

A controlled trial of acceptance and commitment therapy for addiction severity in methamphetamine users: preliminary study

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Summary

The present study aimed at determining the effects of acceptance and commitment therapy (ACT) on addiction severity in methamphetamine users. To achieve research goals and to test the hypotheses, the theoretical bases and study background were investigated, showing that ACT decreased addiction severity in this group of users. After visiting outpatient centers in Tehran and screening the users, 48 subjects were selected as an initial sample. After excluding those who did not wish to take part, the remaining 30 subjects were assigned randomly to an ACT or a waiting-list control (WLC) condition. Treatment intervention was administered individually over 12 sessions of 45–60 minutes weekly. Data were analyzed using multivariate analysis of covariance. Results showed that ACT reduced addiction severity in seven dimensions, namely medical condition ($p=0.016$), occupational status ($p=0.037$), alcohol use status ($p=0.002$), substance use status ($p=0.001$), legal status ($p=0.002$), family status ($p=0.000$), and psychological condition ($p=0.000$). Enhancing psychological flexibility through redirecting the experiential avoidance to experiential acceptance and clarifying the values, the seven dimensions of addiction severity were improved. The findings suggest a positive effect of ACT on reducing addiction severity in methamphetamine users.

acceptance and commitment therapy / methamphetamine users / addiction severity

Addiction is a type of bio-psychosocial abnormality caused by dysfunctional and harmful use of such substances as alcohol, opium and marijuana, which leads to mental or physical dependence in users. This dependence has harmful effects on the users' physical, mental and social function and may even pose a serious risk to the individual [1]. The fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* integrates substance abuse and substance de-

pendence concepts into substance-use disorders. This revision has been introduced because studies have shown that these two types of disorders are not separate, but are part of a continuum, indicating that substance use disorder (SUD) is a behavioral set rather than a one-dimensional problem. According to DSM-5, a diagnosis of SUD requires the presence of at least two symptoms from a list of twelve, and the patient is categorized on a continuum from mild to severe based on the number of symptoms they exhibit [2].

Gross & Thompson [3] believe that over 50% of Axis I disorders and 100% of Axis II disorders implicate emotion regulation deficiencies. Emotion management capability and exhibiting desired behaviors (rather than impulsive behaviors), where the risk for substance use is high,

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make the person engage in appropriate coping strategies [4]. People with high capability in emotion regulation are more capable in predicting demands that may arise from others. They understand unwanted pressures of others and have better control of their own emotions and behaviors; as a result, they develop greater resistance to substance use [5]. On the other hand, people with low capability in emotion regulation usually select substance use as a way of dealing with their negative and inefficient emotions and also to escape from life problems [4]. High prevalence of depression, anxiety and other types of emotional problems and the effect they have on individual, familial, occupational and social functions of a person have stimulated researchers to address the relevant problems. In conclusion, emotional regulation is among the psychological elements that play an important role in substance addiction and relapse [6].

In addition to medical treatments, several psychological approaches have also been developed. The first, second and third generations of these therapeutic methods include behavioral strategies, cognitive-behavioral treatment and acceptance-/commitment-based treatments, respectively. Acceptance and commitment therapy (ACT) attempts to shift the goal of treatment from avoiding unpleasant emotions to completely experiencing them. These experiences would serve to achieve personally valuable goals [7]. Studies have shown that ACT is effective in SUDs [6]. It assumes that avoiding certain unpleasant experiences (thoughts, feelings and physical emotions) is universal. This may lead to illness and to the danger of leaving a treatment programme early and craving more substance use [8].

Frequent use of drugs to relieve negative emotional states may be due to the user's problems with facing such emotions. Addicts have several problems with emotional states' regulation: accepting emotions, seeking purposeful behaviors, controlling impulsive behaviors, developing emotional awareness, having access to emotion regulation strategies, and clarifying the emotions. In addition, the majority suffer from avoiding internal experiences, rejecting feelings, and having incomplete experience of such problems. Treatment is not expected to be successful unless the patient accepts their own emotions and opens up to them completely. Therefore,

this study focuses on emotion regulation. In addition, individuals with substance dependence may be unaware of their own emotions and incapable of identifying them, and thus may exhibit reckless behaviors. The emotional problems in this group include unawareness of their own emotions and incapability in behavioral control.

Ghorbani et al. [9] showed that cognitive-behavioral treatment was more effective than methadone maintenance treatment (MMT) in emotion regulation by substance, but there was no significant difference between the control and MMT groups. Besharat et al. [10] concluded that appropriate emotion regulation affected the severity of SUD. The effectiveness of ACT in reducing addiction severity in people with methamphetamine dependence has not been investigated. Therefore, we set out to establish whether ACT affects addiction severity in people with methamphetamine dependence.

METHOD

This was a semi-experimental study of pre-test and post-test design and with a control group. The sample size of 15 patients for each group was estimated to carry effect size of 0.5 and test power of 0.75, using the Cohen table [11]. Thirty patients were purposefully selected from among methamphetamine users visiting drug rehabilitation centers in Tehran. They were placed randomly and equally into ACT or waiting-list control (WLC) conditions. Patients who met the inclusion criteria: (1) were at least 18 years of age, (2) had at least a high-school diploma, (3) had no history of psychotic disorder, (4) had no history of psychological treatment, (5) had no history of withdrawal in the past year, and (6) had signed a consent form to participate in the study. Exclusion criteria were not engaging with the researcher, not showing up or delaying therapeutic sessions on three occasions. The patients in the ACT condition received 12 sessions of ACT intervention individually on a weekly basis, each session lasting 45–60 minutes. Therefore, the whole protocol was completed in 3 months. Post-treatment was done on both groups after the end of treatment period. Table 1 shows the goals of ACT therapeutic sessions based on a standard protocol designed for SUD [12].

Table 1. The goals of ACT therapeutic sessions

Sessions	Goals
Session 1 & 2	Introducing the treatment; explaining the privacy principle; informed consent of participants to complete therapeutic process; general assessment; familiarity with the concept of creative hopelessness; homework assignments
Session 3 & 4	Evaluation of feelings, thoughts and behavioral functioning; review participant's experience since last session; enquire about homework assignments; more discussion about creative hopelessness; homework assignments
Session 5 & 6	Evaluation of feelings, thoughts and behavioral functioning; review participant's experience since last session; enquire about homework assignments; introduce control as a problem, not a solution; familiarity with the concept of willingness–acceptance; behavioral commitment exercises; homework assignments
Session 7, 8 & 9	Evaluation of feelings, thoughts and behavioral functioning; review participant's experience since last session; enquire about homework assignments and behavioral commitment exercises; familiarity with the concept of self-as-context; familiarity with the concept of defusion; homework assignments
Session 10, 11 & 12	Evaluation of feelings, thoughts and behavioral functioning; review participant's experience since last session; enquire about homework assignments; familiarity with the concept of values; emphasizing the behavioral commitments

INSTRUMENT

The Addiction Severity Inventory (ASI) is a semi-structured interview that is conducted by clinical experts and trained researchers in a face-to-face setting. This questionnaire records patients' problems in the past 30 days, the past year, and over their lifetime. ASI gives a total score for each section and grades the person's status in that section. The questionnaire includes 116 items that assess medical condition, occupational status, substance and alcohol use status, legal status, familial status, and psychological condition of the patient [13]. ASI is completed at the beginning of the study and once a month thereafter.

To obtain the reliability of the inventory via a test-retest method, ASI was conducted on 30 patients over 7 days. Then, the correlation of combined scores from problematic areas in the test along with retest scores was investigated. Result ranged from 0.44 for substance use and 0.93 for psychological status [14]. Separate questionnaires were used to investigate the concurrent validity of different areas. The Pearson correlation coefficients between family/social status and social support questionnaire, between alcohol use and alcohol use section of the Structured Clinical Interview for DSM-IV Disorders (SCID), between substance use and substance

use section of SCID, and between psychological area and the Symptom Checklist-90-Revised (SCL-90-R) was 0.22, 0.18, 0.19 and 0.39, respectively.

Data analytic plan

Before evaluating treatment outcome, a series of preliminary analyses were conducted in order to address various validity issues. First, a series of seven independent-samples *t*-tests were conducted to determine possible differences among the initial levels of seven of the ASI scales across the ACT and WLC conditions. No between-group differences were found to be significant (all *ps* > 0.05). Additional independent-samples *t*-test and chi-square tests were conducted for the various demographic variables reported in results. Once again, no significant between-group differences emerged. On the basis of these results, we concluded that our randomization procedure resulted in comparable groups of participants.

To describe data, descriptive indices such as central, deviation and distribution indicators were employed. Multivariate analysis of covariance (MANCOVA) was used in testing research hypotheses at an inferential level. MANCOVA can be used with a two-group pre-test/post-test

design to adjust the effect of pre-treatment, and it is also recommended for small sample sizes [15]. The assumptions of this test, including univariate and multivariate normality, absence of outliers, absence of multicollinearity and singularity, linearity, homogeneity of regression, homogeneity of variance and covariance matrices, and homogeneity of variances, were investigated, and no violation was shown.

RESULTS

All the participants were male. The age range in the ACT group was 20 to 30 years (26.07 ± 3.06) and in the WLC group it was 19 to 30 years (26.2 ± 3.51). Participants were predominantly single (67%), and unemployed or partially employed (74%). Table 2 presents descriptive indices of addiction severity subscales of ACT and WLC conditions pre-treatment and post-treatment. As shown in the table, scores of all subscales of the ACT condition decreased post-treatment.

Table 2. Descriptive indices of addiction severity subscales of ACT and WLC conditions pre – and post-treatment

Subscales	Groups	Mean	SD	Skewness	Kurtosis
Medical condition	ACT pre	5.63	1.71	0.375-	0.231
	WLC pre	5.20	2.19	0.022-	0.929-
	ACT post	4.15	1.29	0.293	0.179-
	WLC post	5.72	1.67	0.746-	0.432
Occupational status	ACT pre	6.36	2.20	0.783-	0.471-
	WLC pre	5.67	1.93	0.623-	0.443-
	ACT post	4.22	1.27	0.514-	0.510-
	WLC post	5.34	1.16	0.545-	0.261-
Alcohol use status	ACT pre	6.72	1.99	0.972-	0.973
	WLC pre	5.63	1.76	0.097	0.836-
	ACT post	4.41	1.04	0.750-	0.470
	WLC post	4.66	.79	0.287-	0.438-
Substance use status	ACT pre	6.23	1.74	0.634-	0.920
	WLC pre	6.15	1.10	0.06	0.927-
	ACT post	3.90	0.96	0.597-	0.166
	WLC post	4.72	0.94	0.077	0.982-
Legal status	ACT pre	6.96	1.80	0.724-	0.733-
	WLC pre	5.37	1.75	0.371-	0.564-
	ACT post	3.53	0.78	0.215-	0.028-
	WLC post	3.63	0.69	0.579-	0.699-
Family status	ACT pre	6.30	1.62	0.061-	0.722-
	WLC pre	5.58	1.84	0.238-	0.686-
	ACT post	2.29	0.82	0.270-	0.971-
	WLC post	3.77	0.79	0.507-	0.353-
Psychological condition	ACT pre	6.48	1.52	0.961-	0.969
	WLC pre	6.37	1.32	0.170	0.458-
	ACT post	1.76	0.35	0.640-	0.042-
	WLC post	3.11	0.45	0.567	0.320-

ACT: acceptance and commitment therapy condition, WLC: wait-list control condition, pre: pre-treatment, post: post-treatment.

The results of the between-subjects effects (Table 3) showed significant statistical differences on all addiction severity subscales in the ACT and WLC conditions ($p < 0.05$). In other words, there was a significant difference between the

two conditions in terms of medical condition, occupational status, alcohol use status, substance use status, legal status, family status, and psychological condition by adjusting the effect of pre-treatment means. These findings suggest that ACT affects score reduction in seven subscales of addiction severity for methamphetamine users.

Table 3. Results of between-subjects effects

Dependent variables (post-treatment)	SS	d.f.	MS	F	p	η^2
Medical condition	8.991	1	8.991	7.036	0.016	0.281
Occupational status	7.164	1	7.164	5.058	0.037	0.219
Alcohol use status	2.087	1	2.087	13.810	0.002	0.434
Substance use status	3.996	1	3.996	14.621	0.001	0.448
Legal status	2.307	1	2.307	13.886	0.002	0.435
Family status	11.359	1	11.359	18.485	0.000	0.507
Psychological condition	6.798	1	6.798	40.637	0.000	0.693

DISCUSSION

The present study aimed at determining whether ACT was effective in reducing addiction severity in methamphetamine users, and the results were positive. Our findings are consistent with those of Stotts et al. [8], Doran et al. [16], Parker et al. [17] and Stotts et al. [18]. They emphasize that people who are incapable of emotional arousal control are very likely to develop permanent substance dependence.

In explanation, the mindfulness techniques such as deep breathing enable methamphetamine-dependent people to have better cognitive function when in an emotionally challenging situation, and to observe their own emotions. Conscious acceptance and refraining from experiential avoidance and inefficient methods of coping have been effective in relapse prevention and in negative emotional states' reduction in this group. In addition, the acceptance of negative emotional states and substance use craving thoughts have made them capable of looking at their own thoughts, experiencing less impulsive behaviors and less experiential avoidance by establishing a conscious contact with the present moment. Separation from one's thoughts or cognitive defusion helps the person in resisting substance use tendency. Under such conditions, the

person attempts less to avoid life circumstances and difficulties. Results from clinical studies confirm that users take methamphetamine to relieve disturbing emotional states [19].

In Beck's model, avoidance occurs when a person cannot accept or get along with their feelings, which eventually leads to relapse. Although experiential avoidance makes people vulnerable to adaptive factors, the ACT suggests a new alternative. It helps substance-dependent people experience unpleasant emotions directly. Blackledge & Hayes [7] showed that acceptance of unpleasant emotions and feelings and experiencing them merely as feelings reduced their harmful effect, so that the person can move closer towards his life values. In this type of treatment, substance users accepted their experiences and improved their flexibility, and proportionally avoided their previous experiences and thoughts of substance use. In fact, the application of ACT mechanisms such as acceptance, contact with the present moment, and non-judgmental observation of thoughts and not acting upon them improves the person's capability in emotion regulation. It also reduces the substance use and impulsive behaviors, improves psychological flexibility, and thus empowers the person to manage anxious thoughts, cravings for sub-

stance use and withdrawal symptoms as principal indices of frequent substance use.

Hayes [20] believes that instead of focusing on elimination of harmful factors, ACT helps individuals to accept their emotions and release themselves from problematic verbal rules, and also allows them to avoid struggling with (unhelpful) thoughts and emotions.

The main and important construct of ACT is psychological flexibility, which refers to the capability to act effectively in line with the personal values. In fact, methamphetamine-dependent people perform better on the regulation of emotional actions and reactions, which may be attributed to their tendency towards negative psychological and emotional experiences, and unpleasant thoughts and memories.

According to the findings of this study, therapeutic techniques such as mindfulness exercises (e.g. focusing on breathing) and the use of metaphor, which leads to an awareness of internal experiences (thoughts, feelings, memories and physical symptoms) by accepting them intentionally, helps people in reducing inefficient control and avoidance strategies. In fact, acceptance is the key process of involvement with therapeutic achievements, reduction of the effect of painful experience on emotional functions, and prediction of one's functions in the future. With this awareness, individuals determine that strong feelings can be harmlessly acknowledged and internal experiences accepted without resistance [21]. Thus, the patients' focus shifts to what they want their life to be about [21]. Experiential avoidance is contrary to acceptance. It includes cognitive or behavioral strategies for escaping from negative emotional experiences, i.e. the use of alcohol, drugs, etc. [22].

Accepting one's problems reduces anxiety, which alone helps people avoid substance use, i.e. an avoidance behavior, as an appropriate solution for distancing from pain and suffering [23]. In addition, distancing from thoughts (cognitive defusion) teaches people (who sometimes have depressive symptoms) how to observe negative self-, other or event assessment as not necessarily their actual thoughts. This enables them to reduce the effects of such negative assessments.

Before therapeutic sessions, the ACT condition used inefficient approaches (rumination, sup-

pression and avoidance) for preventing sadness, controlling unpleasant thoughts, avoiding impulsive behavior, etc. Sher & Grekin [24] showed that failure in emotion regulation (i.e. controlling the mind and avoiding pain and unpleasant thoughts) is related to SUD. Because of these inefficient behaviors, one's experience is focused on negative internal events rather than on one's life values. In fact, an attempt is made to shift the person's attention from avoidance, suppression, and rumination to focus on their negative internal events, so that one can feel them by willingness and do not escape. They learn to live in a way that it is important to them and move towards their own values. An attempt is made to teach the person how to live in contact with the present moment by experiencing internal events, instead of living in the past or future.

People tend to use substances as a coping, avoidance, negative and inefficient strategy to reduce their own problems. In addition, some people use drugs to relieve themselves from anxiety and to reduce aggressive feelings [25]. Carroll [26] showed that when the intensity of substance use necessitates treatment, the user may consume the drug as a way of coping with a wide range of interpersonal problems. This may be attributed to several reasons. The person may have learned no effective coping strategies in adolescence to deal with problems of adulthood, or their frequent substance use as a way of coping may have weakened those skills. In addition, they may have forgotten what the effective strategies are due to long-term involvement with substance use, wasting large part of their time on supplying and administering drugs, and then on recovery from drug use symptoms. Effective therapeutic interventions help addicts find appropriate strategies to deal with withdrawal symptoms such as craving for substance use, avoidance, etc.

LIMITATIONS

The lack of a psychotherapeutic placebo group was a limitation of this study. Moreover, it was limited only to methamphetamine-dependent males, and thus the findings are not generalizable to methamphetamine-dependent females or to users of other substances. Regarding the

semi-experimental nature of this study, it was not possible to control for all external variables, and the patients might have been affected by some conditions out of the researchers' control.

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