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The Effectiveness of Acceptance and Commitment Therapy on Suicidal Thoughts, Sensation Seeking and, Distress Tolerance among Substance Users

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A B S T R A C T

Introduction: Addiction is a chronic disease leaving deep social, psychological, physical, and economic effects on the individual. This study aimed to assess the effects of acceptance and commitment therapy on suicidal thoughts, sensation seeking, and distress tolerance in substance users.

Materials and Methods: This was a quasi-experimental controlled trial with a pretest/posttest design. The study population consisted of all substance-dependent individuals who were referred to the addiction treatment center of the psychiatric department of Mustafa Khomeini Hospital in Ilam in 2022. Using the convenience sampling method, 32 individuals were selected as the sample population and were randomly assigned to two groups of 16 individuals. In this study, the Sensation Seeking Scale (SSS), Beck Suicidal Ideation Scale (BSSI), and Distress Tolerance Scale (DTS) were used to collect data. The data analysis method was descriptive and inferential statistics**.** Data were analyzed using Chi Square, Pillay effect, Wilks' lambda, Hoteling effect, Root Largest Rey, and multivariate covariance (MANCOVA) tests in SPSS v.16, with a significance level of 0.001.

Results: Acceptance and commitment therapy was effective on the studied variables. The findings of this study showed that acceptance and commitment therapy reduced suicidal thoughts ($P < 0.001$), reduced sensation seeking ($P < 0.001$), and increased distress tolerance ($P<0.001$).

Conclusion: Acceptance and commitment therapy has positive effects on suicidal thoughts, sensation seeking, and distress tolerance in male substance users, reducing suicidal thoughts and sensation seeking and augmenting distress tolerance in them.

Keywords: Acceptance and Commitment Therapy, Suicidal Ideation, Substance-Related Disorders

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Introduction

Addiction is a chronic and progressive cerebral disorder imposing profound social, psychological, physical, and economic effects. Substance use is on the rise, especially among the youth. Addiction, officially known as substance dependence, is defined as the repeated use of a drug or chemical associated with physical dependence, profound effects on various functioning dimensions, and significant disabilities in a relatively large portion of people (1). Comorbidities and substance-related disorders occur in about 60% to 70% of users, and disorders such as antisocial personality, depression, suicidal thoughts, and suicide attempts show the strongest association with substance use (2). Suicide refers to the act of harming oneself with the intention of self-annihilation. The cause of suicide death may be multifactorial (3). Related evidence suggests that the use of narcotics and psychotropic substances is among the reasons for the increase in suicide (4). According to Zuckerman's theory, sensation-seeking refers to the need to experience a variety of complex and innovative feelings and a willingness to take risks (5). Sensation seeking is an inherited tendency to eagerly start an activity in rIndividuals who exhibit high sensation-seeking tendencies typically exhibit variety-seeking, impatience, and impulsivity in their pursuit of rewards (6), are unable to accept failure, and are often perceived as impenetrable. ally, impenetrable (6). Numerous studies have explored the connection between substance use and personality structure, with sensation seeking emerging as a significant predisposing factor for substance use (7). Martines et al. also compared sensation seeking, impulsivity, and taking risky behaviors among people with severe substance dependence and normal subjects and showed that sensation seeking and impulsivity were positively correlated with substance use (8). Distress tolerance is a common construct when studying emotional irregularities. Distress tolerance is defined as an individual's ability to bear negative emotional states (9). People with low distress tolerance exhibit behavioral irregularities when they attempt to deal with negative emotions in the wrong way (10). Among these behavioral irregularities is destructive substance use. In a study, researchers showed that smoking dependence was related to impaired emotional regulation and low distress tolerance (11). Therapists strive to improve the health of their clients by using a combination of different therapeutic techniques and expanding available therapies. Among psychological therapies are behavioral therapy, biological feedback psychotherapy, body relaxation, cognitive-behavioral therapy, family therapy, group therapy, and acceptance and commitment therapy (12). Acceptance and commitment therapy is a psycho-cognitive intervention that employs mindfulness and acceptance strategies along with commitment- and behavioral change-based strategies to increase psychological resilience (13). The aim of acceptance and commitment therapy is not to make a direct change in patients but to help them bond with their experiences in different ways and to enable them to fully engage with a meaningful and value-based life. In other words, acceptance and commitment therapy seeks to increase an individual's psychological and behavioral flexibility in areas towards which the person shows avoidance, depriving the individual of a foundational and valuable life (14). Numerous studies have shown the effectiveness of the acceptance and commitment therapy approach in improving sensational irregularities and emotion regulation in patients with mood and anxiety disorders (15-17). According to the abovementioned, due to the increasing rate of substance use and its subsequent ramifications, such as suicidal behaviors, sensation seeking, and distress tolerance, and the fact that little research has been conducted in this important area in Iran, it seems justified to perform such studies in the country.

Therefore, the present study was designed to address this need, aiming to investigate the effectiveness of acceptance and commitment therapy in modifying suicidal thoughts, sensation seeking, and distress tolerance in male substance users.

Materials and Methods

Setting and Sample

The present research was a quasi-experimental study with a pre-test/post-test design and a control group. The statistical population of the study consisted of all substance-dependent individuals referring to the addiction treatment center of the psychiatric disease ward of Mostafa Khomeini Hospital of Ilam in the second half of 2022. Inclusion criteria in this study encompassed age of 18 to 65 years, being diagnosed with substance dependence by a psychologist or psychiatrist, having a high school diploma or higher, willingness to participate in the therapeutic sessions, and having no psychotic disorders. Exclusion criteria included missing more than one session and unwillingness to continue participation in the study. Ethical considerations, including obtaining informed consent for participation, observing the principle of confidentiality, and avoiding bias, were observed.

Sample Size, Randomization and Blinding

The sample size was calculated using G*Power-1/3 software. The required sample size in each of the experimental and control groups was determined as n = 16 (i.e., a total of 32 subjects), delivering an effect size of 0.5 and a study power of 0.85% at a significance level of 0.05. Considering the possibility of sample drop-out, 16 people were considered for each of the experimental and control groups. A sample population of 60 people was selected via the accessible sampling method for recruiting the subjects. After screening using clinical interviews and according to inclusion criteria, 32 individuals were finally selected and randomly assigned to the experimental and control groups (n = 16 people per group). These individuals were then invited to attend a briefing session to conduct the pre-test phase.

Measuring tools, Validity and Reliability

1. **Demographic form**

Demographic variables entailed age, marital status, and education status.

2. Sensation Seeking Scale (SSS)

This questionnaire is a short form of Zuckerman's Sensation Scale (35) and includes a series of questions aiming to assess an individual's desire to carry out risky activities. This scale contains 15 questions with two response options of correct and false, which are scored as zero or one; the highest score is 40, and the lowest score is zero, and a score above 20 indicates high sensation seeking. Respectively, Soltani et al. reported the reliability coefficient of this questionnaire using Cronbach's alpha method as 0.76 and its concurrent validity using the psychological resilience scale as 0.57 (18).

3. Beck Scale for Suicide Ideation (BSSI)

This is a 19-item self-reporting instrument designed to measure attitude, thoughts, and planning for suicide. In this scale, the first five questions have been designed for screening so that if the participant gives zero scores to these questions, he/she is considered to have no suicidal thoughts. This scale is scored based on a three-point Likert scale from zero to two (zero = none, 1 = somehow, and 2 = high). A score of 1 to 5 indicates the presence of suicidal thoughts; a score of 6 to 19 indicates readiness for committing suicide, and a score of 20 to 38 reflects intent for committing suicide. Beck & Steer reported the concurrent validity of this scale (along with the Beck Depression Inventory) as 0.90 for hospitalized patients and 0.94 for outpatients (19). In various studies, Beck & Steer have reported the reliability of this tool from 0.87 to 0.97 using Cronbach's alpha method. This tool has also been translated into Persian, and its concurrent validity with the General Health questionnaire has been reported as 0.76, and its validity has been verified according to a Cronbach's alpha coefficient of 0.95 (20).

Distress Tolerance Scale (DTS)

Simmons & Gaher (9) developed this 15-item self-report tool. The items of this scale assess distress tolerance based on the individual's capability to bear emotional distress, as well as by subjective assessment of distress, attention to negative emotions when they occur, and evaluation of distress-coping regulatory actions.

This scale consists of four subscales, including emotional distress tolerance, enthrallment by negative emotions, subjective appraisal of distress, and stress-reducing regulatory efforts. A five-point Likert scale, ranging from 1: strongly agree, 2: agree, 3: no idea, 4: disagree, and 5: strongly disagree, serves as the basis for scoring the scale. This scale allows for maximum and minimum scores of 75 and 15, respectively, where a higher score signifies a higher level of distress tolerance. Simmons & Gaher assessed the reliability of the subscales of the original tool using Cronbach's alpha coefficient, reporting values between 0.70 and 0.84. Watson, Clark, and Telgen assessed the whole scale concurrently with the negative emotion subscale of the Positive and Negative Affect Schedule (PANAS) scale, reporting a concurrent validity of 0.57 (9). Also, Amin Al-Ruaya et al. found that the Cronbach's alpha coefficients for the subscales of tolerance, enthrallment, appraisal, and regulation were 0.72, 0.82, 0.78, and 0.70, respectively. The overall coefficient for the whole tool was 0.89.

Intervention

The participants of the experimental and control groups completed the research tools in the pre-test phase. Then treatment sessions (eight 90-minute sessions of acceptance and commitment therapy) were held for the experimental group twice a week (Table 1). During this period, the participants of the control group received no intervention. After eight sessions of treatment, all subjects (the experimental and control groups) completed the research tools in the post-test phase. To observe the ethical principles, control subjects also received eight sessions of acceptance and commitment therapy after completion of the post-test. The Acceptance and Commitment Treatment Package developed by Hayes & Rose in 2011 was used (eight 90-minute sessions) during eight weeks as follows (12).

Table 1. The summary of treatment sessions

Sessions	Content
1st	Carrying out the pre-test, members of the group being acquainted with each other introduce acceptance and commitment therapy, explain its therapeutic goals, provide information about addiction and its complications and problems, explain the link between acceptance & commitment therapy and addiction, and state the rules of participation in treatment sessions.
2nd	Providing a summary of the content presented in the previous session and receiving feedback from participants, introducing experiential avoidance and its consequences, devising and evaluating creative helplessness, and explaining the metaphor of "human in a sand pool," checking participants' expectations of acceptance and commitment treatment, describing the goals of an alive human, providing concluding remarks, and assigning homework.
3rd	Providing a summary of the content presented in the previous session and receiving feedback from participants, reviewing the homework assigned in the previous session, recognizing ineffective controlling strategies and acknowledging their ineffectiveness evidenced by the metaphor of "falling in love," the exemplification of the lie detector and jelly donuts, explaining the concept of acceptance and its difference with the concepts of submission, failure, despair, denial, & resistance, and finally, assigning homework.
4th	Providing a summary of the content presented in the previous session and receiving feedback from participants, reviewing the homework assigned in the previous session, being familiarized with the concept of cognitive fusion, evaluating self-conceptualized fusion, faulting, applying cognitive fusion techniques, intervening with the functioning of problematic language chains, and assigning homework.
5th	Providing a summary of the content presented in the previous session and receiving feedback from participants, reviewing the homework assigned in the previous session, practicing the concept of fusion, introducing mindfulness techniques and being in the present time, elaborating on the notion that control is the problem rather than the solution, introducing "desire" as an alternative to "control" using the "skating" metaphor, and assigning homework.
6th	Providing a summary of the content presented in the previous session and receiving feedback from participants, reviewing the homework assigned in the previous session, introducing the concept of

	values and comparing them with goals, identifying people's values using the compass of life, the target circle, and the "seven-day documentary and the magic stick" metaphor, explaining mindfulness and being in the present, and assigning homework.
7th	Providing a summary of the content presented in the previous session and receiving feedback from participants, reviewing the homework assigned in the previous session, explaining mindfulness and being in the present, body appraisal, reviewing values, goals, and committed actions, and assigning homework.
8th	Summarizing the previous session, receiving feedback, reviewing the homework assigned in the previous session, reviewing the nature of "desire" and "commitment" (commitment-to-act training), recognizing the behavioral patterns that are in line with values, and becoming committed to acting accordingly, reviewing assignments, summarizing the sessions, requesting the members to share their experiences, expressing gratitude to the participants for their cooperation, preparing for performing the post-test phase, and saying farewell.

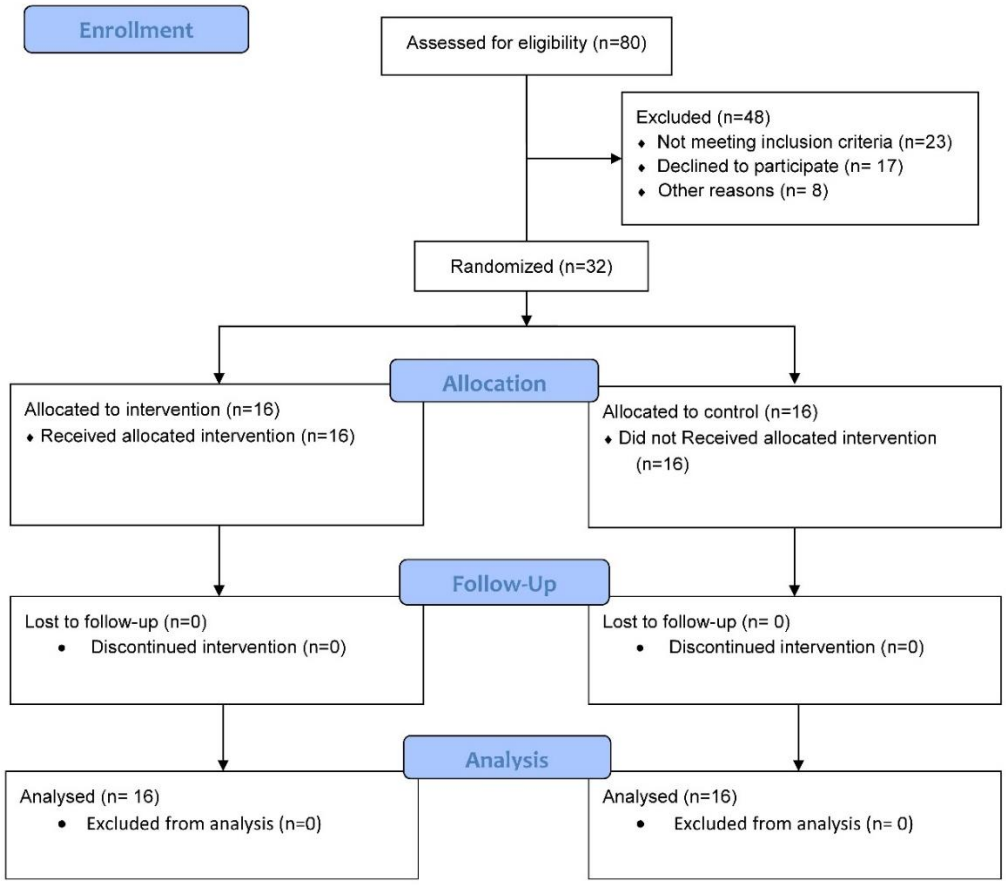


Figure 1. The process of allocating and implementing the study protocol for both groups

Ethical consideration

Participants' information was documented after the assignment of a code to each student, and the data remained secret with the researcher. The surveys were gathered anonymously. This research maintained integrity and confidentiality throughout the document evaluation process. Our study aligns with the community's values and traditions and will not impede students' academic advancement. All tenets of the Helsinki Declaration were adhered to. The Ethics

Committee of Kerman University of Medical Sciences accepted this study, and an ethics code was acquired (IR.MEDILAM.REC.1401.192).

Statistical and Data analysis

The researcher created a checklist and entered all student information, including demographic and clinical factors, into SPSS V.16. Statistical analyses were presented in two descriptive and analytical sections. In the descriptive section, the mean attitude as the main variable was presented across different groups, and all demographic and clinical characteristics of students were reported based on descriptive criteria. Data were analyzed using Chi Square, Pillay effect, Wilks' lambda, Hoteling effect, Root Largest Rey, and multivariate covariance (MANCOVA) tests in SPSS v.16, with a significance level of 0.001.

Results

Before performing the analysis, the researcher first assessed if its assumptions were met. The Shapiro-Wilk test was used to evaluate the normal distribution of variables, and the obtained results (P>0.05) revealed that the distribution of scores was normal in both study groups.

Table 2 shows that in the age variable, the control group consisted of 8 individuals aged 15-24, 7 individuals aged 26-55, and 1 individual aged 56-75. On the other hand, the experimental group included 6 individuals aged 15-25, 9 individuals aged 26-55, and 1 individual aged 56-75. In terms of marital status, in the control group, 12 people were single and 4 people were married, and in the experimental group, 11 people were single and 5 people were married. In terms of educational status, the control group consisted of 5 individuals with a high school education, 5 individuals with a diploma, 2 individuals with a postgraduate diploma, and 1 individual with a bachelor's degree. Conversely, the experimental group included 9 individuals with a high school education, 4 individuals with a diploma, 1 individual with a postgraduate diploma, and 1 individual with a bachelor's degree (Table 2). Using the chi-square test, analysis between the variables of age (P=0.573), marital status (P=0.654), and education status (P=0.0687) revealed no significant differences between the control and intervention groups (Table 2).

Table 2. Distribution of Demographic Variables

Variable		Control (%)	Experiment (%)	P Value (Chi Square)
Age	**15-25**	8 (50%)	6 (37%.5)	0.573
	26-55	7 (43%)	9 (56%)	
	56-75	1 (7%)	1 (6%5)	
Marital status	**Single**	12 (75%)	11 (68.80%)	0.654
	Married	4 (25%)	5 (31.20%)	
Education status	**High school**	8(50%)	9 (56%)	0.687
	Diploma	5 (31.30%)	4 (25%)	
	Postgraduate	2 (12.50%)	1 (9.5)	
	Bachelor's degree	1 (6.30%)	1 (9.5)	

According to Table 3, research variables in the experimental group improved in the post-test compared to the pre-test. In this regard, suicidal thoughts and sensation-seeking decreased while distress tolerance moved upward in the experimental group, indicating a significant

difference between the two study groups regarding these variables in the post-test, showing the effectiveness of the intervention in the experimental group (P<0.05).

Table 3. The means and standard deviations of research variables in each study group at pre-test and post-test

Variables	Experimental group		Control group		P Value (Chi Square)	
	Pre-test Mean (SD)	Post-test Mean (SD)	Pre-test Mean (SD)	Post-test Mean (SD)	Pre-test	Post-test
Suicidal thoughts	27.43 (4.35)	18 (2.39)	23.93 (5.25)	23.81 (3.18)	0.091	0.087
Sensation seeking	10 (1.67)	7.93 (2.76)	10.81 (2.42)	11.37 (1.89)	0.066	0.110
Distress tolerance	34.10 (7.90)	60.56 (10.39)	48.70 (8.48)	44.81 (9.23)	0.118	0.057

Dependent variables were compared between the experimental and control groups using multivariate covariance analysis. Another assumption of multivariate covariance analysis is the homogeneity of variance-covariance matrices, for which the M-box test was utilized. The results of this test indicated that covariance matrices were equal (Box M = 11.32, F = 1.68, P = 0.12). The Levin test was used to investigate the homogeneity of variances in the two groups. The results of the Levin test for suicidal thoughts (F = 2.01, P = 0.16), sensation seeking (F = 3.91, P = 0.06), and distress tolerance (F = 0.96, P = 0.33) indicated that this assumption was met. Another important assumption of multivariate covariance analysis is the homogeneity of regression slopes, which was assessed based on the interaction between pre-test dependent and independent variables at the post-test phase. The results of this interaction were statistically significant for suicidal ideation (F = 39.69, P = 0.01), sensation seeking (F = 17.06, P = 0.01), and distress tolerance (F = 6.18, P = 0.01), so the assumption of the homogeneity of regression slopes was not met. This assumption was ignored by employing a narrower alpha value (i.e., 0.025 rather than 0.05). Since the assumptions of multivariate covariance analysis were met, we were allowed to use this test to investigate our research hypotheses (Table 4).

Table 4. The results of multivariate analysis of covariance on the scores of research variables

Tests	Value	F	P- Value (MANCOVA)
Pillay effect	0.61	13.15	<0.001
Wilks' lambda	0.38	13.15	<0.001
Hotelling effect	1.57	13.15	<0.001
Root Largest Rey	1.57	13.15	<0.001

The Wilks' lambda index obtained for the research variables (F = 13.15, P < 0.001) was statistically significant at P < 0.001. Based on this, it could be said that the experimental and control groups differed significantly in at least one of the dependent variables (suicidal thoughts, sensation seeking, and distress tolerance). To designate this difference, post-test scores were analyzed by ANCOVA analysis in the context of MANCOVA, the results of which have been illustrated in Table 5. According to Table 5, there were significant differences between the experimental and control groups in terms of suicidal thoughts, sensation seeking, and distress tolerance in the post-test stage (P < 0.001). Regarding the mean values of the post-test presented in Table 4, suicidal thoughts and sensation-seeking decreased in the experimental group compared to the control group, while distress tolerance increased in the experimental group compared to the control group. The effect sizes were 0.65, 0.35, and 0.33 for suicidal thoughts, sensation seeking, and distress tolerance, indicating that 65%, 35%, and 33% of the variations observed in suicidal ideation, sensation seeking, and distress tolerance, respectively, could be attributed to acceptance and commitment therapy.

Table 5. Univariate analysis of covariance in the context of MANCOVA on the scores of dependent variables using pretest scores as the control

Dependent variables		Sum of squares	Mean of squares	F value	P-value (MANCOVA)	Effect size
Suicidal thoughts	**Pre-test**	63.59	63.59	19.55	0.003	0.26
	Group	330.97	330.97	54.89	0.001	0.65
	Error	174.84	6.02			
Sensation seeking	**Pre-test**	45.60	45.60	10.74	0.003	0.27
	Group	67.33	67.23	15.87	0.001	0.35
	Error	123.08	4.24			
Distress tolerance	**Pre-test**	54.97	54.97	0.56	0.46	0.02
	Group	1428.46	1428.46	14.54	0.001	0.33
	Error	2847.40	98.18			

Discussion

This study aimed to investigate the effectiveness of acceptance and commitment therapy in modifying suicidal ideation, sensation seeking, and distress tolerance among substance users. The findings of this research showed that acceptance-and-commitment therapy desirably affected suicidal ideation, sensation seeking, and distress tolerance in male substance consumers. The first hypothesis was supported by the F value of 39.69, which showed that there was a significant difference in the experimental group's adjusted mean scores for suicidal thoughts between the pre-test and post-test steps. This shows that commitment and acceptance therapy had an effect. This observation was in line with the results of Dokas et al. (22), Loma et al. (23), and Fadhil et al. (24). Suicidal ideation refers to thinking about killing oneself and its effects on others, as well as planning for the time, place, and manner of suicide (21). Suicide is a major public health problem and one of the leading causes of death worldwide. Regarding the relationship between drugs and suicidal ideation, it can be said that substance use may increase the likelihood of suicide by affecting neurotransmitters. Substance abuse is strongly associated with self-destructive behaviors such as suicide. Addiction poses multiple negative consequences to the family and, consequently, to society and is associated with many adverse events, including suicide. Acceptance & commitment therapy is based on acceptance, which helps clients not take their unpleasant emotions and thoughts seriously. Also, the person is trained to simplify his/her thoughts by self-appraisal and to correct negative self-assessments (25). Regarding the second hypothesis and according to the F value obtained (17.06), the adjusted mean sensation-seeking score showed a significant change in the post-test stage compared to the pre-test phase. Therefore, commitment & acceptance therapy was effective in modulating sensation seeking in male substance users. This finding agreed with that of Ruiz et al., Fahlkar et al., Sahebi et al., and Davis et al. (15-17, 26). The people seeking sensation always look for new risky experiences, so they are more interested in unusual activities. These people tend to break themselves free from social boundaries to achieve the pleasure of new experiences. These traits of sensation seeking push individuals toward behaviors such as addiction and substance abuse. Kou et al. showed that sensation seeking is strongly correlated with risk-taking or adventurous behaviors. According to acceptance and commitment therapy, none of an individual's inner experiences is harmful (27), so the person is confident that by assimilating these negative emotions, he/she can appropriately encounter them similar to positive emotions by taking timely and appropriate actions. Using its key element (i.e., acceptance), acceptance-and-commitment therapy eventually helps the person recognize and regulate

his/her emotions, which in turn suppresses exaggerated emotions and suicidal ideation (28). Ruiz et al. also showed that acceptance and commitment therapy effectively reduced negative thoughts and emotions, as well as emotional disorders (17). Regarding the third hypothesis of this study, according to the F value obtained (0.96), the results showed a significant difference comparing the adjusted means of the distress tolerance score between the pre-test and post-test phases. Therefore, commitment and acceptance therapy is effective in improving distress tolerance among substance users. This finding was in agreement with that of studies by Greenberg, Walser et al., Zolensky et al., and Worden et al. (29-32). Distress tolerance refers to the ability to bear unpleasant inner feelings and can encompass different conditions, such as negative emotions, ambiguity, uncertainty, despair, and physical problems (33).

Substance use is one of these negative states and destructive distress-rooted behaviors. Acceptance & commitment therapy draws upon various therapeutic techniques, emphasizing concepts such as acceptance, mindfulness, living in the present moment, cognitive fusion of values, and committed behaviors. These approaches foster psychological flexibility, reduce drug temptation, mitigate the symptoms and consequences of drug withdrawal, enhance the effectiveness of treatment, and prevent the recurrence of substance use. The main purpose of acceptance and commitment therapy is to teach people, including those who are dependent on drugs, how to set themselves free of negative thinking and disturbing thoughts and how to show more resilience when facing unpleasant feelings so that they can resist the temptation of resuming substance abuse and subsequently reduce the rate of such a mistake and addiction recurrence. According to our findings, it can be concluded that acceptance & commitment therapy strives to augment psychological flexibility by empowering clients to identify their values and improve their coping abilities against unpleasant thoughts, feelings, and body sensations (34). Acceptance & commitment therapy tries to help people stop controlling or avoiding unpleasant feelings or emotions. The goal of the treatment is not to reduce unpleasant feelings, emotions, and thoughts, but to widen opportunities and desire for experiencing them. The desire to experience these inner events and respond to them by accepting them (instead of escaping) facilitates individuals' commitment to behaviors that are in line with their fundamental values. Therefore, identifying avoidance behaviors and increasing psychological flexibility are the core components of acceptance and commitment-based interventions, encouraging people to pursue drug withdrawal and preventing substance use resumption. As evidenced by the hypothesis, acceptance-and-commitment therapy influenced sensation seeking among substance users. Likewise, Sheibani et al. reported the effectiveness of acceptance-and-commitment therapy in improving emotion regulation and its related strategies. Acceptance and commitment therapy helps increase awareness/appreciation towards positive emotions and conscious participation in pleasant activities, promoting positive emotions (15).

Like any other study, this research also suffers from some limitations, including limited access to the sample population, as well as time and geographical constraints, which restrict the data's generalizability.

Conclusion

Acceptance and commitment-based training helps group members share their unwanted and painful feelings and emotional experiences. On the other hand, values and commitment to acting help them set themselves free of negative thoughts and emotions and acquire a greater sense of vitality, meaning, and purpose in life. In this therapeutic approach, acceptance & commitment-based group counselling, as well as the techniques used (such as mindfulness, inconsistency and acceptance, detailed discussions about a person's values and goals, the necessity of clarifying values, and behavioral commitment), all contribute to the effectiveness of acceptance & commitment therapy in increasing distress tolerance in substance-dependent men.

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Conflict of interest

The authors declare no conflict of interest.

Authors' Contributions

Formal Analysis: MM, Investigation, Resources: GN, Visualization: HN, Conceptualization, Methodology, Data Curation, Writing– Original Draft Preparation, Writing– Review & Editing, Supervision, Project Administration: S.S

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