

Comparison of the Effectiveness of Acceptance and Commitment Therapy and Metacognitive Therapy on Substance Craving in Patients with Substance Use Disorder

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Abstract

Background: Drug abuse, as one of the chronic psychiatric diseases, has become one of the major problems in societies today.

Objectives: The present study aimed to compare the effectiveness of acceptance and commitment therapy (ACT) and metacognitive therapy in substance craving in patients on methadone maintenance treatment.

Methods: This quasi-experimental study adopted a pretest-posttest control group design. The statistical population comprised all patients with drug abuse in Mashhad who were actively getting methadone therapy. A total of 60 patients getting methadone maintenance therapy who were referred to Mashhad substance addiction treatment institutions during the second half of 2019 were selected as the sample. They were randomly assigned to two test groups (ACT and metacognitive groups) and a control group. Data were analyzed in SPSS software (version 24).

Results: The results demonstrated that the ACT and metacognitive therapy are effective in the reduction of craving in patients on methadone maintenance treatment ($P < 0.01$).

Conclusion: As evidenced by research findings, it can be concluded that the ACT is more effective than metacognitive therapy in the reduction of cravings in patients on methadone maintenance treatment.

Keywords: Acceptance and commitment treatment, Metacognitive therapy, Substance craving

1. Background

Drug abuse has affected many individuals and families in the country, and this is not an issue that can be ignored or considered insignificant (1). The characteristics of this social damage, which directly and indirectly targets society, are somewhat vague; nonetheless, what is interesting is how to deal with the obvious features of this social damage (2). More than two decades ago, addiction treatment was punitive and harsh, with punishments, such as imprisonment and rehabilitation, and those in charge were law enforcement, prisons, and rehabilitation facilities (3). With a marked shift in authorities' perspectives and the dominance of the medical viewpoint on social issues, including addiction, the addicted person has transitioned from a criminal to a sick person (4). Substance dependence is defined as a chronic and recurring brain disorder that, despite its negative consequences, is accompanied by compulsive searching and consumption (5). These negative consequences, which have acute and chronic physical, psychological, social, and chronic aspects, cause serious social issues, such as crime, unemployment, and poverty (6).

Since epidemiological studies, according to World Health Organization statistics, demonstrated that approximately 3% of the world's population suffers from this disorder, these issues and problems have been universal (7). Although the prevalence of

substance abuse has not increased significantly in recent years, it has increased in line with global population growth. Nonetheless, concerns in this area have grown in the international community due to the chronic nature and reversibility of substance dependence, as well as the potential costs imposed on families and communities (8). Since relapse is a major challenge for addiction treatment and treatment seekers' inability to abstain, these concerns are entirely justified and natural. The consequences of addiction, including a lower rate of return to treatment, health problems, and social ills, worsen over time. To increase the efficiency of addiction treatments and minimize mortality from these disorders, it is critical to understand the characteristics linked to positive and poor outcomes following treatment for substance use disorders (9).

Methadone maintenance treatment is one of the most contentious therapies for addiction treatment, and since methadone is a narcotic, it is unlikely that the doctor will do what the person does instead of leaving. If he/she does not use a substance, he/she gives a person another type of drug (10). These people have a poor understanding of substance abuse. Many patients believe that it is impossible to have a drug that does not require them to abuse any other drugs for at least 24 hours a day. Suppose the patient is accepted through the admission process from consultation to initiation of treatment. In that case, there is an incentive when the patient first realizes that

he/she does not need to abuse any other drugs by taking methadone in one meal. It becomes more difficult to stop using consumables (11). Several factors can play a role in the mitigation of drug cravings in patients with substance abuse disorders treated with methadone maintenance. Craving is one of the causes of relapse and slippage in abstaining from opioids. If the drive to consume is not met, it causes mental and bodily problems, such as fatigue, anorexia, anxiety, restlessness, anger, and depression (17). As a result, one of the most significant concerns of therapists and researchers in this sector is searching for strategies to lessen cravings and diminish the influence of emotions, thoughts, and unpleasant memories in addicts.

According to research, professionals have had therapeutic effectiveness using two types of therapies: pharmacological therapy (methadone), as well as individual and group psychosocial interventions. Furthermore, professionals in recent decades have studied the deployment of psychological therapies in order to lower the chance of relapse and have a longer-lasting influence on adherence to treatment and relapse by modifying a person's lifestyle (18). This research compared the effectiveness of acceptance and commitment therapy (ACT) and metacognitive therapy. The effectiveness of ACT and metacognitive therapy is explored in this study. The ACT, one of the third-wave approaches of behavioral therapy, has displayed advances in the treatment of mental disorders and improvement of quality of life, creating psychological flexibility through the processes of acceptance, mindfulness, behavior change, and commitment (19).

The ACT is viewed as a taught behavioral pattern in therapy. Unlike cognitive-behavioral treatments that strive to avoid unpleasant feelings and ideas, it modifies the content of cognitions connected to substance use or focuses on reducing impulses, appetites, and images. This approach helps the patient experience painful sensations in the present, implement cognitive deficiencies, and eventually determine life values and commitment (20). Therefore, the methods of describing anxiety, vulnerability, avoidance (non-acceptance), and non-avoidance (fusion) are explored in order to uncover causes for shifting away from performance based on life values. As a result, the addicted person's proclivity to take drugs decreases (21).

In this context, the study by Twohig et al. found that ACT reduced cravings and dependency in marijuana users (22). In their study, Hayes et al. (23) revealed acceptance, commitment, and facilitative therapy as a 12-step randomized clinical trial on patient reduction. Methadone maintenance therapy proved successful for those who were addicted to opioids. The ACT, on the other hand, has been shown to be more beneficial than medication therapy and facilitative therapy in terms of lowering substance

abuse and overall follow-up. Another treatment for the reduction of cravings is metacognitive therapy, which can be considered a useful method by putting an emphasis on changing thinking patterns and paying attention to them due to the feeling of lack of control over thoughts and behavior and focusing thoughts on oneself and threatening issues (24). Metacognitive therapy was another treatment employed in this study in the components of lowering drug cravings. Researchers think that changing metacognitive beliefs and teaching self-regulation methods can considerably reduce cravings and prolonged drug use by lowering unpleasant feelings (25). As a result, metacognitive therapy decreases anxiety and rumination and promotes cognition through developing coping skills, regulating cognitive, emotional, and mood states, modifying patterns of thinking and cognitive processing, and paying attention to them, allowing for more cognitive control flexibility (26).

Transcendental awareness and attention in metacognitive therapy, which facilitates the implementation of techniques and interventions of this approach, have a stronger cultural affinity with Iranian society, particularly in order to reduce consumption, withdrawal, and adherence to the treatment of substance abuse patients. Doubles and can be useful in recognizing cognitive impairments and adhering to life ideals (27). In addition, a wide array of studies have examined the effect of psychological therapies, including metacognitive therapy and ACT, separately on reducing cravings. Nonetheless, no research has specifically compared the effect of the two intervention methods on the mentioned variables. Furthermore, none of the studies evaluated the effectiveness of the aforementioned treatments in the community of men receiving methadone maintenance therapy to stop opioids, and this difference is also required to conduct the current study.

2. Objectives

The present study aimed to compare the effectiveness of ACT and metacognitive therapy in substance craving in patients on methadone maintenance treatment.

3. Methods

This quasi-experimental study adopted a pretest-posttest control group design. The statistical population comprised all patients with drug abuse in Mashhad who were actively getting methadone therapy. A total of 60 patients getting methadone maintenance therapy who were referred to Mashhad substance addiction treatment institutions during the second half of 2019 were selected as the sample. A number of 80 people came to Mashhad after announcing the call, posting announcements in medical centers, and contacting all people referred to

these centers who were treated with methadone to participate in psychotherapy intervention sessions in five drug withdrawal centers (Aramesh Mandegar, Laleh, Honare Zendegi, Milad, and Mehr Reza). Patients were tested in advance. The individuals with the lowest scores in craving and those who matched the inclusion criteria were then randomly allocated to one of the two experimental groups (acceptance and commitment therapy and metacognitive therapy) and a control group. The inclusion criteria were as follows:

1. Substance abuse and voluntary referral to Mashhad methadone maintenance programs for drug rehabilitation.
2. Absence of serious cognitive or personality issues.
3. Avoiding additional psychological procedures at the same time.
4. An age range of 18- 40 years.
5. Minimum education of high school diploma.
6. Conscious agreement to attend treatment sessions

On the other hand, the exclusion criteria entailed:

1. Dissatisfaction with the continuation of meetings.
2. The occurrence of unexpected events (hospitalization and death).
3. Failure to attend more than three therapy sessions.
4. Inadequate physical or mental circumstances to complete the surveys, as well as failure to complete the questionnaires in a way that negatively impacts the outcome.
5. Methods and tools of data collection and treatment protocol

Material craving scale

Salehi Fedardi, Bar Erfan, and Amin Yazdi developed the Substance Abuse Scale (28): This measure consists of 20 items, each of which is rated on a 6-point Likert scale (totally true = 5, not at all true = 0). The overall score of the questionnaire is calculated by adding the scores of all items and scoring them according to the cut line (minimum 20 and maximum 100). As a result, the scores of 20-40, 40-60, and > 60 signify a temptation to use substances after mild cracking, after moderate cracking, and after severe cracking, respectively. Cronbach's alpha was used to determine the validity

of this questionnaire in the study by Salehi Fedardi et al. (28) (0.94). Anis and Graham (29) ($P=0.001$; $r=0.53$), and psychological cravings (30) (Rob et al., 2004) ($P=0.001$; $r=0.48$) were used to examine the validity of the situational confidence questionnaire. Watson, Clark, and Telgan (31) employed positive emotions ($P=0.001$; $r=0.32$) and negative emotions ($P=0.001$; $r=0.55$) to corroborate the direction and strength of the associations. In the current study, the reliability of this questionnaire was determined using Cronbach's alpha technique, yielding a total score of 0.91.

Treatment procedure for acceptance and commitment

Instead of modifying cognitions, this therapeutic strategy attempts to strengthen the person's psychological connection with his/her ideas and feelings. This therapy intervention was established in the current study based on Hayes et al.'s (23) treatment protocol, which was translated by Dr. Farhad Asghari, Assistant Professor, Department of Educational Sciences, University of Guilan. The content validity of the treatment package was validated and its conformity with the research goals was found in the study by Ghanbari et al. (32).

Metacognitive treatment protocol

Metacognitive therapy was delivered as a group in ten 90-minute sessions over the course of three months in this style of treatment. The following is the framework of these sessions, which was constructed based on the Wales metacognitive model based on metacognitive flaws. The treatment package employed is summarized as follows: 10 sessions over three months, one 90-minute session each week. Finally, the research data were analyzed in SPSS software (version 24) using descriptive statistics (chart, mean, and standard deviation) and inferential statistics (analysis of variance with repeated measures and Bonferroni test) to determine the group's efficacy and durability.

Table 1. Protocol of the interventions used in the research

Treatment Protocol for Commitment and Acceptance (ACT)	
Session	Topics
1	(Beginning) Obtaining the agreement of the customers, describing the steps of therapy, introducing the research techniques, and having the subjects complete the questionnaires
2	Awareness of the price of consuming) Authorities' awareness of the repercussions of substance addiction in her life, use of (metaphors, such as picturing wiping muck from the glass
3	(Confronted with the system: creative frustration) Inducing a condition of creative dissatisfaction by managing private experience, studying the history of attempts at change, and articulating solutions as part of the problem
4	(The fundamental difficulty is that severe emotion control is required.) The issue with managing emotions is that you must thoroughly grasp the situation before taking a different approach. Introduce the law based on the 95 percent vs. 5% guideline, from the liar's metaphor
5	Emotional want) Introducing desire as an alternative, highlighting the distinction between the urge to act and the need to (feel, emphasizing that desire cannot be a fundamental control program, relating the cost of resistance and evaluating values
6	Difference between individuals and planning) Many behaviors are automatic; they are programmed, and one should not (constantly hunt for a rationale for them. You are not their ideas and feelings, allowing you to see yourself in a way that goes beyond evaluation
7	Challenges to Emotional Acceptance) Literacy Fundamentals, Verbal Contracts Fundamentals: Using metaphors such as the (

	.monster on the sacrificial Peter bus to label thoughts and feelings as thoughts and feelings rather than what they say
8	Distinguish between choice and decision, identify the features of action in accordance with the aims of acting vs. trying, want .as a choice and an action, utilize metaphors such as pleading in a moody kid, and Try against the action
9	Objectives and Values) Expertise in measuring values, deciding the task of measuring values for clients, and executing the (.task of measuring values by clients, therapists, and authorities debate each area's values
10	Taking on responsibility for change) Accepting for successful action, addressing the distinction between pain and harm ((trauma), withdrawing from the victim position, blaming the changed reaction power, using the metaphor of jumping, matches in the fuel tank, and causing Complete crime
11	Increasing Emotional Desire for Real Life Through Commitment and Commitment) Finishing unfinished tasks, forgiving, (;and accepting oneself are potential causes of the same reasons
12	Summary and review) Analysis and processing of end-of-treatment emotions, describing willpower hurdles, assessing (experiences of reviewing and summarizing the treatment process, discussing life after treatment, and completing questionnaires by post-test participants

Treatment Protocol for Metacognitive treatment

Session	Topics
1	Welcome, discussion about the location, the number of sessions, the duration and duration of each session, the introduction of group rules and regulations, the introduction and introduction of members, the explanation of research instruments, and .the completion of questionnaires by the subjects
2	Summarize the previous session's material with members' assistance, explain the metacognitive pattern dissociative mindfulness techniques, teach attention and procrastination, offer a diagram, presentation of the task, and emphasis on .accomplishing the task, and get feedback
3	Discussion of good and negative metacognitive beliefs and their practice, mindfulness method training, and suppression- non-suppression test of technique of delaying attention focused on uncontrolled beliefs
4	Receive feedback from the previous session, review the previous session's exercise and homework (samples of positive and negative metacognitive beliefs), challenge positive and negative metacognitive beliefs, teach the delaying worry technique, .and practice the metacognitive guiding technique
5	Discussing homework, teaching and practicing free association, offering homework, and getting comments from the last session
6	Using coping mechanisms and avoidance of reactions focused on reassuring ideas, redirecting attention on safety indicators, anti-inhibition test training and practice, homework presentation
7	Reviewing homework, training and practicing the skill of prescribing the wandering mind, learning to perform the tiger homework, delivering homework, and getting feedback from the previous session
8	Teaching the process of changing danger monitoring beliefs based on self-awareness, employing verbal and behavioral re- documentation procedures based on risk beliefs
9	Receiving feedback from the previous session, reviewing homework, training and practicing the verbal loop technique, learning the practice of resistant child's schoolwork, providing homework, receiving feedback, and answering questions from members
10	Technique training examines the evidence to the contrary and prepares members to identify impediments to the adoption of .techniques, ultimately leading to a conclusion

4. Results

The ACT, metacognitive, and control therapy groups had mean ages of 32.15, 34.80, and 33.25, respectively. A one-way analysis of variance revealed no significant differences in age between the groups ($P < 0.05$; $F = 1.125$). Males made up 65%, 80%, and 55% of those in the ACT, metacognitive, and control groups, respectively. The Chi-square test findings revealed that the groups were sexually homogenous ($P < 0.05$; $2 =$

2.85). In terms of education, 60% and 40% of subjects in the metacognitive treatment group had a diploma and higher education, respectively. In the ACT group, 55% and 45% of cases had a diploma and higher education, respectively. In the control group, 70% and 30% of subjects had diplomas and higher education, respectively. The Chi-square test revealed that the groups were matched in terms of education ($P < 0.05$; $2 = 0.987$). Table 1 displays the mean and standard deviation of research variables.

Table 2. Demographic indicators in experimental and control groups

Index	Group	ACT		MCT		Control		χ ²	p-value
		frequency	percentage	frequency	percentage	frequency	percentage		
Gender	Male	4	20	7	35	9	45	2.850	0.241
	Female	16	80	13	65	11	55		
Marital status	Single	6	30	7	30	6	30	0.582	0.965
	Married	9	45	9	45	8	40		
	divorced	5	25	4	20	6	30		
education	Diploma	11	55	12	60	14	70	0.987	0.610
	Bachelor and higher	9	45	8	40	6	30		
	University student	1	5	3	15	2	10		
Job	housewife	3	15	2	10	3	15	7.404	0.494
	Unemployed	6	30	12	60	8	40		
	Employed in the private sector	8	40	2	10	5	25		
	Employed in the public sector	2	10	1	5	2	10		
Drugs consumed within a month	Hashish	10	50	7	35	6	30	2.848	0.584
	Opium	4	20	8	40	8	40		
	Heroin	6	30	5	25	6	30		
Style	Fumigation	13	65	8	40	9	45	6.575	0.363
	Eating	3	15	8	40	5	25		
	Injection	2	10	4	20	4	20		
Number of previous quits	Tanqiya	2	10	0	0	2	10	1.560	0.816
	0	11	55	8	40	11	55		
	1	7	35	10	50	8	40		
	2	2	10	2	10	1	5		

illustrates the demographic characteristics of experimental and control groups (P>0.05).

Table 3. Results of analysis of variance for intra-group and inter-group differences

Variables	Source of changes	sum square	degree of freedom	mean squares	F	Significance level	Square share price
Craving	Test	1650.186	1.031	1650.475	77.243**	0.001	0.757
	Group membership	2430.003	2	1215.001	21.604**	0.001	0.431
	Test* Group membership	1101.423	2.062	534.121	25.788**	0.001	0.475

**p ≤ 0.01 *p ≤ 0.05

As demonstrated in Table 3, there is a significant difference between the three groups (ACT, metacognitive therapy, and control) in craving

according to the test, group membership, as well as the interactive effect of the test and group membership.

Table 4. Descriptive indicators of craving in experimental and control groups

Variable	group	Acceptance and commitment treatment		Metacognitive therapy		Control group	
		Average	Standard deviation	Average	Standard Deviation	Average	Standard Deviation
Craving	pre- test	63.3	6.664	64	5.74	63.83	6.459
	Post-test	51.3	3.733	56.18	4.615	64.68	4.791
	Follow up	51.3	3.654	56.1	4.444	64.18	4.739

Table 5. Multivariate test results to examine intergroup differences in craving

Variable	Source of changes	Wilks Lambda	F	Significance level	Partial Eta Squared
Craving consumption	Test	0.418	38.952	0.001	0.582
	Test* Group membership	0.485	12.191	0.001	0.303

The Wilkes lambda multivariate test is significant in terms of test phases, test interaction, and group membership (P=0.01). Table 4 shows the findings of a repeated measures analysis of variance for craving

Based on Table 6, there is a significant difference in terms of test, group membership, as well as the interactive effect of test and group membership between the three treatment groups based on

acceptance and commitment, metacognitive, and evidence in craving (P<0.05). The findings illustrated in Table 6 can be divided into two categories: intragroup and intergroup.

Table 6. Investigating intra-group and inter-group differences in craving

Variables	Source of changes	sum square	degree of freedom	mean squares	F	significance level	Square share price
craving	Test	1650.186	1.031	1600.475	77.243**	0.001	0.575
	group membership	2430.003	2	1215.001	21.604**	0.001	0.431
	Test* Group	1101.422	2.062	534.121	25.778**	0.001	0.475
	membership						

**P≤ 0.01

1- Change agents within the group:

Repeating the test: The difference in mean craving in the three stages of measurement between the study groups is significant (P<0.05), signifying that craving was significantly different between the three stages of assessment (pre-test, post-test, and follow-up). B. Repeat interaction between test and experimental groups: The difference in mean craving in the three stages of measurement between the studied groups is significant (P<0.05). (A significant interaction occurs when the level of one variable (test) influences the

effect of another variable (group/intervention).

2- Intergroup Change Sources:

C Experimental variable: There is a significant difference in mean craving between the study groups (P=0.05). The null hypothesis is thus rejected, and the research hypothesis is confirmed. That is, the average craving differs significantly between the groups. Table 7 depicts the results of the Bonferroni post hoc test to compare means in terms of group membership and test stages in groups.

Table 7. Bonferroni post hoc test to compare average craving based on test approach and stages

	Pair comparison Approaches-steps	difference between the means	standard error	significance level		
craving	Treatment approaches	ACT	Metacognitive	-3.458*	1.369	0.043
			control	-8.925**	1.369	0.001
		Metacognitive	control	-5.467**	1.369	0.001
	levels	Pre-Test	Post-test	6.325**	0.722	0.001
			Follow up	6.517**	0.722	0.001
		Post-Test	Follow up	0.192	0.105	0.219

**p ≤ 0.01 *p ≤ 0.05

The difference in the mean of the ACT group with metacognitive therapy is significant (P<0.05), according to Table 7. The mean craving scores in Table 5 reveal that the craving score in the ACT group was reduced more than that in the metacognitive group. Therefore, the hypothesis is validated; it can

be inferred that in people who abuse substances, there is a difference between the effectiveness of metacognitive and ACT in yearning. Based on Table 5, the means decreased in both experimental groups from pre-test to post-test and from pre-test to follow, with a significant difference (P<0.01). The differences

between post-test and follow-up were not statistically significant ($P < 0.05$). This indicates that the therapeutic effects have remained consistent throughout time. As a result, it is possible to conclude that the efficacy of ACT and metacognitive therapy in craving in patients receiving methadone maintenance treatment for drug addiction disorder is constant over time.

5. Discussion

The present study investigated the effectiveness of ACT versus metacognitive therapy in substance craving in patients with methadone-containing substance abuse disorder. The ACT and metacognitive therapy were found to be effective in the reduction of substance craving. These findings are in line with those reported in previous studies (33-39). It can be acknowledged that emotion management is an internal and external process when explaining the findings of the current study regarding the effectiveness of commitment and acceptance therapy in substance craving in patients with methadone-dependent substance use disorder. It is in charge of controlling, evaluating, and changing the emotional reactions of the person on the path of action realization, and any flaw in emotion regulation can make a person vulnerable to various forms of pathology (40).

People try to get rid of negative emotions and situations. Getting rid of negative emotions and anxiety manifests itself in substance abuse for a drug user. In fact, when a person is under pressure to use drugs, effective emotion management reduces the risk of substance abuse. The ability to manage emotions enables a person to employ effective coping strategies in situations where there is a high risk of consumption (41). As a result, in this treatment, the effect of physiological sensitivities and the excitement of substance use on overt behavior is moderated by the individual's relationship with these experiences. Therefore, treatment based on acceptance and commitment with the goal of facing temptation and any undesirable emotion and being aware of its existence and emphasizing their acceptance without judgement. The concept of cognitive fusion or fault in ACT refers to the extent to which an idea (e.g., desire to consume) affects behavior. Tissue-dependent behavior and thought-related behavior exist on a spectrum between cognition and cognitive error, and when a person mixes with his/her thoughts, he/she is unable to distinguish his mental judgment from reality (42).

As a result, the effect of physiological and emotional sensitivities caused by substance use on overt behavior is moderated in this treatment by teaching the presence of present and cognitive failure. Accordingly, in this treatment, drug users

are taught to accept and tolerate their experiences, and they can act independently of these experiences to the extent that they can accept and tolerate their experiences. The ACT can be helpful in reducing or counteracting temptation due to latent mechanisms such as acceptance, awareness raising, momentary presence, and avoidance of empirical avoidance. Therefore, increasing psychological resilience in ACT can increase the patient's ability to cope with cravings and withdrawal symptoms, which is the main indicator of continued use in these patients (43).

Metacognitive therapy teaches the patient to respond to internal events in a flexible and decentralized manner. Through cognitive regulation of emotion, people learn that by distancing themselves from thoughts and experiencing them in a broken way, they can respond to anxiety stimuli in a new way without becoming involved in the anxiety process. This method employs techniques to halt the ongoing processing of anxiety. It is also used to improve concentration. In further explanation of the metacognitive model, it can be stated that instead of challenging disturbing and anxious thoughts, it is related to thoughts that prevent resistance through complex perceptual analysis and lead addicts to the conclusion that intrusive thoughts do not end in obligation. Only a disturbing thought should be left alone and not interfered with such that addicts use fewer substances to escape from disturbing thoughts and emotions (anxiety and depression). In other words, addicts learn not to consider stressful life events as catastrophic and show no cognitive or behavioral response to them to experience less depression. These lessons were delivered using the techniques of beer homework, cloud imagery, train station allegory, disobedient child allegory, and wandering mind prescription. According to the findings, metacognitive group therapy can influence and reduce the treatment of depression in addicts (44).

In this regard, metacognitive beliefs improve adaptive strategies for cognitive regulation of women-dependent emotions. Metacognitive therapy was effective in tempting beliefs and cognitive regulation of emotion in addicts returning to substance use. In addition, metacognitive therapy had a positive effect on the reduction of drug use and prevention of relapse. As a result of the foregoing, it was determined and explained that ACT combined with metacognitive therapy was effective in patients with methadone-based substance abuse disorders and craving scores in the treatment-based group. Acceptance and commitment are even lower than in the metacognitive group. As a result, the techniques used in commitment-based therapy and acceptance to reduce drug cravings are more effective since acceptance of experiences, cognitive failure, and presence in the present can interact

with each other. Predict lower levels of temptation and mediate the relationship between acceptance and commitment-based therapy and changes in addiction cravings over time. Therefore, increasing psychological flexibility in acceptance and commitment-based therapy can increase the patient's ability to cope with temptation and cravings as the main indicator of continued use in these patients.

6. Conclusion

As a result of the foregoing, it was determined and explained that ACT and metacognitive therapy are effective in the reduction of drug cravings in patients with methadone-based substance abuse disorders. One of the limitations of this study is the use of treatment-related self-report tools, limiting the interpretation of treatment scores in this study. Furthermore, since this study was conducted on a specific sample, great caution needs to be exercised in generalizing the findings. Finally, the number of research subjects opium and the number of subjects. Other courses of treatment should also be repeated in conjunction with the follow-up period (aside from the first follow-up period) to determine whether the results remain consistent over time.

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Conflicts of interest

The authors declare that they have no conflict of interest.

References

- Karami N, Amini N, Behrozi M, Jafarina G. The prediction of distress tolerance based on brain-behavioral systems, HEXACO personality characteristics and social isolation in substance-dependent individuals. 2021.
- Seitz N-N, Lochbühler K, Atzendorf J, Rauschert C, Pfeiffer-Gerschel T, Kraus L. Trends in substance use and related disorders: Analysis of the epidemiological survey of substance abuse 1995 to 2018. *Deutsches Ärzteblatt International*. 2019;**116**(35-36):585.
- Afzali R, Sarami H, Irankhah A. Content Analysis of Media Content in Control over and Counter against Narcotics in Iran (Ettela'at and Iran Newspapers). 2018.
- Mamsharifi P, Jamehbozorg A, Takjoo J. The Effectiveness of Cognitive Rehabilitation on Increased Attention and Memory Functions in Heroin Addicts. *Scientific Quarterly Research on Addiction*. 2020;**14**(55):229-43.
- Singer PD. Factors associated with long-term recovery from substance use disorders: California state university, Long Beach; 2016.
- Sau M, Mukherjee A, Manna N, Sanyal S. Sociodemographic and substance use correlates of repeated relapse among patients presenting for relapse treatment at an addiction treatment center in Kolkata, India. *African health sciences*. 2013;**13**(3):791-9.
- Vakharia SP. Incorporating substance use content into social work curricula: Opioid overdose as a micro, mezzo, and macro problem. *Social work education*. 2014;**33**(5):692-8.
- Tam H-I, Shik AW-y, Lam SS-I. Using expressive arts in relapse prevention of young psychotropic substance abusers in Hong Kong. *Children and Youth Services Review*. 2016;**60**: 88-100.
- Decker KP, Peglow SL, Samples CR, Cunningham TD. Long-term outcomes after residential substance use treatment: Relapse, morbidity, and mortality. *Military medicine*. 2017;**182**(1-2):e1589-95.
- Ghaderi Begeh-Jan K, Khaledian M, Farrokhi N. Structural Modeling of Family Function and Drug Craving in Addicted People under Methadone Maintenance Treatment with an Emphasis on the Mediating Role of Self-Compassion. *Scientific Quarterly Research on Addiction*. 2018;**11**(44):209-26.
- Talabari ZK, Khajavi MN, Rafiei H. Reasons of Methadone Maintenance Therapy Drop out in Clients of Iranian National Center for Addiction Studies (INCAS): A Qualitative Study. *Iranian Journal of Psychiatry & Clinical Psychology*. 2013;**18**(4).
- Lee JL, Bertoglio LJ, Guimarães FS, Stevenson CW. Cannabidiol regulation of emotion and emotional memory processing: relevance for treating anxiety-related and substance abuse disorders. *British journal of pharmacology*. 2017;**174**(19):3242-56.
- Laghi F, Bianchi D, Lonigro A, Pompili S, Baiocco R. Emotion regulation and alcohol abuse in second-generation immigrant adolescents: the protective role of cognitive reappraisal. *Journal of health psychology*. 2021;**26**(4):513-24.
- Perry C, Lawrence A. Addiction, cognitive decline and therapy: seeking ways to escape a vicious cycle. *Genes, Brain and Behavior*. 2017;**16**(1):205-18.
- Lorkiewicz SA, Ventura AS, Heeren TC, Winter MR, Walley AY, Sullivan M, et al. Lifetime marijuana and alcohol use, and cognitive dysfunction in people with human immunodeficiency virus infection. *Substance abuse*. 2018;**39**(1):116-23.
- Tang Y-Y, Tang R, Posner MI. Mindfulness meditation improves emotion regulation and reduces drug abuse. *Drug and alcohol dependence*. 2016;**163**:S13-S8.
- Li J, Weidacker K, Mandali A, Zhang Y, Whiteford S, Ren Q, et al. Impulsivity and craving in subjects with opioid use disorder on methadone maintenance treatment. *Drug and alcohol dependence*. 2021;**219**:108483.
- Dimaggio G, D'Urzo M, Pasinetti M, Salvatore G, Lysaker PH, Catania D, et al. Metacognitive interpersonal therapy for co-occurrent avoidant personality disorder and substance abuse. *Journal of clinical psychology*. 2015;**71**(2):157-66.
- Bloy S, Oliver JE, Morris E. Using acceptance and commitment therapy with people with psychosis: A case study. *Clinical Case Studies*. 2011;**10**(5):347-59.
- Masuda A, Hayes SC, Sackett CF, Twohig MP. Cognitive defusion and self-relevant negative thoughts: Examining the impact of a ninety year old technique. *Behaviour research and therapy*. 2004;**42**(4):477-85.
- Luoma JB, Kohlenberg BS, Hayes SC, Fletcher L. Slow and steady wins the race: a randomized clinical trial of acceptance and commitment therapy targeting shame in substance use disorders. *Journal of consulting and clinical psychology*. 2012;**80**(1):43.
- Twohig MP, Shoenberger D, Hayes SC. A preliminary investigation of acceptance and commitment therapy as a treatment for marijuana dependence in adults. *Journal of applied behavior analysis*. 2007;**40**(4):619-32.
- Hayes SC, Strosahl KD. *A practical guide to acceptance and commitment therapy*: Springer Science & Business Media; 2004.
- Normann N, Morina N. The efficacy of metacognitive therapy: a systematic review and meta-analysis. *Frontiers in psychology*. 2018;**9**:2211.
- Bahramnejad A, Rabani-Bavojdan M, Rabani-Bavojdan M. The relationship of metacognitive beliefs and tendency to addiction in sistan and baluchistan university, zahedan, iran. *Addiction & health*. 2012;**4**(1-2):65.

26. Goldsmith AA, Tran GQ, Smith JP, Howe SR. Alcohol expectancies and drinking motives in college drinkers: Mediating effects on the relationship between generalized anxiety and heavy drinking in negative-affect situations. *Addictive behaviors*. 2009;**34**(6-7):505-13.
27. Veilleux JC. Relationships between craving beliefs and abstinence self-efficacy are mediated by smoking motives and moderated by nicotine dependence Elizabeth D. Reese, BS, BA Jennifer C. Veilleux, Ph. D. University of Arkansas: Ph. D. University of Arkansas; 2015.
28. Fadardi J, Ziaee S, Barerfan Z. The Persian Post-Detoxification Craving and Temptation Scale. Unpublished Manual, Mashhad. 2008.
29. Annis H, Graham JM. Situational confidence questionnaire (SCQ): User's guide: Addiction Research Foundation; 1988.
30. Raabe A, Grüsser SM, Wessa M, Podschus J, Flor H. The assessment of craving: psychometric properties, factor structure and a revised version of the Alcohol Craving Questionnaire (ACQ). *Addiction*. 2005;**100**(2):227-34.
31. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*. 1988;**54**(6):1063.
32. Ghanbari H, Jani HT, Nejat H. Comparison of the effectiveness of Acceptance and Commitment-Based Therapy (ACT) and Quality of Life therapy (QLT) on self-destructive behaviors and emotional cognitive regulation in substance abusers. *Journal of Fundamentals of Mental Health*. 2020.
33. Jahangiri A, Shirdal M, Gharachoorlou S. The effectiveness of Acceptance and Commitment (Act) Therapy on cognitive-emotional regulation and self-efficacy in struggling with problems in people with substance abuse treated with methadone. *Journal of North Khorasan University of Medical Sciences*. 2018;**10**(2):41-9.
34. Lanza PV, Garcia PF, Lamelas FR, González-Menéndez A. Acceptance and commitment therapy versus cognitive behavioral therapy in the treatment of substance use disorder with incarcerated women. *Journal of clinical psychology*. 2014;**70**(7):644-57.
35. Mahmoudi H, Ghaderi S. Effectiveness of Acceptance and Commitment Group Therapy in reducing depression, stress, and anxiety among ex-addicts in Tabriz central prison. 2017.
36. Sadri Damirchi E, Cheraghian H. Modeling of mindfulness and quality of sleep by the mediation of psychological well-being in high school students. *Journal of School Psychology*. 2017;**6**(2):100-23.
37. Witkiewitz K, Bowen S, Douglas H, Hsu SH. Mindfulness-based relapse prevention for substance craving. *Addictive behaviors*. 2013;**38**(2):1563-71.
38. Lee EB, An W, Levin ME, Twohig MP. An initial meta-analysis of Acceptance and Commitment Therapy for treating substance use disorders. *Drug and alcohol dependence*. 2015;**155**:1-7.
39. Jelodari S, Sodagar S, Bahrami Hidaji M. The effectiveness of Acceptance and Commitment Therapy (ACT) on psychological flexibility and cognitive emotion regulation in women with breast cancer. *Quarterly of Applied Psychology*. 2020;**13**(4):527-48.
40. Compas BE, Jaser SS, Bettis AH, Watson KH, Gruhn MA, Dunbar JP, et al. Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative review. *Psychological bulletin*. 2017;**143**(9):939.
41. Estévez A, Jáuregui P, Sánchez-Marcos I, López-González H, Griffiths MD. Attachment and emotion regulation in substance addictions and behavioral addictions. *Journal of behavioral addictions*. 2017;**6**(4):534-44.
42. Rose MR, Norton S, Vari C, Edwards V, McCracken L, Graham CD, et al. Acceptance and Commitment Therapy for Muscle Disease (ACTMus): protocol for a two-arm randomised controlled trial of a brief guided self-help ACT programme for improving quality of life in people with muscle diseases. *BMJ open*. 2018;**8**(10):e022083.
43. Smallwood RF, Potter JS, Robin DA. Neurophysiological mechanisms in acceptance and commitment therapy in opioid-addicted patients with chronic pain. *Psychiatry Research: Neuroimaging*. 2016;**250**:12-4.
44. Wells A. A cognitive model of GAD: Metacognitions and pathological worry. 2004.