



The Effectiveness of Acceptance and Commitment Group Therapy on Cognitive Fusion, Mindfulness, and Body Mass Index in Women with Obesity

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ABSTRACT

Objective: Obesity is a complex chronic metabolic disease characterized by excessive body fat accumulation, resulting from an imbalance between energy intake and energy expenditure. The aim of this study was to determine the effectiveness of acceptance and commitment group therapy on cognitive fusion, mindfulness, and body mass index in individuals with obesity.

Methods and Materials: This quasi-experimental research was conducted using a pre-test and post-test design with a control group. The statistical population included all women who visited a beauty clinic in West Tehran during the first six months of 2020. Sampling was done through convenience sampling. Out of the women who visited the beauty clinic, 40 were selected. The Cognitive Fusion Questionnaire by Gillanders et al. and the Five Facet Mindfulness Questionnaire were administered to the participants. The subjects were then randomly assigned to an experimental group and a control group. The experimental group received 12 sessions of 120-minute acceptance and commitment therapy. Post-tests were administered to both the experimental and control groups after the intervention.

Findings: The results indicated that acceptance and commitment therapy was effective in reducing cognitive fusion and increasing mindfulness in individuals with obesity ($P < 0.05$).

Conclusion: Given the confirmed effectiveness of acceptance and commitment therapy in treating obesity, it is recommended that therapists consider this therapy to improve cognitive fusion and mindfulness in overweight individuals.

Keywords: Acceptance and Commitment Therapy, Cognitive Fusion, Mindfulness, BMI, Obesity, Women.

1. Introduction

The prevalence of overweight, obesity, and their complications is rapidly increasing worldwide (Horwich et al., 2018). Obesity is a complex chronic metabolic disease characterized by excessive body fat accumulation due to an imbalance between energy intake and energy expenditure. According to the World Health Organization report in 2016, about 1.9 billion adults over 18 years old were overweight, and more than 650 million of them were obese, representing 13% of the global population (Al Kibria, 2019). A meta-analysis study in Iran from 2000 to 2013 reported an overall obesity prevalence of 5.8%, with 5.5% in individuals under 18 years and 15.1% in those over 18 years (Kazemi Rezaei et al., 2019). It is predicted that obesity will be the leading cause of decreased life expectancy in the next 100 years (Kelly et al., 2008). Obesity is a health problem affecting both individual and public health, requiring precise description, explanation, and evaluation (Fruh, 2017; Niemeier et al., 2012).

Body Mass Index (BMI) is used to measure obesity. BMI is calculated by dividing a person's weight in kilograms by the square of their height in meters. A BMI of 19.5 to 24.9 indicates normal and healthy weight, 25 to 29.9 indicates overweight, 30 to 35 indicates obesity, 35 to 40 indicates severe obesity, and above 40 indicates morbid obesity, which is associated with a significantly increased risk (Folsom et al., 1993). Obesity (BMI \geq 30) is a severe and chronic public health issue affecting more than 700 million people globally. Individuals with obesity are at higher risk for cardiovascular diseases, gastrointestinal and fatty liver diseases, musculoskeletal disorders, various cancers, respiratory problems, asthma, and psychological disorders, significantly impacting daily life and increasing mortality risk (Horwich et al., 2018). Although genetic and biological factors influence food intake, they do not explain everything. Many people use eating as a coping mechanism for negative emotions and experiences (Furch, 2017). Research evidence indicates that emotions significantly affect food choices and eating behaviors, and eating behaviors also significantly affect emotions (Leehr et al., 2015). Additionally, high impulsivity is correlated with abdominal obesity, overweight, and general obesity (Levitan & Davis, 2010).

Mindfulness cultivates a specific kind of attention and awareness characterized by deliberate and non-judgmental acceptance of thoughts, feelings, and bodily sensations at the present moment (Salmoirago-Blotcher et al., 2015).

Research indicates that when people are in a state of mindfulness, the number of internal and external stimuli they attend to increases (Nezlek et al., 2016). Evidence supports mindfulness in reducing or completely stopping binge eating and bulimia, increasing awareness of hunger and satiety, enhancing self-awareness, and reducing depression, anxiety, and emotional stress (Moor et al., 2013). Mindful eating positively affects eating behaviors, binge eating, attention to external eating cues, reducing depression symptoms, and increasing well-being (Köse & Tayfur, 2021). Research has shown a significant relationship between nutritional knowledge and mindful eating, and walking can reduce emotional eating. Additionally, attention and focus on eating help manage weight (Sarto et al., 2019).

Given the impact of negative thoughts and beliefs on overeating behaviors and consequent weight gain, and considering the role of cognitive fusion as an essential and determinant factor in the negative evaluation of intrusive thoughts, the role of cognitive fusion in overweight can be examined (Trindade & Ferreira, 2014). Cognitive fusion, another component of psychological inflexibility in the face of negative experiences, describes the process wherein a person becomes overly entangled with their thoughts (Hayes, 2004). Studies have shown that cognitive fusion is related to psychological pathology and body dissatisfaction (Trindade & Ferreira, 2014), the emergence of psychological disorders (Gillanders et al., 2015), anxiety, and quality of life (Samadbeik et al., 2020). Another study confirmed its relationship with body dissatisfaction (Johnston et al., 2010). Overall, the research by Gillanders et al. (2015) indicated that cognitive fusion is associated with psychological disorders. Individuals with high cognitive fusion are more susceptible to psychological disorders. In obese individuals, cognitive fusion leads to persistent negative thoughts about fitness and achieving an ideal weight, to the extent that they lose hope for weight loss and ignore the goal (Gillanders et al., 2015).

In recent years, developments in treating psychological disorders and reducing obesity have led clinical psychologists to propose and offer new methods. In this context, one effective therapeutic method for obese individuals is Acceptance and Commitment Therapy (ACT) (Hayes, 2004). ACT, a third-generation cognitive-behavioral therapy, includes six principles: cognitive defusion, acceptance, being present, self as context, values identification, and committed action, which are used for psychological flexibility (Flaxman et al., 2010). This therapy views avoidance of negative thoughts and feelings resulting

from pain and tension as the main problem for patients, leading to disability and reduced life satisfaction. According to this theory, avoidance of negative thoughts and emotions occurs when negative thoughts and emotions have an excessive and inappropriate effect. Therefore, the main approach (in ACT) is to expose patients to situations they have most avoided (Hiratzka et al., 2015). Emphasis (in ACT) on acceptance appears beneficial for short-term obesity treatment, as patients can continually adapt to the facts and events that are a very natural part of the disease. Thus, it increases opportunities for behavioral changes (Niemeier et al., 2012).

There is limited research on the effectiveness of acceptance and commitment therapy on the psychological characteristics of obese individuals, highlighting the need for research in this area. If the effectiveness of the above therapeutic method is confirmed, it will provide more options for therapists in treating these individuals. Therefore, considering the above psychological and behavioral outcomes related to overweight, attention to the causes and treatment of this disorder is essential for the current research. Moreover, considering the high percentage of overweight individuals in Iran, their high vulnerability, and the undeniable impact of their health on the health of society and future generations, this study aims to determine the effectiveness of acceptance and commitment group therapy on cognitive fusion, mindfulness, and body mass index in individuals with obesity.

2. Methods and Materials

2.1. Study Design and Participants

This study is a quasi-experimental, two-group (one experimental group and one control group) design with pre-test and post-test. The statistical population included all women who visited a beauty clinic in West Tehran during the first six months of 2020. The sample included women who visited Shokoofa Clinic in the first six months of 2020. Forty women were selected using convenience sampling, considering inclusion and exclusion criteria, and were randomly assigned to two groups of 20 (20 in the ACT experimental group and 20 in the control group). Inclusion criteria: age range 25-40, female, education above high school diploma, BMI above 30, agreement to participate in the study, no chronic diseases including glandular diseases (hypothyroidism, diabetes, etc.), polycystic ovary syndrome, depression, and anxiety. Exclusion criteria: absence from more than two sessions, inadequate cooperation during the

educational process. The Cognitive Fusion Questionnaire by Gillanders et al. (2010) and the Five Facet Mindfulness Questionnaire (FFMQ) were used, and the ACT therapy sessions were conducted once a week for 12 two-hour sessions.

2.2. Measures

2.2.1. Cognitive Fusion

The Cognitive Fusion Questionnaire by Gillanders et al. (2010) contains 12 questions and two components of cognitive fusion and defusion, based on a six-point Likert scale (from always true to never true). The minimum score is 12, and the maximum score is 72. Zare (2014) standardized the questionnaire by testing 379 students from Payame Noor and traditional universities. The results indicated satisfactory validity and reliability, with a Cronbach's alpha coefficient of 0.76 (Zare, 2014).

2.2.2. Mindfulness

The FFMQ is a 39-item self-report scale used by Baer et al. (2006). The questionnaire has 39 items and five factors. Based on the results, four of the five factors were comparable to the factors identified in the KIMS, and the fifth factor included items from FMI and MQ, defined as non-reactivity to inner experience. The score range on this scale is 195-39. Internal consistency of the factors was appropriate, with Cronbach's alpha coefficients ranging from 0.75 (for non-reactivity) to 0.91 (for describing). The correlation between the factors was moderate and significant in all cases, ranging from 0.15 to 0.34 (Barani et al., 2020).

2.2.3. Body Mass Index

BMI of the samples was measured and calculated using a standard scale and standard meter ($BMI = \text{weight in kilograms divided by height in meters squared}$).

2.3. Intervention

2.3.1. Acceptance and Commitment

This ACT intervention protocol consists of twelve sessions designed to improve cognitive fusion, mindfulness, and commitment to valued actions in individuals with obesity. Each session builds on the previous one, integrating various ACT principles and techniques to foster psychological flexibility and behavioral change (Hayes, 2004).

Session One: Introduction and Rapport Building

In the first session, group members are introduced to each other to establish rapport. The session includes psychoeducation on cognitive fusion, mindfulness, and emotions from the ACT perspective. Participants complete initial questionnaires to assess their baseline levels.

Session Two: Experience Discussion and Creative Hopelessness

This session focuses on discussing personal experiences and evaluating them. Participants are encouraged to talk about their anxieties, fostering creative hopelessness. The effectiveness of control strategies is reviewed, and homework for the next week is assigned.

Session Three: Willingness to Experience and Control Alternatives

Participants are introduced to the concept of willingness to experience emotions as an alternative to controlling them. The apparent success in controlling emotions is discussed, along with programming from internal events. A numbers exercise is included to illustrate these concepts.

Session Four: Defusion Techniques and Behavioral Commitment

This session reviews experiences from the previous meeting and emphasizes behavioral commitment. Cognitive defusion techniques are introduced, along with their applications. Participants engage in activities to weaken the self's attachment to problematic thoughts and emotions.

Session Five: Observer Self and Self-as-Context

Behavioral commitment homework is reviewed, and the observer self is introduced, showing the separation between self, internal experiences, and behaviors. Participants learn about the self as context, aiming to weaken conceptual self and express themselves authentically.

Session Six: Mindfulness Techniques and Cognitive Modeling

Performance assessment is conducted, and mindfulness techniques are applied to highlight the contrast between experience and mind. Participants are taught to see internal experiences as processes. The session includes a break and snack.

Session Seven: Values Clarification

The concept of values is introduced, emphasizing the risks of focusing solely on outcomes. Practical life values are explored, helping participants identify and articulate their core values.

Session Eight: Overcoming Barriers and Committed Action

Participants identify barriers to action and engage in committed action based on the ACT algorithm. Individual goals are recorded, and steps for committed action are planned.

Session Nine: Reason-Giving and Mindfulness Practice

This session delves into the practice of giving reasons as causes, continuing mindfulness exercises, and practicing objectification. Participants learn to view thoughts objectively rather than being entangled by them.

Session Ten: Goal Setting and Committed Action

Participants receive training on goal setting and committed action. They learn to set realistic goals aligned with their values and commit to actionable steps.

Session Eleven: Cognitive Entanglement and Group Discussion

The session addresses cognitive entanglement, examining thoughts that participants cling to and their roles in emotional experiences. A group discussion on the impact of these thoughts on current behavior is facilitated, and exercises on cognitive separation are conducted.

Session Twelve: Understanding Willingness and Commitment

Participants explore the nature of willingness and commitment, aligning action patterns with their values. A post-test is administered to assess the intervention's effectiveness, and future action plans are discussed.

2.4. Data analysis

Analysis of variance tests, significance test of group interaction effect, covariance analysis test, and adjusted statistics after removing the pre-test variable effect were used for inferential statistics. All analyses were performed using SPSS 25 software.

3. Findings and Results

The mean age of the subjects was 33.44 years. In terms of educational attainment, 9 had a high school diploma, 21 had a bachelor's degree, 14 had a master's degree, and 1 had a doctorate. The results in [Table 1](#) show that the mean pre-test mindfulness scores in the acceptance and commitment therapy (ACT) group were 49.13 and in the control group were 44.20. The mean pre-test cognitive fusion scores in the ACT group were 32.43 and in the control group were 30.22. As observed, the pre-test means of the research variables in the two groups were almost equal.

Table 1

Means and Standard Deviations of Research Variables in Groups in Pre-Test and Post-Test

Variable	Status	ACT Group Mean	ACT Group SD	Control Group Mean	Control Group SD
Mindfulness	Pre-test	49.13	9.43	44.20	19.2
	Post-test	69.23	11.48	45.28	7.04
Cognitive Fusion	Pre-test	32.43	6.31	30.22	6.13
	Post-test	21.40	6.41	31.20	6.98
Body Mass Index	Pre-test	35.52	7.39	32.29	7.15
	Post-test	19.40	7.51	32.25	8.02

As indicated in Table 1, the mean post-test mindfulness scores in the ACT group were 69.23 and in the control group were 45.28. The mean post-test cognitive fusion scores in the ACT group were 21.40 and in the control group were 31.20. The mean post-test body mass index scores in the ACT group were 19.40 and in the control group were 32.25. As observed, the post-test means of the research variables in the two groups were almost equal. To examine the assumptions of normal distribution and homogeneity of variance of the variables, the Kolmogorov-Smirnov test and Levene's test were used, respectively. The results of the Kolmogorov-

Smirnov test were not significant for any of the research variables ($P < 0.05$). Therefore, it can be concluded that the research variables have a normal distribution. The results of Levene's test also showed that the variances of all research variables between the two groups did not have a significant difference ($P < 0.05$). Therefore, the assumption of homogeneity of variances was accepted. Finally, the regression slope uniformity test showed that the interaction of covariates (pre-tests) and dependent variables (post-tests) at the levels of the factor were not significant ($P < 0.05$).

Table 2

Results of ANOVA for Mindfulness Variable

Variable	Source	Sum of Squares	df	Mean Square	F	P	Eta Squared
Mindfulness	Pre-test	422.83	1	422.83	11.46	0.0001	0.31
	Group	3158.28	1	3158.28	69.78	0.0001	0.59
	Error	175.42	26	9.15			
	Total	86545.00	30				
Cognitive Fusion	Pre-test	248.16	1	248.16	8.36	0.0001	0.35
	Group	2857.18	1	2857.18	42.68	0.0001	0.51
	Error	95.12	25	7.65			
	Total	86545.00	30				
Body Mass Index	Pre-test	1856.12	1	1856.12	47.14	0.0001	0.41
	Group	4247.35	1	4247.35	125.18	0.0001	0.82
	Error	10245.23	25	25.89			
	Total	86545.00	30				

As reported in Table 2, the results of the ANOVA test indicate that the difference in mindfulness between the two groups is significant ($P = 0.0001$). To determine which two groups differ from each other, Fisher's post hoc test was used, showing that the difference between each of the ACT and control groups is significant.

The results of the ANOVA test indicate that the difference in cognitive fusion between the two groups is significant ($P = 0.0001$). Fisher's post hoc test was used to determine which two groups differ from each other, and the results showed a significant difference between the ACT group and the control group.

The results of the ANOVA test indicate that the difference in body mass index between the two groups is significant ($P = 0.0001$). Fisher's post hoc test was used to determine which two groups differ from each other, and the results showed a significant difference between the ACT group and the control group.

4. Discussion and Conclusion

The present study aimed to determine the effect of acceptance and commitment group therapy on cognitive fusion, mindfulness, and body mass index in individuals

with obesity. The results showed that acceptance and commitment group therapy had a significant effect on reducing cognitive fusion and improving mindfulness and body mass index in the participants. These results align with the prior findings (Alfoone et al., 2020; Kazemi Rezaei et al., 2019; Khayatan et al., 2021) in improving the psychological characteristics of individuals.

In explaining these findings, it can be said that this therapeutic approach introduces acceptance as a strong predictor of psychological health, particularly in individuals with obesity, as an alternative to negative experiences (Cheung & Ng, 2019). Therefore, acceptance and commitment therapy teaches clients to accept their disturbing thoughts and feelings and to experience them merely as thoughts and feelings arising from the mind. Additionally, ACT teaches individuals to identify their inner thoughts and feelings and personal values, set achievable goals based on them, and take steps towards them. This therapy encourages clients to strengthen their observer self, using mindfulness techniques to focus on the present moment without judgment and evaluation of thoughts and feelings, which can increase self-awareness and acceptance and ultimately lead to weight loss (Carvalho et al., 2019).

By focusing on acceptance and willingness towards distressing thoughts and feelings, ACT helps individuals align their actions with their current conditions, specifying values and goals and moving towards them, thereby enhancing positive emotions, happiness, and energy in depressed individuals. This is a key factor in promoting individuals' emotional capital. Moreover, ACT philosophy emphasizes goal-directed and satisfying behaviors, promoting committed action that involves engaging in activities aligned with personal values (Nigol & Di Benedetto, 2020). Taking steps in the direction of values can reset reward learning, increasing positive emotions, happiness, and energy in the individual. ACT aims to help individuals with obesity accept thoughts and feelings they avoid. ACT interventions can enhance patients' self-efficacy and subsequently be beneficial in managing obesity.

5. Limitations & Suggestions

One limitation of this study is the use of self-report tools, which may result in participants not being completely honest and accurate in expressing their issues and responding to questionnaires. The absence of a follow-up phase, and consequently the lack of information on the persistence or stability of the results, is another limitation. Another

limitation is the lack of control over contextual and individual factors. There is a possibility that participants overestimated the program's effect due to certain contextual factors. Another possible assumption is that individuals, due to personal tendencies, optimism, and similar factors, overestimated the program's effect. The results showed that acceptance and commitment therapy is effective in reducing cognitive fusion and improving mindfulness in individuals with obesity. Therefore, considering the confirmed effectiveness of acceptance and commitment therapy in treating obesity, it is recommended that therapists consider this therapy to reduce cognitive fusion and improve mindfulness in overweight individuals.

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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

All authors equally contributed to this article.

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