Original Article

Psychological Determinants of Drug Abuse among Male Adolescents in Isfahan: A Structural Model

Mehdi Nosratabadi, Zohreh Halvaiepour[1]

Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran, [1]Department of Education and Psychology, University of Isfahan, Isfahan, Iran

Abstract

Background: Drug abuse is one of the most prevalent public health problems around the world and Iran too. Drug abuse is influenced by various psychosocial factors. This study aimed to explain the relationship model of drug abuse based on perceived criticism, mindfulness, and emotion regulation in Isfahan male adolescents. **Methods:** This was a correlational cross-sectional study. A total of 350 male students were randomly selected from different high schools in Isfahan during the period of 2015–2016 academic year. Four questionnaires including the probability of drug abuse questionnaire, emotion regulation inventory, Mindful Attention Awareness Scale, and perceived criticism scale were employed. Data were analyzed using Chi-square and correlation coefficient, besides; Structural equation modeling was used to model the direct and indirect relationships between variables. In this regard, SPSS and AMOS softwares were used. **Results:** Out of the whole subjects, 49.7% had score above the median, indicating more likely to be drug abuser. There was a significant correlation between emotional reappraisal ($r = -0.40$), expressive suppression ($r = -0.38$), mindfulness (−0.57), and criticism ($r = 0.57$) with drug abuse among male adolescents ($P < 0.001$). Moreover, criticism through the emotional self-regulation had indirect effects on drug abuse. Totally 69% of the variance in drug abuse was explained by the study variables. **Conclusions:** In total, the results of this study revealed that high levels of drug abuse among students can be considered as a crucial issue, regarding the significant effects of psychological factors, adaptive emotion-regulation strategies, as well as school and family-based Psycho-social skills, are recommended.

Keywords: *Drug abuse, emotion regulation, mindfulness, perceived criticism*

Introduction

Undoubtedly, substance abuse is among the major biopsychosocial problems which lots of countries have encountered with. In addition to interpersonal outcomes, substance abuse has been accompanied with crucial physical, psychological, and social effects,[1] it imposes heavy costs on individuals and society.[2] According to the WHO, 3.3 million people die annually due to drug abuse and alcoholism, an estimated 320,000 of whom included in 15–29 years age group.[3] In Iran, the prevalence of drug abuse among adolescents has been reported in the range of 15.4%[4]–30.2%[5] in different studies.

Psychological factors can play an important role in the development of psychosocial problems such as substance abuse in teenagers.[6,7] Accordingly, one of the psychological factors affecting smoking tendency is known as perceived stress that can provide conditions for different mental and social problems.[8] Experience of regular criticism from parents or family members during Childhood can cause confusion for an adolescent; moreover, most individuals are afraid of criticism and it is thought that this fear leads to punishment avoidance. Therefore, individuals focus on avoidance strategies to deal with criticisms.[9,10]

In this respect, perceived stress, induced by parental criticism, is very uncomfortable and irritating; making the person motivated to seek ways for reducing it. External criticism has a significant and positive relation with substance abuse and relapse among drug abusers.[11,12]

On the other hand, nowadays mindfulness-based approaches for regulating emotions and substance treatment have increasingly become important.[13,14] The main objective of mindfulness education is to reduce dysfunctional thought and emotion in harmful events, such as substance abuse, through strengthening nonjudgmental thoughts[15] in adolescents, mindfulness has some separate factors

How to cite this article: Nosratabadi M, Halvaiepour Z. Psychological determinants of drug abuse among male adolescents in Isfahan: A structural model. Int J Prev Med 2019;10:27.

Address for correspondence:
Dr. Mehdi Nosratabadi, Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: nosrat.welfare@gmail.com

Access this article online

Website: www.ijpvmjournal.net/www.ijpvm.ir

DOI: 10.4103/ijpvm.IJPVM_23_17

Quick Response Code:

that act as elements of consciousness, nonreactive, and description.[16] Studies have shown that mindfulness-based therapies have been successful for the treatment of drug abuse and reduced its prevalence.[14,17,18]

Emotion regulation is a multidimensional construct comprised of a responsible mechanism for the monitoring, recognizing, and mitigating emotional states.[19] Emotional adjustment functioning refers to multiple cognitive and emotional processes that are associated with controlling impulses. These processes are rooted in neuro-biological development that continues throughout adolescence and beyond.[20] Two well-known regulation strategies include emotional reappraisal and expressive suppression, which can lead to decrease or increase emotional responses in arousal situations.[21] Expressive suppression reduces emotion-expressive behavior by seeking ways to control negative emotional experiences.[22] Reappraisal involves the reinterpretation of emotional situations or coping with negative attitudes.[23] Both strategies result in reduced negative affect.

A correlational model can be conducted for examining the effects of cognitive and emotional predisposing factors on drug abuse. Considering the adverse consequences of drug abuse among adolescents, the purpose of this study was to test the relationship model of drug abuse, mindfulness, emotional regulation, and perceived criticism in Isfahan male adolescents using structural modeling.

Methods

Participants and sampling

In this correlational cross-sectional study, the study population consisted of 15–18-year-old boy students who were studying during the academic year (2015–2016) in high schools in Isfahan. According to Cochran's formula, 350 adolescents were selected using cluster random sampling. In this regard, two out of six districts area in Isfahan were randomly selected and from each of these two districts, two boy high schools and three classes in each high school were randomly selected and the questionnaires were completed.

Measures

The probability of drug abuse questionnaire

This 16-item questionnaire was first introduced by Pour Sharifi *et al*. in 2005. In this questionnaire samples indicate how much they engage in activities regarding drug abuse and smoking in a month ago. This scale consists of 16 items and is rated on four-point scale ranging from 1 (at all) to 4 (always) which has been developed by review of valid sources regarding people's vulnerability to drug abuse. In this questionnaire, each item represents a risk factor, and more risk factors indicate a higher possibility of drug abuse. This scale has been shown to be reliable and valid in Iranian student samples.[24,25] In this study, the Cronbach's alpha of the scale was 0.85.

Mindful Attention Awareness Scale

This test consists of 15 questions, developed by Carlson and Brown[26] to measure mindful awareness. The items evaluate the mindful awareness in a six-point Likert scale ranging from score 1 for "almost always" to score 6 for "hardly ever." This provides us a general score on the mindfulness, ranging from 15 to 90 and higher scores reflect greater levels of mindfulness. The reliability of the scale is acceptable (Cronbach's alpha = 0.87). The construct and criterion validity of the scale is measured and verified in different studies,[26,27] higher MAAS scores were related to lower symptoms of stress inventory ($r = -0.42$; $P < 0.001$).

Emotion regulation inventory

It is a 10-item self-report questionnaire developed by Gross[21] consisted of two different mechanisms of emotion regulation: cognitive reappraisal (6 items) and expressive suppression (4 items). Subjects were asked to rate how they regulate their emotions by employing a scale which is rated on a seven-point Likert scale, with a higher score reflecting strategies in which individual used more to regulate their emotions.

The cognitive reappraisal measures ones' tendencies toward emotion regulation through changing thoughts; however, the expressive suppression scale measures the lack of positive and negative emotional expressions. Cronbach's alpha coefficients for two subscales reappraisal and suppression are 0.79 and 0.73, respectively, and 3-month reliability coefficient is reported 0.69.[28] In a study reported in Iran, psychometric properties of the questionnaire are reported as desirable.[29]

Perceived criticism inventory

This six-item questionnaire, developed by Hooley and Teasdale[30] using a Likert scale of 1 (not critical) to 10 (very critical), measures perceived criticism. A test–retest reliability score of 0.75 of the questionnaire during 20 successive weeks in two different samples was obtained. Reliability and validity of the questionnaire has been studied in the Iranian population. Halvaiepour *et al*.[31] studied the psychometric properties of the scale in Iranian adolescents by employing confirmatory factors analysis method to examine the latent structure of the scale. The results revealed that one-dimensional factor in the model fits the data the best, with significant overall indices of fitness. Moreover, the composite reliability coefficient of scale was 0.63 which indicates a good construct reliability.

Statistical analysis

Statistical analyses were conducted using the SPSS 22.0 and AMOS 18.0 statistical software (IBM Corp., Armonk, NY, USA). Chi-squared and correlation coefficient tests were utilized to compare the qualitative and quantitative variables, besides, structural equation model-path analysis

was constructed to interpret the relationships among various Psychological determinants of drug abuse. The parameters of the model have been estimated using maximum likelihood method.

We used the goodness-of-fit statistic (GFI), the adjusted GFI statistic (AGFI) and the root mean squared error of approximation (RMSEA), Chi-square/df and Parsimony Comparative of Fit Index (PCFI) to test the model adequacy. Confidence level was set at 95%. *P* value is lower than 0.001 ($P < 0.001$) and less than 0.05, was considered to be statistically significant. Finally, structural model was fitted to discover the direct and indirect effects.

Results

The total 350 participants were male students, with a mean age of 16.8 years (±0.64 years). Regarding the fields of study, the majority of the participants were studying in the technical and vocational major, followed by those who were studying in mathematics–physics, experimental sciences. To report drug abuse among students, the median score of drug abuse (number 42) were employed as a cut-off point; accordingly, students in the above-the-median in the drug abuse questionnaire reassumed to be more likely inclined to drug abuse; out of the whole 350 students, 49.7% had score above median which can indicate more likely to be craved toward drug abuse [Table 1].

As Table 1 shows, among the fields of study, the highest percentage in drug abuse belonged to students studying in technical and vocational. About 61.4% had scores above the median, besides, the lowest percentage in drug abuse devoted to students studying in experimental sciences (36.9). With regard to Chi-square test ($\chi^2 = 16.09$, $P < 0.05$), it is evident that there is a significant difference between students studying in different disciplines and inclination toward drug abuse.

The Pearson correlation analysis [Table 2] shows that there is a significant inverse relationship between emotion reappraisal ($r = -0.40$), expressive suppression ($r = -0.38$), and mindfulness ($r = -0.57$) with drug abuse among students ($P < 0.01$). Moreover, perceived criticism was positively correlated with drug abuse ($r = 0.57$).

Model testing

Figure 1 and Table 3 express the standardized path coefficients of the structural model which determine the direct and indirect relationship between the constructs.

The direct effects as shown in Table 3, the standardized regression weight of −0.20 ($P < 0.001$) from emotion regulation to drug abuse was observed. The standardized factor loading value between mindfulness and drug abuse was −0.36 ($P < 0.001$). The standardized regression weight from Perceived criticism to drug abuse was 0.42 ($P < 0.001$).

As shown in Table 3, there were two indirect effects in this research model: standardized value from mindfulness to drug abuse was −0.07 and standardized value from perceived criticism to drug abuse was 0.30. The mediating factor of each indirect effect path was emotion regulation. Accordingly, the R-squared coefficient related to drug abuse was 69%. In other words, 69% of variances in drug abuse can be explained by three variables including emotion regulation, mindfulness, and perceived criticism. Moreover, 43% of the variance in emotion regulation was accounted for by mindfulness and perceived criticism. As it is revealed in Table 3, perceived criticism has significant direct and indirect effects on drug abuse among students.

In terms of the model fit, a variety of indices were used to evaluate the model's overall value. Absolute fit indices demonstrated that this research model was statistically well developed: Chi-square/df of the model was 2.9, GFI Index was 0.83, and RMSEA was 0.05. These results were also supported by incremental and Parsimony fit indices: AGFI Index was 0.84 and PCFI Index was 0.72. As shown in Table 4, GFI and AGFI values exceeding 0.80 and RMSEA values of approximately 0.10 or less indicate adequate fit. For Chi-square/df, values <3 and for PCFI values >0.50 indicate a reasonable fit.

Discussion

The study revealed that mindfulness both directly and through emotion regulation can reduce the likelihood of drug use among students. Consistent with the results of other studies[32,33] based on theoretical foundations, it seems adolescents with high levels of mindfulness would be better able to recognize disturbing experiences and with lower likelihood being engaged in substance abuse behaviors as a way to deal with such experiences.[34,35]

Some models relating to emotion regulation had focused on the role of mindfulness in regulating emotions efficiently.[36] One of the components of mindfulness that researchers agree upon is related to accept nonjudgmental emotions. Accordingly, mindfulness is considered to be an immediate awareness and nonjudgmental in which thoughts

Table 1: Descriptive characteristics and the prevalence of drug abuse among students

Field of study	Score below median, *n* (%)	Score above median, *n* (%)	Total, *n* (%)	χ^2	*P*
Experimental sciences	41 (63.1)	24 (36.9)	65 (18.6)	16.09	0.01
Mathematics-physics	60 (59)	48 (41)	117 (33.4)		
Humanities	12 (42.9)	16 (57.1)	17 (4.9)		
Technical and vocational	54 (38.6)	86 (61.4)	140 (40)		

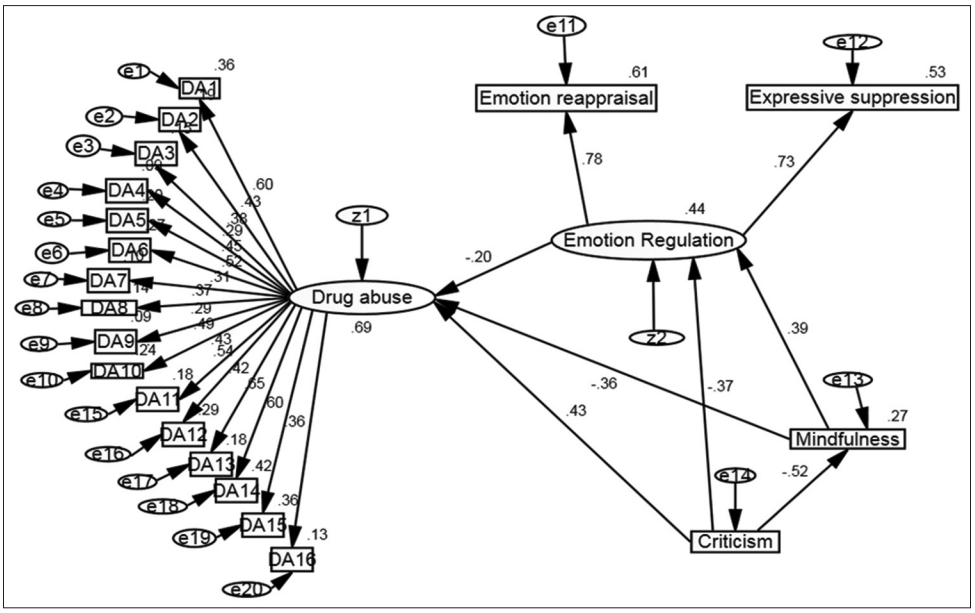

Figure 1: Structural equation modeling for explaining drug abuse based on mindfulness, emotion regulation and perceived criticism

Table 2: Correlation matrix and descriptive statistics

Variable	Emotion reappraisal	Expressive suppression	Mindfulness	Perceived criticism	Drug abuse	Mean±SD
Emotion reappraisal	1					18.6±5.01
Expressive suppression	0.57	1				11.4±4.1
Mindfulness	0.45	0.42	1			62.5±15.2
Perceived criticism	−0.43	−0.43	−0.51	1		32.2±10.1
Drug abuse	−0.40	−0.38	−0.57	0.57	1	46.4±25.6

SD=Standard deviation

Table 3: Standardized regression coefficients (beta), a critical ratio (CR), *P* value and direct and indirect effects of factors related to the model

Path	Estimate (total effect)	CR	*P*	Direct effect	Indirect effect
Mindfulness on drug abuse	−0.43	−6.08	<0.001	−0.36	−0.07
Emotion regulation on drug abuse	−0.2	−2.7	<0.001	−0.2	-
Mindfulness on emotion regulation	0.39	6.3	<0.001	0.39	-
Perceived criticism on drug abuse	0.72	7.04	<0.001	0.42	0.3
Perceived criticism on mindfulness	−0.52	−11.3	<0.001	−0.52	-

CR=Critical ratio

Table 4: Goodness-of-fit indices for structural modeling of drugabuse, mindfulness, emotion regulation and perceived criticism

Index	Accepted value	Model value
Absolute fit measures		
χ^2/df	<3	2.9
GFI	>0.80	0.83
RMSEA	<0.10	0.05
Incremental fit measures		
AGFI	>0.80	0.84
Parsimony fit measures		
PCFI	>0.50	0.72

GFI=Goodness of fit index, RMSEA=Root mean square error of approximation, AGFI=Adjusted goodness of fit index, PCFI=Parsimony comparative of fit index

and feelings are accepted as they are.[37] Therefore, mindfulness-based therapies that focus on the adoption nonjudgmental approach have been used in several disorders such as anxiety[38] and substance abuse.[13]

Interventions that focus on emotion regulation skills, such as dialectic behavioral therapy,[39] can be effective on reducing substance abuse. These interventions actually can be used for encountering with negative emotions by facilitating none-judgmental attitude toward negative experiences, moreover, at the same time increase the degree of adaptability through formal and informal procedures.[40] Such interventions include training emotional regulation, emotions-based therapies and mindfulness cognitive-behavioral therapies.[41]

According to the results, criticism both positively and negatively, through mindfulness, associated with possibility of drug abuse among students. Consistent with current study, other studies have revealed the association of criticism with some mental disorders[42] and drug abuse.[11]

McCardy and Epstein[43] have asserted that criticism made by parents in the form of frequent criticism can be prelude for the increased possibility of alcohol and drug use. Hence when young people are criticized, they may be led to emotional coping behaviors such as drug and alcohol abuse to overcome the stress and turmoil due to criticism.[11]

Regarding of results, emotion regulation reduced the likelihood of drug use among students. Previous studies have focused on the positive effects of emotion regulation in reducing the tendency and likelihood of substance use in adolescents.[44,45]

Theory of learned preparation[46] refers to the root risk factors of substance abuse. According to this theory, impulsivity forms the process of learning by predisposing individuals to acquire positive expectations for substance, resulting in more possibility of engaging in drug abuse. Moreover, adolescents with impulsivity characteristics supposed to be shaped positive expectation for conducting substance use behavior due to learning error regarding to reinforcement consequences, instead of punitive consequences. Accordingly, teenagers who do not use adaptive emotion regulation more likely have been developing positive expectations about strengthening effects of drug use in the way that drug use has positive consequences and its usage can reduce their negative emotions. This issue can increase the likelihood of drug use among them.

One explanation for the application of learned preparation theory in this study can be as follows, since adolescence is a period of growth and development and in this era social relations and interactions have become more important, beliefs related to social strengthening effects of drug use get more emphasized.[43] Moreover, research has shown that emotion regulation and mindfulness are associated with performance and social consequences.[47] For example, lower levels of stress can lead to more positive social outcomes, and hence adolescents who have lower mindfulness and defect from their emotional functioning might learn that engaging in behaviors such as drug abuse may increase their positive social experiences eventually. Other studies have shown the validity of this hypothesis.[48]

Conclusions

To reduce the likelihood and willingness of students toward substance abuse, school, and family-based psycho-social strategies are recommended considering their influencing on students' emotion and thought. One possible strategy is using of techniques to challenge the expectations of young people in such a way its intervention for substance-abused adolescent had been successful.[49] In this technique, the individual expectations of the consequences of certain behaviors such as drug and tobacco are challenged and it is supposed that with altering expectations from positive to negative, the possibility of adolescent's engagement in substance use-related behaviors is reduced. Besides, making parents aware of adverse consequences of Dysfunctional criticism, by strengthening parenting skills can be effective.

One of the strengths of our study was applying the structural model to explore mediating effects of main psychological determinants on drug abuse. Moreover, this study was focused on adolescent age group which is regarded as the most vulnerable and susceptible groups to be substance abuse.

Among the limitations of the present study, unfortunately, we did not have access to female student because of some difficulties during gathering data. It should be said that due to some psychosocial differences between male and female, explanations of drug abuse for female students might be differ from males too. Moreover, regarding cross-sectional–based nature of this study and lack of causality relation between variables, results should be treated cautiously.

Financial support and sponsorship

This study is supported by Social Determinants of Health Research Center of Isfahan University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

Received: 14 Jan 17 **Accepted:** 15 Oct 17
Published: 15 Feb 19

References

1. Wills S. Drugs of Abuse. 2nd ed. London,UK: Pharmaceutical Press; 2005.
2. Cohen MA, Piquero AR, Jennings WG. Estimating the costs of bad outcomes for at-risk youth and the benefits of early childhood interventions to reduce them. Crim Justice Policy Rev 2010;21:391-434.
3. WHO. Media Centre: Alcohol, Fact Sheet; 2011. Available from: http://www.who.int/mediacentre/factsheets/fs349/en/. [Last accessed on 2013 Apr 15].
4. Babaei Heydarabadi A, Ramezankhani A, Barekati H, Vejdani M, Shariatinejad K, Panahi R, *et al.* Prevalence of substance abuse among dormitory students of Shahid Beheshti University of Medical Sciences, Tehran, Iran. Int J High Risk Behav Addict 2015;4:e22350.
5. Ahmadi J, Hasani M. Prevalence of substance use among Iranian high school students. Addict Behav 2003;28:375-9.
6. Savage RJ, King VL, Clark CB, Cropsey KL. Factors associated with early marijuana initiation in a criminal justice population. Addict Behav 2017;64:82-8.
7. Weng SC, Huang JP, Huang YL, Lee TS, Chen YH. Effects of tobacco exposure on perinatal suicidal ideation, depression, and anxiety. BMC Public Health 2016;16:623.
8. Wang Y, Chen X, Gong J, Yan Y. Relationships between stress, negative emotions, resilience, and smoking: Testing a moderated mediation model. Subst Use Misuse 2016;51:427-38.

9. Rachman S. A cognitive theory of obsessions: Elaborations. Behav Res Ther 1998;36:385-401.
10. Webb Hooper M, Antoni MH, Okuyemi K, Dietz NA, Resnicow K. Randomized controlled trial of group-based culturally specific cognitive behavioral therapy among African American smokers. Nicotine Tob Res 2017;19:333-41.
11. Fals-Stewart W, O'Farrell TJ, Hooley JM. Relapse among married or cohabiting substance-abusing patients: The role of perceived criticism. Behav Ther 2001;32:787-801.
12. Baskin-Sommers AR, Foti D. Abnormal reward functioning across substance use disorders and major depressive disorder: Considering reward as a transdiagnostic mechanism. Int J Psychophysiol 2015;98:227-39.
13. Marlatt GA, Witkiewitz K, Dillworth TM, Bowen SW, Parks GA, Macpherson LM, *et al*. Vipassana meditation as a treatment for alcohol and drug use disorders. Mindfulness and Acceptance: Expanding the Cognitive-Behavioral Tradition. New York, Guilford Press; 2004. p. 261-87.
14. Chiesa A, Serretti A. Are mindfulness-based interventions effective for substance use disorders? A systematic review of the evidence. Subst Use Misuse 2014;49:492-512.
15. Bishop SR, Lau M, Shapiro S, Carlson L, Anderson ND, Carmody J, *et al*. Mindfulness: A proposed operational definition. Clin Psychol Sci Pract 2004;11:230-41.
16. Fernandez AC, Wood MD, Stein LA, Rossi JS. Measuring mindfulness and examining its relationship with alcohol use and negative consequences. Psychol Addict Behav 2010;24:608-16.
17. Zgierska A, Rabago D, Chawla N, Kushner K, Koehler R, Marlatt A, *et al.* Mindfulness meditation for substance use disorders: A systematic review. Subst Abus 2009;30:266-94.
18. Grow JC, Collins SE, Harrop EN, Marlatt GA. Enactment of home practice following mindfulness-based relapse prevention and its association with substance-use outcomes. Addict Behav 2015;40:16-20.
19. Barkley RA, Fischer M. The unique contribution of emotional impulsiveness to impairment in major life activities in hyperactive children as adults. J Am Acad Child Adolesc Psychiatry 2010;49:503-13.
20. Spear LP. The adolescent brain and age-related behavioral manifestations. Neurosci Biobehav Rev 2000;24:417-63.
21. Gross JJ. Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. J Pers Soc Psychol 1998;74:224-37.
22. Gross JJ, Levenson RW. Emotional suppression: Physiology, self-report, and expressive behavior. J Pers Soc Psychol 1993;64:970-86.
23. Speisman JC, Lazarus RS, Mordkoff A, Davison L. Experimental reduction of stress based on ego-defense theory. J Abnorm Psychol 1964;68:367-80.
24. Sohrabi F, Akbari ZS, Taraghijah S, Falsafinezhad M, Yaghoubi H, Ramezani V. Substance abuse among state university students. Soc Welfare 2009;9:65-82.
25. Sohrabi F, Taraghja S, Najafi M, Falsafi Nejad M. Assessment of Iranian students' mental healh and it's correlation with some psychological variables in year 85-86. Couns Res Dev 2010;8:7-30.
26. Carlson LE, Brown KW. Validation of the mindful attention awareness scale in a cancer population. J Psychosom Res 2005;58:29-33.
27. MacKillop J, Anderson EJ. Further psychometric validation of the mindful attention awareness scale (MAAS). J Psychopathol Behav Assess 2007;29:289-93.
28. Gross JJ, John OP. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. J Pers Soc Psychol 2003;85:348-62.
29. Mohajerin B, Dolatshahi B, Pour Shahbaz A, Farhoudian A. Differences between expressive suppression and cognitive reappraisal in opioids and stimulant dependent patients. Int J High Risk Behav Addict 2013;2:8-14.
30. Hooley JM, Teasdale JD. Predictors of relapse in unipolar depressives: Expressed emotion, marital distress, and perceived criticism. J Abnorm Psychol 1989;98:229-35.
31. Halvaiepour Z, Nosratabadi M. External criticism by parents and obsessive beliefs in adolescents: mediating role of beliefs associated with inflated responsibility. Global journal of health science. 2016;8:125.
32. Garland EL, Gaylord SA, Boettiger CA, Howard MO. Mindfulness training modifies cognitive, affective, and physiological mechanisms implicated in alcohol dependence: Results of a randomized controlled pilot trial. J Psychoactive Drugs 2010;42:177-92.
33. Tang YY, Tang R, Posner MI. Mindfulness meditation improves emotion regulation and reduces drug abuse. Drug Alcohol Depend 2016;163 Suppl 1:S13-8.
34. Brewer JA, Bowen S, Smith JT, Marlatt GA, Potenza MN. Mindfulness-based treatments for co-occurring depression and substance use disorders: What can we learn from the brain? Addiction 2010;105:1698-706.
35. de Dios MA, Herman DS, Britton WB, Hagerty CE, Anderson BJ, Stein MD, *et al.* Motivational and mindfulness intervention for young adult female marijuana users. J Subst Abuse Treat 2012;42:56-64.
36. Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. J Psychopathol Behav Assess 2004;26:41-54.
37. Burchett N. Mindfulness-Based cognitive therapy for depression. A new approach to preventing relapse. Br J Occup Ther 2010;73:442-3.
38. Roemer L, Orsillo SM, Salters-Pedneault K. Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: Evaluation in a randomized controlled trial. J Consult Clin Psychol 2008;76:1083-9.
39. Linehan MM, Dimeff LA, Reynolds SK, Comtois KA, Welch SS, Heagerty P, *et al.* Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. Drug Alcohol Depend 2002;67:13-26.
40. Sinha R, Fox HC, Hong KA, Bergquist K, Bhagwagar Z, Siedlarz KM, *et al.* Enhanced negative emotion and alcohol craving, and altered physiological responses following stress and cue exposure in alcohol dependent individuals. Neuropsychopharmacology 2009;34:1198-208.
41. Berking M, Margraf M, Ebert D, Wupperman P, Hofmann SG, Junghanns K, *et al.* Deficits in emotion-regulation skills predict alcohol use during and after cognitive-behavioral therapy for alcohol dependence. J Consult Clin Psychol 2011;79:307-18.
42. Miklowitz DJ, Wisniewski SR, Miyahara S, Otto MW, Sachs GS. Perceived criticism from family members as a predictor of the one-year course of bipolar disorder. Psychiatry Res 2005;136:101-11.
43. McCardy B, Epstein E. Mrital therapy in the treatment of alcohol problems. In: Jacobson NS, Gurman AS, editors. Clinical Handbook of Couple Therapy of Couple Therapy. New York: The Guilford Press; 1995. p. 369-93.

44. Dir AL, Banks DE, Zapolski TC, McIntyre E, Hulvershorn LA. Negative urgency and emotion regulation predict positive smoking expectancies in non-smoking youth. Addict Behav 2016;58:47-52.
45. Stautz K, Cooper A. Impulsivity-related personality traits and adolescent alcohol use: A meta-analytic review. Clin Psychol Rev 2013;33:574-92.
46. Smith GT, Anderson KG. Personality and learning factors combine to create risk for adolescent problem drinking. Adolescents, Alcohol, and Substance Abuse: Reaching Teens Through Brief Interventions. New York, Guilford Press 2004; pp. 109–41.
47. Settles RE, Zapolski TC, Smith GT. Longitudinal test of a developmental model of the transition to early drinking. J Abnorm Psychol 2014;123:141-51.
48. Copeland AL, Diefendorff JM, Kendzor DE, Rash CJ, Businelle MS, Patterson SM, *et al.* Measurement of smoking outcome expectancies in children: The smoking consequences questionnaire-child. Psychol Addict Behav 2007;21:469-77.
49. Scott-Sheldon LA, Terry DL, Carey KB, Garey L, Carey MP. Efficacy of expectancy challenge interventions to reduce college student drinking: A meta-analytic review. Psychol Addict Behav 2012;26:393-405.