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The Effectiveness of Group Dialectical Behavior Therapy and Structured Matrix Treatment on Quit Addiction Self-efficacy, Distress Tolerance, and Mindfulness in Individuals with Stimulant Drug Abuse

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Abstract

Background: Drug abuse causes irreversible damage to human health at both micro and macro levels among the aggravating problems of human society.

Objectives: This research aimed to evaluate the role of group dialectical behavior therapy (DBT) and structured matrix treatment (SMT) on quit addiction self-efficacy, distress tolerance, and mindfulness in individuals with stimulant drug abuse.

Methods: This quasi-experimental study was based on a pretest-posttest design with test and control groups. The population included drug abusers referring to the centers of addiction rehabilitation affiliated with the Social Welfare Department, Ahvaz, Iran, in 2021. A total of 75 individuals were selected using convenience sampling and allocated to one control group and two experimental groups. Participants in all three groups completed the Distress Tolerance Scale (DTS), the Mindful Attention Awareness Scale (MAAS), and the Quit Addiction Self-efficacy Questionnaire. The first experimental groups underwent eight sessions (90-minute sessions per week) of group DBT. The SMT was performed on the second experimental group for fourteen 90-minute sessions, and the control group did not receive any training. Then, the data were analyzed statistically using the multivariate analysis of covariance.

Results: DBT and SMT groups increased quit addiction self-efficacy, distress tolerance, and mindfulness in the experimental group compared to the control group ($P < 0.001$). There was a significant difference between DBT and SMT groups regarding distress tolerance in the individuals with stimulant drug abuse ($P = 0.020$).

Conclusions: Based on the results, DBT and SMT were effective in quitting addiction self-efficacy, distress tolerance, and mindfulness among drug abusers, improved psychological states, and reduced drug abuse in individuals.

Keywords: Dialectical Behavior Therapy, Self-efficacy, Distress, Mindfulness, Drug Abuse, Addiction

1. Background

Addiction and drug abuse are one of the major human issues that have influenced the broad biological, psychological, and socio-economic dimensions of the contemporary world (1). According to the national survey on the prevalence of drug abuse amongst Iranian people, the prevalence of drug abuse is 2.65% (2). The World Drug Report indicates that drug abuse is on the rise globally (3), which causes irreversible damage to human society at both micro and macro levels. Drug abuse is among the aggravating problems of human society. Drugs that cause cognitive-behavioral-social and physiological damage are stimulants (4, 5). The rapid growth of methamphetamine abuse increased its supply in Iran. Currently, methamphetamine ranks first among the drugs available in Iran (6). The concept of quit addiction self-efficacy plays a critical role in the amount of stimulant abuse (7). Self-efficacy was first used in the social learning theory to give meaning to a person's feelings regarding their ability and efficacy to produce, change, and control daily events (8). Wong and Longshore (9) found that higher levels of self-efficacy in abuse were related to the increased likelihood of quitting Heroin. Manning et al. (10) demonstrated that low distress tolerance is related to quitting addiction self-efficacy in individuals with Hashish abuse. Distress tolerance can predict quit addiction self-efficacy through emotional disorders associated with the pain and severity of Hashish abuse.

Distress tolerance is a major factor involved in the growth and maintenance of drug abuse (11). Simons et al. (12) reported that distress tolerance has a significant relationship with the severity of alcohol abuse, which is a

common construct for research on emotional dysregulation. Distress tolerance is a person's ability to experience and tolerate negative emotional states (13, 14). Simons et al. (12) indicated that distress tolerance skills play a significant role in reducing alcohol abuse.

Mindfulness has received lots of attention among the studies on drug addiction (15). Mindfulness is a receptive non-judgmental awareness regarding whatever is happening at the moment. Training mindfulness and employing the treatments such as psychodynamic psychotherapy can be influential in treating addiction (16, 17).

DBT is one of the treatments used to reduce the improper physiological traits in individuals addicted to stimulants (18). DBT is a type of cognitive-behavioral therapy (CBT), which entails identifying the negative thinking patterns and directs them toward positive behaviors. Various studies have confirmed the effect of DBT on reducing the use of psychotropic drugs (19).

The use of the matrix treatment method to treat stimulant drug use disorders such as methamphetamine has been widely investigated in the US. This type of treatment was developed by the specialists in the Matrix Institute in Los Angles and California to reduce drug abuse, which was adopted in most studies to treat methamphetamine (20, 21). This systematic treatment method educates clients about creating a healthy lifestyle and supports them in quitting drugs, particularly methamphetamine and cocaine. According to previous studies, matrix treatment has a significant influence on improving the strategies for coping with stress and distress in addicts (22).

Individuals with drug abuse problems require appropriate medical and psychological treatment. There is scant research on the psychological treatment methods to reduce stimulant abuse in Iranians. Thus, the researcher investigated treatment methods such as DBT and matrix therapy for stimulant drug abusers. Moreover, research on these drugs is essential due to changing drug abuse patterns, the new industrial and laboratory-based drugs, and their popularity among young people.

2. Objectives

This study aimed to evaluate the role of group DBT and SMT on quit addiction self-efficacy, distress tolerance, and mindfulness in individuals with stimulant drug abuse.

3. Methods

The quasi-experimental study was based on a pretest-posttest design with test and control groups. The population included drug abusers, who referred to the centers of addiction rehabilitation affiliated with the Social Welfare Department, Ahvaz, Iran, in 2021. A random selection was made from two districts of Ahvaz for the participants of the centers for addiction rehabilitation affiliated with the Social Welfare Department. Then, several six centers were selected randomly from each district. Finally, 75 drug abusers participating in the research were chosen to make a convenience sample. The inclusion criteria were being a drug abuser aged 25 - 40 years, lack of receiving any other simultaneous therapies, and signing informed consent. The exclusion criteria were being absent in more than two treatment sessions and unwillingness to resume the treatment procedure. The subjects were randomly distributed between a control group and two experimental groups (n = 25 per group). Based on G*Power software, the sample size was determined (significance level = 0.05, test power = 0.8, and effect size = 80%). Eight 90-minute weekly sessions for DBT groups were held for the first experimental groups. The SMT was carried out for the second experimental group as 14 weekly sessions lasting 90 minutes, while no training was conducted for the control group. Control groups consisting of individuals receiving no treatment are impossible to select in such studies, or it is unethical to assign methamphetamine or stimulant users to the control group. The control group consisted of buprenorphine-treated patients. Participants were asked to sign informed consent forms before the study began, and their participation could be terminated at any time.

3.1. Research Instruments

3.1.1. Quit Addiction Self-efficacy Questionnaire

This questionnaire, which was developed by Bramson (1991), is composed of 16 items and measures the skills, such as decision-making, problem-solving, communication, and assertion. The scoring is based on a 7-point Likert scale from definitely no (1) to definitely yes (7). The total score of this questionnaire ranges between 16 and 112. An alpha Cronbach coefficient of 0.79 was reported by Habibi et al. for the questionnaire (23). The calculated Cronbach's alpha coefficient was 0.80 in the present study.

3.1.2. Distress Tolerance Scale

The Distress Tolerance Scale (DTS), which was designed by Simons and Gaher (24), includes 15 items and four subscales, including the perceived capability for toleration of emotional distress (tolerance), attention absorbed by negative emotions (absorption), subjective appraisal of distress (appraisal), and regulation efforts to alleviate distress (regulation). A 5-point Likert scale is used to score the items of this scale, in which higher scores indicate more severe distress. An alpha Cronbach coefficient of 0.85 was

reported for the scale by the authors (25). The calculated Cronbach's alpha coefficient in this study was 0.83.

3.1.3. Mindful Attention Awareness Scale

The Mindful Attention Awareness Scale (MMAS) was designed by Brown and Ryan (26) based on 15 items. The 6-point responses range between 1 (Almost Always) and 6 (Almost Never), and the minimum and maximum scores are 15 and 90, respectively. A high score on this scale indicates higher levels of mindfulness. Low mindfulness scores range from 15 to 30, moderate mindfulness scores is from 30 to 60, and high mindfulness scores range from 60 to 90. The internal consistency of the test was reported from 0.80 to 0.78 based on Cronbach's alpha. The authors reported an alpha Cronbach coefficient of 0.85 for the scale (27). In this study, Cronbach's alpha coefficient was 0.86.

3.2. Intervention Program

The intervention programs included eight 90-minute sessions of DBT group based on the practical guide of behavioral therapy techniques and fourteen 90-minute sessions of SMT based on the guidelines provided by Matrix Institute. The therapeutic intervention sessions were conducted for two groups on different days at the Social Welfare Counseling Center in Ahvaz, Iran. In addition, the intervention programs were conducted by the first author, who had attended specialized courses and workshops. A summary of these two interventions is presented in Tables 1 and 2.

3.3. Statistical Analyses

The data analysis was conducted by employing inferential statistics (the Bonferroni and MANCOVA tests) and (standard deviation (SD) and mean) at the significance level of 0.05.

4. Results

The participating subjects were 75 drug abusers whose mean age in the control groups, DBT, and SMT were 34.41 ± 6.32, 34.27 ± 5.53, and 35.19 ± 6.80 years, respectively. Table 3 presents the participants' demographic variables, and Table 4 shows the SD and mean of investigated variables in the experimental and control groups.

According to the MANCOVA results, the control, DBT, and SMT significantly differed in at least one of the dependent variables. The F-values in the one-way analysis of covariance (ANCOVA) for quit addiction self-efficacy ($F = 71.28$, $P = 0.001$), distress tolerance ($F = 42.27$, $P = 0.001$), and mindfulness ($F = 48.38$, $P = 0.001$) were calculated. According to these findings, the dependent variables of the group, which underwent group DBT and the SMT, significantly differed from the control group.

There was a significant difference between the control group and DBT group, as well as the control group and SMT group, concerning quit addiction self-efficacy, distress tolerance, and mindfulness ($P < 0.001$). In addition, there was a significant difference between DBT and SMT groups regarding distress tolerance in the individuals with stimulant drug abuse ($P = 0.020$). In addition, no significant difference was observed between the SMT and DBT groups regarding mindfulness, quit addiction self-efficacy, and distress tolerance (Table 5).

5. Discussion

The intervening programs of DBT and SMT significantly increased the quit addiction self-efficacy, distress tolerance, and mindfulness in individuals with stimulant drug abuse. In addition, DBT and SMT did not differ significantly on quit addiction self-efficacy and mindfulness in stimulant drug abusers. These results are consistent with those of Aryan et al. (22) and Moghadam et al. (25).

Consistent with the results of previous studies (22), the present study showed that DBT effectively quits addiction self-efficacy among drug abusers. Drug abusers with higher quit addiction self-efficacy experience fewer relapses. However, those with low self-efficacy tend to give in to their urge to use, and eventually relapse. The drug abusers who lack quit addiction self-efficacy suffer from emotional and cognitive problems (28). Providing drug abusers with the right solutions and resolving problems can enhance their self-efficacy. This therapy can cause positive changes in drug addicts and reduce most of their psychological disorders. Therefore, DBT can enhance quit addiction self-efficacy in drug abusers (25). Asarnow et al. (29) demonstrated that DBT enhanced emotional regulation in adolescents, improved self-harm, and reduced drug abuse in the course of treatment.

Based on the results, SMT increased quit addiction self-efficacy in substance abusers. In addition, the matrix treatment is influential in treating dependence on methamphetamine, particularly stimulants. This treatment proved effective regarding various addictive drugs such as alcohol, marijuana, cocaine, morphine, and cigarettes, which influence the quit addiction self-efficacy of drug abusers. The matrix treatment is a structured approach for treating adults with problems of controlling their dependence on stimulants and amphetamines. In addition, the matrix treatment is problem-focused, prevention-based, and result-based, emphasizing learning and training a broad spectrum of improvement skills (20). The therapeutic strategies of this model arise from

Table 1. Summary of Group Dialectical Behavior Therapy Sessions

Sessions	Description
First	Familiarity with goals and rules, familiarity with the three states of mind: Logical, emotional, and rational
Second and third	Taking non-judgmental position, self-mindfulness, and acting effectively Practicing the skills related to "what" and "how"
Fourth and fifth	Familiarity with some of the emotion regulation skills: Definition of emotion and its components
Sixth and seventh	Familiarity with skills needed to accept emotions, distress tolerance techniques, and strategies of survival in critical situations (e.g., self-relaxation through the five senses)
Eighth	Familiarity with skills of improvement in the face of failure or anger

Table 2. Summary of Structured Matrix Treatment

Sessions	Description
First	Initial evaluation, history of drug abuse, initial recovery skills, cessation of the vicious cycle of drug abuse
Second	Behavioral analysis tasks based on recognizing external tempters and drug abuse initiators
Third	Identification of internal temptations and emotional factors related to drug abuse
Fourth	Familiarity with the chemical structure of the body during the rehabilitation period and common treatment problems for accurate assessment of internal changes and segregation of emotional factors to control the habit
Fifth	Familiarity with psychological components including thought, feeling, and behavior and how they cause the onset of drug abuse in the past and future
Sixth	Familiarity with some factors such as boredom, fatigue, and nostalgia that may stimulate craving for drugs now or in the future
Seventh	Discussing the importance of employment, recovery, and entertainment that can be achieved through a healthy lifestyle
Eighth	Discussing the importance of honesty during relapse and awareness of temptations in preventing a relapse
Ninth	Relapse prevention, emphasis on complete or permanent abstinence
Tenth	Familiarity with skills of eliminating irrational and inefficient thoughts and beliefs about drug abuse
Eleventh	Familiarity with how to ask for help from other, especially family members, in the face of a relapse
Twelfth	Familiarity with how to find and join self-help groups
Thirteenth	Concluding the solutions, providing a multi-purpose coping program (including predicting risky situations), developing appropriate self-centered and community-centered solutions
Fourteenth	Review of previous sessions, termination of the intervention, post-test

Table 3. Demographic Variables of the Participants [a]

Groups	Age (y)	Duration of Addiction (y)	Education			Marital Status	
			Middle Education	High School	University Education	Married	Single
DBT	34.27 ± 5.53	5.43 ± 2.27	15 (60.00)	6 (24.00)	4 (16.00)	10 (40.00)	15 (60.00)
SMT	35.19 ± 6.80	4.79 ± 2.65	17 (68.00)	6 (24.00)	2 (8.00)	8 (32.00)	17 (68.00)
Control	34.41 ± 6.32	5.12 ± 2.89	17 (68.00)	5 (20.00)	3 (12.00)	11 (44.00)	14 (56.00)

Abbreviations: DBT, dialectical behavior therapy; SMT, structured matrix treatment; SD, standard deviation.
[a] Values are expressed as mean ± SD or No. (%).

clinical research literature consisting of the cognitive-behavioral approach, relapse prevention, motivational strategies, and psycho-education training. This treatment model can change quit addiction self-efficacy using Marlatt's cognitive-behavioral approaches for relapse prevention (21). The matrix can enhance quit addiction self-efficacy in drug abusers by using its techniques during the training programs.

DBT and SMT increased distress tolerance in drug abusers. DBT enabled drug abusers to control their emotions and feelings, accept problems and inefficiencies, and imagine life as more perceivable, under control, and meaningful (18) and increase their distress tolerance. Distress tolerance also reduces the risk of abuse when a peer pressures an individual to abuse drugs. The ability to tolerate distress enables individuals to adopt appropriate strate-

Table 4. The Mean and Standard Deviation of the Variables in Experimental and Control Groups

Variables, Phases	DBT	SMT	Control
Quit addiction self-efficacy			
Pre-test	49.50 ± 7.74	46.80 ± 8.67	49.80 ± 8.28
Post-test	57.20 ± 6.84	53.15 ± 8.40	49.70 ± 7.96
Distress tolerance			
Pre-test	44.20 ± 5.94	43.45 ± 5.89	42.95 ± 5.57
Post-test	51.50 ± 6.13	48.55 ± 6.12	43.60 ± 5.26
Mindfulness			
Pre-test	46.40 ± 5.80	44.65 ± 6.83	45.70 ± 5.83
Post-test	53.85 ± 6.24	50.40 ± 7.86	46.15 ± 5.86

Abbreviations: DBT, dialectical behavior therapy; SMT, structured matrix treatment.

Table 5. Bonferroni Posthoc Test Results for Paired Comparison of the Investigated Variables in the Post-test Stage

Variables, Groups	MD	SE	P-Value
Quit addiction self-efficacy			
DBT - control	7.66	0.68	0.001
SMT - control	6.24	0.68	0.001
DBT - SMT	1.41	0.69	0.141
Distress tolerance			
DBT - control	6.73	0.75	0.001
SMT - control	4.59	0.75	0.001
DBT - SMT	2.14	0.76	0.020
Mindfulness			
DBT - control	6.95	0.73	0.001
SMT - control	5.16	0.74	0.001
DBT - SMT	1.79	0.75	0.061

Abbreviations: DBT, dialectical behavior therapy; SMT, structured matrix treatment; MD, mean difference; SE, standard error.

gies when confronted with a high risk of drug abuse.

The matrix treatment method can provide patients with appropriate strategies to improve their distress tolerance. Individuals with high distress tolerance avoid drugs, are more devoted to not drinking or using other drugs, have a healthier personality and psychological health, can say no to their peers, control their emotions and expectations, and have superior problem-solving skills, which deters drug misuse. Improving distress tolerance enables a person to resolve conflicts, prevents temptation, hedonism, and drug abuse, improves social relations, occupation, and family relations (20), and increases an individual's psychological health.

Substance abusers experienced a greater level of mindfulness after receiving DBT and SMT. This result is consistent with that of previous studies (25). DBT enhanced mindfulness in drug abusers through techniques during treatment, including meditation techniques and exercises, such as observation, description, automatic simultaneous participation, mindful prevention from judgment, concentration on the moment, and focusing on effectiveness instead of being accurate (25). In addition, the matrix treatment method assists drug abusers in correcting their thinking method and acquiring skills to resist psychological pressures. Correcting the thoughts and expectations of drug abusers leads to positive results in improving their mindfulness (21). Moreover, the long-term efficiency of these treatments can be employed as potent hindering agents against drug abuse to enhance individuals' mindfulness. Mindfulness serves as an obstacle against temptation, hedonism, and drug.

Similar to any other research, this study faced some limitations. Since this study was conducted on stimulant abusers in addiction rehabilitation centers of Ahvaz, the results should be cautiously generalized to other drug abusers in other regions. Future studies are recommended to focus on the continuity of the effectiveness of these interventions in the follow-up period. Based on the importance of DBT and SMT, future studies can be conducted on other groups, as well as on psychological interventions for mood disorders and addiction problems.

5.1. Conclusions

Based on the results, DBT and matrix treatment training were effective in quitting addiction self-efficacy, distress tolerance, and mindfulness among drug abusers. This training can be employed along with other treatments to improve psychological states and reduce drug abuse in individuals. DBT and matrix treatment training programs

are recommended to be applied in addiction treatment clinics.

Footnotes

Authors' Contribution: SB, and SS developed the study concept and design. SB acquired the data. SS and FH analyzed and interpreted the data, and wrote the first draft of the manuscript. All authors contributed to the intellectual content, manuscript editing and read and approved the final manuscript. SB, and FH provided administrative support.

Conflict of Interests: This paper is based on the first author's PhD dissertation in the Department of Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran. In this study, the second author is the supervisor and the third author are the advisor.

Ethical Approval: The study was approved by the Ethical Committee of Islamic Azad University-Ahvaz Branch (code: IR.IAU.AHVAZ.REC.1400.118).

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

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