



Research Paper:

The Effects of Mindfulness Training and Dialectical Behavior Therapy on Drug Craving and Emotion Self-regulation in Clients With Substance-dependence



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ABSTRACT

Background: Drug craving is a strong and resistant yearn to consume drugs; if not met, this condition would be followed by biopsychological issues, such as fatigue, anxiety, aggression, and depression. This study determined the effects of mindfulness training and Dialectical Behavior Therapy (DBT) on drug craving and emotion regulation in clients with substance dependence.

Methods: This was a quasi-experimental study with a pre-test, post-test and a control group design. The research population included all the clients with drug use disorders, referring to midterm substance-dependence treatment centers in Baghmalek City, Iran, in 2018. Using a convenience sampling method, 60 clients with drug use disorders, willing to participate in the project were selected. Accordingly, they were randomly assigned into two experimental groups (mindfulness training & dialectical behavior therapy), and a control group (n=20/group). The research instruments included the Substance Craving Questionnaire-NOW (SCQ-NOW) and the Emotion Regulation Questionnaire (ERQ). The first experimental group underwent twelve 45-minute weekly sessions of mindfulness training. Besides, the second experimental group received twelve 45-minute weekly sessions of dialectical behavior therapy. The control group received no treatment. Multivariate Analysis of Covariance (MANCOVA) was applied in SPSS to analyze the obtained data.

Results: The Mean±SD post-test scores of drug craving for mindfulness training, dialectical behavior therapy, and control groups were 130.02±8.01, 124.75±7.58, and 212.19±12.32, respectively. The collected results suggested that the provided intervention programs effectively reduced drug craving and improved emotion regulation in the examined clients (P=0.0001). Additionally, there was no significant difference between the effects of mindfulness training and dialectical behavior therapy on drug craving and emotion regulation.

Conclusion: In addition to decreasing drug craving, mindfulness training and dialectical behavior therapy can improve emotion regulation in subjects with drug use disorders.

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Highlights

- Mindfulness training and dialectical behavior therapy reduced drug craving in substance-dependent clients.
- Emotion regulation was improved in substance-dependence treatment seekers using mindfulness training and dialectical behavior therapy.
- There was no significant difference between the effects of mindfulness training and dialectical behavior therapy on drug craving and emotion regulation.

Plain Language Summary

Drug use disorders and their adverse consequences are among the main public health problems worldwide. Drug craving is introduced as the most prominent factor and the core variable of drug dependence affecting individuals' relapse. Emotion regulation is among the skills that help substance-dependent individuals better manage their emotions. This study suggested that emotion regulation in drug use disorder treatment seekers improved using mindfulness training and dialectical behavior therapy. Mindfulness training and dialectical behavior therapy reduced drug craving in the examined substance-dependent clients.

1. Introduction

Substance Dependence (SD), as one of the most complicated social challenges, simply destroys the foundations of personal, familial, social, and cultural life in a community (Belin et al. 2013). SD and its adverse consequences are considered among the main public health problems worldwide. This is because they can affect different aspects of an individual's life, including interactions, work, religious beliefs, and social relations (Badie et al. 2020). Psychologically, SD or substance abuse is a mental health disorder. This term, known in psychiatric classifications as substance use disorder, is the second most prevalent mental health disorder (Shahbazi et al. 2020). According to previous research, approximately 90% of individuals with SD encounter one or more psychiatric disorders. Substance abuse is a chronic recurrent illness, i.e., associated with psychiatric, medical, familial, occupational, and spiritual problems. This disorder not only affects the life of the individual but also imposes extensive stress on the family and the community. SD, like any other chronic disorder, must be controlled over time (Moghadam et al. 2020).

Drug craving is defined as a strong and resistant yearn to consume drugs; accordingly, if not met, this condition would be followed by biopsychological issues, such as fatigue, anorexia, anxiety, insomnia, aggression, and depression (Badie et al. 2020; Maarefvand, Ghiasvand & Ekhtiari 2013). The concept 'drug craving' is generally among the main cognitive basics included in the knowl-

edge of drug dependence. Besides, it is introduced as the most prominent factor and the core variable of SD affecting individuals' relapse (Basharpoor, Mohammadi & Asadi-Shishegaran 2017). In the SD treatment process, when an individual with SD reaches abstinence, there appears a strong temptation and desire to lapse, which gradually decreases over time. However, such a feeling is rarely disappeared and is considered a failure factor among SD therapies. Craving results from the sense of indifference to the future consequences of drug abuse, reflecting an impaired decision-making process. This reflects impairments in such individuals' frontal cortex (PoorSeyedMousaiee, Mousavi & Kafi 2015).

Given the relatively independent nature of drug craving and its relationship with the severity of SD, its duration, and response to treatment as well as numerous interpersonal differences in accepting drug craving induction, the awareness of drug craving intensity in patients and its variations during the treatment procedure would help therapists to measure the effects of treatment methods; accordingly, they could predict the success of treatment and the need for psychological interventions (Pirmia et al. 2017).

One of the variables concerning drug users is Emotion Regulation (ER). ER is an intrinsic aspect of emotional response tendencies. The term refers to actions used to modify an emotional state. ER strategies encompass 9 cognitive coping styles (i.e., acceptance, self-blame, and objectification, positive refocusing, rumination, positive reappraisal, refocusing on planning, facilitating events via holism, catastrophizing, & other-blaming) (Mohammadi

et al. 2020). There might exist different conceptualizations of ER; however, numerous scholars regard it as a combination of physiological, behavioral, and cognitive processes, which make individuals moderate negative emotions (Edossa et al. 2018). Emotive answers to demanding occasions can be controlled by cognitive coping strategies (Ong & Thompson 2019). ER can be generally considered among the skills assisting individuals to better manage their emotions. In other words, an individual can partly control what emotion to express, when, and how, and moderate the emotional reactions (Cote Gyurak & Levenson 2010).

Mindfulness refers to the quality of attention to one's momentary experience without judgment or dependence on results (Lindsay & Creswell 2017; Farb, Anderson & Segal 2012). Instead of denying and rejecting unpleasant experiences, i.e., non-constructive ER styles, mindfulness teaches individuals to accept such experiences as they are and to be conscious of themselves and their responses to the bad experiences (Desbordes et al. 2015). Mindfulness Training (MT) also assists individuals to be responsive to any existing thought, sensation, or emotion by performing some exercises, including mindful breathing, attention to the body and sitting meditation (Roemer Williston & Rollins 2015; Wahbeh et al. 2014). Considering concepts, such as acceptance, desensitization, presence at the moment, increased awareness, confrontation, observation without judgment, and release, mindfulness reduces avoidance symptoms and consequences, promotes the therapeutic effects, and prevents relapses among individuals with SD (Yaghubi & Zargar 2018). The mindfulness approach is effective. Because in this intervention, therapists help patients to recognize thoughts arousing positive attitudes towards drugs and modify irrational beliefs and misconceptions (Edenfield & Saeed 2012). Mindfulness is a receptive and judgment-free awareness of what is happening at the moment. Accordingly, numerous psychological pathology types are associated with attempts to modify or avoid negative thoughts or affects (Keng, Smoski & Robins 2011).

As an approach, Dialectical Behavior Therapy (DBT) combines client-centered acceptance and compassion with problem-solving therapy and social skills training. Besides, it is underpinned by two acceptance-oriented skills (main consciousness & distress tolerance) and two change-oriented skills (ER & interactive effectiveness) (Chapman, Turner & Dixon-Gordon 2011). Numerous studies have documented the effects of DBT on the treatment of a variety of other psychiatric disorders, such as anorexia, drug abuse, attention-deficit/hyperactivity disorder, suicidal ideation, self-harm, and depression (Berk

et al. 2020; Lin et al. 2019; Cole et al. 2016; Dimeff & Linehan 2008). Adopting DBT, the therapist promotes the patient's tolerance capacity, i.e., theoretically proved to be the main reason for returning to drugs. DBT is effective in promoting drug abuse behaviors (Dimeff & Linehan 2008). Accordingly, this study aimed to determine the effects of mindfulness training and dialectical behavior therapy on drug craving and emotional self-regulation in the clients with addiction disorder who were referred to midterm addiction treatment centers in Baghmalek city- Iran.

2. Materials and Methods

This was a quasi-experimental study with a pre-test, post-test design and a control group design. The research population included all the clients with SD disorder who were referred to midterm SD treatment centers in Baghmalek City, Iran, in 2018. Using the convenience sampling method, 60 males who were admitted to the midterm residential SD treatment center were selected using G*Power statistical software. Then, the research participants were randomly assigned into two experimental and a control group (20 per group). The inclusion criteria were as follows: male gender, the age range of 18-50 years, reading and writing skills, drug abuse diagnosis based on the diagnostic and statistical manual of mental disorders criteria fifth edition, drug use for at least 6 months, the lack of participation in other therapies, and no serious psychiatric illnesses. The exclusion criteria were absence from >2 sessions, participants' dissatisfaction with attending therapy sessions, the discontinuation of treatment under the supervision of SD treatment centers.

The following tools were applied to collect the required data in this study:

The Substance Craving Questionnaire-NOW (SCQ-NOW): This questionnaire was developed by Tiffany et al. (1993). The SCQ-NOW, as a 45-item self-report questionnaire, measures current craving. The statements are scored on a 7-point Likert-type scale, ranging from 1 to 7 (from completely opposed to totally agree). The SCQ-NOW includes 5 subscales of desire to use substances (9 items); intention and planning to use substances (9 items); the anticipation of a positive outcome (9 items); the anticipation of relief from withdrawing or dysphoria (9 items), and the lack of control over substance use (9 items). The total score ranges from 45 to 315. Higher scores indicate further craving. Tiffany et al. (1993) reported a Cronbach's alpha coefficient of 0.89 for the original version of the questionnaire. Hadadi et al. (2009) reported the in-

ternal consistency of 0.84 for the Persian version of the questionnaire, indicating its good reliability.

The Emotion Regulation Questionnaire (ERQ):

This questionnaire was designed by Gross and John (2003) based on the process model of ER. The ERQ is a 10-item self-report questionnaire, designed to measure the use of two ER strategies: an antecedent focused strategy called cognitive reappraisal (6 items) where an individual attempts to change how they consider a situation to change its emotional impact; a response-focused strategy, called expressive suppression (4 items), where a subject attempts to inhibit the behavioral expression of their emotions (Gross & John 2003). It is scored based on a 7-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The range of scores on this questionnaire is from 10 to 70, with higher scores indicating greater use of that strategy (Preece et al. 2020). Besharat et al. (2017) reported the Cronbach's alpha of 0.82 for the Persian version of the questionnaire.

After receiving the required approvals from the competent centers as well as informed consent forms from the research participants, a sample (males, aged 18-50 years with substance abuse) of the midterm SD treatment centers in Baghmalek City, Iran was selected. Initially, all study groups completed the pre-test questionnaires. The first intervention program consisted of twelve 45-minute sessions of MT and the second intervention program consisted of twelve 45-minute sessions of DBT. The controls received no treatment intervention; they were placed on the waiting list to receive the treatment at the end of the study. The intervention programs were conducted in experimental groups by the first author in the selected SD treatment centers. In the last session of the intervention program, a post-test was performed in all study groups. The research participants were ensured that the information provided in the questionnaire would remain confidential.

The first experimental group was treated by MT for twelve 45-minute sessions. This intervention program was used by Asghari et al. (2016) in women with addicted spouses. Moreover, Van Son et al. (2011) also implemented this method on the outpatients with diabetes and the results presented good validity. The summary of MT sessions was as follows: Introducing participants, providing explanations about addiction and its impact on the family, and discussing marital burnout; inviting the study participants to discuss their experiences with mindfulness exercises, practicing thoughts and feelings, and sit-

ting meditation with a focus on breathing; a three-minute breathing space, and the discussion of thoughts; practicing sitting meditation and open awareness, and discussing the best manner of self-care; learning how to incorporate mindfulness into thoughts and emotions, as well as substance abuse meditation training and instructions on using mindfulness exercises (Moghadam et al. 2020).

The second experimental group was treated with DBT for twelve 45-minute sessions. This intervention program was used by Linehan et al. (2002) in opioid-dependent women and Narimani et al. (2015) on methamphetamine-dependent patients. The summary of mindfulness training sessions was as follows: providing introductory explanations; teaching skills to reduce self-destructive behaviors; teaching emotional awareness to the study participants and anxiety tolerance training; the clients were helped to practice to control their impulsive behaviors; ER training through emotion recognition, reducing vulnerability, and emotional suffering, and increasing positive emotions; increasing interpersonal efficiency, and training essential individual skills, including negotiation and self-esteem (Moghadam et al. 2020).

The obtained data were analyzed using mean, standard deviation, and Multivariate Analysis of Covariance (MANCOVA). Levene's test was applied to examine the equality of the variances. SPSS was used for data analysis at the significance level of 0.05.

3. Results

The Mean±SD age of the study participants in the MT, DBT, and control groups were 33.19±7.46, 34.42±5.23, and 35.19±6.32 years, respectively (P=0.824). Table 1 lists the Mean±SD values of the study variables in the experimental and control groups at the pre-test and post-test stages. The Mean±SD post-test scores of drug craving in the MT, DBT, and control groups were 130.02±8.01, 124.75±7.58, and 212.19±12.32, respectively (P=0.001). Moreover, the Mean±SD post-test values of ER in the MT, DBT, and control groups were 48.72±5.34, 46.10±6.20, and 34.47±5.76, respectively (P=0.001).

The study assumptions were assessed to establish the fitness of the data to the assumptions of MANCOVA. Accordingly, data normality resulted from the insignificant Kolmogorov-Smirnov Z statistic revealed that drug craving and ER followed a normal distribution. Additionally, the homogeneity of variances (in the experimental & control groups) was assessed by Levene's test.

Table 1. Mean±SD scores of the dependent variables in the study groups at pre-test and post-test phases

Variable	Phases	Mean±SD			P
		MT	Dialectical Behavior Therapy	Control	
Drug craving	Pre-test	228.37±9.10	221.38±8.10	207.63±11.25	0.423
	Post-test	130.02±8.01	124.75±7.58	212.19±12.32	0.001
Emotion regulation	Pre-test	34.25±6.43	31.60±5.48	33.28±4.62	0.184
	Post-test	48.72±5.34	46.10±6.20	34.47±5.76	0.001

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Table 2. The results of univariate ANCOVA on the post-test scores of the research variables

Variable	SS	df	MS	F	P	η^2	Statistical Power
Drug craving	104.51	1	104.51	449.96	0.0001	0.924	0.927
Emotion regulation	13.217	1	13.217	171.7	0.0001	0.768	0.741

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The relevant results approved the assumption of homogeneity of variances, and the possibility of using MANCOVA. After controlling the pre-test effect and comparing the experimental and control groups concerning the post-test scores, MANCOVA was used to examine the effects of MT and DBT on drug craving and ER in the study sample. The results of MANCOVA for the study groups in the post-test phase revealed significant differences between the study groups in at least one of the dependent variables.

Table 2 presents the results of the univariate Analysis of Covariance (ANCOVA) of dependent variables for post-test scores. The F-statistics of the univariate ANCOVA of the dependent variables indicated a significant difference between the test groups respecting drug craving and ER in the post-test phase.

The mean difference of drug craving between the MT and the control groups was equal to -22.42, indicating the effectiveness of MT in drug craving reduction ($P=0.001$). Besides, the mean difference between the DBT and control groups in drug craving was measured as -26.70; thus, this finding revealed the significant effects of DBT on drug craving reduction ($P=0.001$). The mean difference between the MT and DBT groups concerning drug craving was computed as 4.52. The detected difference was not significant at the 0.05 level; therefore, there was no significant difference between the effects of MT and DBT on drug craving reduction. The results of comparing the mean values of ER are also presented in Table 3.

Table 3. LST test for the paired comparison of drug craving and ER in the post-test phase

Variable	Groups	Mean Difference	SE	P
Drug craving	Mindfulness training - Control	-22.42	3.62	0.001
	Dialectical behavior therapy - Control	-26.70	3.48	0.001
	Mindfulness training - Dialectical behavior therapy	4.52	3.14	0.147
Emotion regulation	Mindfulness training - Control	13.25	2.59	0.001
	Dialectical behavior therapy - Control	10.30	2.32	0.001
	Mindfulness training - Dialectical behavior therapy	-1.62	2.02	0.100

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4. Discussion

The present study results revealed that MT and DBT were effective in reducing drug craving and improving ER in subjects with SD. Our results on the effect of DBT on drug craving were consistent with those of [Li et al. \(2017\)](#), [Elwafi et al. \(2013\)](#), [Witkiewitz et al. \(2013\)](#), as well as [Garland et al. \(2010\)](#). [Li et al. \(2017\)](#) reported that MT was effective in avoiding smoking after treatment and substance misuse in drug users. [Elwafi et al. \(2013\)](#) suggested MT as an effective treatment for smoking cessation, and that informal mindfulness practice predicts a disconnection between craving and smoking. [Witkiewitz et al. \(2013\)](#) signified a positive association between mindfulness-based relapse prevention and substance craving in substance abusers. Moreover, our findings on the effects of MT on drug craving were in line with those of [Salimi et al. \(2016\)](#), [Kiani, Ghasemi & Pourabbas \(2013\)](#), as well as [Alfonso et al. \(2011\)](#). [Salimi et al. \(2016\)](#) stated that mindfulness-based cognitive therapy has reduced drug craving in the heroin addicts who were referred to substance abuse treatment centers. [Kiani, Ghasemi and Pourabbas \(2013\)](#) documented that MT has reduced craving and cognitive ER in methamphetamine dependents. [Alfonso et al. \(2011\)](#) declared that goal management training and mindfulness interventions are effective in reducing executive and decision-making deficits in polysubstance abusers. Accordingly, drug users exploit the biopsychological properties of drugs to reach emotional stability. This is because they describe negative emotions and nervousness as unbearable and disappointing and fail to manage such emotions without drugs. Accordingly, SD is a means to moderate stressful emotions. This theory assumes that numerous individuals become dependent on substances because of impaired ER and the lack of impulse control.

Emotional self-regulation refers to the actions taken to change or correct an emotional state. The concept generally indicates the cognitive methods of manipulating information input evoking emotions. It is considered as a process in which individuals adjust their emotions to meet conscious and unconscious environmental expectations. To explain this hypothesis, factors making addictive behaviors resist are drug craving and perversion in ER and cognitive ER. As [Beck et al. \(1993\)](#) believed, drug craving behaviors are controlled by automated or non-automated cognitive-emotional processes; thus, relevant theories generally highlight that individuals' desires are associated with the activation of emotions and incentives to seek drugs. [Hormes and Rozin \(2010\)](#) defined drug craving as a highly strong feeling and an

immediate desire for something as such it is impossible to focus on anything other than what is being wished.

According to the aforementioned points, instead of challenging cognitions, third-wave psychotherapy is concentrated on individuals' awareness and the acceptance of feelings, emotions, cognitions, and behaviors. The mindfulness approach thus adopts new strategies to tackle an individual with SD, who has a mentality tempted to abuse drugs and has a mental craving for drugs; this approach focuses on acceptance and living at the moment.

Our findings suggested that mindfulness is effective in promoting emotional self-regulation. Besides, emotional self-regulation can be regarded as one of the skills aiding individuals to better manage their emotions. In other words, an individual can partly control what emotion to express when and how and moderate their emotional reactions. The obtained data concerning the effects of MT on ER was consistent with those of [Asghari et al. \(2016\)](#) as well as [Goldin and Gross \(2010\)](#). [Asghari et al. \(2016\)](#) argued that MT significantly increased ER and quality of life in the wives of individuals with SD referring to SD treatment centers. [Goldin and Gross \(2010\)](#) reported that mindfulness-based stress reduction training in patients with a social anxiety disorder may reduce emotional reactivity while enhancing ER.

This study had some limitations; the research was only conducted on men. Moreover, we overlooked some demographic characteristics, including the duration of drug abuse, the history of drug abuse, and the type of drug use, i.e., among other limitations. Future research studies are recommended to investigate these methods in combination with medical therapies. Using the findings of the study to help solve the emotional problems of substance abusers is recommended to psychotherapists and psychiatric nurses.

5. Conclusion

ER is among the variables by which drug abusers tackle. Given the similarities between methods, concepts, principles, and techniques of MT and DBT, the present study aimed to detect some differences between these interventions; however, the obtained findings revealed no significant differences in this regard. Mindfulness is a mediator in DBT; thus, the combination of these methods seems to be more effective. Similarly, the collected data revealed that MT and DBT present the same impacts on variables, such as drug craving and ER.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of the Islamic Azad University, Ahvaz Branch (Code: 1064819713060). All ethical principles are considered in this article. The participants were informed about the purpose of the research and its implementation stages. Informed written consent was obtained from all the subjects. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them.

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Authors' contributions

Conceptualization, supervision: Mojtaba Moghadam, Behnam Makvandi; Methodology, funding acquisition, resources: Mojtaba Moghadam; Investigation, writing – review & editing: Mojtaba Moghadam, Behnam Makvandi, Farah Naderi; Writing – original draft: Mojtaba Moghadam, Behnam Makvandi;

Conflict of interest

The authors declared no conflicts of interest.

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