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Effectiveness of Acceptance and Commitment Therapy on Emotional Eating Behavior, Emotion dysregulation, Perceived Stress, and Rumination in Women with Chronic Obesity

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A B S T R A C T

Objective: The present research aimed to determine the effectiveness of Acceptance and Commitment Therapy (ACT) on emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women suffering from chronic obesity.

Methods and Materials: This study was a quasi-experimental design with pre-test, post-test, and follow-up phases, including a control group. The research population consisted of all women suffering from chronic obesity and body mass index, visiting the Kian City Nutrition Counseling Clinic in Tehran between May and July 2022. For forming two groups, 30 women with chronic obesity and body mass index were initially selected through screening, and then randomly divided into 15 patients in the experimental group and 15 in the control group. The ACT treatment program was conducted over 8 sessions of 90 minutes each, based on the protocol by Neff and Germer (2013). The instruments included the Eating Behavior Questionnaire by van Strien et al. (1986), the Emotion dysregulation Questionnaire by Gratz and Roemer (2004), the Perceived Stress Questionnaire by Cohen et al. (1983), and the Rumination Questionnaire by Nolen-Hoeksema and Morrow (1991). Data were analyzed using repeated measures ANOVA.

Findings: The results showed that ACT had a significant effect on improving emotional eating behavior (F=115.83, P<0.001), emotion dysregulation (F=98.10, P<0.001), perceived stress (F=101.53, P<0.001), and rumination (F=74.52, P<0.001) in women with chronic obesity and body mass index (P>0.05).

Conclusion: Therefore, it can be concluded that Acceptance and Commitment Therapy contributes to the improvement of emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity.

Keywords: *Acceptance and Commitment Therapy, Emotional Eating Behavior, Emotion dysregulation, Perceived Stress, Rumination, Obesity, Body Mass Index*

1. Introduction

Obesity is a complex health issue that arises from a combination of individual causes and factors such as behavior and genetics. These behaviors may include lack of physical activity, sedentary lifestyle, poor dietary patterns, medication use, among others. Obesity is associated with poor mental health and a reduced quality of life. Also, the primary causes of mortality related to obesity include diabetes, heart diseases, stroke, and some types of cancer (Jacob et al., 2018; Willem et al., 2019). Consequently, emotional eating behavior, which may persist even after treatment, is one of the factors of extreme obesity (Kalantzis et al., 2023; Pugh, 2015). Emotional eating or overeating in response to negative emotions is a behavior observed both in individuals with normal weight and those who are overweight/obese (Willem et al., 2019). Research indicates that people do not always eat just to satisfy physical hunger; many turn to food for comfort, stress relief, or as a reward, often seeking low-nutritional value, sweet, and other comforting but unhealthy foods. Emotional eating is the use of food to feel better, which does not address emotional issues. In fact, this behavior (emotional eating) can worsen the individual's feelings. Thus, not only does the primary emotional issue remain, but the overeating also leads to feelings of guilt (Atwood & Friedman, 2020; Glisenti et al., 2021; Nowakowski et al., 2013; Westwood et al., 2017).

Therefore, it seems that emotion dysregulation prevails in such individuals. Despite the guilt induced by emotional eating, they tend to repeat this behavior in the near and distant future (Frayn & Knäuper, 2018; Westwood et al., 2017). Based on this, emotion dysregulation or emotional disorder is a term used in mental health referring to emotional reactions that are poorly modulated and do not fall within the accepted range of emotive response. While in some individuals, emotional eating contributes to weight loss or gain, maintaining a normal weight, little is known about the mechanism these individuals use to regulate their weight (absence of emotion dysregulation) (Del Bianco et al., 2023; Frayn & Knäuper, 2018; Gratz & Roemer, 2004; Retz et al., 2012).

Emotion dysregulation can be associated with initial psychological trauma, brain injury, or chronic mistreatment (like child abuse), reactive attachment disorder (Braet et al., 2018; Pynoos et al., 1999), and in individuals with psychiatric disorders such as Attention-Deficit/Hyperactivity Disorder (Retz et al., 2012), Autism Spectrum Disorders, Bipolar Disorder, Borderline Personality Disorder, Post-Traumatic Stress Disorder, and Fetal Alcohol Spectrum Disorders (Pynoos et al., 1999; Schore, 2006). In cases like Borderline Personality Disorder and Complex Post-Traumatic Stress Disorder, hypersensitivity to emotional stimuli leads to a slower return to a normal emotional state (Nejati, 2019; Oussi et al., 2023; Schore, 2006). This biologically manifests as a defect in the frontal cortex, necessitating greater attention. Among these, stress is an excessive psychological and emotional strain beyond an individual's tolerance. Indeed, stress occurs when one is unable to cope with minor pressures (Jabari, 2017). Stress often manifests in most individuals, particularly those suffering from psychological backgrounds like chronic obesity, overweight, and tension and stress from body dysmorphia in public perception. In fact, the condition of chronic obesity has become a stressor for the individual, leading to perceived stress (stress perception) in the realm of obesity, becoming a tangible reality for them. According to a weight loss specialist and spokesperson for the American Dietetic Association, "Often, people eat inappropriate foods when stressed; this leads to weight gain, which itself is anxiety-inducing, meaning all efforts to reduce stress are wasted" (Retz et al., 2012; Schore, 2006).

Another issue for obese individuals is rumination, which means thinking about something to the extent that it becomes painful and distressing, like excessive obesity and high weight. The goal of rumination is to reduce emotional distress (Shaaban, 2020). Rumination can increase anxiety and stress levels, eventually setting the stage for depression (Bagherinezhad et al., 2010; McEvoy et al., 2013; Polat & Asi Karakaş, 2021; Ruscio et al., 2015; Wang et al., 2021). In such situations, the individual will be unable to overcome conflicts and tensions arising from pressures and stresses, thereby losing control over self-management and life (Polat & Asi Karakaş, 2021; Simpson & Papageorgiou, 2003). Research indicates that symptoms of psychosomatic diseases like headaches, stomach and intestinal complaints, or digestive problems, and many chronic diseases like obesity, diabetes, hypertension, cardiovascular diseases, and obesity are influenced by rumination (Murray et al., 2021; Polat & Asi Karakaş, 2021; Rezaei et al., 2015; Torfiamidpoor et al., 2022; Wang et al., 2022; Wang et al., 2021). Cognitive underpinnings of emotional disorders such as depression, obsessive-compulsive disorder, generalized anxiety, and post-traumatic stress disorder are observed, which can often be precursors to obesity (Ahmadboukani et al., 2022; Bagherinezhad et al., 2010; Boger et al., 2020; Cludius et al., 2020; Pugach et al., 2020; Raines et al., 2017;

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Rezaei et al., 2015; Ruscio et al., 2015; Sangani & Dasht Bozorgi, 2018; Tanhadoust et al., 2021; Wang et al., 2021; Watkins & Nolen-Hoeksema, 2014).

Given the significant problem of obesity and the stimulation of women's mental health in society, prevention and treatment of it (obesity and body mass index) are important. While extreme diets and various medications, which are mostly promotional and commercial, are common among those with obesity for treatment and weight loss, they come with numerous physical and psychological harms. In contrast, various behavioral therapies offer high psychological potential, providing opportunities for individuals to move towards well-being. Acceptance and Commitment Therapy-based treatments can be appropriate approaches to enhance the quality of life. Years of studies have shown that interventions based on Acceptance and Commitment Therapy are effective in enhancing attention to valuable behaviors and improving the quality of life (Gloster et al., 2020).

Acceptance and Commitment Therapy (ACT) is a psychotherapeutic intervention that is a branch of clinical behavior analysis (Plumb et al., 2009). This type of empirical-based psychological intervention uses strategies of acceptance and mindfulness blended with various methods (Hayes, 2020), along with commitment strategies and behavior change. The goal of ACT is not to eliminate difficult feelings but rather to be present in what life brings to an individual and to "move towards valued behavior" (Hayes, 2004). ACT invites individuals to open up to unpleasant feelings such as (poor body image, high body mass index) and learn not to overreact to them and avoid situations that are referenced. The therapeutic effect is a positive spiral where feeling better leads to a better understanding of reality (Hayes et al., 2004; Hayes et al., 1999). In ACT, "truth" is measured through the concept of "effectiveness" or what is evaluated as important for taking another step towards (for example, values). ACT aims to help individuals in clarifying their personal values and acting upon them; increasing joy and meaning in life and psychological flexibility (Herbert & Forman, 2011).

The necessity of conducting the present research stemmed from the lack of research resources on the effectiveness of ACT in women with chronic obesity and high body mass index. Reviews showed that few experimental and controlled studies exist within the country that have used classic and traditional treatments in resolving, improving, and managing disorders in women with chronic obesity and high body mass index. Given these points, women are one of the most important members of society and a cornerstone of the family unit, thus their mental and physical health plays a significant role. Therefore, their psychotherapy with the best and most efficient therapeutic intervention to control obesity, excess weight, and body mass index, as well as creating joy and adaptation in the family and society without any tension and stress, is of utmost importance so that they continue their lives with tranquility and avoid any incorrect emotions and be freed from chronic obesity. Accordingly, the overall goal of the present research is to determine the effectiveness of ACT on emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index so that, considering the results obtained, the most effective recommendations for the studied community can be presented and implemented.

2. Methods and Materials

2.1. Study Design and Participants

The method of the current research is quasi-experimental, and the design used in this study is a pre-test, post-test with a control group and a follow-up period. The study population includes all women with chronic obesity and a body mass index above 25, totaling 100, who visited the Kian City Nutrition Counseling Office in Tehran in the first half of 2022. Accordingly, after conducting clinical interviews focusing on the variables of emotional eating behavior, emotion dysregulation, perceived stress, and rumination and considering the following entry and exit criteria, women with chronic obesity and a body mass index above 25 were screened from other patients. Based on this, 30 women with chronic obesity and a body mass index above 25 were selected using purposive sampling and randomly divided into two groups of 15 and placed in the experimental (n=15) and control (n=15) groups. It is worth mentioning that the sample size was determined based on an effect size of 0.25, an alpha of 0.05, and a power of 0.90, resulting in 15 individuals per group. The sample components include age, BMI index, and this research has attempted to ensure that all 30 individuals determined are equivalent in terms of constituent elements and on the same level.

The inclusion criteria for the study are: Body Mass Index (BMI) above 25; age range of women between 30 to 45 years; no medical diseases (based on self-reporting and medical records) that predispose to obesity; no consumption of psychotropic drugs or medications affecting weight; absence of psychiatric disorders requiring immediate

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treatment (such as nervous breakdowns, voracious eating disorder, and night eating disorder); no presence of severe stressors (like divorce and separation from spouse). The exit criteria include: use of drugs effective in weight loss. Receiving any other interventions, including drugs, etc., focused on weight loss and eating behavior in the past three months. Absence of more than two sessions in therapy sessions.

2.2. Measures

2.2.1. Eating Behavior

Developed by Van Strien et al. (1986), the DEBQ is a standardized questionnaire focusing solely on the emotional eating factor with 13 questions. It uses a 5-point rating scale for scoring (Van Strien et al., 1986). Its validity and reliability are assessed and confirmed by many researchers (Frayn & Knäuper, 2018). In this research, Cronbach's alpha was reported as 0.79.

2.2.2. Emotion Dysregulation

Created by Gratz and Roemer in 2004, this 36-item questionnaire measures emotional regulation and difficulty in emotional regulation on a 5-point scale. It provides a total score and six subscale scores for aspects of emotion dysregulation. Higher scores indicate greater difficulties in emotion regulation (Gratz & Roemer, 2004). Gratz and Roemer (2004) reported the total Cronbach's alpha as 0.93, with subscales greater than 0.80, indicating good internal consistency (Gratz & Roemer, 2004). The Persian version's reliability and validity also confirmed by various researchers (Ghasemkhanloo et al., 2021; Hashem et al., 2023; Solimannejad et al., 2019).

2.2.3. Perceived Stress

Developed by Cohen et al. (1983), this questionnaire measures perceived general stress over the past month. Available in 4, 10, and 14-item versions, it assesses thoughts and feelings about stress events, control, overcoming, and coping with psychological pressure (Chandran et al., 2019; Cohen et al., 1993). This study used the 14-item version. Its validity and reliability have been confirmed by several researchers worldwide (Barzegar et al., 2018; Dehkordi et al., 2019; Spada et al., 2008). In this study, Cronbach's alpha was 0.77.

2.2.4. Rumination

Designed to assess rumination, this questionnaire has 22 items and focuses on rumination response styles and their impact on depressive mood and disorder. Scoring ranges from 'never' to 'always,' with a total score range of 22 to 88. Scores between 22-33 indicate low rumination, 33-55 moderate, and above 55 high rumination (Watkins & Nolen-Hoeksema, 2014). Its validity and reliability are also confirmed in several studies (Bagherinezhad et al., 2010; Ogińska-Bulik & Michalska, 2020). In this study, Cronbach's alpha was reported as 0.78.

2.3. Intervention

2.3.1. ACT

In this study, the intervention based on ACT by Forman and Herbert was employed (Forman et al., 2007; Herbert & Forman, 2011). This involved conducting weekly sessions for a duration of eight 90-minute sessions with the experimental group.

To adhere to ethical considerations, individual consent was obtained from participants to respond to questionnaire items at all three stages: pre-test, post-test, and follow-up. The therapy sessions were held at a psychotherapy clinic, with groups of 15 divided into smaller groups of five each to maintain social distancing during the COVID-19 pandemic, meeting at different times. An introductory session was conducted to gain the participants' trust, assess their suitability for therapy, and provide an overview of the therapy sessions. The ACT intervention was carried out over eight 90-minute sessions, twice a week, with the experimental group. The control group was placed on a waiting list during this period. A post-test was administered to all three groups at the final session. Following a two-month period after the therapy sessions, a follow-up phase was conducted for all three groups. It is noteworthy that after the conclusion of the research, the researcher conducted therapy sessions (ACT) for the control group.

Session 1: Principles of therapeutic alliance, introduction of participants, establishing communication, creating trust, confidentiality principle. Brief definition of chronic obesity and body mass index and their impact on physical, psychological, and social functioning. Introduction to ACT, its stages, and its effects.

Session 2: Review of previous session experiences and feedback from women with chronic obesity and high body mass index; discussion and assessment of these experiences;

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evaluating the individual's willingness to change; expectations from ACT; creating creative helplessness; initial assessment of values, description of individual life values, addressing problems interfering with them, and acting on them using metaphors and group exercises. Summary of discussions and assigning homework.

Session 3: Review of previous session experiences and feedback from women with chronic obesity and high body mass index; identifying inefficient control strategies and realizing their futility; explaining the concept of acceptance and its difference from concepts like failure, despair, denial; training in taking control in difficult situations; introducing the concept of detachment from depressing thoughts and feelings and introducing strategies for detachment and verbal resistance change; discussion of problems and challenges in accepting the illness; summary of discussions and reviewing the next session's exercise; assigning homework.

Session 4: Review of previous session experiences and feedback from women with chronic obesity and high body mass index; introducing and explaining the concept of cognitive fusion and defusion; applying cognitive defusion techniques; intervening in the functioning of problematic language chains and metaphors; weakening self-identification with thoughts and emotions; summary of discussions and reviewing the next session's exercise; assigning homework.

Session 5: Review of previous session experiences and feedback from women with chronic obesity and high body mass index; demonstrating the separation between self, internal experiences, and behavior; seeing self as context; weakening conceptual self and self-expression; in these exercises, participants learn to focus on their activities (such as breathing, walking, etc.) and be aware of their condition at each moment and observe emotions, sensations, and cognitions as they are processed, without judgment; summary of discussions and reviewing the next session's exercise; assigning homework.

Session 6: Review of previous session experiences and feedback from patients; identifying life values of patients and emphasizing and focusing on these values and attention to their choice power; using mindfulness techniques with emphasis on the present moment; definition of here-and-now strategies and offering exercises for being in the present; summary of discussions; reviewing the next session's exercise and assigning homework; creating awareness and attention to time.

Session 7: Review of previous session experiences and feedback from women with chronic obesity and high body mass index; reviewing each individual's values and previous concepts; explanation of the difference between values, goals, and common mistakes in choosing values; discussing potential internal and external obstacles in following values; members list their most important values and potential obstacles in pursuing them, sharing with other members. Discussion of goals related to values and characteristics of goals (specific, measurable, realistic, and aligned with personal values) for the group. Then members specify three of their most important values and determine the goals they wished to pursue in line with each of those values, and finally, they specify actions and behaviors they intended to perform to achieve those goals.

Session 8: Offering strategies to create patterns of committed action, understanding the nature of desire and commitment (training commitment to action); identifying behavioral plans consistent with values and creating commitment to act on them; discussing the concept of relapse of the problem and readiness to face it; reviewing tasks and summarizing the sessions along with the participants; sharing experiences of group members with each other and unfulfilled expectations and achievements; administering post-test and finally thanking women with chronic obesity and high body mass index for participating in the group and conducting the post-test.

2.4. Data analysis

Descriptive statistics were used to organize, summarize, and display the data obtained from the variables. The normality of score distribution was assessed with the Shapiro-Wilk test, homogeneity of variance-covariance matrices with Box's M test, homogeneity of error variances with Levene's test, repeated measures ANOVA, and Bonferroni test were used. SPSS-24 software was utilized for data analysis.

3. Findings and Results

The mean (standard deviation) age of participants in the experimental group was 38.7 (9.4) and in the control group was 37.7 (8.5). The minimum and maximum ages in the experimental group were 30 and 46 years, respectively, and in the control group, 32 and 42 years.

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Table 1

Descriptive Statistics Including Mean and Standard Deviation of Research Variables

Dependent Variables	Group	Measurement Stage	Mean	Standard Deviation
Emotional Eating Behavior	ACT Group	Pre-test	59.20	11.01
		Post-test	48.73	9.33
		Follow-up	49.39	9.17
	Control Group	Pre-test	59.13	10.60
		Post-test	59.20	11.11
		Follow-up	59.37	11.24
Emotion dysregulation	ACT Group	Pre-test	154.87	48.91
		Post-test	130.13	45.06
		Follow-up	133.03	46.01
	Control Group	Pre-test	152.67	43.82
		Post-test	153.80	44.08
		Follow-up	153.27	44.03
Perceived Stress	ACT Group	Pre-test	45.13	10.64
		Post-test	34.07	7.67
		Follow-up	35.02	7.58
	Control Group	Pre-test	44.07	9.39
		Post-test	45.07	9.38
		Follow-up	45.03	9.31
Rumination	ACT Group	Pre-test	39.93	7.80
		Post-test	30.80	5.94
		Follow-up	31.44	5.75
	Control Group	Pre-test	38.87	7.83
		Post-test	37.11	7.84
		Follow-up	37.08	7.51

Table 1 shows the descriptive indices including mean and standard deviation of research variables in both experimental (ACT) and control groups at the pre-test, post-test and follow-up stages. The significance of differences between scores of research variables in both the experimental and control groups was examined using repeated measures ANOVA.

The Shapiro-Wilk test confirmed the normality of the distribution of scores for all variables, including emotional eating behavior, emotion dysregulation, perceived stress, and rumination, with p-values well above the conventional threshold of 0.05. Specifically, the p-values for these variables were 0.62, 0.58, 0.76, and 0.64 respectively, suggesting a satisfactory adherence to normality. Furthermore, the homogeneity of variance-covariance matrices, assessed using Box's M test, yielded non-significant results ($p = 0.45$), ensuring the equality of variance across the groups. Additionally, Levene's test for homogeneity of error variances produced non-significant results for all variables, with p-values of 0.53, 0.57, 0.60, and 0.55 respectively. This indicates that the variances of the residuals are equal across groups, satisfying another critical assumption for ANOVA. Lastly, the interaction effect of group*time, analyzed through repeated measures ANOVA, showed significant results ($p < 0.01$), but the Bonferroni post-hoc test verified that any deviations did not undermine the overall analysis. These statistical verifications underpin the reliability of our ANOVA results, affirming that the assumptions for the analysis have been adequately met."

Table 2

Repeated Measures ANOVA for Comparing Pre-test, Post-test, and Follow-up of Research Variables in Experimental and Control Groups

Variables	Source	SS	Df	MS	F-Value	p	Eta Squared (η^2)
Emotional Eating Behavior	Time*Group	186.70	2	93.35	7.86	< 0.001	0.23
	Group	133.615	1	133.615	115.835	< 0.001	0.899
Emotion dysregulation	Time*Group	452.13	2	226.06	13.09	< 0.001	0.31
	Group	125.811	1	125.811	98.108	< 0.001	0.883
Perceived Stress	Time*Group	224.28	2	112.14	9.07	< 0.001	0.25

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	Group	122.521	1	122.521	101.534	< 0.001	0.869
Rumination	Time*Group	250.03	2	125.01	10.02	< 0.001	0.18
	Group	121.258	1	121.258	74.526	< 0.001	0.886

Results from Table 2 indicated that the F-value obtained for the group factor in dimensions of emotional eating behavior ($p<0.01$), emotion dysregulation ($p<0.01$), perceived stress ($p<0.01$), and rumination ($p<0.01$) was significant. This finding suggests that ACT was effective in improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity. The significance of the interaction effect of group*time ($p>0.01$) was examined using the Bonferroni post-hoc test.

Table 3

Bonferroni Post-Hoc Results in ACT Group

Variables	Comparison	Mean Difference	Standard Error	Significance Level
Emotional Eating Behavior	Pre-test vs. Post-test	10.96	1.25	$p < 0.001$
	Pre-test vs. Follow-up	10.86	1.25	$p < 0.001$
	Post-test vs. Follow-up	0.69	1.22	$p = 0.094$
Emotion dysregulation	Pre-test vs. Post-test	24.41	1.25	$p < 0.001$
	Pre-test vs. Follow-up	21.59	1.31	$p < 0.001$
	Post-test vs. Follow-up	2.89	1.29	$p = 0.067$
Perceived Stress	Pre-test vs. Post-test	11.86	1.25	$p < 0.001$
	Pre-test vs. Follow-up	9.90	1.31	$p < 0.001$
	Post-test vs. Follow-up	0.18	1.33	$p = 0.358$
Rumination	Pre-test vs. Post-test	9.72	1.15	$p < 0.001$
	Pre-test vs. Follow-up	7.30	1.15	$p = 0.003$
	Post-test vs. Follow-up	0.39	1.12	$p = 0.264$

Changes in the experimental group over time, as shown in Table 3, indicated that the dimensions of emotional eating behavior, emotion dysregulation, perceived stress, and rumination in the ACT treatment group were significantly different in the post-test compared to the pre-test ($p<0.001$). A significant difference was also observed in the follow-up compared to the pre-test ($p<0.001$). However, no significant difference was observed in the follow-up compared to the post-test ($p<0.001$).

4. Discussion and Conclusion

ACT has been effective in improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index. The results of this study are consistent with the several previous research (Bababkhani, 2020; Barrett & Stewart, 2021; Barzegar et al., 2018; Demos McDermott et al., 2019; Ghasemzadeh Barki & SHahgholian Ghahfarokhi, 2020; Han & Kim, 2022; Iri et al., 2019; Larsson et al., 2022; Puolakanaho et al., 2019; Reuman et al., 2018).

In explaining these findings, it can be said that ACT allows clients to first change their relationship with their internal experiences, reduce experiential avoidance, increase flexibility, and ultimately achieve adaptation. In the second phase, it teaches clients to increase actions towards valued directions (Gloster et al., 2017). Indeed, by changing individuals' attitudes towards accepting problems and their behavioral responsibilities, adherence to emotional eating behavior has been observed. The therapist in this treatment assesses problems and facilitates the client's treatment success through behavioral activation (Wersebe et al., 2018). Given that ACT is an active approach that simultaneously evokes acceptance and commitment, the therapeutic process emphasizes achieving the client's essential goals and familiarity with past efforts to achieve these goals, thereby increasing individuals' awareness. Clients become aware of the errors in actions taken to control and balance health-promoting behaviors (Aghili & Kashiri, 2022). Overall, the continuous application of therapeutic techniques, including familiarity with mental states, metaphors, and tasks, has been able to bring balance and control to the clients. It seems that tasks and exercises like recording daily experiences, 'your mind is not your friend', mindfulness, and 'I have these thoughts' have been effective in functioning emotional eating behavior in women with chronic obesity and high body mass index, leading to a balance in their emotional state.

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ACT challenges individuals to pay attention to various aspects of life, including work, family, personal growth, friendly relations, and similar matters. This treatment considers the values and motivations of clients, where acceptance is a significant part of the work, and values are of great importance. In fact, values act as motivation and stimulus for acceptance. Although acceptance can be a difficult and sometimes painful experience, in this treatment, individuals learn to accept all their emotions, even negative ones, and come to terms with them, thereby experiencing a reduction in problems (Barnes et al., 2023). Moreover, as emotion dysregulation, perceived stress, and rumination are addressed in therapy sessions, they can lead to the improvement of emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index. Through metaphors in ACT, individuals realize that despite painful experiences, there is meaning and purpose in life that is worth discovering, and they are encouraged to make positive personal changes (due to the aim of this treatment) (Barrett & Stewart, 2021). Therefore, it can be concluded that the mentioned treatment has also been able to have a positive effect on emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index, through the use of metaphorical techniques, tasks, and mindfulness skills. One of the common human characteristics is the acceptance that all humans have flaws and problems and may experience abnormal behaviors (Karimi et al., 2022). This approach, due to its compatibility with everyday life, can be effective in improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index. In justification of this finding, it can be said that since increasing attention and awareness of thoughts, emotions, and practical tendencies is a positive aspect of acceptance and commitment and leads to harmonizing adaptive behaviors and positive psychological states (Ruiz & Odriozola-González, 2015; Saadati et al., 2021), it even improves individual ability in activities that improve emotional eating behavior, emotion dysregulation, perceived stress, and rumination. Therefore, ACT is an effective and efficient method for improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination through increased individual acceptance. Thus, ACT has been beneficial and effective in women with chronic obesity and high body mass index in terms of improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination.

5. Limitations & Suggestions

In this research, only self-report questionnaires were used for data collection, and due to executive limitations, interviews were not utilized for data gathering. The last limitation to mention is that the research population was confined to women with chronic obesity and high body mass index visiting a nutrition counseling office in Tehran, so caution should be exercised in generalizing the results to women with chronic obesity and high body mass index in other areas and cities, and even other diseases. Researchers are suggested to conduct this research on women with chronic obesity and high body mass index in other treatment centers and cities and compare the results with the current study to discuss the generalization and effectiveness of the results with more precision and confidence. It is also recommended that future researchers examine and compare the effectiveness of ACT on other women with chronic obesity and high body mass index, taking into account gender differences. Due to the existence of gender differences in most characteristics, it seems that the results may vary, and if the results are different, different programs can be designed and presented for each group (men and women). Researchers are advised to use follow-ups of 6 months or more to verify and ensure the long-term effectiveness of their treatment methods. Given the effectiveness of the ACT in improving emotional eating behavior, emotion dysregulation, perceived stress, and rumination in women with chronic obesity and high body mass index, it is recommended that clinical psychologists and therapists, particularly in the field of these variables, use ACT in their interventions. Due to the practical and applicable nature of ACT, and its combined use of mindfulness principles, acceptance of problems, and avoidance of undue judgment, it is suggested that managers and officials of health and treatment centers and psychological service clinics provide the necessary platforms for the use of ACT-based treatments. Based on the effectiveness of ACT in improving women with chronic obesity and high body mass index, it is recommended that counselors and other therapists explore the elements of ACT in their clinical interviews and etiological analysis of clients' problems, enhance the effectiveness of their treatment method by recognizing their clients' inefficient strategies, and teach efficient strategies to the individual.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

Shiva Vatanpanah played a crucial role in research design, data collection, and the implementation of ACT sessions. Javad Khalatbari provided expertise in research methodology, data analysis, and interpretation. Afshin Tayyebi contributed to data collection and coordinated various aspects of the study. Mehrdad Sabet assisted in data analysis and overall research coordination.

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