

# The Effect of Group Therapy With Transactional Analysis Approach on Emotional Intelligence, Executive Functions and Drug Dependency

Masoomeh Forghani,<sup>1\*</sup> and Bahram Ali Ghanbari Hashem Abadi<sup>2</sup>

<sup>1</sup>Science and Research Branch, Islamic Azad University, Tehran, IR Iran

<sup>2</sup>Department of Psychology, Faculty of Education and Psychology, Ferdowsi University of Mashhad, Mashhad, IR Iran

\*Corresponding author: Masoomeh Forghani, Science and Research Branch, Islamic Azad University, Tehran, IR Iran. Tel: +98-9155100532, Fax: +98-5136099199, E-mail: hayde\_forghany@yahoo.com

Received 2014 October 01; Revised 2015 March 23; Accepted 2015 May 23.

## Abstract

**Objectives:** The aim of the present study was to evaluate the effect of group psychotherapy with transactional analysis (TA) approach on emotional intelligence (EI), executive functions and substance dependency among drug-addicts at rehabilitation centers in Mashhad city, Iran, in 2013.

**Patients and Methods:** In this quasi-experimental study with pretest, posttest, case-control stages, 30 patients were selected from a rehabilitation center and randomly divided into two groups. The case group received 12 sessions of group psychotherapy with transactional analysis approach. Then the effects of independent variable (group psychotherapy with TA approach) on EI, executive function and drug dependency were assessed. The Bar-on test was used for EI, Stroop test for measuring executive function and morphine test, meth-amphetamines and B2 test for evaluating drug dependency. Data were analyzed using multifactorial covariance analysis, Levenes' analysis, MANCOVA, t-student and Pearson correlation coefficient tests t with SPSS software.

**Results:** Our results showed that group psychotherapy with the TA approach was effective in improving EI, executive functions and decreasing drug dependency ( $P < 0.05$ ).

**Conclusions:** The result of this study showed that group psychotherapy with TA approach has significant effects on addicts and prevents addiction recurrence by improving the coping capabilities and some mental functions of the subjects. However, there are some limitations regarding this study including follow-up duration and sample size.

**Keywords:** Drug Dependency, Emotional Intelligence, Executive Function, Group Psychotherapy, Transactional Analysis Approach

## 1. Background

Opiate dependency has been considered as an important social and health problem in the world. It is a chronic and recurrent disorder which imposes heavy cost burden on the individuals, families and societies. There is not any definite treatment for drug addiction and even after a long period of drug abstinence there is still a chance that a person returns to drug use. Numerous factors including individual, family and social factors are effective in beginning, continuing and returning to drug abuse (1-4). Clinical evidences show that factors like personal characteristics, lifestyle, social relations, attitudes, beliefs, feelings, emotions, attachments, and behaviors which form during developmental stages have essential roles in drug dependency (5, 6). Emergence of emotional intelligence (EI) concept, different theories about it and great efforts for inventing its evaluation tools demonstrate the attention to effects of interpersonal relations on psychological health. It seems that EI is one of the factors determining human reactions to the social life (7, 8). This concept is different from

cognitive intelligence and contains: understanding feelings and applying them correctly, appropriate emotional decision making, desirable mood management, impulse control, and appropriate social skills (9-12). The limited number of research studies of the relationship between EI and drug abuse show that low EI has a direct correlation with alcohol, tobacco and cigarette use (13, 14) and drug abuse (15, 16). Executive functioning is a high cognitive and metacognitive functioning, which includes excellent inhibition abilities, self-starting, strategic planning, cognitive flexibility, and impulse control. In facts, functions like organizing, decision making, active memory, retention and conversion of motor control, time perception, predicating future, reconstruction, internal language, and problem solving are some of the most important neurocognitive executive functions that help humans in learning processes and intelligence practices. Cognitive treatments of addiction focus on teaching confronting skills for managing risky situations, and treating psychological disorders associated with addiction. Nevertheless, although the cognitive models of drug addiction show the relationship be-

tween beliefs and attitudes with drug abuse, they do not explain how beliefs affect cognitive processing. Some of the recent theories (17-19) highlight the limitations of cognitive treatment approaches and offer a framework for cognitive conceptualization and psychological disorders. Psychological theory of transactional analysis (TA) was first developed by Berne (20). According to the international transactional analysis association, TA is a theory of personality and a systematic psychotherapy for personal development and change. Transactional analysis is useful in evaluating organizations and their management, evaluating child development, in treating psychological disorders at educational centers, and for social workers. Generally, it is useful in any ground needs understanding people, relations and communications. Methods and techniques of TA have been designed in a way that promotes independence and self-direction. Independence and self-direction originate from knowledge, self-motivation and ability to induce intimacy and use person's resources as an adult to solve problems. Researchers have found TA is effective in improving parents and children relationship. Transactional analysis has positive effects on adolescents' methods of confrontation, reduces their emotion-orientation and increases their problem-orientation. It is also effective in change period in addicts and prevents recurrence to addiction. Although different treatment methods have been developed for drug addiction like abstinence-oriented methods and social maintenance-oriented methods, there has not been any effort for improving EI, executive functions and to reduce dependence.

## 2. Objectives

The aim of study was to use group therapy based on TA for improving EI, executive functions and to reduce dependence. Clinically addiction classified as psychological disorder (substance abuse or dependency disorder), which includes cognitive, behavioral and physiological symptoms (21). The role of group therapy based on TA on EI, executive functions and reducing dependency is a new subject, which there was not any published article about it so far. From theoretical and practical aspects, it is important to show the effect of group therapy based on TA on EI, executive functions and reducing dependency, to find why such an effect exists and what the intermediate variable is. These findings can guide strategy planners to introduce preventive program and improvement plans. Transactional analysis, a cognitive interaction analysis method, has given a new hope to people who want to change from inside instead of compromising with themselves. The aim of this study was to assess the effect of teaching TA on EI, executive functions and reducing dependency in addicts.

## 3. Patients and Methods

### 3.1. Study Design

In this quasi-experimental study, we evaluated the effects of the study experimental variable (group therapy with an emphasis on TA) on dependent variables (EI, executive functions and reducing drug dependency "primary temporary relative improvement") in a group of addicts. This is a pretest-posttest research with the control group (n = 31), which are expressed with the following symbols.

### 3.2. Study Sample

Study population included the addicts who were at one addiction rehabilitation center in Mashhad city, Iran, in 2013. The sampling lasted 6 months and was made based on the availability model (convenient sampling), 30 addicts from these centers were recruited and randomly assigned into two groups.

### 3.3. Study Measures

The Bar-On model of emotional intelligence (EI) is a multifactor model for EI and was designed by Bar-On in 1997 (22). The emotional quotient (EQ) tool is used to evaluate EI and includes 90 questions, which describe emotions, ideas and behaviors in different situations. Study subjects read the question and then mark the rate of his agreement (or unagreement for some of the questions) with the question. The answers are based on the Likert scale (strongly agree, agree, undecided, disagree somewhat, and strongly disagree). The higher score means better position for person in the tested scale or in overall test, for example the higher score in the self-expression scale means better a self-expression skill. This tool can be used for adults 18 years old and up, men and women with the common level of education. Reliability of the test was assessed with Cronbach's alpha, and the total Cronbach's alpha was reported 93%. The calculated alpha in the third part of the questionnaire was the same as alpha in the second part (23). Many researches have been done on the validity of EQ-I, including structure validity of it. The results of structure validity have been shown with a few questionnaires like Beck digressional inventory (24), coping inventory for stressful situations (25), Eysenck personality questionnaire (26), Mayer-Salovey-Caruso EI questionnaires (27), the Minnesota multiphasic personality inventory (MMPI-2) (28), NEO-five factor inventory (29), sixteen personality factor questionnaire (16PF) (30), Toronto Alexithymia scale (31), symptom check list-90 (SCL90) (32), Zung self-rating depression scale (33). Stroop test (victory ES) (34) is a common neuropsychological test for executive functions, selective attention and concentration. Subject

must call the colors of the written words without attention to their meaning. This test is also useful in evaluating function of the frontal lobe. Validity of results of the attention direction part of the Stroop test in psychopathic studies depends on validity and reliability of this tool. Siegrist (35) used a collection of taboo words as emotional stimulus and test them along with unemotional words on a group of normal precipitants. Using this single stimulus method, Siegrist was able to evaluate internal consistency of Taboo words, which was in an acceptable range (Cronbach's alpha = 80%). Fadardi (36) repeats the test-retest process and Siegrist (37) factor analysis with the emotional and classic Stroop (38) tests and finds the similar results; there are other tests likewise but we used Stroop test due to being computerized and so more reliable and faster. Besides reliability of Stroop test, there is enough evidence for its validity. Sharma and McKenna (39) believe that a limited number of studies have shown the effect of Stroop test in non-clinical population. Usually, the intervention rate is less in the nonclinical group compared with the clinical group; make it more difficult to show Stroop effects. Nevertheless, the emotional Stroop test is able to differentiate between clinical and nonclinical groups. This will help to solve the reliability problem, as Thorndike (40) mentioned there are always some overlaps between reliability and validity.

### 3.4. Inclusion and Exclusion Criteria

Inclusion criteria were as follows: all adult addicts referred to Mashhad rehabilitation centers with consent to participate in the intervention and assessments, without any mental problem. Those refused to continue the study or with any other chronic ill-health condition that seems interrupting in the intervention were excluded.

### 3.5. Ethical Considerations

The subjects were ensured about the confidentiality of their personal information and the study protocol was approved by the ethical committee of the university.

### 3.6. Statistical Analysis

Data were entered the SPSS software and were analyzed. To find differences between means, multifactorial covariance analysis was used and pretests considered as covariate variables to remove the effect of random variable. Statistical assumptions like normal distribution of data and equality of variances (Leven's test) was evaluated. The MANCOVA test was used to examine the differences between the two groups for both variables. In all measurements P value less than 0.05 was considered statistically significant.

### 3.7. Method of Conducting the Study

At the beginning of the study both group of participants participated in a pretest. Then the experiment group had 12 sessions of group psychotherapy with TA approach. Then posttest was performed for both groups. An independent variable was 12 sessions of group psychiatry with TA approach. The steps of TA-approach based on Berne (20) description are as follows:

- a) Structure analysis,
- b) Reciprocal behavior analysis,
- c) Game analysis and time structuring,
- d) Life minute analysis.

## 4. Results

Table 1 show descriptive statistics indexes for EI and executive functions in both experimental and control group. As it shown in pretest, no significant differences were found in the mean values between the experimental and two control groups (1 and 2). In posttest, the experimental group had a higher mean score compared to the two control groups. The result of multifactorial covariance analysis for comparing the effects of group therapy on EI and executive functions was demonstrated in Table 2. Levene's test for equality of variances ( $P > 0.05$ ) for each of dependent variables showed no assumption violation. The MANCOVA test showed that there was a significant difference between the two groups in both variables; Wilk's Lambda = 0.001,  $P = 0.001$ , and  $F_{(14, 1)} = 58.64$  for EI and Wilk's Lambda = 0.001,  $P = 0.001$ , and  $F_{(14, 1)} = 13.52$  for executive functions. Table 2 shows significant effects of group and significant differences between the means in the experimental and control groups. Emotional intelligence and executive functions in the experimental group were increased significantly after the intervention. To evaluate the effect of TA on drug dependency, we used 3 common addiction tests: a) morphine test, b) methamphetamine test, and c)  $B_2$  test.

The results of these three tests in the pretest phase showed that participants in both groups dropped out of the treatment; 8 participants in each group. However, in the post-test phase only eight participants of the control group dropped out of treatment and the experimental group did not show such a problem.

## 5. Discussion

The aim of the present study was to evaluate the effects of group therapy with TA approach on EI, executive functions, and reducing drug dependency of addicts in Mashhad rehabilitation centers. This experimental intervention study aimed to assess the group therapy with TA approach

**Table 1.** Descriptive Statistics Indexes for Emotional Intelligence and Executive Functions for Both Groups in Pre-Test and Post-Test

Variable	Groups (n = 30)	
	Experiment (n = 15)	Control (n = 15)
<b>Emotional intelligence</b>		
Pre-test	3.2 ± 0.31	3.3 ± 0.30
Post-test	3.8 ± 0.36	3.4 ± 0.31
<b>Executive functions</b>		
Pre-test	55.05 ± 0.35	55.01 ± 0.34
Post-test	58.40 ± 0.38	55.03 ± 0.33

**Table 2.** Covariance Analysis for Emotional Intelligence and Executive Functions

Differences Sources and Variables	df	F	P Value	Coefficient Effect	Statistical Power
<b>Modified model</b>					
Emotional intelligence	2	42.48	< 0.001	0.77	1
Executive functions		12.31	< 0.001	0.49	1
<b>Pre-test</b>					
Emotional intelligence	1	55.96	< 0.001	0.60	1
Executive functions		28.34	< 0.001	0.43	1
<b>Group</b>					
Emotional intelligence	1	58.64	< 0.001	0.75	1
Executive functions		13.52	< 0.001	0.42	1
<b>Error</b>					
Emotional intelligence	14				
Executive functions					

in teaching addicts and evaluate how this method affects their EI, executive functions, and reduces their drug dependency. Further data analysis showed that teaching TA has significant effects on EI, and an executive function which is similar with Lavalekar et al.'s study (41) investigated the relationship between EI and marriage satisfaction (42); EI predictor of individual differences in social changes (43); the relationship between EI and resiliency tolerance (44); comparing EI in opiate addicts and non-addicts. The results of our study are not consistent with the results of Millet (45) study which reported the relationship between EI and job satisfaction in police officers (46) and relationship between managers' EI and following variables: age, educational level, organization position and roles (47), and also relationship between EI and drug abuse. Further data analysis showed that teaching TA has significant effects on components of executive functions in addicts. These results are consistent with results of Murphy et al. (48) about comorbidity executive function disorders in mood disorders

and bipolar (49). Executive functions of kids with ADHD and normal kids (50) in defects of EI and sustained attention. However, results are dissimilar with the results of Hashemi-Nosratabad et al. (51). Ahmadi-Dehghotbodinni study (52) reported defects in children with hyperactivity and problems with thought reorganization and evaluated the relation between dominance goals, functional goals of tendency avoidance, learning strategies and the ability to solve mathematical disparate problems. The results of the second hypothesis showed that TA has significant effects on reducing drug dependency in addicts, which is similar with Golestani results (53). Effectiveness of group therapy based on changing stages in preventing recurrence in male addicts of Kerman (54) buprenorphine opposite to morphine maintenance treatment (55, 56), relation between indicators of impulsivity and risky behaviors with intensity of craving in different opiate addicts. In conclusion, assessing the role of group therapy with TA approach on EI, executive functions and reducing drug dependency

is a new subject, which has not been fully studied yet. It is important to show the effect of group therapy with TA approach on EI, executive functions and reducing drug dependency, because in this case we can find the intermediate variable responsible for increasing EI, executive functions and reducing drug dependency. The result of our study showed that group psychotherapy with TA approach has significant effects on addicts and prevents addiction recurrence. However, considering our study limitation on follow-up time and the number of subjects, more studies should be done to show such effectiveness.

### Footnotes

**Authors' Contribution:** Bahram Ali Ghanbari Hashem Abadi conceived and designed the evaluation and analyzed the data. Masoomeh Forghani collected the clinical data and drafted the manuscript. Both authors interpreted the clinical data, revised the manuscript and approved the final edition.

**Declaration of Interest:** None declared.

### References

- Pourshahbaz A, Shamloo S, Jazayeri AR, Ghazi TM. Structural relations of psychological risk and protective factors of drug abuse in adolescents [in Persian]. *J Soc Welf*. 2006;**5**(19):31-54.
- Dabbaqi P. Comparing effectiveness of cognitive group therapy and relapse prevention in opiate addicts, [in Persian]. *Iran Clin Psychol Psychiatr J*. 2007;**13**(4):366-75.
- Amini K, Amini D, Afsharmoghaddam F, Azar M. A survey of Social and environmental factors associated with the return of narcotics addicts Referred to Addiction centers in the state Hamadan 2000, [in Persian]. *Sci J Zanjan Uni Med Sci*. 2003;**45**(11):41-7.
- Beck AT, Wright FD, Newman CF, Liese BS. Cognitive therapy of substance abuse. New York: Guilford Press; 2011.
- Besharat MA, Mirzamani M, Pourhossein R. The role of family variables in the development of substance abuse disorder, [in Persian]. *Iran J Psychiatr Clin Psychol*. 2002;**7**(3):46-52.
- Siegle L, Senna J. Juvenile delinquency. 6th ed. West Publishing Company; 1997.
- Salovey P, Mayer JD. Emotional intelligence. *Imagin Cogn Pers*. 1990;**9**(3):185-211.
- Gannon N, Ranzijn R. Does emotional intelligence predict unique variance in life satisfaction beyond IQ and personality?. *Pers Individ Dif*. 2005;**38**(6):1353-64.
- Sjoberg L. Emotional intelligence and life adjustment: A validation study. Sweden: Center for Economic Psychology Stockholm School of Economics; 2001.
- Kaschub M. Defining emotional intelligence in music education. *Arts Edu Pol Rev*. 2002;**103**(5):9-15.
- Boyatzis E. Developing emotional intelligence. San Francisco: Jossey-Bass; 2000.
- Mohammadi SD, Qaraei B. Assessment of Relationship between Behavioral Disorders and Emotional Intelligence, [in Persian]. *J Kerman Univ Med Sci*. 2007;**14**(4):289-99.
- Trinidad DR, Johnson CA. The association between emotional intelligence and early adolescent tobacco and alcohol use. *Pers Individ Dif*. 2002;**32**(1):95-105.
- Trinidad DR, Unger JB, Chou CP, Azen SP, Johnson CA. Emotional intelligence and smoking risk factors in adolescents: Interactions on smoking intentions. *J Adol Health*. 2004;**34**(1):46-55.
- Riley H, Schutte NS. Low emotional intelligence as a predictor of substance-use problems. *J Drug Educ*. 2003;**33**(4):391-8. [PubMed: 15237864].
- Brackett MA, Mayer JD, Warner RM. Emotional intelligence and its relation to everyday behaviour. *Pers Individ Dif*. 2004;**36**(6):1387-402.
- Wells A, Matthews G. Attention and Emotion: A clinical perspective. Hove Erlbum; 1994.
- Wells A, Purdon C. Metacognition and cognitive behaviour therapy: a special issue. *Clin Psychol Psychother*. 1999;**6**(2):71-2.
- Wells A. Emotional disorders and metacognition: Innovative cognitive therapy. United kingdom: Wiley; 2000.
- Berne E. Transactional Analysis: Ballantine Books, [Translated by Fasih, E.]. Tehran, Iran: Fakhteh; 1994.
- Thombs DL, Osborn CJ. Introduction to addictive behaviors. Guilford Press; 2013.
- Bar-On R. The Emotional Quotient Inventory (EQ-i): A test of emotional intelligence. Toronto: Multi-Health Systems, Inc.; 1997.
- Samoe R. Emotional Intelligence Test of Bar-On. Tehran: Sina Behavioral Sciences Research Institute; 2005.
- Beck AT, Steer RA, Brown GK. Beck depression inventory-II. San Antonio: Psychological Corporation; 1996.
- Endler NS, Parker J. Coping inventory for stressful situations (CISS): Manual. 2nd ed. Toronto: Multi-Health systems Incorporated; 1990.
- Eysenck HJ, Eysenck SBG. Manual of the Eysenck Personality Questionnaire (junior and adult). London: Hodder and Stoughton; 1975.
- Mayer SC, Salovey P, Caruso DR. MSCEIT: Mayer-Salovey-Caruso Emotional Intelligence Test. Toronto, Canada: Multi-Health Systems; 2002.
- Butcher JN, Dahlstrom WG, Graham JR, Tellegen A, Kaemmer B. The Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration and scoring. Minneapolis: University of Minnesota Press; 1989.
- Costa PT, McCrae RR. Revised NEO personality inventory NEO PI-R and the NEO five-factor inventory NEO-FFI professional manual. Odessa FL: Psychol Ass Resour; 2008.
- Cattell HEP, Mead AD. In: The SAGE Handbook of Personality Theory and Assessment: Personality Measurement and Testing. Boyle GJ, Matthews G, Saklofske DH, editors. 2. Los Angeles: Sage Knowledge; 2008. pp. 135-78. The sixteen personality factor questionnaire (16PF).
- Alexander RD. The evolution of social behavior. *Ann Rev Ecol Syst*. 1974;**5**:325-83.
- Kim K, Kim J, Won H. Symptom Check List-90 (SCL90). Seoul: Chung Ang Aptitude Publishing; 1984.
- Bar-On RE, Parker JDA. The handbook of emotional intelligence: Theory, development, assessment, and application at home, school, and in the workplace. San Francisco: John Wiley and Sons; 2000.
- Stroop JR. Studies of interference in serial verbal reactions. *J Exp Psychol*. 1935;**18**(6):643.
- Siegrist M. Effects of taboo words on color-naming performance on a Stroop test. *Percept Mot Skills*. 1995;**81**(3f):1119-22.
- Fadardi JS. Cognitive-motivational determinants of attentional bias for alcohol-related stimuli. Bangor: Wales University, College of psychology; 2003.
- Siegrist M. Test-retest reliability of different versions of the Stroop test. *J Psychol*. 1997;**131**(3):299-306.
- Kohli A, Kaur M. Wisconsin card sorting test: Normative data and experience. *Indian J Psychiatr*. 2006;**48**(3):181.
- Sharma D, McKenna FP. The role of time pressure on the emotional Stroop task. *British J Psychol*. 2001;**92**(3):471-81.
- Thorndike RL. Applied psychometrics. Houghton Mifflin; 1982.
- Lavalekar A, Kulkarni P, Jagtap P. Emotional intelligence and marital satisfaction. *J Psychosoc Res*. 2010;**5**(2):185.

42. Grewal D, Salovey P. Inteligencia emocional, [in Spanish]. *Mente y cerebro*. 2006;**16**:10-20.
43. Javadi R PD. relationship of Emotional intelligence and resiliency in Students of University of Welfare and Rehabilitation Sciences. *Etiyad-pazhohi*. 2009;**8**(2):69-81.
44. Bazzazian S, Besharat MA. Comparison of emotional intelligence, mental and physical health In different occupations. *J Applied Psychol*. 2009;**1**(9):7-26.
45. Millet T. An examination of trait emotional intelligence factors: Their relationship to job satisfaction among police officers. Minnesota: Pro-Quest; 2007.
46. Bohrer VC. A study of the relationships between leader emotional intelligence (EI) ability and demographic, performance, job satisfaction measures, and MBTI type in the United States (US) intelligence community. Missouri: Webster University; 2007.
47. Manshaee GH, Mazaheri MM. The relationship between emotional intelligence and Substance abuse: Explained patterns of opiate and nonopiate abused drugs, [in Persian]. *Andisheh Va Raftar*. 2010;**4**:71-85.
48. Murphy JM, Horton NJ, Monson RR, Laird NM, Sobol AM, Leighton AH. Cigarette smoking in relation to depression: historical trends from the Stirling County Study. *Am J Psychiatry*. 2003;**160**(9):1663-9. doi: [10.1176/appi.ajp.160.9.1663](https://doi.org/10.1176/appi.ajp.160.9.1663). [PubMed: [12944343](https://pubmed.ncbi.nlm.nih.gov/12944343/)].
49. Tehrani-Doost M, Goodarzi-Rad R, Sepasi M, Alaghband-Rad J. Executive Dysfunction in Children and adolescents with Attention Deficit Hyperactivity Disorder (ADHD). *Iran J Psychiatr*. 2007;**2**:25-7.
50. Aliloo MM, Hamidi S, Shirvani A. Comparison of executive function and sustained attention in students with obsessive-compulsive, high schizotypal and overlapping symptoms with the normal group. *J Res Behav Sci*. 2011;**19**(3):216-21.
51. Hashemi-Nosratabad T, Mahmood-Aliloo M, Gholam-Rostami HA, Nemati-Sogolitappeh F. Comparison of Reconstitution of Thought Executive Function in Subtypes of Attention-Deficit/Hyperactivity Disorder Based on Barkley, s Model. *J Clin Psychol*. 2010;**2**(1):35-9.
52. Ahmadi DehGhotbodinni M. Relationships among mastery goals, performance goals tend to avoid, learning strategies and students' ability to solve mathematical problems [in Persian]. *Studies Edu Psychol*. 2008;**3**(10):21-40.
53. Golestani F. Effectiveness of Group Therapy Based on Stages of change in Relapse prevention in Male drug addicts in City of Kerman, [in Persian]. *Etiyadpazhohi*. 2008;**8**:83-104.
54. Mattick RP, Ali R, White JM, O'Brien S, Wolk S, Danz C. Buprenorphine versus methadone maintenance therapy: a randomized double-blind trial with 405 opioid-dependent patients. *Addiction*. 2003;**98**(4):441-52. [PubMed: [12653814](https://pubmed.ncbi.nlm.nih.gov/12653814/)].
55. Ekhtiari H, Mokri A, Daneshmand R, Ganjgahi H. High Frequency Repeated Transcranial Magnetic Stimulation (rTMS) on Dorso Lateral Prefrontal Cortex (DLPFC) for Modulation of Methamphetamine Craving. *J Addic*. 2009(9):32-4.
56. Mokri A, Ekhtiari H, Edalati H, Ganjgahi H, Naderi P. Relationship between craving intensity and risky behaviors and impulsivity factors in different groups of opiate addicts. *Iran J Psychiatry Clin Psychol*. 2008;**14**(3):258-68.