

Efficacy Trial of an Innovative Group Theories and Practices and Body Image Academic Initiative for College Students

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Abstract

Aim: To assess the feasibility and impact of an innovative M.Sc. academic course addressing the issue of body image among nutrition students while delivering the course, entitled "Group Theory and Practice".

Design: A non-randomized controlled trial was conducted between 2014 and 2016 to assess a body image intervention that was nested within an academic course (groups-theories and practices) of thirteen 3 hr sessions.

Participants: In total, 72 active students participated in the course, with 67 participants in the control group (mean age=25 years, SD=1.9, 90% females).

Methods: The participants completed computerized scales before the course started and immediately after it ended. The following scales were validated for the local language and used for this study: the Rosenberg Self-Esteem questionnaire, Body Image States Scale, Eating Disorders Inventory, Body Appreciation Scale and Body Esteem Scale. Differences between the pre- and post-outcomes were analyzed with the GLM Repeated Measures Analysis of Variance.

Results: The results revealed statistically significant improvements in the intervention group compared to the control group in terms of Body Image States Scale ($p<0.01$, $\eta^2=0.23$), the Eating Disorders Inventory subscales asceticism and social insecurity ($p<0.01$), the Body Appreciation Scale ($p=0.007$) and the Body Esteem Scale ($p<0.05$, $\eta^2=0.26$).

Conclusions: Meaningful teaching of group dynamics, through experiential participation in a nested body image group, is a powerful strategy to create meaningful teachable moments in group dynamics while also challenging well-being risk factors and addressing protective factors.

Keywords: Innovative education; Body image; Eating-disorders prevention program; College health

Introduction

Internalization of thin-idealized beauty is a culturally stereotyped standard of beauty that is ubiquitously communicated in Westernized societies, and it promotes the sense of body dissatisfaction among youngsters [1]. Body dissatisfaction has been described as one of the most robust and consistent predictors of eating pathology in college female adolescents and young adult women [2,3]. A higher prevalence of eating disorders has been reported in university courses, including physical education and nutrition, in which physical appearance is important. Preoccupation with eating, weight, and body image might be part of the students' personal interest in the subject and results in risky health behaviors [4,5].

Health promotion and health education programs have been conducted in the university setting since the mid-1980s [6,7] to improve students' body image issues. Some have reported significant impacts on the risk factors for eating disorders. Programs usually use a

social cognitive approach (focusing on teaching sessions to provide information about body image and eating disorders, as well as changing thinking or behavioral patterns), media literacy interventions (focusing on promoting a critical evaluation of the media messages and strategies to reduce its credibility and persuasive influence), and dissonance-based body-acceptance features (addressing inconsistency or dissonance between an individual's health beliefs and behaviors) designed to help participants resist cultural pressures to conform to the ideal standard of female and male beauty and reduce their pursuit of unrealistic bodies. Most of these programs are facilitated in groups, and some of them are college-based [6-8]. However, no academic course has explored the impact of creating meaningful teachable moments in group dynamics while addressing body image issues in group relations conferences.

The premise of improving student learning by improving teaching practices using active learning, such as role playing and simulations, is a major challenge [9]. Group relations conferences offer a unique experiential learning experience in which the participants learn through experiencing and emotionally engaging in the topic learned. Both the participants and staff are "observers" who co-create the group

outcome. The participants can observe, experience, conceptualize and learn about issues of power and group facilitation. The conscious and unconscious communications and processes that influence the group leader's and the participants' behaviors and reactions are explored. The purpose is for participants to study their own experiences and behaviors in real time through awareness, analysis, and reflection, as well as understand their perceptions about the focal point (body image) while taking an interpretive stance and attempting to reflect on group dynamics in the moment [10].

This model of learning emphasizes a deep understanding of the "participant role" as well as the "facilitator role"; both roles are important nutritionist professional qualification skills.

This manuscript describes an innovative M.Sc. course that focuses on group theories and practices. The main objective is to assess the feasibility and impact of a real body image group nested in this course as a strategy to improve nutrition students' body image issues. Within each lesson, the class forms a real body image group. The idea for the course emerged when acknowledging that B.Sc. and M.Sc. students found it difficult to fully understand the dynamics and developmental processes that occur in groups and, at the same time, the relevance of body image issues at this age group. The idea was to bring body image issues into the center stage of the academic curriculum as a strategy to achieve deep meaningful learning of group dynamics while confronting body image difficulties.

Methods

Study design and ethical standards

A non-randomized controlled trial was conducted between 2013 and 2016 with 139 nutrition students at Academic College. Approval was granted by the Institutional Research Board of Academic College, and clinical intervention registration was performed (number NCT03211468). All stages of the project aligned with the Declaration of Helsinki. Informed written consent was obtained from all study participants.

Course objectives

- Explore the theory and practices of key dimensions of groups and group facilitation.
- Develop a deep understanding of the dynamics and processes through the participants' own experiences and behaviors as they occur in real time.
- Actively participate in a body image group.
- Develop ideas about how and what can be done to improve body image and the use of groups to apply these ideas later on in their work as nutritionists and group facilitators.

Course structure

The course consists of 39 academic hours, three hours for each of the 13 sessions. Each of the middle 11 sessions consists of three 45-minutes parts. The first part is a 45-minutes frontal lecture focused on group theories. Over the next 45 minutes, half of the students participate in a body image group, while the other half serve as outside observers using structured worksheets.

Each group session started with a "corridor" into the discussed topics using responses from a previous meeting or the home assignments. The day prior to the course, all participants completed a structured exercise that exposed them to the main issues to be discussed or an issue that was discussed and requires practice. In the last 45 minutes, the reflecting part, the observers report their observations, and the whole class discusses the group dynamics that they observed. The professor who teaches this course is highly experienced in developing prevention programs that address the focused issues, as well as teaching and supervising group dynamics.

Course content

The course content, body image group topics and assignment are described in Table 1.

Lesson no	Group topics	Body image topics	Assignments
1	Course objective and assignments.		Baseline questionnaire, before starting
	What is a group? Key concepts & dimensions in groups-theory and examples.		
2	Types of groups	Body image group objectives, expectations and contract.	Scale your body image and describe the manners in which you wish to improve your body images
3	Groups setting, contract and norms	Exploring my relationships with my body.	Write your perception and opinion of your body at ages 6, 10, 13, 16, and today
4	Group cohesion	The impact of the media on our body image	A media literacy exercise with chosen advertisements
5	Group roles	The impact of other's comments on our body image	Write comments from family members or friends (positive and negative) about your body and how you reacted to those comments.
6	Group developmental stages	Cognitive work with negative thinking about appearance	Write 10 negative thoughts about your appearances
7	Group developmental stages	Dissonance-based work to counter thin idealization	Explore the dissonance between your logical thinking and personal values and the statements described.
8	Hidden and exposed dynamics	Dissonance-based work to encounter negative perceptions	Explore the dissonance between your logical thinking and personal values and the statements described.

9	Group leading approaches and coping with contract violation	Mindfulness, self-regulation techniques.	Monitor the usage of self-care activities and self-regulation strategies used during this week.
10	Facilitators skills	Mirror exposure training	Self-monitoring of body image and perceptions during the week
11	Participants' resistance	Mirror exposure training	Practice mirror exposure at home and report on its impact.
12	Addressing resistance	Creating self-body contour	Choose pictures of yourself from different ages and explore the main values that were important to you at each age
13	Closing up	Where you are today on the body image scale and what are your plans for the future? Good-bye letter to the group.	Write a good-by letter to the preoccupation with appearance.

Table 1: Course content, body image group topics and assignment.

Didactic strategies

A variety of methods was used to foster a stimulating, creative, collaborative, and interactive learning community, such as sharing homework assignments, having discussions in pairs, creating visualized tasks in subgroups, and more. The emphasis shifted between experiential learning as a group member to observation and comprehension of the process and the theoretical background. For example, at the beginning of the process, the participants might have asked themselves “What does it mean for me to fill a space in a new group?” or “How do I say things without being hurtful or sounding judgmental?”

The professor modeled group principles and skills, while facilitating the body image group, as well as encouraging the participants to report authentically when they served as outside witnesses. Reflections of this modeling and the strategies used were discussed in each lesson. Other teaching methods included class discussions, videos, and lectures as well as assigned learning activities.

Course assignments

Although this course was an elective, full attendance in the 13 lessons was mandatory. At each session, the students were assigned different body image tasks that were discussed in the coming session or performed after the session, depending on the content (Table 1). Each assignment included an example. Students uploaded the completed tasks to the course website before the start of each lesson. Assignments were previously validated and tested for reliability ($r=0.89$) to ensure that they are relevant to the current population. All assignments were discussed in the body image group. Half of the course's grade was given for the exercises submitted, and half for a multiple-choice exam performed at the course termination. At each session, the observers had to complete and submit a structured observation sheet in which they identified the group dynamics in the body image group (e.g., the focal points, resistances, group norms, and more).

Participants

The intervention group included all course participants. The course was open to all MSc students in the nutritional sciences as well as those who demonstrated excellence during the third year of their BSc in nutrition; these were the only inclusion criteria. In each of the three years reported in this study, only the first 20 students (of 80 students in the department) who signed up for the course were included. No exclusion criteria were used. All other students who requested to sign

up for the course but did not have a spot served as the control group. The control group included those students who applied to participate in the course but were declined because the course was already full and who participated in other elective courses that were unrelated to body image.

Measures

The knowledge and understanding of group dynamics was tested through the final exam. The examination covered only group theories and practices using multi-choice scenario questions.

All participants (control and intervention participants) completed an assessment battery using a computerized system (Qualtrics) before the course started and immediately after it ended. Demographics, including personal and familial details, were obtained from each participant at baseline. The assessment battery included the following scales, which were previously validated in Hebrew.

The Rosenberg Self-Esteem (RSE) questionnaire [11] contains ten items rated on a scale ranging from 1 (strongly disagree) to 4 (strongly agree). The total score is obtained by summing items 2, 5, 6, 8, and 9 being scored oppositely. RSE scores have been shown to demonstrate acceptable internal consistency, test-retest reliability over a 2-week period, and convergent validity [12]. In the current study, the Cronbach reliability score was high, at $\alpha=0.88$

The Body Image States Scale (BISS) [13] measures an individual's evaluative/affective body image states. It is a 6-item scale, with acceptable internal consistency. Scoring of the BISS: The measure is the composite mean of the six 9-point items. The measure should be scored so that the low scores reflect more negative body image states, and the high scores reflect more positive states. Prior to calculating the mean of the six items, reverse score items 2, 4, and 6. In the current study, the Cronbach reliability score was high, at $\alpha=0.85$

The Body Shape Questionnaire BSQ-34 [14], a 34-item self-reported measure of body dissatisfaction cognitions and preoccupation, consists of items rated on a frequency scale of 1 (never) to 6 (always), and it yields a range of total scores from 34 to 204. In the current study, the Cronbach reliability score was $\alpha=0.96$. Factor analysis yielded 3 contents: 15 items about “me and my body” ($97=\alpha$), 15 items “about me in a social context” ($97=\alpha$), and 4 items relating to negative behavior ($52=\alpha$). In our study, the mean Cronbach reliability score was 0.97.

The Eating Disorder Inventory-2 (EDI-2) [15] is a self-reported inventory containing 91 items divided into 11 subscales rated on a 0-4-point scoring system. Three items are specific to eating disorders, and 8

are general psychological scales that are relevant to eating disorders. In the current study, the Cronbach reliability scores ranged from 0.67-0.97, with fear of growing, asceticism, and interceptive observation receiving the lower α values both times.

The Body Esteem Scale for Adolescents and Adults (BES) [16] was used to measure the self-evaluation of physical appearance. A total score was computed, with higher values indicating more positive body esteem. In the current study, the Cronbach reliability score was high, at $\alpha=0.85$.

The Body Appreciation Scale (BAS) [17] is a 13-item self-reported questionnaire reflecting aspects of positive body image. Items were designed to assess the extent to which women (a) hold favorable opinions of their bodies, (b) accept their bodies in spite of their weight, body shape, and imperfections, (c) respect their bodies by attending to their bodies' needs and engaging in healthy behaviors, and (d) protect their body image by rejecting unrealistic images of the thin-ideal prototype portrayed in the media. BAS items are rated on a 5-point scale (1=never, 2=seldom, 3=sometimes, 4=often, and 5=always) and are averaged to obtain an overall body appreciation score. Higher scores reflect greater body appreciation. In our study, the mean Cronbach reliability score was 0.93.

Overall satisfaction with the course was rated by one item, which was scored on a scale of 1 to 5.

Statistical analysis

All analyses were performed using SPSS version 21. The initial power analysis was based on the Body Esteem Scale [15]; the means and SDs of nonathletic participants were used [18]. The change from baseline to post-test scores were estimated using the Body Esteem Scale global score to be a 3-unit decrease for the intervention group. With a sample size of at least 100 total participants, the study should be able to detect a difference as small as 2 units between the groups. Thus, all group comparisons in this manuscript should have enough power to detect differences in physical self-esteem.

Quantitative characteristics are reported using the means and standard deviations, and categorical characteristics are reported using percentages. Chi-squared analyses and t-tests were used to examine baseline differences in demographics between the intervention and control groups.

Variables with balanced SDs in both groups were analyzed with the GLM Repeated Measures Analysis of Variance to detect differences between groups and times, and p values <0.05 were considered to be statistically significant; all tests were two-tailed. Cohen's f^2 was computed to interpret the statistical size of the effects [19]. Values of $f^2=0.02$ or higher were interpreted as a small effect size, values of $f^2=0.15$ or higher as a medium effect size, and values of $f^2=0.35$ or higher as a large effect size. In some measurements, the partial eta squared was computed to assess effect size. Values of $\eta^2<0.02$ were interpreted as a small effect size, 0.13 as a medium effect size, and >0.26 as a large effect size [20].

Results

Sample characteristics

Seventy-two students participated in the intervention group (mean age=25, SD=1.9), and 67 students who were not included in the “first

20 registered” were allocated to the control arm. The sample consisted of 91% females and 9% males (a proportion similar to the ratio of females to males in the dietetic courses in _____). The participants' demographic characteristics are described in Table 2. The sample was representative of the larger academic population of the nutrition department at _____, in terms of ethnicity (3% Arabs and 97% Jewish), and most students (70%) were of middle socioeconomic status, according to parental education and reports on the number of rooms and cars at home. At baseline, no differences in the demographic characteristics or in the other variables were observed between the participants in the intervention and control groups (Tables 2 and 3).

Characteristics	Intervention	Control	p
	N=72	N=65	
Family status			
Single	61.70%	73.80%	p=0.69
Married or living with a partner	38.30%	26.20%	
Siblings (number)	3.47 (1.41)	(2.15) 3.82	p=0.12
Birth order			
Eldest	38.60%	24.60%	p=0.27
Middle	31.40%	46.20%	
Younger	27.10%	29.20%	
Only	2.90%	0%	
Military service			
Yes	85.70%	89.20%	p=0.68
Religion			
Religious	7.10%	7.70%	p=0.53
Traditional	27.10%	20%	
No	65.70%	72.30%	
Sports as a hobby			
Yes	65.70%	58.50%	p=0.62
Intensity of exercising (Mean hours/week)	4.62	4.43	p=0.66
	-2.2	-2.3	-
Body image perception	1.99	2.09	p=0.38
	-1.04	-1.43	-
History of hospitalization due to eating disorders	2.40%	3.10%	p=0.48

Table 2: Demographic characteristics of the study participants (Frequencies, Means, and Standard Deviations).

Measurement	Cut-off points and comparison means for classifying scores	Intervention group N=72	Control group N=65	p
Self-esteem (Rosenberg scale)	Score of 20 or more=extremely high (Yager et al.) [8]	23.57 (4.8)	23.55 (5.4)	p=0.98
Body Appreciation Scale (BAS)	3.46 (0.76) (Kosmidou et al.) [21]	3.65 (0.75)	3.43 (0.7)	p=0.13
Body Image States Scale (BISS)	5.11 (1.10)	5.10 (0.54)	5.09 (1.3)	p=0.12
Body Shape Preoccupation (BSQ-34)	Score <80- no shape concern 80-110-mild concern Over 140- marked concern (Coyne et al.) [22]	78.5 (34.6)	80.6 (33.2)	p=0.41
Body Esteem Scale (Mendelson)	2.33 (0.61) (Kosmidou et al.) [21]	2.13 (0.64)	2.11 (0.7)	p=0.56
Mean EDI scores	Danish population (Rouveix et al.) [18] _____ population (Avalos et al.) [17]	-	-	-
EDI2_Drive for thinness	3.76 (5.5)	4.48 (5.16)	4.93 (6.1)	p=0.65
	5.1 (5.61)			
EDI2_Bulimia	0.8 (2.1)	1.6 (2.5)	1.8 (3.5)	p=0.67
	1.86 (2.9)			
EDI2_Body dissatisfaction	8.78 (8.2)	6.5 (6.6)	6.25 (6.7)	p=0.83
	8.29 (7.64)			
EDI2_Ineffectiveness	2.22 (4.1)	2.26 (3.9)	2.5 (3.7)	p=0.63
	3.43 (4.33)			
EDI2_Perfectionism	2.81 (3.4)	6.38 (4.2)	5.12 (3.8)	p=0.77
	5.66 (3.93)			
EDI2_Distrust	1.63 (2.7)	2.19 (2.8)	1.68 (2.0)	p=0.24
	4.03 (3.5)			
EDI2_Introceptive awareness	3.0 (3.9)	3.20 (3.7)	3.65 (3.4)	p=0.49
	4.05 (4.42)			
EDI2_Fear of growing	2.4 (2.9)	3.0 (3.15)	3.49 (3.3)	p=0.38
	5.9 (4.0)			
EDI2_Asceticism	2.31 (3.8)	2.34 (2.3)	2.69 (2.7)	p=0.38
	5.4 (3.58)			
EDI2_Impulsiveness	1.8 (3.3)	1.97 (3.3)	2.03 (3.1)	p=0.91
	4.0 (4.66)			
EDI2_Lack of confidence	2.54 (3.2)	2.0 (2.4)	1.98 (2.5)	p=0.97
	3.11 (3.44)			

Table 3: Baseline differences between participants in the intervention and control groups (Means and Standard Deviations).

The mean self-esteem was 23.5 (SD=5) in both the intervention and control groups, which corresponds to high self-esteem. All other scores assessing different aspects of body image and disordered eating perceptions and behaviors corresponded to the means reported by the normal college population, and did not demonstrate any extreme pathologies [23,24].

Changes from baseline to course conclusion

Knowledge of group theory: The knowledge and understanding of group dynamics was tested through the final exam. The mean score during the 3 years was 89.5 (6.2) in the intervention group (the control group took a different elective course).

Self-esteem: A significant improvement (increased score) in self-esteem was noted across time $F(1, 110)=5.69, p<.05, \eta^2=0.049$, with superiority in the intervention group. However, the interaction effect between group X time did not reach statistical significance, $F(1,110)=1.54, p=0.21$ (Figure 1).

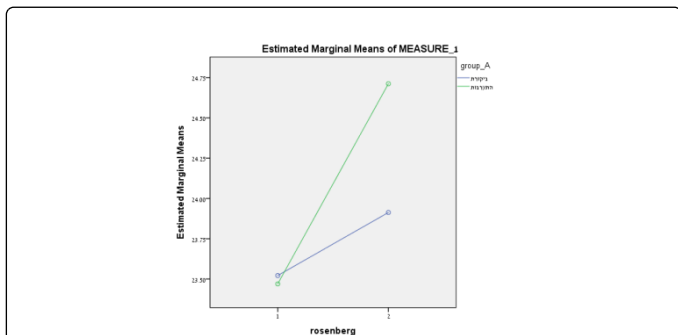


Figure 1: Change in Rosenberg self-esteem mean scores in the intervention and control groups.

Body image: The Body Image States Scale. A statistically significant effect of time was noted for the BISS $F(1,77)=22.95, p<0.01, \eta^2=0.23$. A statistically significant effect of the interaction between group X time was also noted, with only the intervention group demonstrating improvement (increase) in BISS with a large η effect size $F(1,77)=25.53, p<0.01, \eta^2=0.25$ (Figure 2). The participants who were married and did not have a history of eating disorders demonstrated a greater improvement: $\chi^2(19)=72.71; p=0.000, ICC=76%$ (63%, 86%).

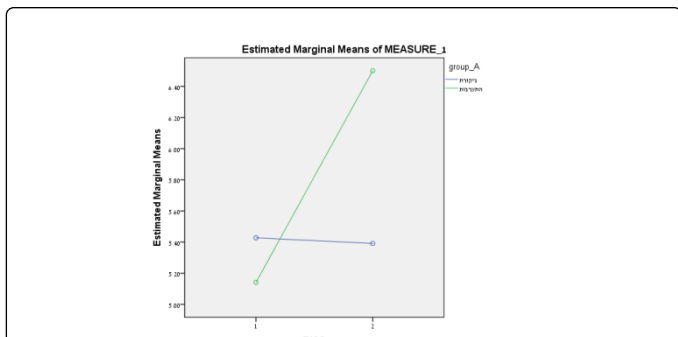


Figure 2: Changes in the mean scores of body image states in the intervention and control groups.

The Body Shape Questionnaire. At baseline, no extreme body shape concerns were reported by the participants in either group, although their scores ranged between no concerns (<80) and mild concerns (80-11). Participants in the intervention group demonstrated a decrease (improvement) of 4.3 units in body shape preoccupation, although this result was not statistically significant. No change in BSQ was noted in the control group (Figure 3). The participants who were married and did not have a history of eating disorders demonstrated a greater improvement after the course. The model of this moderator was statistically significant: $\chi^2(19)=44.79; p=0.000, ICC=78%$ (68%, 85%)

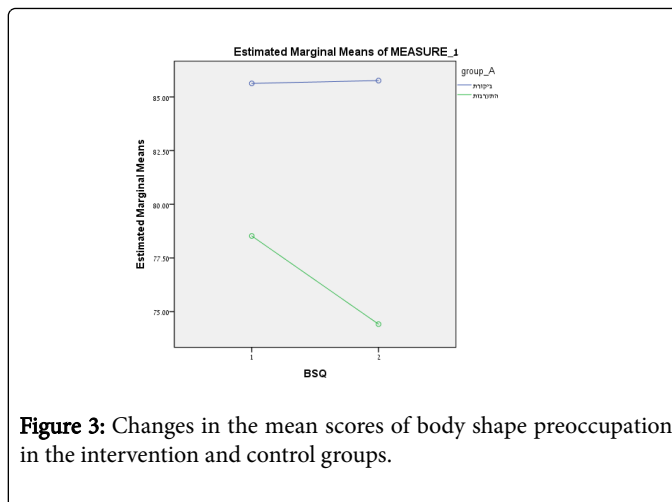


Figure 3: Changes in the mean scores of body shape preoccupation in the intervention and control groups.

Body esteems Scale. This variable was tested only in the last group of students; therefore, it is controlled only by the baseline values of the intervention group. A statistically significant effect of time with large effect size was observed in the intervention group, $F(1,19)=6.34, p<0.05, \eta^2=0.26$.

Body appreciation Scale. A significant improvement in a 0.5-unit increased score was noted in the intervention group compared to the control group, $B(SE) 0.49(0.18); p=0.007$ (Figure 4). The statistically significant model $\chi^2(19)=36.43; p=0.009, ICC=76%$ (63%, 86%) indicated that the participants who were married and had no history of eating disorders demonstrated greater improvements.

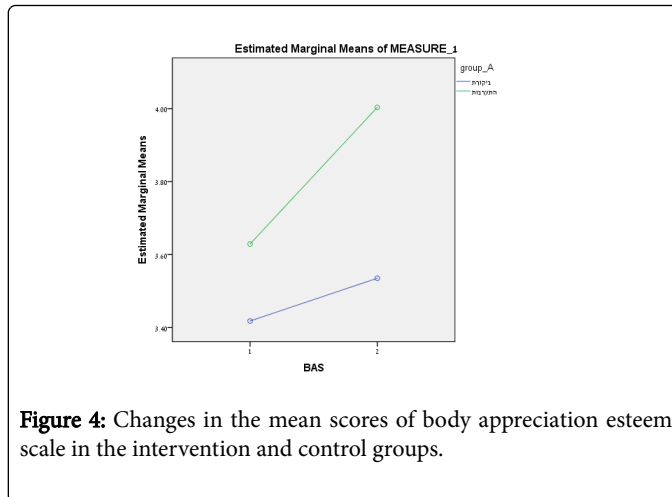


Figure 4: Changes in the mean scores of body appreciation esteem scale in the intervention and control groups.

Eating disorders inventory. Although all subscales improved (decreased) only in the intervention group, after the course conclusion, only two of the 11 subscales of EDI demonstrated a statistically significant improvement.

For example, in terms of body dissatisfaction, although the differences between the intervention and control groups were not statistically significant, $F(1,108)=2.60, p=0.1$, an improvement in body dissatisfaction was only observed in the intervention group at course conclusion (Figure 5). With respect to perfectionism, no statistical significance was noted in the interaction time X group, $F(1,108)=2.67, p=0.1$, however, a larger decrease (improvement) was demonstrated by the intervention group (Figure 5).

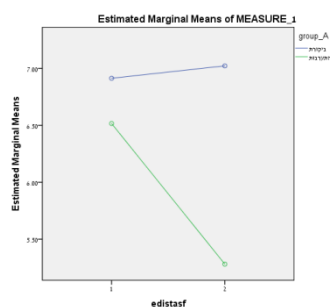


Figure 5: Changes in the mean scores of edi body dissatisfaction subscale in the intervention and control groups.

In terms of asceticism, $B (SE)=-0.73 (0.34)$; $p=0.031$, the statistically significant model $\chi^2(19)=36.43$, $p=0.009$, $ICC=76%$ (63%, 86%) indicated a greater decrease (improvement) in the intervention group. The participants who were married and had no history of eating disorders demonstrated greater improvements.

In terms of social insecurity, $B (SE)=-1.01 (0.38)$, $p=0.009$, a significant improvement was demonstrated in the intervention group compared to the control group. The statistically significant model $\chi^2(19)=95.17$, $p=0.009$, $ICC=47%$ (26%, 68%) indicated a greater decrease (improvement) in the intervention group. The participants who reported higher levels of physical activity showed less improvement at the course conclusion.

Discussion

This study aimed to assess the impact of a meaningful teaching strategy in an academic course on students' body image outcomes. The external frame of the course focuses on group theories and practices and within it, a real body image group was nested. The nesting strategy and the live body image group was expected to provide a deep learning of group dynamics and contribute to participants' positive body image. The average marks of participants in this course in these 3 years demonstrated high knowledge and understanding of the theories and practices learned.

The discussion will focus on the changes (between the pre-course and post-course measurements) in body image, self-esteem and eating disorders outcomes, which were assessed using a controlled efficacy study.

Although the initial scores of the studied population demonstrated high self-esteem and no significant eating disorder characteristics or extreme body image and preoccupation status, the course participants demonstrated statistically significant superiority improvement in the Body Image State Scale, EDI asceticism and social insecurity scales, Body Appreciation Scale, and Body Esteem Scale.

In this study, the improvement (increase) in the Body Image State Scale was greater than that published by Carraro et al. [25] ($n=295$), who used this measure to assess the impact on individuals (in the same age group) after one session of physical activity intervention. They reported a change in scores from 5.53 (1.09) to 5.97 (1.13) ($p=0.05$), while in our study, it increased to 6.40, with a large effect size. Fletcher [26] have reported a similar change when twenty-one female college students were introduced to a single-session intervention (body

massage). A decrease of 4.3 units in body shape preoccupation was noted in the intervention group, although the difference was not statistically significant, and it was similar to the reports by others [27]. Nevertheless, Franko and Edwards [28] have reported an 11-unit improvement in the BSQ following a 2-hour CD-ROM prevention program and a 2 hr discussion session among Latina college women. Paired sample t-tests indicated significant changes from baseline on the BSQ ($p=0.006$), as well as on body dissatisfaction ($p<0.001$) in the EDI subscale [28]. Comparable to our study, the authors did not observe a significant reduction in the EDI for thinness subscale and observed a 2.4-unit reduction in body dissatisfaction. In our study, a 1.3-unit reduction in body dissatisfaction was observed; however, this finding was not statistically significant. Mitchell et al. [29] have used yoga as the primary intervention for preventing eating disorders in 93 undergraduate females (mean age, 19.56 years). After six weekly 45-minute yoga sessions, no statistically significant decreases were found for disordered eating ($p>0.05$), drive for thinness ($p>0.05$), or body satisfaction ($p>0.05$) [29]. In contrast to the studies mentioned above, our results revealed statistically significant improvements in the EDI subscales for asceticism and social insecurity, measures that are rarely used in prevention program assessment. The lack of statistical significance in other EDI subscales, despite showing meaningful improvements, may be due to high standard deviations, which are common in these measures [23].

In terms of the protective factors, the program revealed statistically significant improvements in the Body Appreciation Scale and the Body Esteem Scale, which is an important contribution, as previous studies have demonstrated that for both women and men, higher levels of body appreciation correspond to greater perceived self-attractiveness and lower body dissatisfaction [30].

In terms of body esteem, Kosmidou et al. [31] have reported that in a 3-month prevention program, repeated measures analysis revealed significant interactions between perceived body esteem and time, Pillai's trace=0.20, $F(1,45)=11.10$, $p<0.01$, and partial eta squared=0.15 (medium effect size). The Body Esteem Scale increased by 0.12 units, while in our research, it increased by 0.24 units (10%) with a partial $\eta^2=0.25$, which is a large effect size. Protective factors can reduce the likelihood of maladaptive outcomes (for example, eating disorder symptomatology) by decreasing these outcomes directly, preventing the initial occurrence of a risk factor (for example, internalization of sociocultural beauty standards), interacting with a risk factor to interrupt its deleterious effects, and by disrupting the mediational chain through which a risk factor operates. The significant improvement demonstrated in this study, both in the reduction of risk factors and in increased protective factors, may be attributed to several factors. First, the active learning used a real body-image group. Second, the study used combined common strategies to address body image issues, such as changing thinking or behavioral patterns using cognitive-behavioral strategies, developing critical evaluation of media and culture messages through media literacy strategies, and endorsing dissonance-based body-acceptance components.

Future study may extend the understanding by performing mediating assessment to explore the unique impact of each strategy employed.

Study strengths and limitations

The current study challenges the conclusions of a recently published meta-analysis [32] suggesting that interventions produced a small-to-

medium improvement in body image ($d=0.38$). However, the effect size for body image was inflated by bias both within and across studies and, while reliable, was of small magnitude.

The primary strength of this study is that it demonstrates the ability of a meaningful deep educational approach to influence not only students' knowledge but also their body image perceptions and reactions. The experimental nature of this study should also be highlighted. Although random assignment to intervention and control groups was not performed, the group allocation was not influenced by the research team but rather by the order of the students' registration for the course. However, the inclusion criteria of this course limit the widespread application of these health education initiatives to university students.

Moreover, the sample size calculation was performed according to the Body Esteem Scale; however, it seems that it was not large enough to overcome the high variability that was demonstrated in many of the measured variables. The small sample size might have also contributed to bias due to the tendency for estimates of the intervention effects to be more favorable in smaller studies [33]. Although the internal validity of most measures was high, some had lower internal consistency, likely due to the length of the questionnaire. Cultural backgrounds were not investigated, and additional mediating analysis should be performed.

Conclusions

Body dissatisfaction has been described as one of the most robust and consistent predictors of eating pathology in college students [33,34]. Enterprises, such as an innovative education course that incorporates meaningful education, challenges well-being risk factors, and addresses protective factors for body image disturbances, are promising developments in this domain. The described course uses an experiential and analogized approach during the course sessions and may be an effective addition to the traditional psycho-educational approach, primarily in academic settings, where students are prone to eating disorders. Moreover, nutritionists may adopt ideas addressing body-image issues in their practices and then apply them in their experiential body image groups.

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