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Transdiagnostic treatment (UP-A) on shame, self-criticism, emotional eating and emotional dysregulation in obese adolescents: A randomized controlled trial

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ABSTRACT

Background: The present study aimed to investigate the effectiveness of Unified Protocol for Transdiagnostic Treatment – adolescent version- on shame, self-criticism, emotional eating and difficulties in emotion regulation in adolescents suffering from obesity. *Method:* In a randomized controlled trial, 30 female adolescents were recruited by convenience sampling from three nutrition clinics and randomly allocated to intervention and control groups. The experimental group went through 16 weekly treatment sessions of UP-A. Both groups were assessed at pre-tests and re-assessed after the intervention and 3 months follow-up. Body image shame scale, difficulties in emotion regulation scale, self-criticizing and reassuring scale, and emotional eating subscale of Dutch eating behavior questionnaire, and were used to measure body shame, self-critical attitudes, emotional eating, and emotional dysregulations, respectively. *Results:* Mixed analysis of variance (P-value <0.05) showed that UP-A significantly reduced body shame (F=19.28, P=0.00, η2=0.40), self-criticism including {inadequate Self (F=11.22, P=0.00, η2=0.28), Hated Self (F=9.66, P=0.00, η2=0.25), Reassuring Self (F=11.01, P=0.00, η2=0.28)}; emotional eating (F=13.94, P=0.00, η2=0.33) and difficulties in emotion regulation (F=10.41, P=0.00, η2=0.27) in teens with obesity. *Conclusion:* The findings suggest that UP-A treatment offers a promising avenue through which emotional problems could be alleviated in obese adolescents.

Keywords: obesity, unified transdiagnostic treatment, shame, self-criticism, emotional eating, emotion regulation

1. INTRODUCTION

Obesity, a global pandemic, is construed as one of the most problematic issues in the world that its prevalence tends to have a dramatic rise (Abarca-Gómez

et al., 2017). According to the World Health Organization (WHO), approximately 13% of the world's adult population and 18% of adolescents were obese in 2016. In a recent review among Iranian adolescents, the prevalence of obesity has been reported 11% percent (Sarokhani et al., 2020). The issue of obesity is of prominent importance during adolescence as this period is known to bear poorer psychosocial outcomes (Buttitta et al., 2014), and particular vulnerability for obesity development into adulthood (Kaur et al., 2005; Ghafouri et al. 2021). This period is known by a preoccupation with changing body and sensitivity to social evaluation (Somerville, 2013). During social interactions, obese adolescents experience degradation and ridicule, go through weight-based victimization (Pont et al., 2017), and experience shame (Brewis & Bruening, 2018). The imposed weight stigma on obese individuals results in a sense of inferiority, self-criticism and body shame [Body Shame (BS)] (Ferreira et al., 2013).

The occurrence of more shame experiences in obese adolescents has been frequently articulated in the literature (Iannaccone et al., 2016; Smith et al., 2014). In trying to conceptualize BS researchers have recognized the perception of negative judgments and evaluation by others regarding physical appearance (Duarte et al., 2015). Evaluation of shaming physical appearance could be internalized to the extent that one judges the self in the same failing manner (Gilbert, 1998). Hence, self-criticism (self-criticism (SC)) may appear as a defensive strategy against rejecting shaming attitudes (Gilbert & Irons, 2005). Previous research has shown a positive association between SC and BS and dissatisfaction (Kelly & Carter, 2013). Accordingly a reversed association was shown between self-compassion and high BMI (Kachooei et al., 2018). In addition, it has been found that Shame-based SC undermines self-regulation of eating behavior (Duarte et al., 2017).

One of the eating behavior disturbances seen in adolescence is emotional eating (Vandewalle et al., 2014). Emotional eating (Emotional eating (EE)), a tendency to over eat when facing negative emotions, (Van Strien & Ouwens, 2007) is explained as a coping mechanism to wipe out the experienced troubles (Kaplan & Kaplan, 1957). Thus, among individuals suffering from shame, food, and calorie intake may act as a self-enhancing strategy to bolster self-esteem that is why EE is known to serve as an emotion regulation (emotion regulation (ER)) strategy (Chao et al., 2012). Studies have shown difficulties in emotion regulation strategies like lack of emotional clarity or non-acceptance; uniquely contribute to emotional eating (Gianini et al., 2013). Seminal work by Vanderwalle et al., (2016) suggests that adolescents who use higher maladaptive ER strategies report higher EE (Vandewalle et al., 2016). As this happens in the absence of hunger and beyond the saturation point, it leads to weight gain during the time (Kubiak et al., 2008). Similarly, other research has shown the relation of EE to obesity in adolescent (Glisenti & Strodl, 2012). So far, many efforts have been made to treat the psychological correlates of obese people. Virtually all of the research conducted in the area of obesity have used disorder-specific protocols like CBT (Corstorphine, 2006), DBT (Souza et al., 2019), ACT (Forman & Butryn, 2015), schema therapy (Shams Azar et al., 2018), but none has targeted common core mechanisms, while, adopting a protocol like Unified protocol for transdiagnostic disorders which puts emphasis on equipping patients with extended, transdiagnostic skills like ER skills may have additive value and overcome the limitations inherent in other approaches(Shams Azar et al., 2018).

Research has revealed the effectiveness of UP on ER difficulties in those with eating disorders (Rahmani et al., 2017). Drawing from research with the UP in adult samples, Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Adolescents (UP-A) has been developed (Ehrenreich-May et al., 2017). Prior to the present study, the UP-A had been empirically investigated in a range of problems in adolescents and has led to significant improvements (Grossman et al., 2020; Sherman et al., 2018). However, no study to date has examined the effectiveness of UP-A in adolescents' obesity. While emotion regulation difficulties are common among obese individuals and emotional eating bears a health burden. Apart from that, we encountered a paucity of research in treating BS and SC in obese individuals. This shortcoming is surprising in that several lines of evidence concur that shame may be an especially important experience during adolescence (Spero, 1984; Wang & Sang, 2020) and incorporated in a shameful experience are self-critical cognitions (Gilbert & Miles, 2009). As these cognitions have triggering and perpetuating role in emotional disturbances (Boersma et al., 2015), they could bean important target for intervention. Based on what has been said, the aim of the present study is to investigates the effectiveness of UP-A on BS, SC, EE, and DER in obese adolescents (Duarte et al., 2015).

2. MATERIAL AND METHOD

Sample Size Calculation

To distinguish the difference between two groups with a two-tailed α of 0.05 and a (1-β) of 0.80, 15 patients in each group were needed. We allocated 20 patients in each group, given 25%-30% anticipated dropout.

Participants

In this randomized controlled trial with parallel groups, female adolescents seeking treatment for their obesity from three nutrition clinics in Tehran in 2021were selected by convenience sampling. Only the participants known to be obese (equal to or above the

95th percentile) according to the center for disease and prevention (CDC) criteria for BMI-for-age classification, were included in the study. At first step, Psychiatric interview was fully run for the sake of screening inclusion and exclusion criteria. Inclusion criteria were (1) Age between 12 to 18 years (2) Absence of a current or lifetime eating disorder according to the 5th Diagnostic and statistical manual of mental disorders (DSM-5) (3) No dependency on or abusing substance or alcohol (4) Absence of severe psychiatric disorder (schizophrenia, pervasive developmental, bipolar type 1 and 2, obsessive compulsive disorder, suicidal or homicidal ideation or plan. Exclusion criteria were (1) Receiving weight-loss medication (2) Candidate of bariatric surgery (3) Receiving concomitant psychological treatment or 6 months prior to the study (6) Simultaneous use of other psychiatric medication. Assessments were applied at three points, pre-intervention, post-intervention and at 3-months' follow-up.

Ethical approval

All patients were informed of the voluntary nature of the study and signed a written informed consent before participation. The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki. This trial was registered at the Iranian Registry of Clinical Trials (number: IRCT20210101049908N1) and was approved by the Research Ethics Committee of this university (approval code: IR.SBMU.MSP.REC.1399.488).

Intervention

The UP-A is an extension of the UP, modified for adolescents (ages 13 to 18) and it emphasizes 5 core treatment principles: (1) enhancing present-focused awareness of emotions; (2) introducing cognitive flexibility; (3) preventing emotional avoidance and managing maladaptive emotion-driven behaviors; (4) developing emotional awareness and establishing awareness of physical sensations (5) facilitating situation based emotion exposure. Participants engaged in 16 sessions. UP-A core modules of the treatment are displayed in table 1. Eight core modules of UP- A are presented in table 1.

Table 1 UP-A Core Modules

Module 1: Orienting to Treatment and, Enhancing Motivation, Building and keeping motivation, building rapport, Goal setting, identifying barriers
Module 2: psychoeducation of emotions, identifying emotions and their functions, and three components of emotional experiences
Module 3: Introduction of opposite action, tracking emotions and conducting emotion focused behavioral Experiments
Module 4: Awareness of Physical, Sensations and their relations to strong emotions body scanning and interoceptive exposures
Module 5: introducing cognitive flexibility, teaching the concept of "traps of thoughts", cognitive reappraisals and problem solving
Module 6: present- moment and nonjudgmental emotional Awareness
Module 7: Situation-Based Emotion Exposures
Module 8: Relapse Prevention and review skills

Measurements

The *body image shame scale (BISS)* is a 14-item questionnaire assessing negative, threatening evaluations about body. Each item is scored on a five-point likert scale (0 = never to 4 = almost always). Evidence has been provided in support of a very good internal reliability with a Cronbach's alpha 0.92 (Shams Azar et al., 2018). Suitable test-retest reliability above 0.70 in Iranian population has been shown (Khanjani et al., 2020).

Self-Criticizing/ attacking & self- Reassuring Scale (SCRS), assesses the extent to which people self-evaluate as demeaning when things go wrong. It is composed of 22 items and two factors of self-criticism (feeling inadequate & self-hating) and one factor of self-reassurance. Scoring is based on a 5-point likert scale ranging from 0 ("not at all like me"), to 4 ("extremely like me"). Prior research shows Cronbach's alpha 0.89, 0.80, 0.84 for inadequate-self, hated-self and reassured-self respectively, in obese individuals (Duarte et al., 2019). SCRS has been found to demonstrate good test–retest reliability, 0.85 for self-criticism and 0.81 for self-reassurance in Iranian population (Ghahremani et al., 2020).

Difficulties in emotion regulation scale (DERS) is a 36-item self-report questionnaire assessing emotional dysregulations. Scoring is done by summing the items on a 5-point likert scale ranging from 1 (almost never applies to me) to 5 (almost always applies to me) DERS. Questions provide a total score ranging from 36 to 180. Previous studies have emphasized high internal consistency of DERS within both clinical (Gratz & Roemer, 2008) and nonclinical population (Johnson et al., 2008). The Persian version of this scale has also shown good internal consistency (0.90) (Mazaheri, 2015).

Emotional eating (EE) subscale of the Dutch Eating Behavior Questionnaire- child version (DEBQ) was used. The subscale consists of 13 items between the age of 7 and 17 years. Items are rated on their frequency of occurrence on a Likert scale from (1 = never to 5 = very often) higher scores indicate eating not only in response to hunger, but also in case of being emotional. Research revealed good internal consistency, and test–retest reliability.

3. RESULTS

Fifty-four adolescents were interviewed by a clinical psychologist during their visit to nutrition clinic and screened for eligibility. Eleven participants failed to meet initial study inclusion criteria and four patients declined to participate. Thirty-nine patients were randomized and allocated in UP-A (N=20) and control group (N=19). In the UP-A group, two patients discontinued during the first three sessions due to their parents' disinclination, and three were sent for bariatric surgery based on their nutritionist's diagnosis. In control group, one patient went on medication and three discontinued. Finally, thirty patients fully participated in the study (figure 1). Demographic characteristics of participants are shown in the Table 2.

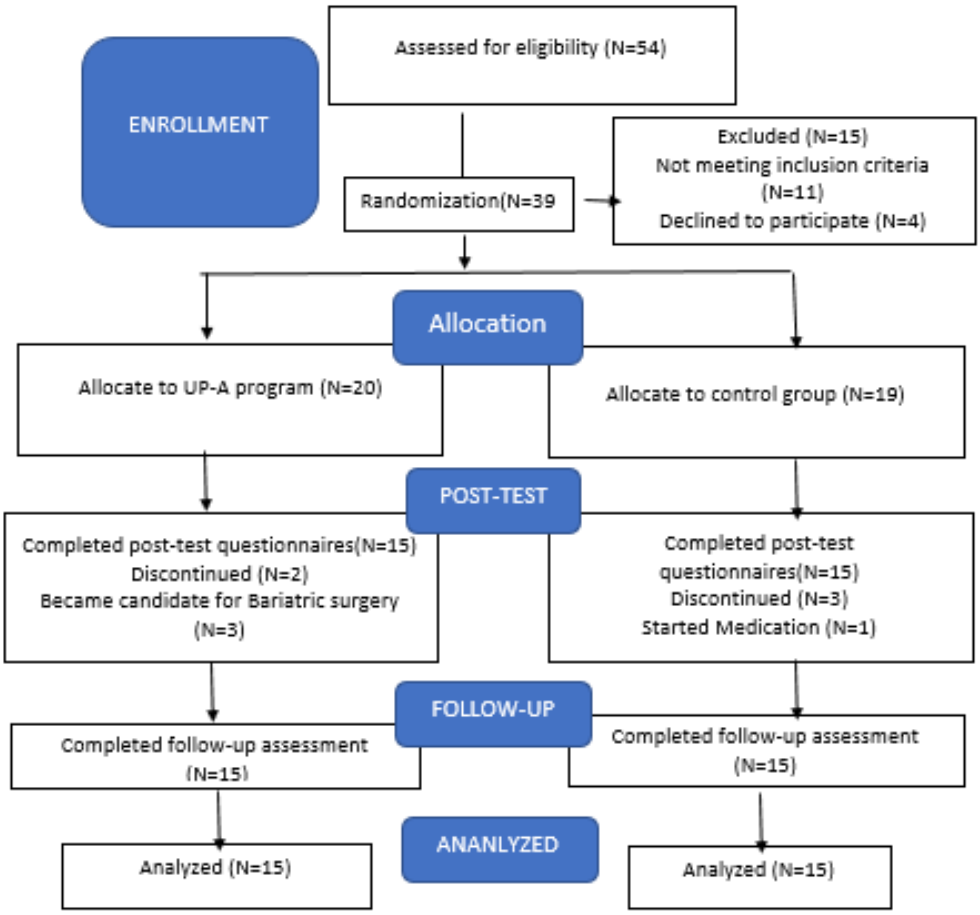

Figure 1 Flow Chart of study procedure

Table 2 Demographic characteristics of Participants

Variable		UP-A N (%)	Control N (%)	UP-A Mean (SD)	Control Mean (SD)
Grade	7	4 (26.66 %)	3 (20 %)		
	8	3 (20 %)	4 (26.66%)		
	9	3 (20 %)	2 (13.33 %)		
	10	2 (13.33 %)	3 (20 %)		
	11	2 (13.33 %)	2 (13.33 %)		
	12	1 (6.66%)	1 (6.66%)		
Age	13	4 (26.66 %)	3 (20 %)	14.87 (1.64)	15.00 (1.60)
	14	3 (20 %)	4 (26.66 %)		
	15	3 (20 %)	2 (13.33 %)		
	16	2 (13.33 %)	3 (20 %)		
	17	2 (13.33 %)	2 (13.33 %)		
	18	1 (6.66%)	1 (6.66%)		
Weight				79.93(12.14)	76.40 (8.30)
BMI				30.56 (2.41)	30.21(2.81)

NOTE: UP-A: Unified Protocol for Transdiagnostic Treatment-Adolescents

No significant differences were found on Chi square tests and independent *t*-tests between the two groups in grade (χ2=0.686, P=0.984), age ($t_{(28)}$=-0.22, P=0.82), weigh ($t_{(28)}$=0.930, P=0.360) and BMI ($t_{(28)}$=0.362, P=0.720). At baseline assessment there no significant differences were found between these groups in BISS ($t_{(28)}$= 0.36, p = 0.72); SCRS {(In.S $t_{(28)}$= 0.76, p = 0.45), (Re.S $t_{(28)}$= 0.06, p = 0.94), (H.S $t_{(28)}$= 0.54, p = 0.59)}, EE ($t_{(28)}$= 0.49, p = 0.62),(H.S $t_{(28)}$= 0.54, p = 0.59) and DERS ($t_{(28)}$=-0.8, p = 0.42). Means and standard deviations of dependent variables at 3 phases of study (pre, post and follow-up) are resented in Table 3.

Table 3 Means and Standard Deviations of Variables in Pre-treatment, Post-treatment, and Follow-up Assessments

Variables	Condition		Pre-treatment Mean _(SD)	Post-treatment Mean _(SD)	Follow up Mean _(SD)
BISS	UP-A		42.46 (1.8)	28. 2 (6.87)	30.13 (6.95)
	Control		44.6 (6.21)	43.33 (6.75)	45.26 (7.66)
SCRS	UP-A	In.S	27.02 (5.53)	17.06 (3.34)	18.53 (3.92)
		Re.S	12.93 (3.59)	22.8 (4.03)	21.6 (3.68)
		H.S	13.33 (3.73)	6.73 (2.78)	7.93 (3.23)
	Control	In.S	25.93 (3.32)	24.86 (4.8)	25.93 (3.32)
		Re.S	12.80 (6.64)	14.2 (6.02)	12.33 (6.22)
		H.S	12.66 (2.91)	11.4 (3.01)	13.6 (3.6)
EE	UP-A		49.66 (9.13)	34.06 (7.64)	35.06 (6.05)
	Control		48.26 (6.14)	46.53 (6.17)	50.06 (5.71)
DERS	UP-A		128.93 (18.26)	96.93 (17.60)	102 (15.62)
	Control		127 (9.96)	121 (12.47)	129.86(15.76)

UP-A: Unified Protocol for Transdiagnostic Treatment-Adolescents

BISS: Body Image Shame Scale

EE: Emotional Eating

SCRS: Self-Criticizing and Reassuring Scale

DERS: Difficulties in Emotion Regulation Scale

In.S: inadequate Self`

Re.S: Reassuring Self

H.S: Hated Self

Note: (P<0.05)

Mixed Analysis of Variance was adopted to determine the effect of UP-A. Data were tested to meet parametric assumptions. Normality assumption was assessed by Shapiro-Wilk test. Distribution of scores were normal in both UP-A and control groups for BISS (Z=0.91, P=0.18; Z=0.92, P=0.22), SCRS {In.S (Z=0.95, P=0.57; Z=0.85, P=0.01), (H.S(Z=0.92, P=0.22; Z=0.96, P=0.72) , (Re.S (Z=0.94, P=0.41; Z=0.89, P=0.09), EE (Z=0.91, P=0.18; Z=0.92, P=0.22) and DERS (Z=0.95, P=0.6; Z=0.9, P=0.1). Levene's test showed homogeneity of variances for BISS (F=0.93, P=0.34), SCRS {(In.S (F=3.32, P=0.07), Re.S (F=12.91, P=0.001), H.S (F=2.25, P=0.14)}, EE (F=3.71, P=0.60) and DERS (F=43.4, P=0.04). However, sphericity assumption was not met: BISS (Mauchly's W=0.65, P=0.001); SCRS {In.S (Mauchly's W=17.76, P=0.015), Re.S (Mauchly's W=16.86, P=0.41), H.S (Mauchly's W=9.37, P=0.021)}; EE (Mauchly's W=0.65, P=0.003) and DERS (Mauchly's W=0.59, P=0.001).Thus Greenhouse-Geisser correction was used.

Table 4 Mixed Analysis (repeated measure of Variance) for Shame, Self-criticism, Emotional eating and difficulties in emotion regulation strategies Scores with Greenhouse- Geisser Correction

Variables		Statistical Indices		SS	df	MS	F	P Value	Eta square
BISS		Within group	Time	980.86	1.26	774.27	60.56	0.001	0.68
			Time*group	845	1.26	667.02	52.17	0.001	0.65
			Error	453.46	35.47	12.78			
		Between group	Group	2624.40	1	2624.40	19.28	0.001	0.40
			error	3810.26	28	136.08			
SCRS	In.S	Within group	Time	486.60	1.39	349.94	40.95	0.001	0.56
			Time*group	454.67	1.39	326.54	38.21	0.001	0.57
			Error	332.66	38.93	8.54			
		Between group	Group	577.60	1	577.60	11.22	0.002	0.28
			error	1441.46	28	51.48			
	Re.S	Within group	Time	508.95	1.55	327.71	67.80	0.001	0.70
			Time*group	388.86	1.55	250.39	51.80	0.001	0.64
			Error	210.17	43.48	4.83			
		Between group	Group	810	1	810	11.01	0.003	0.28
			error	2058.88	28	73.53			
	H.S	Within group	Time	233.48	1.62	143.51	32.26	0.001	0.53
			Time*group	173.88	1.62	106.88	24.02	0.001	0.46
			Error	202.62	45.55	4.44			
		Between group	Group	233.61	1	233.61	9.66	0.004	0.25
			error	677.11	28	24.18			
EE		Within group	Time	1212.08	1.48	816.49	55.81	0.001	0.66
			Time*group	1169.15	1.48	787.57	53.83	0.001	0.65
			Error	608.08	41.56	14.62			
		Between group	Group	1698.67	1	1698.67	13.94	0.001	0.33
			error	3410.71	28	121.81			
DERS		Within group	Time	5543.35	1.42	3883.18	58.19	0.001	0.67
			Time*group	3946.20	1.42	2764.35	41.42	0.001	0.59
			Error	2667.11	39.97	66.72			
		Between group	Group	6250	1	6250	10.41	0.003	0.27
			Error	16806.49	28	600.23			

UP-A: Unified Protocol for Transdiagnostic Treatment-Adolescents; BISS: Body Image Shame Scale
EE: Emotional Eating; SC: Self-Criticism and Reassuring Scale; DER: Difficulties in Emotion Regulation Scale
In.S: inadequate Self; Re.S: Reassuring Self; H.S: Hated Self
Note: (P<0.05)

The results in this table of the mean scores of BISS, SCRS, EE and DERS at different phases, *i.e.*, pre-test, post-test and follow-up and their statistical significance imply that the scores of our dependent variables changed over time in 3 phases of the study. Moreover, the between-subjects effects revealed that calculated F of all variables is significant and the total scores of dependent variables are different between UP-A group and control group. This implied that the treatment was effective on the scores of the measurements and the variables were improved. In addition, the group *time interaction mean score of BISS, SC, EE and DERS in the pre-test, posttest, and follow-up assessments were significantly different in UP-A and control groups. This means that the dependent variables which were influenced by both time and group factors yielded different results in two groups. Linear trend analyses of the scores of measurements for groups in pretest, post-test and follow-up are presented below (Figures 2-7).

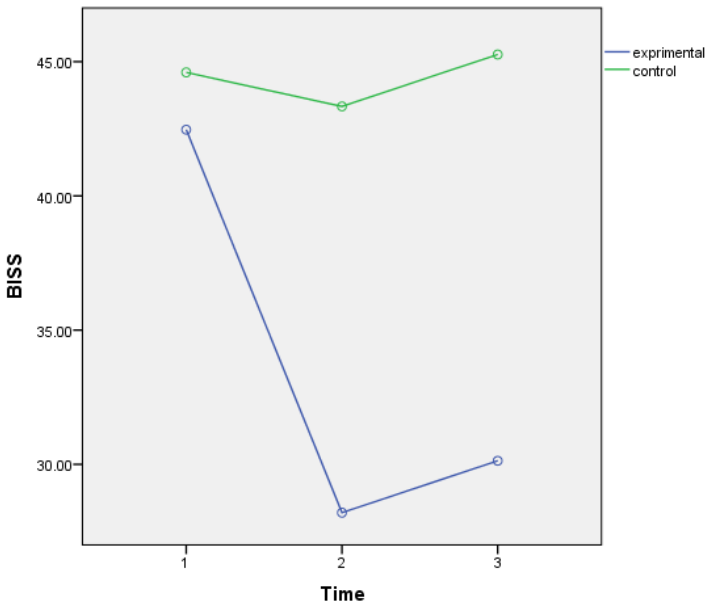

Figure 2 linear trend analyses of the scores of BISS (Body Shame) for two groups in pretest, post-test, and follow-up

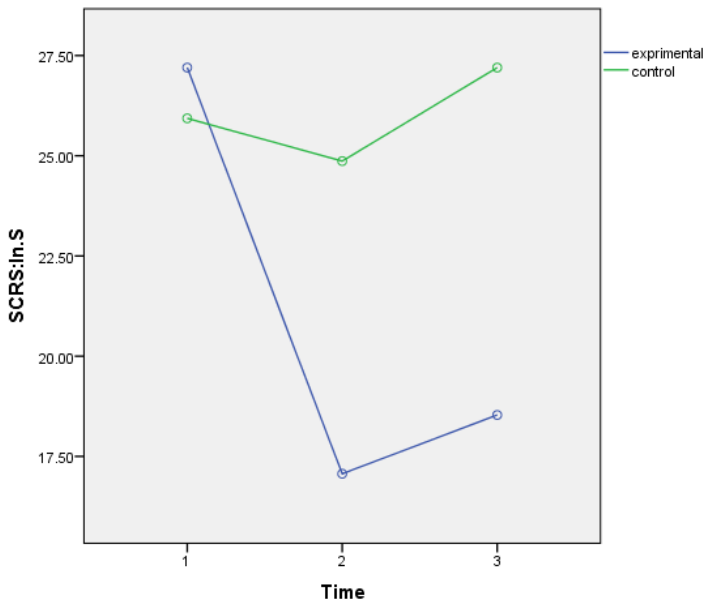

Figure 3 Linear trend analysis of the scores of SCRS subscale (Inadequate-self) for two groups in pretest, post-test, and follow-up

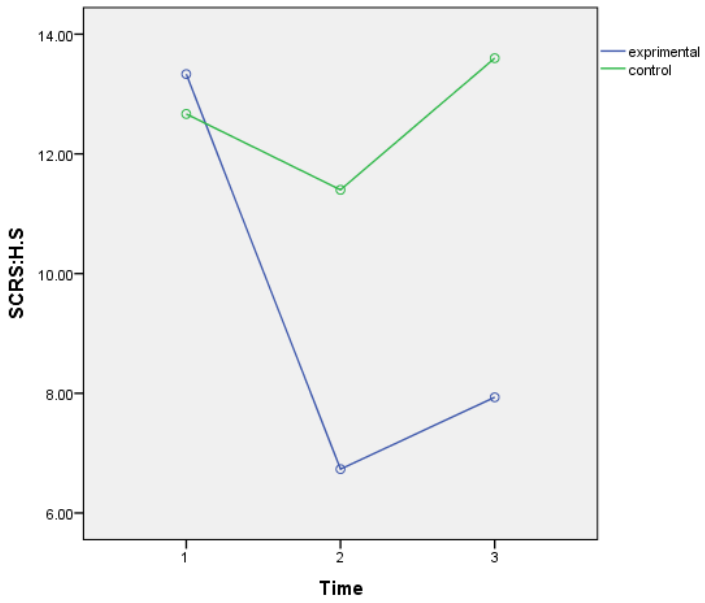

Figure 4 Linear trend analysis of the scores of SCRS subscale (Hated-self) for two groups in pretest, post-test, and follow-up

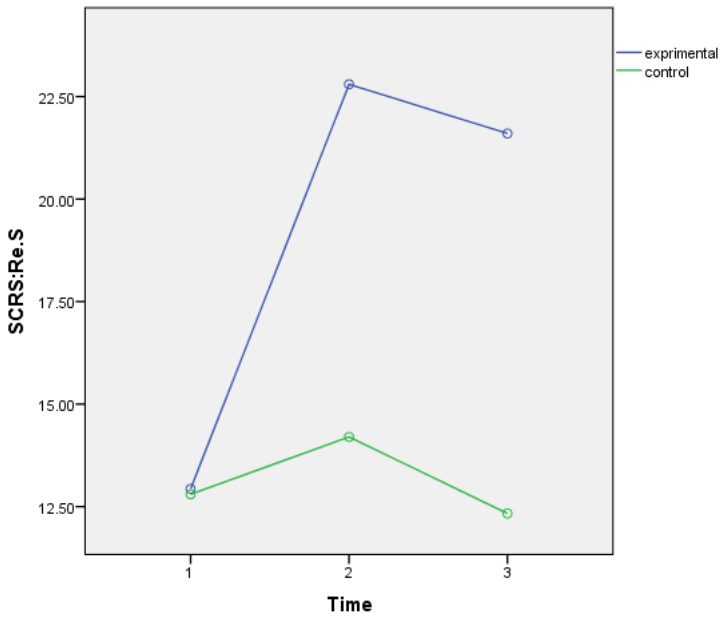

Figure 5 Linear trend analysis of the scores of SCRS subscale (Reassuring-self) for two groups in pretest, post-test, and follow-up

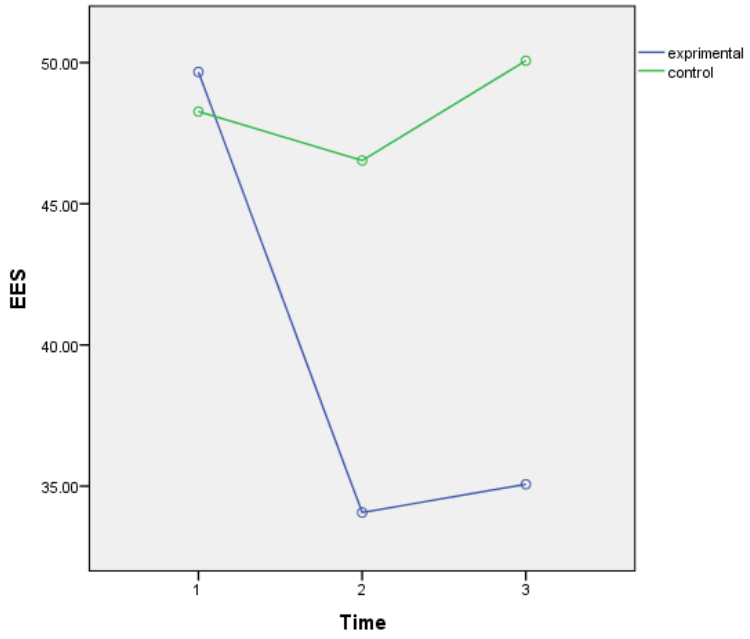

Figure 6 Linear trend analyses of the scores of EES (Emotional Eating) for two groups in pretest, post-test, and follow-up

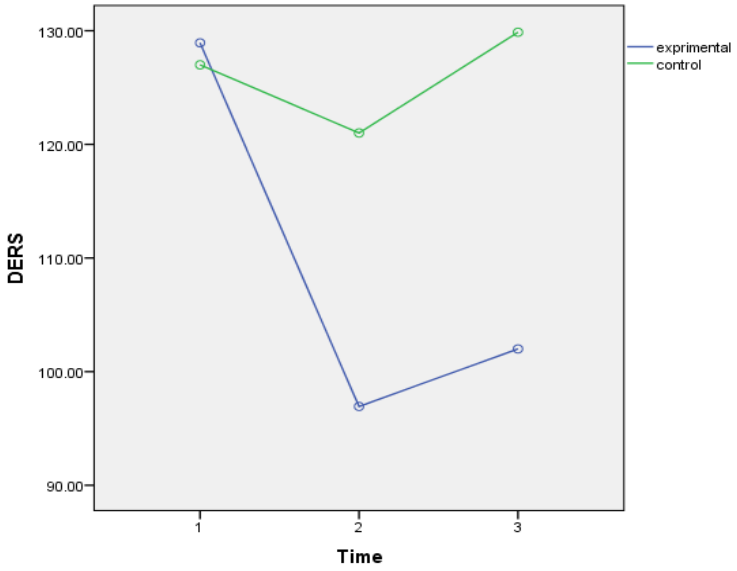

Figure 7 Linear trend analysis of the scores of DERS (Emotion Regulation) for two groups in pretest, post-test, and follow-up*

The next step, Bonferroni follow up test was used for the two-by-two comparison and the difference between the significant means levels. Regarding *BISS*, there exists a significant difference between the scores of the pre-test with post-test and follow up, while, the difference between post test and follow up was not significant. Comparison of the groups showed that the adjusted mean was higher in the pre-test (M =42.46) rather than the post-test (M = 28.20) and follow up (M = 30.13). Regarding *In.S*, there was a significant difference between the scores of the pre-test with post-test and follow up, while, the difference between posttest and follow up was not significant. Comparison of the groups showed that the adjusted mean was higher in the pre-test (M =27.20) rather than in the post-test (M = 17.06) and follow up (M = 18.53). Regarding *Re.S*, a significant difference between the scores in the pre-test with post-test and follow up was discerned, while, the difference between posttest and follow up was not significant.

Comparison of the groups showed that the adjusted mean was lower in the pre-test (M = 12.93) rather than the post-test (M = 22.80) and follow up (M = 21.60). Regarding *H.S*, a significant difference between the scores in the pre-test with post-test and follow up was seen, while, the difference between posttest and follow up was not significant. Comparison of the groups showed that the adjusted mean was higher in the pre-test (M = 13.33) rather than the post-test (M = 6.73) and follow up (M = 7.93). Regarding EE, there exists a significant difference between the scores of the pre-test with post-test and follow up, while, the difference between post-test and follow up was not significant. Comparison of the groups showed that the adjusted mean was higher in the pre-test (M =49.66) rather than in the post-test (M = 34.06) and follow up (M = 35.06). Regarding DERS, there was a significant difference between the scores in the pre-test with post-test and follow up, also, the difference between post-test and follow up was significant. Comparison of the groups showed that the adjusted mean was higher in the pre-test (M = 128.93) rather than in the post-test (M = 96.93) and follow up (M = 102) (table 5).

Table 5 Pairwise Comparison

variable			Mean difference	S.E	Sig
BISS		Pretest-posttest	14.26	0.67	0.001
		Pretest-follow up	12.33	1.21	0.001
		Posttest-follow up	-1.93	0.88	0.032
SCRS	In.S	Pretest-posttest	10.13	0.78	0.001
		Pretest-follow up	8.66	0.84	0.001
		Posttest-follow up	-1.46	0.51	0.054
	Re.S	Pretest-posttest	-9.86	0.66	0.001
		Pretest-follow up	-8.66	0.77	0.001
		Posttest-follow up	1.20	0.53	0.121
	H.S	Pretest-posttest	6.60	0.43	0.001
		Pretest-follow up	5.40	0.71	0.001
		Posttest-follow up	-1.20	0.51	0.113
EE		Pretest-posttest	15.60	0.78	0.001
		Pretest-follow up	14.60	1.31	0.001
		Posttest-follow up	-1	1.10	1
DERS		Pretest-posttest	32	1.79	0.001
		Pretest-follow up	26.93	2.23	0.001
		Posttest-follow up	-5.06	1.54	0.012

UP-A: Unified Protocol for Transdiagnostic Treatment-Adolescents
BISS: Body Shame Scale
EE: Emotional Eating
SC: Self-Criticism and Reassuring Scale
DER: Difficulties in Emotion Regulation Scale
In.S: inadequate Self`
Re.S: Reassuring Self
H.S: Hated Self
Note: (P<0.05)

4. DISCUSSION

In the present study we sought to explore the effectiveness of UP-A on emotional problems among adolescents struggling with obesity. To the best of our knowledge, the current study is the first to empirically examine the effectiveness of UP-A in obesity in this group range. Overall, results appear promising. The findings show that by 16 sessions UP-A, scores reduced, attesting to the effectiveness of the protocol. The overall score of DERS, depicted in table 4 demonstrates that patients developed essential competencies in healthy ER. This goes in line with research implicating heightened patterns of adaptive ER strategy engagement, with UP-A in adolescents (Grossman et al., 2020; Sauer-Zavala et al., 2016).

The results were predicted as this approach is assumed to be primarily an emotion-oriented protocol. Perhaps because instruction in ER skill acquisition e.g., (anchoring in the present moment, reappraisal, acceptance) and shaping ability to flexibly modulate the intensity and duration of emotional experiences, replaced maladaptive ER skills (i.e., suppression, avoidance). With

modules revolving around emotional awareness and emotion identification skills embedded in psychoeducation, adolescents became able to identify and experience a variety of emotional states and find the associated thoughts and behaviors. The treatment helped them gain deep knowledge about the nature and function of several key emotions, altogether leading to emotional clarity and awareness. Moreover, present-focused modules directing patients to foster non-judgmental awareness probably evoked emotional acceptance. This is in line with UP therapists' notion that when the button for emotional acceptance is "pressed," symptom improvement quickly ensues (Bullis et al., 2014).

Results also indicated that UP-A was associated with a decrease in emotional eating. Amelioration of emotion eating could be explained in terms of sessions revolving around emotional avoidance and teaching adolescents to identify their avoidance patterns and tendency to inhibit or suppress emotions. Formulating emotional eating as an avoidant behavior that acts to relieve emotions helped clients to recognize the role of their EDBs in maintaining their eating vicious cycle. Exploring maladaptive EDBs in relation to a given behavior (overeating in response to negative emotional arousal) might reliably enlighten them on the nature of their eating habits. Patients were motivated to self-monitor emotional experiences and recognize how certain cues or feeling states were closely paired with urges to eat. Thus, learned to decouple their emotions and associated behaviors. Moreover, during module 3, teens were then invigorated to utilize "differing" actions (verbalizing the situation, physical activities, singing aloud, go biking) to modify emotions rather than engaging in usual behaviors of escaping to eat, which would typically lead to weight gain. Besides, present-moment skills provided experiences of mindfulness training as an important skill that allowed them to observe the reactions of their emotions and bodily sensations and experience and approach them as they occur in the current context instead of rushing to eat. UP-A may also prompt regulated eating behavior through improvement in ER. This is in accordance with evidence suggesting a beneficial impact of development of acceptance skills on behavioral self-regulation (Lillis & Kendra, 2014; O'Reilly et al., 2014).

In addition, consistent with our assumption, the UP-A effects demonstrated effectiveness across measures of shame BISS and SCRS. To understand this, we should look at those modules that foster cognitive flexibility during which the concept of "thinking traps" is introduced. With discussion of maladaptive automatic thoughts, clients became able to recognize those cognitive distortions pertaining to their body and inner self-loathing appraisals. Patients were invited to consider the influence of self-deprecating thoughts on emotional responses and associated EDBs (avoiding social situations or choosing clothes to conceal disgusting body parts), chiefly in the situation that shame was anticipated. Besides, through learning "detective thinking" skills, with personally relevant examples, adolescents were trained to evaluate their shame-like thinking styles and catastrophic interpretations they made and assess the extent of being realistic. The UP-A treatment also allowed us to implement other strategies like problems solving in their challenging interpersonal problems (like making alternative sensible responses to sarcasm on behalf of peers).

As a putative mechanism of change in self-critical thinking, nonjudgmental mindful-based practices should be noticed. This strategy was introduced as an opposite action for adolescents' tendency to criticize themselves and motivated them toward shifting their perspectives. This means that the compassionate, kind, and accepting form attitude and effort to acknowledge and accept experiences may underlie changes that occurred in the scores of SCS and BISS. By learning an acceptance-oriented stance teens were assisted to monitor their shame, pay attention to it as it is and allow it to occur and not trying to change or control it in any way rather than engaging to escaping and evasive behaviors like taking eyes off people around, wearing loose clothes, avoiding participation in social places including gym or safety behaviors like having slimming tabs. Altogether with the aid of strategies delivered, clients were given inner resources needed for coping effectively with self-reproachful thoughts. However, this is in contrast to research related to self-compassion (CFT) training on SC suggesting that empathic-based intervention do not bring about reliable improvement on SC. The inconsistency may in part be due to the higher load of cognitive techniques in UP-A. Despite the evident overlap between the two approaches, it seems that UP-A encompasses more cognitive-oriented strategies as well as diverse behavioral techniques (Boersma et al., 2015).

It is noteworthy to point, although the improvements were still retained after 3 months period, we could see a change of DERS and BISS from post-test to follow-up. This can be explained by the time of the survey. Home schooling and distancing limited many emotion regulation strategies adolescents normally use. With the imposed isolation teens could no longer socialize with friends or participate in teamwork or physical activities. Reduction of physical activities and sedentary lifestyle in the midst of covid which itself is linked with increased risk of obesity caused teens to lose their motivation to continue their weight loss and also lose the chance to engage in adaptive strategies and activities congruent to evolutionary development. Apart from that, regarding BS, this study follow-up assessment was undertaken during Covid-19 4th peak when obesity was declared as a reprehensible phenomenon and a major risk factor and obese individuals went through recurrent stigma because of higher vulnerability to Covid infection due

to body size, all of which could exacerbate and perpetuate feelings of shame. Besides, developmental issues plus cultural sex role expectations about appearance should be noticed.

Adolescence period naturally exposes individuals vulnerable to others' evaluations of appearance (Harter, 1990) particularly in girls among whom disturbances of self-concept and negative self-evaluations are more common (Davies & Furnham, 1986) and this is regardless of BMI. Constant depiction of a slender body image as ideal by media gives rise to internalization of beauty and perfect body image among women especially adolescent girls whose body is now undergoing changes and distortions, and as BS has been tied to perceived discrepancy between the real self and ideal (Mustapic et al., 2017), the increase of BISS scores in follow-up could be partly explicable.

While the UP-A may be suitable for adolescents with obesity, the conclusions of the present study must be interpreted within the context of several limitations. First, the study only recruited females, regarding more frequent diet-seeking of this sex group, theoretically higher sensitivity of society on girls' appearance and lower referral of boys. Thus, further studies could fruitfully explore the potential role of gender in the existing results by targeting the male group. Second, due to imposed time constraints, follow-up data did not extend beyond 3months; hence the researchers are not aware whether the results will retain longer. Third, only the patients with limited criteria were included in this study, given the associated psychological comorbidity with obesity, inclusion of full-blown disorders would be beneficial in future studies.

5. CONCLUSION

These findings bear clear implications for clinical interventions, helping mental health professionals to treat effectively neglected emotional problems including shame, self-criticism, emotional eating and emotional dysregulation in adolescents suffering from obesity.

Authors' contribution

Conceptualization, Parastoo Naeimijoo; Methodology and Formal analysis, Parastoo Naeimijoo; Investigation, Resources, Abbas Masjedi; Datacollection, Gholamreza Mohammadi Farsani, Parastoo Naeimijoo; writing—original draft preparation, review and editing Parastoo; Supervision, Maryam Bakhtiari; Project administration, Abbas Masjedi Arani. All authors have read and agreed to the published version of the manuscript.

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Conflict of interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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