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The Effectiveness of Matrix Interventions in Reducing the Difficulty in Cognitive Emotion Regulation and Craving in Methamphetamine-Dependent Patients

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Abstract

Background: *Craving is a persistent factor in addictive behaviors. The aim of study was to investigate the effectiveness of matrix interventions in reducing the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent patients.*
Methods: *The research method was experimental and the research design was pre and posttest with the control group. The statistical population of the study consisted of all methamphetamine-dependent patients who visited the Golestan hospital of Ahvaz in 2019. Among them, 40 ones were selected by a purposive sampling method and were randomly classified into experimental and control groups (n = 20 per group). The Cognitive Emotion Regulation and Craving Questionnaires were used for data collection. The experimental group received the matrix program (24 fifty-minute sessions), but the control group did not receive any intervention. Data were analyzed by the analysis of covariance (ANCOVA). Significant level was set at 0.05.*
Results: *The results indicated that the matrix program was effective in reducing the difficulty in cognitive emotion regulation (F = 13.483, Pvalue < 0.001). The research results also indicated that the matrix program was effective in reducing craving in methamphetamine-dependent patients (F = 60.716, Pvalue < 0.001).*
Conclusions: *According to results, the therapy could be used to reduce the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent patients.*

Keywords: Matrix model, Cognitive emotion regulation, Craving, Methamphetamine
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Introduction

Addiction is a state in which a person naturally has an abulia to control action repetition due to mental reason or chemical abuse. Despite the fact that the abulia is not a disease itself, but it is assumed as a disease due to adverse effects on the central nervous system and it causes repetitive behavior by disrupting control over the reward-behavior system.[1] The methamphetamine-dependence is a type of dependence on drugs. This disorder is a set of cognitive, behavioral, and psychological symptoms that have a pattern of recurrence and complications of tolerance, withdrawal, and coercion.[2] Treatment of methamphetamine users is a very difficult and complicated process.[3] In a study by Carpenter et al. it was concluded that most drug users re-used drugs after detoxification and rehabilitation therapies within 90 days after the start of treatment.[4] Difficulty in cognitive emotion regulation is a cause of the inability to quit the addiction. The ability to manage and regulate emotion plays an important role in maintaining lasting social relationships and well-being in individuals' lives. Emotion regulation has many dimensions and aspects. An important aspect of the emotion regulation process is the regulation of emotional experiences by using cognitive elements. This concept in psychology is called difficulty in cognitive emotion regulation.[5] The inability to cope with difficulty in cognitive emotion regulation in methamphetamine-dependent patients leads to stress in them. Therefore, it is important for methamphetamine-dependent patients to be able to control their stress and choose more appropriate strategies to cope with stressors.[6]

Increasing the craving rate can be expected by reducing the difficulty in cognitive emotion regulation in methamphetamine-dependent patients. In fact, craving is a persistent factor in addictive behaviors.[7] Craving seems to be controlled by automatic or non-automatic cognitive-emotional processes so that craving theories generally emphasize that cravings in individuals are related to the activation of emotions and motivations for seeking drugs. Craving is an uncontrollable desire for drug use, and if it is not fulfilled, it can lead to psychological and physical suffering in methamphetamine-dependent patients, including aggression, anxiety, depression, and weakness.[8] Therefore, the inevitable and severe craving for the continuation of using drugs in methamphetamine-dependent patients is the main cause of relapse and failures. In general, addiction relapse factors can be classified as personal, familial, social, geographic, and economic factors.[9]

The matrix program is an important educational and cognitive intervention that reduces the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent patients. During the treatment sessions, patients work on early recovery topics and skills, and prevention of relapse.[10] The matrix model program, which has become a stimulant treatment protocol in some treatment centers, provides a 24-to-36-week intensive, structured intervention for drug abusers. This program originally dates back to the 1980s when therapists searched for effective treatments for cocaine dependence. Over the years, various therapies have been combined and summarized to develop effective protocols for drug addiction. In this treatment, clients learn appropriate information about the way of obtaining a healthy life and support to access to the drug abuse treatment centers, especially methamphetamine.[11] Various studies have confirmed the effectiveness of the matrix model on the locus of control of methamphetamine consumers, craving, the tendency to addiction, reduction in the severity of the addiction, relapse prevention, emotional regulation, hardiness, and psychological well-being.[12-15] Therefore, the present study aimed to investigate the effectiveness of matrix interventions in reducing the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent patients.

Materials and Methods

The research method was experimental and the research design was pre and posttest with control group. The statistical population of the study consisted of all methamphetamine-dependent patients who visited Golestan hospital of Ahvaz in 2019. Among them, 40 ones were selected by a purposive sampling method. Using the pre-test of emotion regulation and craving questionnaires in 80 methamphetamine-dependent patients, those with lower than average scores in cognitive emotion regulation questionnaire and higher than average scores in craving questionnaire were selected as the research samples and were randomly classified into experimental and control groups (n = 20 per group) The inclusion criteria: methamphetamine addiction; age: 20 to 42 years; no concurrent drug use; and no other disorder. Exclusion criteria: not attending more than two sessions of therapy sessions. The experimental group then underwent the matric therapy intervention, but the control group did not receive any treatment. After the sessions, the experimental and control groups underwent the pre-test under the same conditions. Furthermore, appropriate treatment sessions were also performed on the control group after the end of training sessions and the post-test on the experimental and control groups in order to comply with ethical principles. For the matrix program, a training protocol by Mokri et al. was used in 24 fifty-minute sessions, three sessions per week[16] (table 1).

Table 1. Summary of matrix intervention sessions

Session goal	Activities
Building a good relationship. Why I quit drug (change scales)	Introducing people by themselves to other members; exploring participants' verbal and nonverbal entry behaviors; encouraging participants to identify pleasant and apparently positive aspects of drug use; identifying the durability of effects of pleasant aspects of drug use and complications of drug quit. Assessment: Determining the most important reason for drug quit.
Exploring the initiators (stimuli, fillip) of drug abuse	Talking about internal and external drug use initiators; stopping temptations. Assessment: Introducing drug use stimuli; stating them, and working on decisions to stop the initiators.
Investigating the assessment; describing stages of recovery, and its practice	Describing 4 stages of recovery (Stages of physical symptoms, early abstinence, long abstinence, return to daily life). Assignment: Encouraging people to discuss their experiences at the recovery stages; identifying their major symptoms.
Review of assignment, external drug-use initiators	Explaining external drug-use initiators. assignment: List of external initiators by each participant; identifying risky external initiators by each participant
Review of assignment, internal drug-use initiators	Explaining internal drug-use initiators. assignment: List of internal initiators by each participant; identifying risky internal initiators by each participant
Review of assignment, major problems in recovery 1: family trust	Explaining family-related events and problems that interfere with recovery; discussing cases of family mistrust, and examining it in participants. Assignment: Encouraging participants to identify distrust and the way of its creation, the feeling it creates, and the response they give to it.
Review of assignment, major problems in recovery	Explaining problems and barriers to recovery, such as lack of energy and ability to work and exercise, depletion of energy, and their roles in the individual tendency towards drug use. Assignment: daily record of energy levels within a week.
Review of assignment, major problems in recovery 3: misuse of drugs as an alternative	Explaining problems and barriers to recovery such as the arbitrary use of other medications, their adverse effects, the individual motivations for taking drug. Assignment: daily record of energy levels within a week.
Review of assignment, describing temptation as a drug stimulus	Explaining the drug temptation; exploring the temptation problem in the last week based on who, where and how? Examining the beliefs, mental states, and distressing emotions in people in being tempted to use drugs. Assignment: Recording temptations until the next session.
Review of assignment; What we should do with temptations?	Examining the individual views and strategies during temptation; providing and describing general strategies for avoiding temptation; providing assignment for members about stimuli, and ways to cope with them.
Review of assignment, wrong ways to cope with temptations	Explaining wrong ways to cope with temptations. Assignment: Examining wrong ways to cope with temptations, identifying and experiencing them
Review of assignment, thoughts, feelings, and behaviors that cause the drug abuse	Explaining thoughts, feelings, and behaviors that cause the drug abuse. Investigating and discussing thoughts, feelings, and behaviors that cause the drug abuse.
Review of assignment, feeling depressed	Explaining some of unpleasant emotions and negative emotions caused by discontinued drug abuse; examining emotions and feelings about participants; discussing their reactions to such situations, encouraging people to engage in recreational activities in recovery.
Review of assignment; preventing the relapse: Identifying the relapse preventing activities	Explaining and warning that the relapse does not happen suddenly and often occurs gradually and due to the individual's neglect. Providing and explaining regular relapse prevention activities such as exercising and interacting with relatives and friends. Assignment: Specific relapse prevention activities in individuals.
Review of assignment; preventing the relapse: relapse predisposing activities	Explaining and warning about relapse predisposing activities; Identifying some of relapse predisposing activities in participants and explaining their roles in relapse; avoiding the relapse predisposing activities by participants every week.
Review of assignment, work, and recovery	Explaining roles of positive and negative aspects of being employed and unemployed; helping participants to balance work and treatment
Review of assignment, shame, and guilt	Explaining the negative feelings of shame and guilt in people about the family; identifying the participants' current negative feelings about the family; examining activities and measures they are considered to compensate for shame and guilt. Assignment: Participants are asked to do two simple compensatory activities and report the next session.
Review of assignment, staying active	Discussing the benefits of being active and staying busy; being in touch with a man and doing a variety of homework: reporting daily hours in the past 3 days; planning interesting and funny activities in the future, and ways to improve quality.
Review of assignment; motivation for improvement	Investigating the individuals' motivation to quit drug; discussing the motivation of the first day of quit, and its gradual growth as an essential point
Review of assignment, truthfulness	Explaining the causes and consequences of lying as an integral part of consuming drug, and helping people dare to confess lies. Truthfulness as a key to preventing relapse; Identifying cases that are difficult to tell truth.
Review of assignment, full detoxification	Explaining the full detoxification; discussing drug substitutes and their roles in increasing the likelihood of relapse; encouraging participants to completely avoid all drugs.
Review of assignment, addictive sex	Explaining the pathological sexual relations and drug addiction; roles of pathological sexual relations in damaging recovery and its relapse.
Predicting relapse and its prevention	Explaining the next step in quitting drug (not restart); defining the addiction-related behaviors. Assignment: People were asked to write their addictive and quitting behaviors as well as thoughts, feelings, and drug-related behaviors.
Review of assignment; Be smart, not strong	Roles of willingness and strength in relapse; talking about seemingly strong but addicted people; relapse against smart people who avoid high-risk and drug-use situations.

The Cognitive Emotion Regulation Questionnaire (CERQ): The questionnaire was designed by Garnefski & Kraaij[17] and consists of 36 questions and 6 factors, namely negative rejection of emotional responses; difficulty in purposeful behavior in helplessness; difficulty in controlling impulsive behaviors in helplessness; lack of emotional awareness; limited access to emotion regulation strategies; and lack of emotional clarity. Therefore, never was scored 1, sometimes: 2, almost half cases: 3, most often: 4, and almost always: 5. In a study, Cronbach's alpha coefficient was 0.95 for all questions; and convergent validity was 0.69 according to Pearson's correlation with depression.[17] In the present study, Cronbach's alpha was used to determine the reliability of the cognitive emotion regulation questionnaire and it was 0.87 for the whole questionnaire.

Craving Questionnaire: The questionnaire was designed by Franken et al.[18] and measures the craving for drugs at the present moment. It has 14 questions and three factors, namely desire and intention, desire to enjoy, and severity of lack of control. It is scored on a 6-point Likert scale from -3 to + 3. Option 3 means full agreement and option -3 means full disagreement and lack of craving. Therefore, a high and positive score means more craving. In a study using internal consistency, Cronbach's alpha coefficient was 0.86 for three factors of the questionnaire on opioid abusers for the total score, and 0.78 for methamphetamine abusers respectively.[15] In the present study, Cronbach's alpha was used to determine the reliability of the craving questionnaire and it was 0.85 for the whole questionnaire.

Results

The mean ± SD age of the participants was 34.50±7.12 years. Table 2 presents the mean and standard deviation of the research variables in the experimental and control groups in the pre-test and post-test. The results indicated the effectiveness of the matrix program in the experimental group compared to the control group.

Table 2. Mean and standard deviation of the research variables in the experimental and control groups in the pre-test and post-test

Dependent variables	Test	Matrix program		Control	
		M	SD	M	SD
Difficulty in cognitive emotion regulation	Pre-test	128.50	6.54	128.80	6.54
	Post-test	86.70	14.53	117.25	23.26
Craving	Pre-test	37.80	6.58	37.80	6.58
	Post-test	21.40	14.99	34.30	14.99

Prior to analyzing the hypothesis data, the underlying assumptions of the analysis of covariance were examined to ensure their fulfillment. Shapiro-Wilk test results indicated that the distribution of scores was normal in the research variables (Pvalue > 0.05). The Levene's test was used to test the equality of variances (to test the equality of variance in the experimental and control groups), and the results were F = 0.837 and Pvalue = 0.228 in the difficulty in cognitive emotion regulation, and F = 0.947, and Pvalue = 0.394 craving variable. The results of Box's test were Pvalue = 0.520, F = 0.865, and Box's = 5.469). The analysis of variance (ANOVA) was utilized to examine the equality of regression line slope, and the results were F = 2.489 and Pvalue = 0.70 in difficulty in cognitive emotion regulation, and F = 0.216 and P = 0.885 in the craving variable. The analysis of covariance was used according to the results.

Thereafter, the multivariate analysis of covariance was used to compare the experimental and control groups based on post-test scores, after controlling the effects of pre-tests in order to determine the effects of matrix program intervention on the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent patients. Multivariate analysis of covariance in the matrix program and control groups indicated that the groups were significantly different in at least a dependent variable (table 3).

Based on table 4, the F ratio of univariate analysis of covariance for dependent variables indicated that there were significant differences in difficulty in cognitive emotion regulation and craving between the program therapy and control groups.

Discussion

The present study aimed to investigate the effectiveness of matrix interventions program in reducing the difficulty in cognitive emotion regulation and craving in methamphetamine-dependent individuals. The results indicated that the matrix program was effective in reducing the difficulty in cognitive emotion regulation and craving. The first finding indicated that the matrix program was effective in reducing the difficulty in cognitive emotion regulation. The finding was consistent with the research results of conducted by Fattahi Shengelabad & Mirhashemi,[14] Jafari & Nezhadmohammad,[12] Ehteshami Pouya et al. [13] and Mohammadi & Kargar Shaker.[15] According to the finding, a matrix program includes an excellent model by which the participants can learn to tolerate other severe negative emotions such as depression or anger. Attitude change is a form of the ability to control emotions, and; matrix-based mental skill training can combine cognitive and behavioral techniques to enhance individuals' cognitive ability to deal with risky situations and provide the necessary behavioral skills to deal with such situations. Furthermore, some of the matrix program exercises work on changing the negative and ineffective vocabulary of addicts such as "I can't quit drug; it is impossible, or other people do not allow"; and this therapy seeks to turn them into "I want or don't want". This change is likely to improve the participants' internal empowerment levels and increase their focus on their addiction tendency, and eventually, change participants' loci of control to more internal locus.[14]

Table 3. Results of multivariate analysis of covariance in the matrix program and control groups

Tests	Value	df	Error df	F	p	η^2
Pillais trace	0.739	4	110	16.101	0.001	0.369
Wilks lambda	0.269	4	108	25.095	0.001	0.482
Hotelling's trace	2.696	4	106	35.722	0.001	0.574
Roy's largest root	2.686	2	55	73.865	0.001	0.729

Table 4. Results of univariate analysis of covariance on post-test scores

Dependent variables / Source of changes	SS	df	MS	F	p	η2	Power
Difficulty in cognitive emotion regulation	9381.855	2	4690.927	13.483	0.001	0.329	0.997
Craving	24608.872	2	12304.436	60.716	0.001	0.688	1.000

The research results also indicated that the matrix program was effective in reducing craving in methamphetamine-dependent patients. The finding was consistent with the research results of conducted by Jafari & Nezhadmohammad,[12] Ehteshami Pouya et al.[13] and Mohammadi & Kargar Shaker.[15] According to studies, the methamphetamine consumption disrupted cognitive and mental functions and created a strong craving in consumers. Most regular drug users reported that they had no choice but to take drugs in facing anxiety, boredom, depression, fear of failure and being purposeless in life, given that the matrix model is an outpatient, intensive, multifaceted, and highly structured therapy program that is planned for individuals and families and teaches skills, which increase the internal ability to cope with these unpleasant emotions and deal with internal and external stimuli of drug abuse, it is a suitable therapeutic approach for treating the addiction to various stimulants, cannabis and, alcohol.[15] Therefore, the matrix-based skills training increases control over painful emotions and focuses on techniques that identify and overcome the tendency to use drugs. In fact, many addiction therapists combine important features of the matrix program to create a useful way to change the addicts' behavior. This approach emphasizes clear goals for changing people's interpretation of their situations. These therapists seek to help clients distinguish serious problems from imaginary or exaggerated problems. They help clients change their perceptions of past events, change current issues and future possibilities, and expand their control over their cognitions, emotions, and behaviors.[12] Since the present study was conducted among methamphetamine-dependent individuals, who visited Golestan hospital of Ahvaz, the generalization of results to methamphetamine-dependent individuals in other cities with different cultures should be done with caution. The sample size of the study was limited to methamphetamine-dependent individuals, who visited Golestan hospital of Ahvaz, similar studies can be conducted on methamphetamine-dependent individuals in other cities and cultures. Given the effectiveness of the matrix program, it is suggested familiarizing the therapists with proper implementation of the treatment and its application in drug-dependent persons, especially methamphetamine to reduce the difficulty in cognitive emotion regulation and craving and increase the treatment continuity.

Questionnaires were filled with the participants' satisfaction and written informed consent was obtained from the participants in this study.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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