Abstract
Objective: The purpose of this study was to determine the role of mindfulness, distress tolerance, and emotional memory in predicting addiction relapse and adherence to treatment in substance abusers. Method: This research is a correlation study. The research population included all the patients referring to substance abuse treatment centers in the first half of 2014. The number of 197 substance abusers in addiction treatment centers of Ardabil was selected through convenience sampling method. General Adherence Scale, Relapse Prediction Scale, Freiburg Mindfulness Inventory, Distress Tolerance Scale, and Emotional Memory Test were used for data collection. Results: The results of Pearson correlation indicated that addiction relapse and adherence to treatment have a significant relationship with mindfulness, distress tolerance, and emotional memory. The results of multiple regression analysis showed that 35.8 percent of relapse prediction variance can be explained by mindfulness, distress tolerance, and emotional memory in substance abusers. Similarly, the results showed that 33.5 percent of adherence to treatment variance can be explained by mindfulness, distress tolerance, and emotional memory in substance abusers. Conclusion: These results show that the mindfulness, distress tolerance, and emotional memory are suitable predictors of relapse and adherence to treatment in substance abusers. Keywords: mindfulness, distress tolerance, emotional memory, relapse, adherence to treatment

The Role of Mindfulness, Distress Tolerance and Emotional Memory in Predicting Addiction Relapse and Adherence to Treatment in Substance Abusers

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Introduction

Substance abuse is one of the biggest problems in human societies that not only causes social and behavioral disorders, but also imposes great financial loss on individuals, families and society by affecting various aspects of physical and mental health (Reed, Amaro, Matsumoto, & Kaysen, 2009). The high prevalence of drug abuse with more than 1.8 million people in Iran defines the importance of considering this problem (Abdullah Zadeh and Hashemi, Moradi and Farzad, 2010). One of the most important aspects of addiction, identified during preventive efforts, is the return to drug use after a period of discontinuation of use. Understanding the phenomenon of return and preventing it is the biggest challenge encountered by drug addicts (Skinner, & Aubin, 2010). Addicts visit rehabilitation centers more than 2 to 3 times, indicating that the rate of return of addiction is dramatically high (Hojjati, Alostayi, Akhondzadeh, Heydari, and Sharif-Nia, 2010). In general, between 20% and 90% of addicts under treatment return to addiction (Roozen et al., 2006). Impulsive selection predicts short-term return in drug-dependent individuals (Stevens et al., 2015). For this reason, addiction has been introduced as an acute reversible problem (Van den Brink, & Haasen, 2006).

Another major problem in the optimal control of addiction is the lack of adherence of addicts to therapy recommendations. The adherence to the therapeutic recommendations is a subject that has long been raised in the relationship between patients and clinical professionals, and lack of adherence has always been an important and multifaceted problem in the health field (Erien, 2002). Among drug abusers in the United States, there is a significant difference between the number of people who have access to substance abuse treatment and the number of individuals who need treatment. Research has shown that increasing personal planning skills and reducing impulsivity of abusers when they are treated is a key strategy for their access to treatment in the future (Fisher et al., 2017). For demographic reasons, clinical properties and poor motivation, drug abusers don’t adhere to therapy or stop it (Nosyk et al., 2010). The intrinsic motivation has a significant relationship with the constructive treatment of substance abusers (Philips, & Wennberg, 2014). Also, the discontinuation of treatment and re-use of the substance is associated with more negative consequences such as the likelihood of higher drugs use, more severe drug dependence, the use of different substances, increased criminal behavior and the imposition of additional costs on health care networks (Veilleux, Colvin, Anderson, York, & Heinz, 2010).

One of the variables that can be involved in drug abuse is mindfulness. Mindfulness is a technique that by combining with meditation and specific mental orientations to an experience, knowing about the present time in a non-biased way, can play a role in addiction and its treatment (Potek, 2012). Temptation is the strongest predictor of return among other predictors (even co-
occurrence with some disorders such as anxiety and depression), and mindfulness can well reduce the negative effects of temptation. The greater the intensity of the mindfulness associated with spirituality, the lower the use of alcohol, tobacco and narcotics (Leigh, Bowen, & Marlatt, 2005). Research suggests that mindfulness is a useful incremental strategy in reducing the likelihood of relapse (Breslin, Zack, & McMain, 2002). Mindfulness by emphasizing on acceptance rather than suppression of thoughts (Bowen, Witkiewitz, Dillworth, & Marlatt, 2007) and the break-up of the stress-relapse chain in drug use (Garland, Gaylord, Boettiger, & Howard, 2010) increases the recovery rate. In a study, Witkiewitz, Bowen, Douglas, & Hsu (2013) found that preventing mindfulness-based return plays a role in reducing craving. In another study by Elwafi, Witkiewitz, Mallik, Thornhill, & Brewer (2013), it was found that mindfulness exercises reduced the relationship between craving and smoking during treatment. Also, the descriptive findings report a negative relationship between mindfulness and substance use disorders, as this result is consistent with the findings of meta-analysis of 39 studies on mindfulness and drug abuse behaviors regarding the correlation -0.57 to -0.21. (Karyadi, VanderVeen & Cyders, 2014). Mindfulness has an inverse relationship with addictive behaviors (Karyadi, VanderVeen, & Cyders, 2014). Levin, Dalrymple, & Zimmerman (2014) showed that lower levels of mindfulness negatively predict the existence of a substance abuse disorder. In Li, Howard, Garland, McGovern, & Lazar (2017), it was shown that mindfulness therapy is effective in increasing the smoking abstinence after treatment, and intervention is optimistic for drug abusers.

Possibly one of the other variables that can predict return and adherence to treatment among substance abusers is distress tolerance. Distress tolerance is referred to how people respond to negative emotions including additional information beyond the individual's awareness of the amount of negative emotion experienced. This behavior is an emotional response that is defined as a person's ability to withstand unpleasant inner states. Research has shown that distress intolerance plays an important role in the growth and continuation of drug use (Leyro, Zvolensky, & Bernstein, 2010). Individuals with high distress tolerance are able to withstand negative psychosocial states, while individuals with low distress tolerance to relieve intrusive experiences, tend to compensative behaviors (Simons, & Gaider, 2005). Researches show that high levels of distress intolerance are associated with high levels of drugs use (Brandon et al., 2003), the increasing risk of suffering and developing drug use disorders (Vujanovic, Bernstein, & Litz2011) and the increased risk of drug relapse (Duckers et al., 2005). Negative urgency and distress tolerance predict substance abuse among university students (Kaiser, Milich, Lynam, & Charnigo, 2012). Researches have shown that emotional sensitivity and distress tolerance are associated with fear, anxiety, and drug and alcohol abuse disorders (Allan, Macatee, Norr, Raines, & Schmidt, 2015). A research by Shorey et al. (2016) showed that
among men treated with substance abuse, distress tolerance is negatively associated with physical and psychological violence towards intimate partner and drug use therapeutical programs aimed at distress tolerance reduce drug use and committing violence. Studies also show that low distress tolerance is associated with high levels of cocaine seeking and impulsive behaviors (Moschak, Terry, Daughters, & Carelli, 2017).

Emotional memory is another variable that can play a role in substance abuse. Emotional memory is a dynamic and adaptive system by which we store the emotional information and recall for use at the present time (Hamann, 2001). Memory is one of the most important cognitive areas associated with daily performance. Many evidence suggests that drugs, and in particular psychedelics, can increase cognitive performance. These effects may include activities in perception, attention, stimulation and motivation, as well as in learning and memory. Drug abuse may change the positive and negative memory (Marco, Weiss, Gold, Kane, 1993; quoted by Shah Mohammadzadeh, 2014). Addiction is a learning and memory disease (Hyman, 2005). The amygdala seems to play the most important role in the interaction between emotion and memory. Neuronal and hormonal mechanisms that are adjusted by amygdala, increase the memory in emotional stimulus, especially during the consolidation after the emotional event (Mather, 2004). Substance abuse destroys the nervous processes involved in memory and learning. For example, the use of cocaine and heroin can affect memory consolidation by affecting the lateral amygdala (Luo, Xue, Shen, & Lu, 2013). Amygdala has a key role to play in returning to drugs, and drugs especially psychedelics, can increase cognitive function and influence perception, attention, arousal, motivation, as well as learning and memory (Koob, 2009). An amygdala disorder can lead to changes in emotional processing, learning and memory disorders associated with various neurological disorders including addiction and madness (Tan, Ahmad, Loureiro, Zunder, & Laviolette, 2014). Hashish abuse is associated with better emotional memory in schizophrenic patients (Bourque et al., 2013). Cognitive flexibility, attention bias and emotional memory of substance abusers are less than smokers and normal individuals (Shah Mohammadzadeh, 2014). By considering the high prevalence of drug use in Iran and few studies on the factors influencing the return and failure to adhere to the treatment, and the negative effects of this issue on an individual, society and family, the importance of identifying the effective factors in this field is obvious. A recovered person who returns to substance abuse again feels guilty, frustration, embarrassment and anger. Therefore, the purpose of this study was to determine the role of mindfulness, distress tolerance, and emotional memory in predicting addiction relapse and adherence to treatment in substance abusers.
Method

Statistical population, sample and sampling method
The present study is a descriptive–correlation design. The research population included all the patients referring to substance abuse treatment centers in the first half of 2014. Of the addicts referring to the five drug treatment centers in Ardebil (State Drug Treatment Centers, Dr. Alavi, Dr. Shirdel, Parastoo and Mani), 200 individuals were selected via convenience sampling method. Considering the fact that 3 persons had not completed the questionnaires, they were excluded and the sample size reached 197. The mean and standard deviation of the sample age were 28.68 ± 7.59 years.

Instrument
1- General Adherence Scale: This scale was designed by Hayes (1994). Each person can respond to this scale in 2 to 3 minutes. This scale measures the patient's willingness to adhere to doctor's recommendations in general, and has 5 items scored on a 6-point Likert scale (always, most often, at times, sometimes, in a few cases, and no Time). Questions 1 and 3 are scored inversely. The internal consistency coefficient of this scale is 0.81. The reliability coefficient was reported in the Hayes et al. studies, based on test re-test with a 2-year interval of 0.6. In the study of Zahednezhad, Poursarifi and Babapour (2012), this scale was performed on 115 patients and its Cronbach's alpha coefficient was 0.68. In this study, the reliability of this scale was calculated by Cronbach's alpha of 0.75.

2- Relapse Prediction Scale: This scale is a 45-item instrument developed by Wright, Beck, Newman, and Lice (2001) to measure the temptation and probability of drug use in addicts. Questions are responded as four points. Using Cronbach's alpha, internal consistency has been reported for a temptation rate of 0.44 and a probability of use of 0.78 (Firoozabadi, 2008). In a research, the Cronbach's alpha for use is 0.81 and 0.78, for use probability, which indicates a good reliability for this scale (Kafi, Esfanjani, Nuri and Salehi, 2011). Experts consider this scale with content validity (Beck, Wright, Newman, Reese, 2001). In this study, the reliability of this scale was 0.83 by Cronbach's alpha.

3- Emotional Memory Test: Emotional memory test was designed to measure emotional memory (Chail and McQue, 1995). This test is run individually and includes 11 slideshows in three stages. The first stage consists of 4 slides that are non-emotional, the second stage consists of 4 slideshows, emotions and the third stage is the final stage, including 3 neutral slides. Before the test is completed, participants are given information on this test. The reliability coefficient of this test by test re-test method for one-week for the emotional phase is 0.83 (Dolan and Fulam, 2009). The correlation coefficient of this test with the verbal test of emotional memory was obtained in the elderly women (50-70 years old) as 0.71 (Cahill, Babinsky, Markowitsch,& McGaugh, 2001). In this study, Cronbach's alpha coefficient was 0.82.
4-Distress Tolerance Scale: The distress tolerance scale designed by Simmons and Gaher (2005) is a 15-item self-reporting instrument. The scoring is based on a five-point Likert scale. The items of this scale are measured based on the individual's ability for emotional distress tolerance, subjective mental distress, attention to negative emotions in case of occurrence, and regulating actions to relieve distress. The items for this scale are graded based on a five-point Likert scale. Score 1 means a complete agreement with the option and score five means a complete disagreement with the desired option. This scale is positively correlated with the mood acceptance, and has negative relationship with coping strategies for the use of alcohol and marijuana, as well as their use for improvement. Also, intra-class correlation after 6 months is reported to be 0.61. Based on the data obtained from the present study, the Cronbach’s alpha was estimated 0.67. The coefficient of reliability was 0.81 for the whole scale and 0.81 for tolerance, absorption, evaluation and regulation 0.71, 0.69, 0.77 and 0.73 respectively. The correlation of distress tolerance scale with problem-oriented, emotion-oriented methods is less effective and ineffective as 0.213, -0.278, -0.337, -0.196, respectively. Also, there was a correlation between distress tolerance and positive emotion, negative emotion and smoking dependence, respectively (0.543, 0.224 and -0.653) (Azizi and Mirzaie and Shams, 2010). In this research, the reliability of this questionnaire by Cronbach’s alpha was 0.85.

5- Freiburg Mindfulness Inventory: This questionnaire was developed by Buchheld, Grossman, & Walach (2006) and contains 14 questions. The individual was asked to answer questions on a four-point Likert scale of (rarely = 1, almost always = 4). It should be noted that the phrase 13 is scored inversely. The minimum score in this questionnaire is 14 and a maximum of 56. A higher score indicates a sign of higher mindfulness (Buchheld et al., 2006). The reliability coefficient of the whole scale of the mindfulness scale is reported to be 0.83%. Also, between the mindfulness scale, self-control scale and the emotional regulation 0.69 and 0.68 respectively are obtained (Ghasemi Jubaneh, Arabzadeh, Jalili Nikoo, Mohammad Ali Pour and Mohsenzadeh, 2015). In a research conducted by Aryapouran in the Iranian population, the validity of the short form of the questionnaire was obtained using Cronbach's alpha coefficient of 0.81 and the reliability coefficient of test re-test was reported 0.56 after two months (Aryapouran, 2012). In the study of Sauer, Walach, Offenbacher, Lynch, & Kohls (2011), the test re-test coefficient of this questionnaire was 0.88. Also, in a study conducted in France on a non-clinical sample, the results showed that the internal consistency was 0.74 (Trousselard, 2010).

Procedure
In the present study, in order to investigate the research variables, at first, the list of five drug abuse centers in Ardebil was prepared. Then, after coordination, they visited the therapy centers and 200 persons were selected using convenient
sampling method. After giving a brief description of the purpose of the research and attracting the trust of individuals about their confidentiality, they were asked to carefully read the questions and, as far as possible, answer all the question. First, an emotional memory test was performed individually, then other questionnaires were provided to them. The collected data (197) entered SPSS software.

**Results**
The results showed that of 197 people, 53 (26.9%) were single, 140 (71.1) married and 4 (2%) were divorced. 117 (59.4%) had 1 to 3 times the history of quit, 41 (20.8%), 4 to 6 times, 26 (13.2%) more than 6 times and 13 (6.6%) lack of drug abuse history. 7 (3.6%) had less than one year of use, 21 (10.7%), 2 to 4 years, 17 (8.6%), 5 to 7 years, and 152 (77.2%) more than 7 years of drug use. Descriptive statistics and correlation matrix of the studied variables are presented in Table 1.

**Table 1: Descriptive Statistics and Correlation Matrix of Research Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Mindfulness</th>
<th>Distress tolerance</th>
<th>Emotional Memory</th>
<th>Relapse</th>
<th>Adherence to treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mindfulness</td>
<td>31/64</td>
<td>7/25</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Distress tolerance</td>
<td>41/15</td>
<td>8/64</td>
<td>-0/12</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Emotional memory</td>
<td>25/20</td>
<td>5/33</td>
<td>-0/12</td>
<td>0/36**</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Relapse</td>
<td>81/55</td>
<td>28/96</td>
<td>-0/52**</td>
<td>0/25**</td>
<td>0/20**</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Adherence to treatment</td>
<td>14/62</td>
<td>5/04</td>
<td>0/33**</td>
<td>0/32**</td>
<td>-0/28**</td>
<td>0/05</td>
<td>1</td>
</tr>
</tbody>
</table>

**p<0.01**

The results of Table 1 show that there is a negative relationship between relapse with mindfulness (r = -0.52) and distress tolerance (r = -0.25), but it has positive relationship with emotional memory (r = 0.20) (p<0.01). Adherence to treatment has a positive relationship with mindfulness (r = 0.33) and distress tolerance (r = 0.32), but there is a negative relationship with emotional memory (r = -0.28) (P <0.01).

As Durbin-Watson statistics is 1.74 and is more than 1.5, and less than 2.5, the errors are independent of each other. Therefore, the assumption of independence between errors is established. Given the fact that multiple colinearity statistics is less than 10 for integrity sense and tolerance value is greater than 0.2, there is no multiple colinearity, and this assumption is established.
Table 2: Results of Regression Analysis to Predict Relapse based on Mindfulness, Distress Tolerance, and Emotional Memory

<table>
<thead>
<tr>
<th>Predictive</th>
<th>$R^2$</th>
<th>$B$</th>
<th>SD</th>
<th>$\beta$</th>
<th>$T$ statistics</th>
<th>Significance</th>
<th>Tolerance</th>
<th>Variance inflation factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-</td>
<td>114/44</td>
<td>12/41</td>
<td>-</td>
<td>9/221</td>
<td>0/001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>0/284</td>
<td>-1/94</td>
<td>0/242</td>
<td>-0/48</td>
<td>-8/01</td>
<td>0/001</td>
<td>0/543</td>
<td>2/25</td>
</tr>
<tr>
<td>Distress tolerance</td>
<td>0/305</td>
<td>-0/53</td>
<td>0/216</td>
<td>-0/16</td>
<td>-2/456</td>
<td>0/015</td>
<td>0/596</td>
<td>2/16</td>
</tr>
<tr>
<td>Emotional memory</td>
<td>0/358</td>
<td>2/15</td>
<td>1/68</td>
<td>0/08</td>
<td>1/277</td>
<td>0/203</td>
<td>0/611</td>
<td>1/98</td>
</tr>
</tbody>
</table>

As shown in Table 2, 35.8% of relapse variance are predicted via mindfulness, distress tolerance, and emotional memory ($P < 0.05$). Also, beta coefficients indicate that the mindfulness ($\beta = -0.48$) and distress tolerance ($\beta = -0.16$) can explain the changes in relapse.

Given that the value of the Durbin-Watson value is 2.10, and is more than 1.5 and less than 2.5, the errors are independent of each other. Given the fact that multiple colinearity statistics is less than 10 for integrity sense and tolerance value of greater than 0.2, there is no multiple colinearity, and this assumption is established.

Table 3: Multiple Regression Analysis Results to Predict Therapy Adherence based on Mindfulness, Distress Tolerance and Emotional Memory

<table>
<thead>
<tr>
<th>Predictive</th>
<th>$R^2$</th>
<th>$B$</th>
<th>SD</th>
<th>$\beta$</th>
<th>$T$ statistics</th>
<th>Significance</th>
<th>Tolerance</th>
<th>Variance inflation factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-</td>
<td>16/02</td>
<td>2/30</td>
<td>-</td>
<td>6/968</td>
<td>0/001</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>0/169</td>
<td>0/20</td>
<td>0/045</td>
<td>0/29</td>
<td>4/428</td>
<td>0/001</td>
<td>0/428</td>
<td>3/34</td>
</tr>
<tr>
<td>Distress tolerance</td>
<td>0/213</td>
<td>0/13</td>
<td>0/040</td>
<td>0/23</td>
<td>3/281</td>
<td>0/001</td>
<td>0/394</td>
<td>3/78</td>
</tr>
<tr>
<td>Emotional memory</td>
<td>0/335</td>
<td>-0/74</td>
<td>0/312</td>
<td>-0/16</td>
<td>-2/385</td>
<td>0/018</td>
<td>0/457</td>
<td>4/01</td>
</tr>
</tbody>
</table>

As shown in Table 3, 33.5% of the variance of adherence to therapy are predicted through mindfulness, distress tolerance and emotional memory ($P < 0.01$). Also, beta coefficients indicate that the mindfulness ($\beta = 0.29$), distress tolerance ($\beta = 0.23$) and emotional memory ($\beta = -0.16$) can explain the changes in adherence to treatment.

**Discussion and Conclusion**

Addiction has a close relationship with physical and mental harm. Considering the importance of this issue, the present study aimed to determine the role of mindfulness, distress tolerance, and emotional memory in predicting addiction relapse and adherence to treatment in substance abusers. The results of this study showed that there is a negative relationship between the mindfulness and drug relapse and has positive relationship with therapy adherence. In other words,
with a high level of mindfulness in substance abusers, the drug relapse is reduced and the therapy adherence is increased. The findings are consistent with the results of the research of Breslin et al. (2002), Suti (2005) and Witky Whits et al. (2013), that the high level of mindfulness prevents drug re-use and are also consistent with the results of Leigh, Bowen, & Marlatt (2005) and Uhlig (2009) on the effective role of the mindfulness in the prevention and treatment of substance abuse disorder, and is consistent with the results of Karyadi et al., (2014), regarding the reverse relationship between mindfulness and addictive behaviors. Increasing evidence suggests the usefulness of the mindfulness in cases such as the reduction of addictive behaviors (Garland, Schwarz, Kelly, Whitt and Howard, 2012), the improvement of behavioral abnormalities such as aggression and substance abuse (Wamperman et al., 2012), impulsivity reduction (Murphy & McKillop 2012). Based on studies, mindfulness is effective on depression and addiction at least via two ways of rumination and reducing the automatic emotional responsiveness (Paul, Stanton, Greeson, Smoski, & Wang, 2013). In explaining these findings, it can be said that mindfulness can increase the coping ability of the patient to cope with the temptation and the withdrawal symptoms. This creates motivation, increases social support and learning coping skills in dealing with drug-related problems. Also, mindfulness as one of the main methods of acceptance strategies brings about a situation, then instead of challenging and avoiding the annoying thoughts and emotions of the withdrawal or drugs use to relieve them, by establishing a different, unresponsive communication style, and a new way of information processing, accepts his thoughts and feelings without Judging and evaluation and cope up with them easily. Part of these changes can be due to the proposed mechanisms in mindfulness such as confrontation, acceptance, relaxation, de-sensitization, changing relation with thoughts and emotion regulation (Breslin et al., 2002). Therefore, mindfulness besides reducing post-withdrawal outcomes, increases the efficacy of treatment and helps the prevention of substance use relapse (Breslin et al., 2002). Also, mindfulness is associated with attention control and emotion regulation, and thus can be effective in controlling this disorder by increasing control over the visual clues of drug use (Garland et al., 2012). If the prevention method teaching is combined with mindfulness, it can have a successful effect on the judgment and hate of injecting drug users (Thaler, Lee Booth and Carteres, 2010), reduce the negative effects of temptation, and in combination with spirituality affect the drugs abuse (Leigh, Bowen, & Marlatt, 2005), reduce relapse probability (Breslin, Zack, and McMinn, 2002), and sleep condition (inadequate and low quality sleep is one of the most important factors in increasing the likelihood of relapse) (Britton et al., 2010). In mindedness teaching, instead of suppressing thoughts (Bowen, Witkiewitz, Dillworth, & Marlatt., 2007) and breaking the stress chain, recovery rates can be increased (Garland, with Tiger, Gaillard, Matthew and Howard, 2010), overcome the
temptation of use (Garland, 2011; Fernandez, Wood, Stein, & Rossi, 2010), reduce stress (Brauer et al., 2009; Long, 2011) and with increased control on the visual clues of drug use can be effective in treating this disparity (Garland, Battiger, Gaillard, Matthew and Howard, 2012). Mindfulness, due to its hidden mechanisms, such as acceptance, increase awareness, de-sensitization, presence at the moment, observation without bias, confrontation and release besides reducing the withdrawal symptoms, increases the effectiveness of treatment and helps the prevention of drug use relapse (Marlatt, Bowen, Chawla, & Witkiewitz, 2008). Therefore, mindfulness provides the necessary training to prevent relapse. By establishing relative adaptation in mindfulness, it can be successfully applied in the initial stages of treatment to prevent relapse, and it has been encountered with satisfaction and acceptance of the clients regarding this treatment (Valjeo and Amu, 2009).

Another finding of the present study is that distress tolerance is negatively correlated with relapse and is positively correlated with adherence to treatment. This finding is consistent with the results of Brandon et al. (2003) that the distress intolerance is associated with drug use and the results of Dutters et al. (2005) that low distress tolerance is associated with the risk of drug relapse, with the results of Kaiser et al., 2012 (2012) that negative urgency and distress tolerance significantly predict substance abuse among college students, and with the results of Mishchak et al. (2017) regarding the relationship between distress tolerance and high levels of cocaine seeking and impulsive behaviors. In explaining these findings, it can be said that, according to Khantzian (1997), since drug users describe negative emotions and restlessness as intolerable and as they can not manage these emotional states without relying on drugs use physiological and psychological properties of drug use to achieve emotional stability. According to this hypothesis, drug addiction is a tool for regulating stressful emotions. This theory is based on the assumption that many people are addicted due to low distress tolerance in emotional regulation (Sohe, Ruffins and Robbins, 2008; quoted by Azizi, Mirzaie, Shams, 2010). Therefore, in drug-dependent individuals with low distress tolerance, in case of experiencing severe stress; drugs relapse and non-adherence to therapeutic programs is a way to regulate one’s emotion and get rid of signs of physical and emotional pain. According to Simmons and Gauger (2005), people with low distress tolerance can not tolerate feelings of discomfort and feel that others have better opportunities to deal with negative emotions; therefore, due to their inability to tolerate negative emotions, they feel disgrace. Based on the lack of perceived coping abilities and also the inability to manage annoying emotional states, these people hardly struggle to avoid the experience of negative emotions through inappropriate methods. If this unhealthy solution is not beneficial, it's likely that their entire energy will focus on their emotions, which will ultimately disrupt their function (Simmons and Gauger, 2005). The results of this study are partly consistent with the implicit meaning of Braun et al., research. In a study by Braun
et al. (2002), it was found that the higher the distress tolerance of individuals, the more tolerant they are to tolerate emotions without the need to more drugs use.

Other findings from this study showed that emotional memory was associated with relapse and therapy adherence. The finding is consistent with the results of research by Leo et al. (2013) suggesting that substance abuse affects the amygdala and memory regions and are consistent with the results of Coob (2009) that amygdala plays a key role in relapse and the results of Shah Mohammadzadeh (2014), cognitive flexibility, attention bias, and emotional memory of individuals with substance abuse are less than smokers and normal. The unusual memory, learning and emotions processing are the main attributes of many neurological problems such as addiction. Disturbance in the ability to form proper memory and to perform adaptive learning tasks has been identified as a psychosocial feature of addiction (Deserno et al., 2013). It also seems that a part of the reasons of addiction relapse the withdrawal inability, which can be attributed to the lack of adherence of the addict to the doctor and treatment process that occurs due to memory impairment. Evidence on addiction and memory shows that most previous studies have examined the effect of addiction on overall performance (Kuyken & Howell, 2000). Research suggests that neuronal defects from drug use affect the nervous system involved in motivation, emotion, learning, memory, and executive functions (Verdejo-Garcia, & Bechara, 2009). In explaining these findings, it can be said that the use of addictive drugs can disturb neuropsychological functions such as memory, the speed of information processing and attention. Research has also shown that drug withdrawal can improve memory more than other cognitive functions (Rosenbloom et al., 2007). Generally, studies refer to the fact that substance use affects processing, judgment and emotional memory. As a result, this change plays a role in relapse and adherence to therapy of drug abusers.

According to Mackinger et al. (2004), depressed substance abusers have problems in memory retrieval of their condition and they have trouble remembering their own special memories. Tronson & Taylor (2013) have shown that opium and morphine users have memory impairments. According to Latvala (2011), individuals with substance dependence and people with relapse, unlike recovered individuals, can not ignore drug-related symptoms. This leads to an increase in concentration on drug-based stimuli and increases the temptation to use drugs. On the other hand, drug dependence is a kind of motivational disorder created due to the blockage of memory-related and learning neural circuits. In fact, brain imaging studies on drug users have shown that the patterns of brain activity and white matter quality associated with attention and memory are different in these individuals than in normal people. Therefore, memory and recall are one of the factors influencing the model of adherence to therapy in patients in which, memory and perception of the patient
as two basic factors influencing indirectly satisfaction of treatment and directly adherence. On the other hand, the better the memory and the lower the error of memory, the higher the adherence to therapy (Thorson & Taylor, 2013).

In fact, the first and most important barrier to adherence to treatment is problems of cognition and cognitive function such as memory error, so it seems that part of the causes of relapse or the inability to withdraw can be related to the lack of addict’s non-adherence to the physician and treatment process that occurs due to memory impairment. In fact, defects in working memory and inhibition processes can quickly endanger the ability of drug abusers to control and quit addictive behaviors, and predict relapse in them after two months. Also, the results of the study showed that 35.8% of the variance of relapse to drugs 33.5% of the variance of therapy adherence was explained through mindfulness, distress tolerance and emotional memory and 64.2% and 66.5%, respectively of variance and residuals are explained by other effective variables on relapse and therapy adherence (e.g. cognitive and motivational factors).

The results of this study have important clinical implications. As can be seen, the role of these variables is almost considerable and should be considered in future researches. The present study was confronted with some limitations. One of these limitations is the nature of the research project. The design of the present study was a correlation type that through this design, there is no general conclusion and the relationship between the variables is also investigated non-causal. Also, considering that the research was carried out only on substance abusers in Ardebil city, it is not possible to generalize the findings to other populations. On the other hand, this research can be the basis for future research in relation to the studied variables.

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