Original Article

Emotional Adaptation Using a Program Based on Cognitive Emotion Regulation Strategies in Patients with Substance Use Disorder: A Double-blinded Randomized Controlled Trial

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Abstract

Background: Disturbances in emotion regulation and emotional adaptation are common problems in drug users. This issue affects the quality of life in different dimensions. Therefore, training these people in cognitive emotion regulation strategies as a supplement to drug treatment helps improve their adaptation skills. In this study, we investigated the effect of a training program based on the cognitive emotion regulation on the emotional adaptation of patients with substance use disorder. **Materials and Methods:** This study was a double-blinded randomized controlled trial that was conducted in 2022–23. Forty-eight men with substance use disorder (SUD) under methadone Maintenance Treatment (MMT) participated in the study. The participants were randomly divided into two intervention and control groups. The intervention consisted of six training sessions based on the cognitive regulation of emotion. The emotional adjustment was examined using the Emotional Adjustment Measure (EAM) before and 1 month after the end of the intervention. Descriptive and inferential statistics, such as independent and paired *t*-tests were used for data analysis. **Results:** Forty-eight male patients with SUD under MMT participated in the present study. There was a significant difference in the mean score of the EAM between the intervention and the control group after conducting the intervention ($p = 0.012$). **Conclusions:** Educational programs based on emotion regulation can play a significant role in improving emotional adaptation in patients with substance use disorder. Therefore, this educational program is suggested as a complementary psychological approach to improving the level of psychological health of patients with substance use disorder.

Keywords: *Adaptation, emotion, methadone, substance-related disorders*

Introduction

Recent estimations show that almost 35 million people worldwide suffer from Substance Use Disorder (SUD).[1] Additionally, a cohort study in Iran revealed that the prevalence of substance use in Tehran was 5.6%.[2] Using substances is the chronic turning disorder that, despite its negative outcomes, is diagnosed by losing behavioral resistance control and disturbance in interpersonal and social interactions.[3] Epidemiological studies are constantly reporting high rates of psychological problems in SUD, among that is a lack of access to effective strategies for regulating emotions.[4] In this regard, emotional adaptation, a significant variable, is known both as a prohibitive factor from reuse and a preventive factor.[5] Emotional adaptation is a set of psychological states, such as desirable psychiatric health, individual life satisfaction, and concordance among emotions, activities, and thoughts. Therefore, emotional adaptation can be regarded as a mechanism by which a person reaches emotional stabilization.[6] Emotional adaptation calls for awareness of one's capabilities and accepting deficiencies. People who are categorized with a low level of emotional adaptation lack self-awareness; this condition may lead to decreased self-confidence, and they will not be able to reach a stable emotional state.[7]

Applying psychological interventions such as cognitive regulation of emotions based on one's lifestyle and improving their adaptation and emotional regulation capabilities influences their devotion to treatments and comprehensively avoids

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repeated slippage.[8] In this regard, the results of a systematic study revealed that people with SUD struggle with more problems than people without SUD.[9] Cognitive emotional regulation refers to the observation capacity, evaluation, understanding, and modification of emotional reactions in a way that applies to an adaptive performance.[10] Cognitive-emotional regulation is a key social-emotional capability that enables flexibility in emotion-provocative situations.[11] Cognitive-emotional strategies are significant in emotional administration or regulation ability, as well as in preserving control over emotions during or after facing threatening or stressful incidents.[12] Farnam *et al*.,[13] in their study, revealed that people exposed to high-risk SUD show less emotionally regulated behaviors compared to those exposed to less-risky SUD. Additionally, Shabani *et al*.[14] revealed that not controlling emotions can work as a predictive factor for orientation toward addiction. In contrast, weak emotional regulation is a metacognitive feature for diagnosing many psychiatric disorders and severely interferes with SUD.[15] The study by Garke *et al*.[16] showed that inefficient strategies of cognitive-emotional regulation, such as reprehending and repressing thoughts, may badly affect the lives of people with SUD. Recent studies have highlighted the significant role of emotion regulation in the treatment outcomes of SUDs. Individuals with SUDs often exhibit greater difficulties in managing their emotions compared to those without such disorders. These deficits in emotion regulation are linked to the development and persistence of addictive behaviors. Interventions targeting emotion regulation have demonstrated moderate effectiveness in reducing substance use and improving emotional management. However, there remains a need for more comprehensive research to fully understand the mechanisms by which emotion regulation influences treatment success and to identify the most effective strategies for enhancing these skills in individuals undergoing SUDs treatment.[9,14] Therefore, weak emotional regulation may be common among people with SUD, and it can be a good target for clinical treatments and improvements.[15] Hence, it seems that developing a better comprehension of the methods by that one can influence emotional adaptation is highly important. Thus, in the present survey, the effect of an educational program based on cognitive emotional regulation on emotional adaptation in patients with SUD under methadone Maintenance Treatment (MMT) was investigated.

Materials and Methods

This is a randomized clinical trial carried out on two groups with a one-to-one relation. Trial registration: IRCR20141127020108N2**.** The participants of the present study were 48 males with SUD under MMT, who reside in a rehabilitation center in Isfahan. The sample size of this study was determined by NCSS software and a 20 percent fall based on a study by Esmaeili *et al*.[17] (2018), as well as the mean of changes before and after the intervention of 48 people in a way that there were 24 members in each group. The researcher divided the qualified participants into two control and intervention groups using a stochastic block model before starting the intervention. The size of all the blocks was the same, and in this two-group randomized trial, the quadruple blocks consisted of two participants in the intervention group and two participants in the control group. In this way, there were 12 quadruple blocks, which divided the participants into two 24-person groups. The randomization tool was Random allocation software; this software not only does simple randomization but is also capable of creating random sequences by block making. Each generated random sequence was recorded on a card, and the cards were enveloped in order. To preserve random sequencing, the external surfaces of the envelopes were numbered in the same order. Finally, the envelopes were sealed and placed in the box in order. When registration started, based on the order of qualified participants' entrance to the study, one of the envelopes was opened, and in this way, the group to which the participant belonged was determined.

The researcher announced the arbitrary participation, anonymity of personal information, and the right to withdraw from the study and that participation in this study would not cost anything in a group session. She also presented the purpose and method of the investigation. The participants were first rated based on the criteria for entrance to the study, which were as follows: age above 18; reading and writing ability; more than 6 months SUD record; having at least one rehabilitation experience; and using MMT. The qualified individuals, who were willing to participate in the study signed a consent letter. Then, Demographic information questionnaire and the Rubio emotional adaptation questionnaire were completed at the beginning of the study on September 23, 2022, by participants. Thereafter, the participants were randomly divided into two control and intervention groups. Moreover, the participants were evaluated during the investigation in terms of withdrawal criteria, including more than one session of absence from group sessions, discharge from residential centers during the intervention, and occurrence of severe psychological problems from which the intended ones were not reported.

The intervention group participated in six emotional regulation training sessions based on the Gross model as a group in two sessions per week, with ninety minutes each session. In the first session, the therapist and the group members were introduced, the goals were elaborated on, and the importance of active participation as well as the rules for taking part in group sessions were explained. In the second session, the focus was on choosing situations, emotion-provoking situations, and explaining different kinds of emotions. The participants were asked to explain their emotional experiences based on situations, conditions,

reactions, and behavior. The contents of the third session taught how to evaluate the members' vulnerability level as well as their emotional skills; the fourth session was dedicated to introducing problem-solving strategies and teaching interpersonal skills. During the session, the participants practiced the intended skills by presenting scenarios and paired role-playing. The fifth session was about attention orientation, stopping obsessive rumination and anxiety, and in the last session, identifying wrong evaluations and their effects on emotional modes, teaching abreaction, relaxation, and reverse action were addressed. In this final session, after teaching skills, the participants practiced the presented techniques, and their trainers provided them with the necessary feedback. Generally, methods of role-playing and presenting practice worksheets were used to encourage and enhance the participants' interaction. Additionally, at the beginning of each session, the participants were asked to voluntarily state the activities they accomplished in the interval of the two sessions. Moreover, a part of each session was dedicated to elaborating on ambiguities and answering the participants' questions. In addition to MMT, the control group participated in group discussion sessions where they discussed social issues, climate change, and environmental protection. Group discussion sessions were held for the control group with the same intervals and frequency as the training sessions for the intervention group. In addition, in this study, to prevent transferring information between the two control and intervention groups, in the first phase, the importance of the study and devotion to keeping the individual's information confidential were explained to the participants in detail. Rubio's emotional adjustment measure was refilled 1 month after the end of the intervention by the participants of the two groups [Figure 1].

Two scales were used to measure the variables: demographic information and the emotional adjustment measure. Demographic information questionnaire included the age, marital status, education level, smoking, alcohol consumption. The emotional adjustment measure was designed by Rubio *et al*.[18] (2007). This scale was developed to test people's emotional adaptation and includes 28 questions and two subscales: lack of manipulation of emotional arousal and physiology. The second subscale is disappointment and longing, although the participants answer each question from a six-degree spectrum of one (agree) to six (disagree). In this tool, questions 21, 25, and 28 are reverse-scored. In general, the total score obtained from this questionnaire ranges from 28 to 167. This questionnaire was validated in Iran by Shokri *et al*.[19] (2016). The study reported a correlation coefficient between the dimensions of emotional adjustment and the subscales of perceived stress reactivity and health-promoting lifestyle profiles. The confirmatory factor analysis results indicated that the two-dimensional structure of the questionnaire, which includes the lack of regulation of emotional and physiological arousal, as well as the

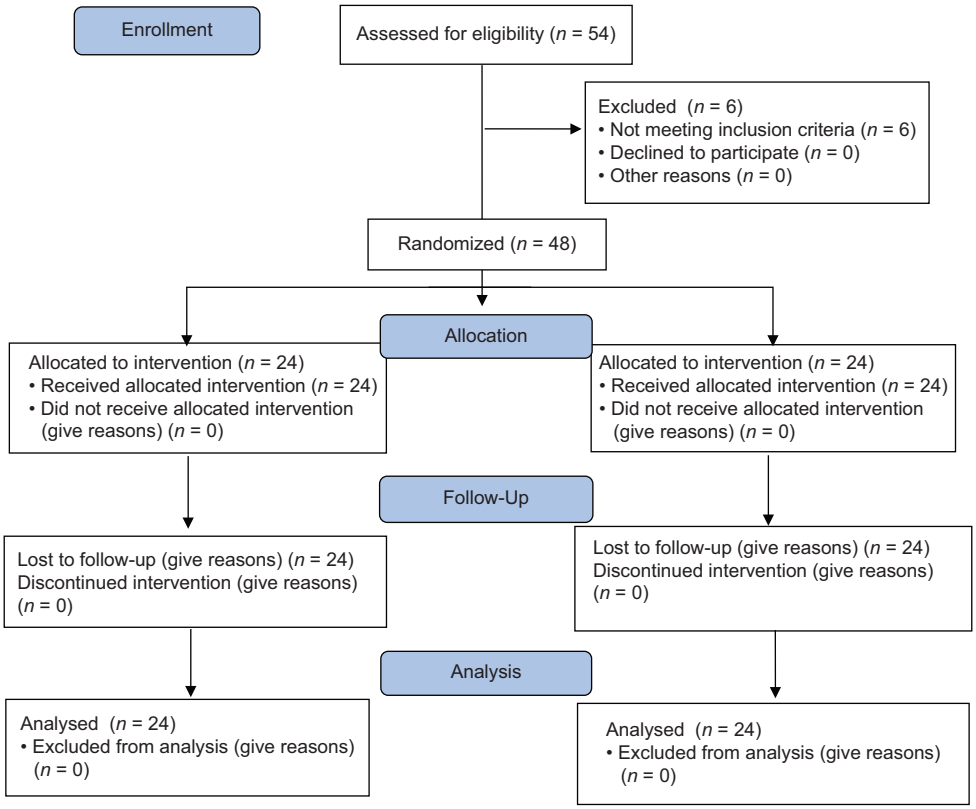

Figure 1: CONSORT flow diagram

factors of hopelessness and wishful thinking, is significant. Moreover, the internal correlation coefficient for the overall factor and the questionnaire subscales ranged from 0.84 to 0.91, which is also significant. SPSS software, version 26, was used to conduct the survey. Descriptive statistics, including mean, standard deviation, sample size, and percentage, were calculated. The Kolmogorov-Smirnov test was applied to assess the normality of the data distribution. Additionally, inferential statistics such as the paired *t*-test, independent *t*-test, and chi-square test were performed. The *p* value was determined to be <0.05 in all tests.

Ethical considerations

Ethical considerations will be performed in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). All participants were informed about the study objectives and signed written informed consent to participate. This proposal has received approval from the ethics committee of Isfahan University of Medical Sciences, under the code IR.MUI.NUREMA.REC.1401.035.

Results

Forty-eight male patients with SUD under MMT participated in the present study. Twenty-four participants were in the control group, and the other 24 were in the intervention group. According to the results of the study, the mean (SD) age of participants was 39.62 (7.69) years and the mean (SD) time of abuse spent was estimated to be 19.11 (8.05). Most of the participants' characteristics included high school education 18 (37.50%), single 23 (47.95%), alcohol consumption 32 (66.70%), smoking 48 (100%), and crime record 31 (64.60%). In general, according to the results obtained by the chi-square test and independent *t*-test between the control and intervention groups from the perspective of demographic features, there was no significant difference ($p < 0.05$) [Tables 1 and 2].

The total emotional adaptation mean score was not significantly different between the two groups before the intervention ($p = 0.493$). After conducting the intervention, the total emotional adaptation mean score was significantly higher in the intervention group compared with the control group ($p = 0.012$) [Table 3].

Additionally, there was a significant difference in the subscale of emotional arousal and physiology ($p < 0.01$) between the two control and intervention groups after the intervention. While There was no significant difference between the intervention and control groups regarding the subscale of disappointment and longing thoughts ($p = 0.549$) [Table 4].

Discussion

Based on the results of the study, no meaningful significant difference was reported between the two control and intervention groups before starting the intervention. Thus, we can say that the potential factors that can influence the treatment effectively are rather controlled and minimize the effect of the intervention. According to another set of results of the study, a meaningful difference was reported between the two control and intervention groups after applying the cognitive-emotional regulation intervention to the emotional adaptation variable. As such, in the group receiving the emotional regulation intervention, the emotional adaptation score was markedly higher than that of the control group. In this regard, the results of the study by Zargar *et al*.[20] revealed that emotional regulation treatment can highly affect the reduction of cravings for drug use. It can also improve conjugal adaptation and

Table 1: Demographic information of individuals

Demographic factors		Group (Number (%))			*p*
		Intervention	Control	Total	
Education	Primary education	6 (25.0)	7 (29.20)	13 (27.10)	0.842
	High school	8 (33.30)	10 (41.70)	18 (37.50)	
	Diploma	7 (29.20)	5 (20.80)	12 (25.0)	
	University degree	3 (12.50)	2 (8.30)	5 (10.40)	
Marital status	Single	10 (41.70)	13 (54.20)	23 (47.90)	0.670
	Married	7 (29.20)	6 (25.0)	13 (27.10)	
	Spouse deceased	7 (29.20)	5 (20.80)	12 (25.0)	
Smoking	Yes	24 (100)	24 (100)	48 (100.0)	The cigarette is a
	No	-	-	-	constant.
Alcohol consumption	Yes	15 (62.50)	17 (70.80)	32 (66.70)	0.540
	No	9 (37.50)	7 (29.20)	16 (33.30)	
History of substance use or alcohol in family members	Yes	13 (54.20)	19 (79.20)	32 (66.70)	0.066
	No	11 (45.80)	5 (20.80)	16 (33.30)	
History of Psychiatric Disorder	No	14 (58.30)	14 (58.30)	28 (58.30)	1.000
	Yes	10 (41.70)	10 (41.70)	20 (41.70)	
History of committing a crime	No	11 (45.80)	6 (25.0)	17 (35.40)	0.131
	Yes	13 (54.20)	18 (75.0)	31 (64.60)	

emotional regulation in patients with SUD. Therefore, it can be used as a fruitful psychological treatment method in rehabilitation centers. In addition, the results of another study conducted by Behrouian revealed that teaching emotional regulation using cognitive methods can considerably decrease anxiety, stress, and depression in caretakers of patients with schizophrenia[21]; these results are in line with those of the present study.

It also seems that the approach toward teaching emotional regulation has a positive effect on interactive styles and interpersonal relationships.[22] Thus, the results align with this study so well that they identify the effectiveness of emotional regulation skills in boosting adaptation levels and interpersonal agreement. Kobylińska, in his study, argues that reaching emotional self-regulation and emotional flexibility in specific situations facilitates conversations by reducing the authority of negative emotions and keeping peaceful; it also supports mental health and long-term well-being.[23]

The results of another survey showed that in subscales of lack of ordering emotional arousal and physiology, there was a meaningful difference between the two control and intervention groups after applying the intervention. In this respect, the outcomes of a longitudinal observational study on a large scale conducted to investigate the effect of emotional regulation ability on expressed emotions indicated that expressing emotions during the day for people, who suppress their feelings has increased. For those who had stronger cognitive re-evaluating abilities, there was a more positive emotion expression, and as a result, the negative emotions increased less severely.[24] However, inefficiencies in using ordinary emotional regulation strategies may result in a lower level of positive feelings and an increase in negative feelings such as disappointment.[25]

During the sessions of this investigation, the therapist used techniques that increased the individuals' rate of using positive cognitive-emotional regulation strategies. Among these techniques were identifying positive and negative emotions, as well as the way to express them in different situations. These techniques lead to an increase in awareness in participants of their emotions and familiarize them with these feelings. However, they were trained on how to identify the sources of their stress and on how to administer them wisely, since environmental stresses can cause negative emotional states and therefore may enhance the tendency toward SUD in addicted individuals.[26] Accordingly, the participants under MMT were able to manipulate their negative emotions by learning the principles of emotional recognition and applying more efficient methods, consequently improving their emotional adaptation level.

Moreover, following the results of the present study, the outcomes of a study by Miller showed that lack of emotional clarity predicted the greatest number of impulsive behaviors, whether in single cases or after controlling other forms of emotional regulation disorder. Not accepting emotions and problems in achieving goals when one is irritated is also related to several impulsive behaviors. Some difficulties of emotional regulation, particularly weak emotional clarity, may reveal certain mechanisms that cause adverse impulsive behaviors.[27] Cognitive emotional regulation refers to the person's ability

Table 2: Quantitative characteristics of the participants

Group	Mean (SD)			*t*	*p*
Statistic Variable	Intervention	Control	Total		
Age	40.08 (8.34)	39.16 (7.148)	39.62 (7.69)	0.409	0.685
Duration of use (years)	22.20 (5.93)	15.25 (9.50)	19.11 (8.05)	1.351	0.219

Table 3: Comparison of the mean difference in emotional adjustment scores in the two groups before and after the intervention

Times		Mean (SD)		Paired sample test	
Groups		Before the intervention	After the intervention	*t*	*p*
Intervention		65.08 (12.57)	72.16 (6.12)	2.57	0.017
Control		68.58 (21.40)	64.20 (13.33)	−0.845	0.407
Independent Sample Test	*t*	−0.691	2.65		
	p	0.493	0.012		

Table 4: Comparison of the mean emotional adjustment scores in the two groups before and after the intervention (independent samples test)

Subscale	Time	Group Mean (SD)		*t*	*p*
		Intervention	Control		
Lack of manipulating emotional arousal and physiology	Before	29.29 (6.77)	31.16 (11.46)	−0.690	0.495
	After	35.20 (3.96)	28.08 (8.23)	3.819	0.001
Disappointment and longing thought	Before	35.79 (6.41)	37.41 (10.49)	−0.680	0.501
	After	36.95 (3.59)	36.12 (5.72)	0.604	0.549

to identify and manipulate emotions to control their thoughts and behaviors despite arousal for a specific action. In such situations, one may resist the temptation to struggle with unacceptable destructive behaviors by trying to manage this arousal.[28] Additionally, the study by Stellern *et al*.[9] revealed that people with SUD have struggled the most in controlling impulsive behaviors and manipulating strategies to regulate their emotions effectively According to Alexander *et al*., regulating emotions refers to comprehending peoples' thoughts and judgments about their abilities to reach the intended aim. The higher the level of emotional regulation, the less the temptation for SUD is.[29] Similarly, Davis *et al*.[30] indicated that difficulty in emotional regulation leads to the inability to adjust the conditions of rehabilitation and facilitates returning to SUD among addicted people, which is a threat to mental and physical balance in people's lives.[30]

On the other hand, one of the most remarkable deficiencies of emotional regulation in people is impulsivity and physiological reactions to emotion; this can also be considered an important issue compared to temptations for SUD.[31] A low level of emotional arousal regulation can affect the level of turning back to SUD because people with SUD are not able to postpone pleasure and joy. In other words, people with SUD prefer the instant effects of abusing drugs that relieve their physical suffering to the advantages of rehabilitation.[30] Therefore, drug abuse, as an impulsive behavior, can be regarded as the result of a disorder in emotional regulation and trouble controlling impulses.[32] In people with SUD, there is a constant attempt to escape the unpleasant emotional states deep inside the mind.[33] All the mentioned results are in line with the outcomes of the present study; in other words, strengthening cognitive emotional regulation can influence the components of emotional arousal regulation and physiology.

The study results indicate that there was no significant difference in the subscale of disappointment and longing thought between the intervention and control groups after the intervention was carried out. Numerous psychological and biological factors can lead to feelings of hopelessness. A study conducted by Fanaj *et al*.[34] has indicated that low self-esteem is directly related to reported feelings of hopelessness. Furthermore, hopelessness, anhedonia, and dissociation are among the most prevalent psychopathological symptoms that can often lead to suicidal thoughts, attempts, and actions.[35] These challenges can significantly undermine the effectiveness of related treatments. Therefore, it is imperative to provide extensive treatment measures, including drug treatments under the supervision of a psychiatrist, for an extended period to overcome these issues.[36] One limitation of this study is that it only involved male participants, which was due to the admissions policy of the rehabilitation center. As a result, caution should be exercised when generalizing these findings to similar populations that include both men and women. We recommend conducting this study with a female group in the future as well.

Conclusion

The results of this study indicate significant outcomes regarding the effect of educational interventions based on emotional regulation on emotional adaptation in people under MMT. The merits of training based on emotional regulation over traditional clinical treatments signal the need to expand such complementary treatments. Thus, using educational interventions based on emotional regulation is recommended as a complementary treatment program at rehabilitation centers. The research about the ways of presenting these services, particularly the way of applying educational interventions based on emotional regulation, should focus more on increasing adaptation as well as preserving and devotion to MMT and the relation between these factors; hence, for this purpose, the requisite interventions may be developed and introduced.

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Conflicts of interest

Nothing to declare.

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