

## Efficacy of group reality therapy versus desipramine pharmacotherapy in drug craving and relapse of methamphetamine-dependent patients in yazd

**Running Title:** Group reality therapy versus desipramine in methamphetamine-dependent patients

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### Abstract

**Aims:** In this comparative study, we aimed to investigate the effectiveness of group reality therapy versus desipramine pharmacotherapy in reducing the craving and relapse of methamphetamine-dependent patients.

**Methods:** This semi-experimental research was conducted using a control group and two experimental groups of reality therapy and desipramine pharmacotherapy. The statistical population of this study included all methamphetamine-dependent patients under methadone treatment who were referred to the health clinics of Yazd city, Iran. We selected 30 patients using convenience sampling and then categorized them randomly into three groups of reality therapy, desipramine pharmacotherapy, and control. In the pre-test stage, the risk questionnaire was administered to evaluate the stimulants. The first experimental group attended 10 reality therapy sessions once a week and was assessed immediately after the treatment. The data were analyzed using the covariance analysis.

**Results:** The findings showed no significant difference between the total mean score of the reality therapy and desipramine pharmacotherapy groups ( $F= 3.289$ ,  $P= 0.087$ ). Hence, these two interventions did not affect attenuating craving to use the drugs. To check the *homogeneity presumptions* of the covariance matrix and variances of the two groups, the Box (6.241) and Levine (0.250) tests were applied, respectively. The results about the experimental groups (Reality therapy and Desipramine group) compared to the control group were meaningful.

**Conclusion:** There was no significant difference between reality therapy and desipramine pharmacotherapy groups in reducing the craving to use the drugs. The scope of changes showed that craving for drug consumption reduced in reality therapy (51.0) and desipramine pharmacotherapy (36.0) groups.

**Keywords:** Craving; Desipramine; Methadone, Methamphetamine; Patients; Reality therapy

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## Introduction

Drug addiction is one of the most important problems of the present time with a global scope and burden. It has exceeded the medical boundaries and changed to a psychological, social, and family problem and challenge. The main characteristic of addictive behaviors is their relapsing nature and tendency. Since drug addiction is a recurrent chronic disorder, relapse or return to the pre-treatment conditions is one of the most important challenges throughout the therapeutic process of addiction (1). The results of related studies showed that in the first year of treatment, more than 50 % of the patients had relapses (2). The findings indicated that three to six months after treatment, 75% of the patients developed relapse (3). Some factors leading to relapse include cognitive and situational factors, self-efficacy, the severity of stressors, and intense craving for consumption. The relapse phenomenon imposes large economic costs on the therapeutic system and can lead to frustration and disappointment in patients and their families towards treatment. So, appropriate interventions are required to reduce the relapse rate (4).

According to Wiliam's study, the director of National Institution Drug Abuse in the United States, over 25% of mortalities in American society are premature and drug-induced. Unfortunately, despite the great efforts of the scientific community, no appropriate treatment has been determined for this problem (5).

According to the World Health Organization (WHO), drug addiction is defined as a dependence syndrome. It is defined as a cluster of physiological, behavioral, and cognitive

phenomena in which the use of a substance or a class of materials takes priority over the previously important behaviors. The belief that negative and undesirable emotions are unbearable and cannot be managed without reliance on materials leads the consumers to relapse and re-use of materials (6).

Craving is one of the most influential and popular topics in addictive disorders. Craving for drug use covers a wide range of phenomena, including the patients' expectations regarding the reinforcing effects of drugs and their intensive tendency to use them. This may be one of the most comprehensive and concise definitions of drug craving. Basically, craving is an uncontrollable desire to consume a substance, which leads to complicated psychological and physical suffering, such as weakness, indigestion, anxiety, insomnia, aggression, and depression if not controlled. To avoid or confrontation with temptation, most of the new psychosocial therapies recommend motivation enhancement methods and learning and practicing new strategies (7). Nowadays, addiction to cocaine and heroin has shifted to other drugs and made the problem of drug addiction much harder to solve. In recent years, the simultaneous use of several substances has increased dramatically. According to the statistics, about 161-588 tons of stimulants group (amphetamine, methamphetamine, known as *Glass* in Iran, methaccatinone, and related substances) were produced in Iran in 2008 (8).

Currently, the dramatic use of methamphetamine has caused widespread domestic and global problems. In 2015, the *National Survey on Drug Use and Health (NSDUH)* reported that

approximately 897,000 12-year-old people were consumers of methamphetamine, which showed a remarkable increase (Substance Abuse and Mental Health Services Administration, 2017). According to the United Nations' Counter Narcotics Report in 2017, more than 37 million methamphetamine users existed, with an annual prevalence of 77 % (9).

On the other hand, the production of artificial and laboratory high-risk materials has compounded the problems of drug-related interventions. Amphetamines and methamphetamine have a similar pharmacodynamic in the human body (10). Methyl amphetamine, known as *Glass*, *Crystal*, and *Ice* in the black market, is a psychoactive substance and a highly potent addictive stimulant that significantly affects the central nervous system. Methamphetamine has shiny transparent crystals in the form of powder (11). Repeated use of these drugs leads to the stimulation of compromise mechanisms, short-term changes, and constant effects on the function of neurons and *opioid* receptor *sensitive* neurons. Consumers of such drugs are vulnerable and develop relapse because these substances create tolerance, dependence, and susceptibility, which are the compromise mechanisms and persist even years after the abandonment (12). Endocrine disorders related hypothalamus-pituitary gonadal axis and spermatogenesis abnormalities are other complications of it (13).

In Iran, *Glass* consumption was very limited in 2007. No cases of *Glass* use were reported in the quick survey of substance abuse in 2004; however, we can expect that a very small number of consumers existed. The same study was

repeated in 2007 and the results showed existence of 3.5 % *Glass* consumers (14).

Resiliance in people with methamphetamine abuse involves their field of attention and leads to severe rumination (15, 16). A study indicated that consumption of methamphetamine elevates the level of oxidative stress in the kidney tissues and prescription of cysteine decreases it (17).

Experts in the field of social and behavioral studies referred to *Glass* as the tsunami of the century. They also added that ease of availability of drugs increased the number of consumers (18). According to the information mentioned above and lack of specific medical treatments considering this substance, the importance of psychotherapy and the role of psychotherapists are highlighted in this area. At present, Matrix psychological therapy is a known treatment for methamphetamine dependence. This treatment is specifically designed for patients with substance abuse and is a cognitive-behavioral therapy (CBT) approach that includes 48 sessions (19). A study showed that patients felt fatigued and dissatisfied with the long duration of Matrix treatment method sessions (20). It is worth noting that outpatient treatment may be effective in dependence on other drugs, but regarding the treatment of methamphetamine abuse, residential rehabilitation is advised despite the lack of clear indicators for admission and detoxification conditions. These conditions include the presence of secondary disorders, addiction to poly substances, the consumption of other substances in methamphetamine use, and the existence of serious social problems so that the patient does not show resistance to drug dependence in the

outpatient treatment (21). However, despite some limited effects on consumers, no definitive and special treatments were reported in the literature regarding methamphetamine abuse.

William Glasser believed that people must face reality, and the foundation of reality is based on the principle that human beings always choose their behaviors. In other words, all the committed behaviors were selected to reduce the level of failure or to satisfy a particular need. Therefore, the purpose of the realistic approach is to help people monitor their behaviors and have good and appropriate choices in their lives (22). According to this theory, humans have intrinsic motivation to fulfill their needs for love and sympathy, power, freedom, survival, health, and recreation. Studies showed that reality therapy reduced the anxiety and increased their responsibility and self-esteem. It also helped individuals control temptation and created positive control feelings and satisfaction with life (23).

Considering the issues mentioned above, the fact that pharmacological and non-pharmacological treatments have not been successful in preventing relapse, and the benefits of reality therapy, we conducted this study. This research aimed to compare the outcomes of the reality therapy method, as a relatively new treatment with the effects of desipramine intake, as an effective treatment for drugs such as cocaine in some studies.

### **Materials and Methods**

This semi-experimental study was conducted with a pre-test and post-test design using control and two experimental groups. The statistical population consisted of all the methamphetamine-

addicted patients who were under treatment with methadone in clinics of Yazd city, Iran. To hit this target, 30 individuals were selected using the random sampling method and assigned into groups of reality therapy (n =10), pharmacotherapy with desipramine (n=10), and control group (n=10) randomly. The pre-test was conducted before the intervention, and the first experimental group was trained with the real therapy method. The second experimental group received desipramine, and the control group did not undergo any treatments. To analyze the data, multivariate and one-way covariance analyses were applied. To collect the data, we used the Stimulant Relapse Risk Scale (SRRS) designed by Ogai et al. in 2007. The tool measures the relapse and temptation of patients regarding consumption of drugs and includes 35 items, which should be answered on a three-point likert scale containing *agree*, *no idea*, and *disagree* choices. The Cronbach's alpha was calculated as 0.69 in a study conducted over 35 participants (24). The content of group reality therapy sessions was designed as the following.

The first session was established for greeting and communication of participants with each other and their introduction to the course. Participants were welcomed and asked to introduce themselves. Later, we tried to raise their motivation for the treatment and explained the structure of sessions, rules, and regulations during the group reality therapy sessions. The second session was initially devoted to developing communication skills between the counselor and the group members. In the second part, we defined the concepts such as identity, the identity

of success, and the nature of the failure. The third session continued with some explanations about the concept of anxiety and mental illness from the perspective of reality therapy. In the fourth session, the overall goals of the treatment sessions were explained.

Furthermore, the short-term and long-term objectives, as well as the methods to reach them during life, were discussed. The fifth session included three sub-categories: 1) An explanation of the concept of choice and responsibility in life; 2) Emphasis and concentration on the common behavior of patients; 3) Acceptance of responsibility for choices and behaviors. In the sixth session, we concentrated on the motivation of individuals to achieve the identity of success in life and helped them develop their motivations according to their intrinsic talents and available facilities. The seventh session included three sub-categories: 1) selection of criteria for appropriate behaviors to achieve the identity of success; 2) value judgments about the current behaviors of the individuals and selection of the best behaviors in line with their goals; 3) acceptance of responsibility regarding the consequences of their behavioral choices in the future. In the eighth session, we dealt with three sub-categories of 1) helping patients to plan for their future and to achieve their goals; 2) setting the goals from the

most minor up to the most major ones; 3) taking written commitments from the consultant and clients to carry out the appointed plans. The ninth session consisted of three sub-categories: 1) follow up the settled plans and reconduct the value judgment in the case of a failure; 2) follow up on taking the responsibility; 3) follow up on the achievements regarding the appointed goals at the start of the course. In the tenth session, we assessed and evaluated treatment success by measuring the changes in patients' attitudes, practices, and feelings throughout the course.

**Results**

In **Table 1**, the mean and standard deviation of the participants' scores are presented. Box test was used to check the equality of covariance matrices, and the results showed that the homogeneity assumption of covariance matrix was confirmed (box coefficient = 6.241). To test the equality of variances of the two studied groups, the Levine test was used. The results indicated that the variance of the three groups (the experimental groups of reality therapy and pharmacological therapy and the control group) did not differ significantly (consumption temptation = 0.254). To compare the effectiveness of the reality and desipramine treatment methods on the temptation and relapse of methamphetamine patients, we used the covariance analysis.

*Table 1.* Descriptive statistics of variables

Variables		Group	Mean	Pre-test		Post-test	
				Standard deviation	Mean	Standard deviation	
Temptation consumption	for	Experimental (Reality therapy)	75.01	14.60	62.40	13.15	
		Experimental (Desipramine)	69.10	13.8	62.50	12.10	
		Control	74.40	14.50	74.20	14.92	

As **Table 2** shows, the difference between the total mean score of the reality therapy group and the desipramine therapy group was significant ( $F = 3.289$  and  $P = 0.087$ ). In other words, the reality therapy and desipramine therapy groups did not

significantly reduce the temptation of consumption. The Eta square of 0.16 was explained by the total score variance using the difference between the two methods.

*Table 2.* Summary of one-way covariance analysis for effects of the intervention on the temptation of consumption

The source of changes	Sum of squares	Degree of freedom	Mean of squares	F	Sig	Eta coefficient
The effect of pre-test	4539.202	1	4539.202	117.686	0.0001	0.874
The effect of group	126.873	1	126.873	3.289	0.087	0.162
Error	655.698	17	38.570			
Total	83195.000	20				

**A. Effectiveness of the real-therapy method on the temptation and relapse of methamphetamine patients in Yazd city.**

**Table 3** indicated that the reality therapy approach was significantly effective on the temptation and relapse of methamphetamine patients. This finding meant that the therapeutic intervention decreased the temptation of drug consumption. In other words, the results showed that by eliminating the effect of pre-test scores, the main effect of reality therapy on post-test was

significant regarding the temptation and relapse of methamphetamine patients. Furthermore, the intervention therapy in the experimental group decreased the temptation for consumption. On the other hand, the significance level, Eta square, and test power showed that the intervention was effective and significant in the experimental group; the effectiveness was practically equal to 51 %. The results of the LSD follow-up test are presented in **Table 4**.

*Table 3.* Summary of One-Way Covariance Analysis for Effects of Intervention (reality therapy) on the Temptation of Consumption

The source of changes	Sum of squares	Degree of freedom	Mean of squares	F	Sig	Eta coefficient
The effect of pre-test	2486.177	1	2486.177	68.710	0.0001	0.802
The effect of group	659.204	1	659.204	18.218	0.001	0.517
Error	615.123	17	36.184			
Total	95475.000	20				

*Table 4.* LSD Fisher

Dependent variable	Group (1)	Group (2)	Means difference	Standard deviation	Sig.	Confidence coefficient 95%
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						Lowest	Highest
Temptation of Consumption	Experimental	Control	-11.489*	2.692	0.001	-17.169	-5.810
	Control	Experimental	11.489*	2.692	0.0001	5.810	17.169

**B. Effectiveness of the desipramine therapy method on the temptation and relapse of methamphetamine patients**

According to **Table 5**, desipramine treatment was significantly effective on the temptation and relapse of methamphetamine patients. This finding meant that therapeutic intervention reduced the temptation of consumption in participants. In other words, by eliminating the effects of pre-test scores, the impact of

desipramine on the post-test scores of temptation and relapse of methamphetamine patients was significant. The therapeutic intervention in the experimental group decreased the temptation rates. On the other hand, the level of significance, Eta square, and test power showed that therapeutic intervention in the experimental group was significantly effective, and its effectiveness was about 36 % practically. The results of the LSD follow-up test are presented in **Table 6**.

*Table 5.* Summary of one-way covariance analysis for effects of intervention (desipramine) on the temptation of consumption

The source of changes	Sum of squares	Degree of freedom	Mean of squares	F	Sig	Eta coefficient
The effect of pre-test	4886.009	1	4886.009	283.111	0.0001	0.943
The effect of group	170.659	1	170.659	9.889	0.006	0.368
Error	293.391	17	17.258			
Total	97678.000	20				

*Table 6.* LSD Fisher

Dependent variable	Group (1)	Group (2)	Means difference	Standard deviation	Sig.	Confidence coefficient 95%	
						Lowest	Highest
Temptation of Consumption	Experimental	Control	-5.908*	1.879	0.001	-9.871	-1.944
	Control	Experimental	5.908*	1.879	0.0001	1.994	9.871

**Discussion**

The findings showed that by eliminating the effect of pre-test scores, reality therapy could be effective regarding the temptation and relapse of patients. Consequently, the reality therapy method was effective, and its effectiveness was about

51%. In the second experimental group, medication therapy (desipramine) was effective on the temptation and relapse of patients after eliminating the effect of pre-test scores. Based on the results, no significant difference was observed between the reality therapy group and the drug

therapy group regarding reducing consumption temptation. However, both therapies effectively reduced the temptation and relapse in patients. According to the findings, the pre-test and post-test scores related to the temptation of consumption were significantly different in the reality therapy group. The medication therapy group had a weaker performance in comparison with the reality therapy group; the temptation and relapse scores of the medication therapy group were slightly lower. It is also noteworthy that the effectiveness of treatment with the reality therapy method was higher than the pharmacotherapy method, with 95 % confidence.

Consequently, the results obtained in this study suggested that the reality therapy method effectively reduced the temptation and relapse of the patients. Therefore, we recommended other researchers and therapists of addiction centers implement group reality therapy to reduce the drug consumption of patients. By applying this method, we can reduce the risk of relapse and temptation among the users of methamphetamine. However, we can also benefit from the prescription of desipramine and its effects.

Hokmabadi et al. conducted a study on 40 patients of the Treatment-Focused Community Center in Mashhad, Iran. They concluded that group reality therapy based on the choice theory increased hope in drug-dependent people significantly. They concluded that addict patients should receive love, attention, acceptance and needed to learn life skills, responsibility (26). In this regard, a negative attitude is created in the patients considering the use of substances. Consequently,

they change their vision, mood, and attitude towards life. In psychopathology view, William Glaser indicated that the patients' behaviors were not unhealthy or defective. He mentions that such people act based on their own abilities and viewpoints. In other words, addicts need to turn their potential talents into perfection and self-fulfillment (21). Noroozi Madah et al. studied 20 smokers who were referred to Negin Health Clinic in Mashhad, Iran. They reported that group-based reality therapy reduced the participants' positive attitudes towards smoking, empowered their source of internal control, and helped them to use coping strategies (27). Furthermore, Vafayi et al. investigated 30 under-treatment addicted patients in Mashhad city and showed that the enrichment training and improving life programs conducted on the basis of reality therapy methods improved the addiction indicators. These training interventions increased happiness and negative control feelings, decreased drug intake, temptation, and relapse in patients (28). Zandkarimi et al. studied 60 healthy participants and methamphetamine users. Their results indicated that metacognitive dysfunction was the driving force for using methamphetamine. In other words, the low levels of cognitive-emotional control led the patients to abuse drugs (29).

On the other hand, Alison Oliveto et al. investigated 21 drug addicts over 12 weeks and indicated that the inhibitory effect of desipramine on cocaine was higher than other drugs, such as Buprenorphine, Amantadine, etc. (30). A study by Caminer in Bradley Hospital, Brown University in the United States showed that desipramine was a potentially effective drug in the onset of cocaine-



dependent addiction in adolescents (31). Moreover, Lyengar et al. carried out a study in the Indianapolis city of the United States. They found that specific noradrenaline reuptake inhibitors, such as desipramine, might have analgesic effects (32). Vollbrecht et al., studied 70-90 days old mice in an *In vitro* at Michigan university and found that cocaine increased epinephrine in mice susceptible to obesity. In addition, they blocked the epinephrine pathway by injecting desipramine and reported that the epinephrine plasma level was reduced in mice. Therefore, they concluded that treatment with desipramine reduced physical activity and food intake in mice susceptible to obesity (33). In a study by Docherty on rats, both cocaine and desipramine enhanced the contractile responses to nerve stimulation, but desipramine inhibited this response with higher concentrations. Furthermore, the strength of prazosin increased against norepinephrine in the presence of rare cocaine block. However, desipramine increased the strength of prazosin because it acted as an adrenoceptor antagonist within the concentration range that blocked it (34).

**Limitations:** The generalization of research results according to the type of substance used, age of onset, duration of use, gender, and type of associated disorder should be considered.

Due to possible problems such as falling in treatment or not continuing treatment, further research in this field is recommended.

## Conclusion

Group reality therapy methods can be of particular importance in resolving this crisis. We found that

this type of intervention effectively reduced the rate of relapse and willingness to re-use in patients. Therefore, we suggest the researchers train the addicts as well as their family members using this method. Furthermore, psychologists and counselors are recommended to rely on group reality therapy in preventing relapses among the patients. In addition, the analgesic effects of desipramine may be used to reduce relapse and temptation in patients.

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