Stice.

Participants randomized to the *eBody Project* received access to six 40-min modules that paralleled the group program (see Stice et al., 2012 and Stice et al., 2014 for more details). Video control condition participants received a web link to a 55-min documentary on eating disorders and body dissatisfaction. This educational video previously produced larger reductions in eating disorder symptoms than an educational brochure control condition ($d = 0.29$) (Stice et al., 2012).

Intervention Cost Inventory

Following standard procedures (Farnham & Ackerman, 1996; Russell et al., 1996), costs associated with replicating the interventions in non-research settings were examined, excluding development/evaluation costs. Micro-costing (Luce et al., 1996) rather than gross-costing techniques were used, identifying costs for each intervention element, which are summarized in Supplemental Table 1. Study recruitment occurred between March 2013 and April 2015. To optimize the usefulness of the analyses, however, cost data are in 2019 US dollars, the most recent year for which U.S. Bureau of Labor salary and benefits data are available.

Because the value of time accounts for the largest share of intervention costs, sensitivity analyses were conducted with high and low time-value estimates. Lower-end sensitivity analysis assumes the lowest value of everyone's time (facilitators and participants), and upper-end assumes the highest value of everyone's time.

Value of Facilitator Time The primary cost to implementing the *Body Project* is the time to deliver and receive it. Clinician time was valued according to the U.S. Bureau of Labor's reported median salary for college mental health counselors, an hourly rate of $27.50 as of May 2019 (U.S. Bureau of Labor Statistics, 2019b). For clinicians who were graduate students, we used the 2018 mean student internship salary of $27,000 as reported by the Association of Psychology Postdoctoral and Internship Centers (APPIC, 2018), plus a 1.9% increase (average annual increase between 2011 (Greenwood, 2016) and 2018), yielding an estimated 2019 mean hourly salary of $13.23. For every 6 h that graduate students interacted with clients, 1.5 h of staff clinician time was allocated for supervision, which was valued at the same rate as clinician facilitators. The proportion of facilitator hours provided by graduate students was 24% (10/42).

Cost estimates for benefits and other salary-related expenses for both staff and graduate student clinicians were based on a June 2019 Bureau of Labor report (U.S. Bureau of Labor Statistics 2019a), in which mean benefits for higher education employees were 27.7% of salaries, with an additional 5.7% for statutory employer expenses (e.g., Social Security). In sum, clinician salary plus benefits (assuming 24% was done by graduate students) was $33.21/h for the intervention and $31.10 for training (no supervision). Sensitivity analyses used the 25th and 75th percentile salaries for staff clinicians, plus benefits, and 75% and 125% of the salary-plus-benefits value for peer leaders (before the 5.7% statutory expenses), plus statutory expenses, for rates of $26.61 and $40.33 per hour for intervention ($24.91 and $37.79 for training).

Peer educators were unpaid; some were volunteers, and some received college credit. To value their time, we used $12.00, the highest state minimum wage in 2019 (in California, Massachusetts, and Washington) for the main analysis (In 2019, Oregon's minimum wage was $11.25 and Texas's was $7.25). For the sensitivity analyses, the lower valuation of their time was zero, as some may have considered it the best use of their time. The upper valuation was 25% higher than the main analysis value or $15.00.

Value of Participant Time It was estimated that 50% of participants had jobs and would incur an opportunity cost for participating in the program. The basis for this estimate was a study of college student employment in 2017, which 43%

of full-time students and 70% of part-time students were employed (McFarland et al., 2019). The 2014 federal minimum wage of $7.25/h was used to represent the participants' opportunity costs. Sensitivity analyses used values of $0 to represent that some participants may have preferred this use of time over alternate activities, and $12.00, the highest state minimum wage in that year, as the high value of their time.

Facilitator Training Facilitator training involved reading the manual and attending a workshop that was 4 h for clinicians and 8 h for peer educators held on campus. Analyses assume no book purchase, and that all trained individuals spend on average 1 h reading the book materials.

Training was provided by the research team; an estimate of real-world costs was based on the Body Project Collaborative (http://www.bodyprojectcollaborative.com/training-costs.html). Standard workshop cost for training up to 16 clinicians is $1290 plus expenses, and for training up to 12 peer educators is $2575 plus expenses, estimated at $500 for travel and $300 for other expenses. Thus, for a training for 12 clinicians, costs are $1290 + 500 + 300, or $2090, about $175 per clinician (plus their time to read the book and attend the workshop; total training costs averaged $330.52 per clinician). For a training for 12 peer educators, costs are $2575 + 500 + 300, or $3375, about $280 per peer educator.

Training costs must also account for facilitator turnover, although the present study was too small and too brief to measure turnover accurately. The study trained 17 clinicians and 21 peer educators. There were 173 participants in the clinician-led groups and 162 participants in the peer-led groups. Thus, each trained clinician and peer educator worked with an average of 10.2 and 7.7 group participants, respectively, which translates roughly to one group per peer educator and 1.5 groups per clinician.

Participant Recruitment Participants were recruited by posters advertising body acceptance groups supplemented by local media. A clinician (or comparably paid peer educator supervisor) then fields calls from potential participants. Per group, advertising and promotion typically require half an hour of one clinician's time; fielding calls may take another hour.

Group Sessions The *Body Project* entails four weekly 1 h group meetings, led by two facilitators. Each facilitator typically spends 5 h per group (4 h for sessions, plus prep time). Handout costs are negligible. Facilities costs were not included, as space was provided by the universities, which expressed no concern about space limitations, and did not charge for use of space. The intervention is intended to be delivered to groups of 5–9 women.

Additional facilitator time is included for providing make-up sessions (for which the participant met with a facilitator for 15 min before the subsequent session). There were 335 participants, across the two facilitator-led conditions, and thus 1340 total sessions. There were 381 missed sessions (the participant was absent; 71.5% of sessions were thus attended), and 121 make-up sessions (thus, overall 80.6% of sessions were attended or made-up). On average, there were 1.14 missed sessions and 0.36 makeup sessions per participant. Each makeup session lasts 15 min at 0.36 sessions per person, totaling 5.4 min/person.

Participant costs were for attending the sessions (4 h − 1.14 average missed sessions per participant (68.4 min) + 5.4 average min of make-up sessions per participant) and homework. Homework estimates were 12 min for a completed assignment and 6 min for a partially complete homework assignment. Homework completion for the 2 facilitator-led modalities did not differ by condition; rates were 24% not completing, 4% partially completing, and 72% fully completing, for an estimated average of 9 min on homework per participant.

eBody Project Participants in this condition were asked to complete 6 40-min modules, plus similar homework as group participants. Assignment to and completion of the program were done on an individual basis. Based on tracking of module completion, the average participant spent 168 min using the intervention, with the same time for homework as facilitated groups. Staff estimates of time spent reminding participants to complete modules were 2 min for those completing 5–6 modules, 10 min for those completing 3–4 modules, and 15 min for those completing 0–2 modules; average time was 6.5 min per participant.

Educational Video Control Participants were asked to view *Dying to Be Thin* (WGBH Video, 2000), a 55-min documentary on eating disorders and body dissatisfaction, and received an automated e-mail (no associated cost). Self-reported use of the video was 80% watched all of the video, 8% watched a portion of the video (estimated at 30 min), and 12% watched none.

Effectiveness Outcomes

The semi-structured Eating Disorder Diagnostic Interview (EDDI) assessed *DSM-IV* (Association, 2000) eating disorder diagnoses. Interviews were conducted by research assistants masked to study condition at pretest, posttest, and at 6-, 12-, 24-, and 48-month follow-ups to determine if and when a participant met criteria for an eating disorder. EDDI diagnoses have shown 1-week test–retest reliability ($\kappa = 0.79$) and inter-rater agreement ($\kappa = 0.75$) (Stice et al., 2008, 2017). This interview, which was conducted in-person

on campus (or by phone if participants had left school), was used to evaluate the intervention but is not required for sites to deliver the program (i.e., would not be needed to replicate the effects). The outcome used in this cost analysis was eating disorder onset by 4-year follow-up, the most clinically meaningful outcome from the study.

Cost-Effectiveness Analysis Methods

Incremental cost-effectiveness analyses are presented from both the societal (i.e., including costs incurred by the universities and participants) and organizational (i.e., university costs only) perspectives. Sensitivity analyses were conducted to set upper and lower cost bounds for valuation of facilitators' and participants' time.

The time horizon was 4 years for the outcome measure. Training costs are averaged over the costs to deliver subsequent groups and intervention delivery costs take place over an approximate 4-week period. Discounting (i.e., attributing greater weight to costs and benefits in the near-term as compared with the more distant future) is not needed because all costs are incurred at roughly the same time and information about time preferences is not relevant.

Interventions that are more costly without also being more effective than an alternative intervention are "dominated" by those that are less costly or more effective, and are omitted from the cost-effectiveness analyses (Garber et al., 1996). For this study, the clinician-led groups and the *eBody Project* were dominated by the video control, which was cheaper and no less effective (see Table 1).

For the non-dominated delivery modalities, the incremental cost-effectiveness ratio (ICER) is calculated as the difference in per-participant costs between conditions divided by the difference in condition effectiveness, for each unit of outcome change (with averted onset of eating disorder over the 4-year period calculated as 1 minus the onset rate). For this study, the ICER indicates how much it will cost for each additional unit of outcome (one prevented onset of eating disorder) that can be produced if a university chooses to provide the peer-led program versus the video control.

Health Care Utilization An indirect cost (or benefit, "negative cost") of an intervention is that those who receive it may also receive more (or less) health care than those who do not. These costs are part of the societal cost but not an organizational cost, unless the organization also provides health care to the participant.

Service utilization was assessed with an adapted version of the Patterns of Help Seeking Behavior Scale (Lane & Addis, 2005). Participants in all conditions were asked at baseline and all follow-ups to report the frequency of care (past year) for physical, mental health, eating, and weight problems, including medication usage and frequency of speaking to a physician, nurse, psychiatrist, therapist, psychologist, or other counselor, or attending a support group. Medication usage included all prescribed medications (excluding birth control) taken daily. We examined treatment utilization defined as number of hours of care received for mental health problems, weight problems, and eating disorder/body image concern but did not include number of hours of care for physical health problems, injury, or illness.

A one-way ANOVA with a Scheffe comparison was used to test whether any group differences were found in reported utilization hours, and paired *t*-tests were also used to compare peer-led *Body Project* versus video control in hours reported for care. No statistically significant (at $p < 0.05$) group differences were found at baseline or any of the follow-up assessments. Analyses were run for health care issue by type of provider separately, and then combined across category of

Table 1 Costs and effectiveness for intervention delivery methods

Delivery method	Cost per participant for intervention delivery		ED onset rates	Hazard ratio (95% CI)	Onset rate p value vs. control
	Societal perspective	Organizational perspective			
Clinician-led groups	$96.36	$84.01	19.3%	1.08 (0.62–1.89)	0.778
Peer-led groups	$79.53	$67.18	8.1%	0.43 (0.21–0.89)	0.020
eBody Project	$22.16	$9.99	15.5%	0.87 (0.48–1.56)	0.639
Educational video control	$9.21	$6.39	17.6%	—	—

The hazard ratio is a comparison between the probability of developing an eating disorder over follow-up for the intervention, and the probability of developing an eating disorder over follow-up in the education video control group

ED eating disorder

care and provider type. Similarly, no condition differences were detected for medication utilization at baseline or over follow-up. Across the follow-up assessments, 29% of peer-led *Body Project* participants and 29% of video control participants started using medication, a non-significant difference ($\chi^2[1323] = 0.01$, $p = 0.930$). Had there been significant differences between any of the conditions (but especially peer-led *Body Project* groups and video controls) in health care utilization costs, they would have been part of the societal perspective analysis but not the organizational perspective analysis.

Results

The cost to train each clinician was, on average, $330.52, and each clinician worked with a mean of 10.2 group participants, for a training cost of $34.20 per group participant. For the peer educators, training costs were $280.00 per peer, and each peer educator worked with a mean of 7.7 group participants, for training costs of $44.16 per group participant.

The overall cost per group participant for both societal and organizational perspectives is shown in Table 1 for each delivery modality. From the societal perspective, average costs ranged from $96 for participants in the clinician-led groups to $8 for those in the video control. Using the "low cost" assumptions of lower clinician salaries and no time value for the peer leaders or participants, the average societal and organizational costs per person are the same: $71 for clinician-led groups, $41 for peer-led groups, $8 for the *eBody Project*, and $5 for the video. Using the "high cost" assumptions of higher values for clinician, peer leader, and participant time, the societal costs are $139 for clinician-led groups, $115 for peer-led groups, $52 for the *eBody Project*, and $17 for the video; the organizational costs are $98, $75, $12, and $8, respectively. For the clinician-led groups, the costs per group (societal perspective, main analysis assumptions) ranged from $696 for 5-person groups to $1253 for 9-person groups. For the peer-led groups, costs per group ranged from $577 to $1039.

Relevant Outcomes

Incidence of eating disorder onset over follow-up was 27 (19.3%) for clinician-led *Body Project*, 11 (8.1%) for peer-led *Body Project*, 22 (15.5%) for *eBody Project*, and 23 (17.6%) for video control. Test statistics and associated *p* values for differences between intervention arms and control are displayed in Table 1; peer-led groups, but not clinician-led groups or the *eBody Project*, had a significantly lower disorder onset rate than video control participants. Attrition was 10% at 1-year, 12% at 2-year, 14% at 3-year, and 19% at 4-year follow-ups. Attrition was not associated with study condition, demographic characteristics, or baseline outcome values, with the exception that participants who dropped out had higher baseline eating disorder symptoms ($d = 0.49$).

Cost-Effectiveness Ratios

Main Analysis Table 2 presents the incremental cost-effectiveness for preventing eating disorder onset, comparing the peer-led *Body Project* group versus video control. The cost per averted eating disorder case was $740 from the societal perspective and $640 from the organizational perspective.

Sensitivity Analyses Using the low-end cost estimates, the cost per averted case of eating disorders was $383 from the societal and organizational perspectives. With the high-end estimates, the cost per averted case was $1036 from the societal perspective and $704 from the organizational perspective.

Table 2 Incremental cost-effectiveness (ICER) for *Body Project* delivery methods

Delivery method	Cost per treated person	Incremental cost	Effectiveness: averted cases of ED onset	Incremental effectiveness	Incremental cost-effectiveness (cost per case averted)
Societal perspective					
Peer-led groups	$79.53	$70.32	0.919	0.095	$740
Educational video control	$9.21	––	0.824	––	––
Organizational perspective (excludes participant costs)					
Peer-led groups	$67.18	$60.49	0.919	0.095	$640
Educational video control	$6.39	––	0.824	––	––

Incremental cost-effectiveness is incremental cost divided by incremental effectiveness

ED eating disorder

Discussion

This paper demonstrates the economic value of the *Body Project*, especially when delivered by peer educators. On average, for every $640, a university invests in providing peer-facilitated *Body Project* groups instead of referring women to an educational video, one additional at-risk person will avoid developing an eating disorder over the next 4 years, when the majority of participants (who had a median age of 19 at baseline) were still attending college. Using lower or higher estimates for the value of staff and peer leader time, the incremental cost-effectiveness varied from $383 to $704.

Few studies have examined the fiscal impact of eating disorder prevention. A 2017 systematic review of cost-effectiveness studies for the prevention and treatment of eating disorders (Le et al., 2018) identified four studies with prevention outcomes: three modeled evaluations focusing on adolescents aged 10–18 years (with outcomes measured in quality-adjusted life years, QALYs, saved) and an earlier trial of our *Body Project* intervention (without QALY outcomes). The first study found that obesity prevention was cost-effective, with an incremental cost-effectiveness ratio (ICER) of $18,291 per QALY saved when including only benefits from eating disorder prevention (Wang et al., 2011). A screening intervention for preventing eating disorders reported an ICER of $57,865 per QALY gained (Wright et al., 2014). A cognitive dissonance intervention was associated with an ICER of $71,865 per disability-adjusted life-year saved (DALY), which was not considered cost-effective (Le et al., 2017). The fourth study, which we described in the "Introduction" section, was conducted by our lab (Akers et al., 2017) and found that the clinician-led *Body Project* program cost $70 per participant to deliver and cost $838 for each additional significant reduction in eating disorder symptomology (rates of eating disorder onset did not differ across conditions), which is strikingly similar to the results from the present report. Although numerous studies have found that clinician-led and peer-led *Body Project* groups have produced reductions in eating disorder risk factors and symptoms, a recent meta-analytic review found that the *Body Project* has only produced a significant reduction in future eating disorder onset when groups are facilitated or co-facilitated by peer educators (Stice et al., 2021). We speculate that the fact that participants (average age 22) were more similar in age to peer educators (average age 21) than clinicians (average age 33), likely increased the receptivity to the intervention content for participants.

This program appears to be a good value relative to treatment. Crow and Nyman (Crow & Nyman, 2004) reported that adequate treatment of anorexia nervosa was $119,200; the treatment included 45 days of inpatient hospitalization, 20 days of partial hospitalization, 50 psychotherapy sessions, 20 medication management sessions, and 2 years of fluoxetine at 60 mg/day. Crow and colleagues (Crow et al., 2013) reported that for bulimia nervosa, the cost per abstinent patient was $12,146 for stepped care and $20,317 for cognitive-behavioral therapy (CBT; 18 sessions); for both conditions, costs included mean dollars spent on CBT, self-help materials/programs, medication, physician visits, emergency department visits, hospitalization, individual therapy, group therapy, and medication management. Thus, for the money that would be spent to successfully treat one person with bulimia nervosa with CBT ($20,317), enough peer-led *Body Project* groups could be delivered to prevent the onset of approximately 32 eating disorder cases ($20,317/$640 = 32). Even more impressive, for the cost of successful treatment for one individual with anorexia nervosa, one could prevent 186 eating disorder cases ($119,200/$640 = 186). Although treatment costs vary widely depending on eating disorder diagnosis and treatment, providing peer-led *Body Project* groups rather than usual preventive care would seem to cost less than 2% of the cost required to treat an eating disorder once it develops.

The reported cost analysis may not have not captured the potential value of the *eBody Project*, as there were several favorable long-term outcomes. This ehealth intervention produced significantly greater long-term reductions in risk factors and eating disorder symptoms relative to the video control, although its cost-effectiveness in terms of eating disorder onset prevention was dominated by the peer-led *Body Project* groups. We have not attempted to calculate costs associated with reductions in continuous measures of eating disorder risk factors and symptoms, but the *eBody Project* may be useful for settings that cannot offer facilitated group sessions and to cater to the variable schedules of those who wish to experience the *Body Project*.

Limitations and Future Directions

Study limitations should be noted. First, many cost-effectiveness analyses report their outcomes as QALYs or DALYs, permitting comparison with other potential uses of health care resources. For example, Le et al. (2021) reported health state utility values for a range of eating disorders. However, given limited evidence about the long-term course of eating disorders (Stuhldreher et al., 2012) and challenges in definitively ascertaining recovery (Aaserudseter, 2007), valuation of benefits (as in QALYs) is not yet recommended (Stuhldreher et al., 2012), and the present study did not collect the data necessary for calculating QALYs or DALYs. Second, if individual-level data were available rather than aggregate averages,

cost-effectiveness acceptability curves (Fenwick et al., 2001, 2004) or confidence intervals (O'Brien et al. 1994) could have been estimated. Third, because participants with greater risk for eating disorders were more likely to be lost to follow-up, the study may underestimate rates of future eating disorder onset. Fourth, treatment utilization was assessed by self-report rather than review of medical records and may have been influenced by social desirability or memory factors; calculating physical and mental health care costs from review of electronic medical records is recommended, if possible. Finally, no costs were attributed to the use of university space to hold the group sessions; if an organization did not receive free access to space for the intervention, this cost would need to be included.

Several directions for future research can be offered. First, grant funds covered training costs so that this program could be delivered at no cost to schools; research or policy changes to identify methods of financing training in implementing peer-led eating disorder prevention groups is needed, including ways of reducing training expenses (e.g., by offering training virtually, which would reduce travel costs). Second, research should aim to improve outcomes for the *eBody Project* intervention, which is much less costly to deliver and can be implemented broadly. Third, cost-effectiveness research needs to identify the most effective dissemination methods for engaging and screening individuals to participate in prevention programs, as this information is extremely limited (Moessner et al., 2016). Fourth, continued research and advocacy work are needed to develop and support new infrastructures to pay for prevention programs for youth in the USA (Herman et al., 2020; Kuklinski et al., 2012). Lastly, given the effectiveness of peer-led groups relative to clinician-led groups, research should consider whether other manualized interventions can be task-shifted to non-professional providers. The cost-savings and potential effectiveness of task-shifting could be substantial.

In conclusion, peer-facilitated delivery of the *Body Project* appears to be a cost-effective method for preventing one of the most costly and debilitating behavioral health diagnoses impacting young people, particularly relative to the high cost of treating individuals with eating disorders.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11121-021-01264-1.

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Author Contribution Tasks completed by the authors are as follows: LA conducted the cost analysis, interpreted the findings, and lead the writing of the manuscript. PR, HS, and ES conceived and designed the study for which the cost analysis was conducted, supervised the data acquisition, and revised the manuscript for important intellectual content. All authors read and approved the final version of the submitted manuscript.

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Declarations

Ethical Approval All procedures performed in the study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent Informed written consent was obtained from all participants included in this study.

Conflict of Interest The authors declare no competing interests.

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