

Comparison of Individuals With and Without the Risk of Post-Traumatic Stress Disorder in Terms of Substance Use Features and Psychological Problems According to Their Substance Preferences

ABSTRACT

Objective: There are multiple studies that show that exposure to a traumatic life event is a significant factor in the development and continuation of addiction. When post-traumatic stress disorder (PTSD) is added to an alcohol-substance use disorder, the course of treatment is negatively affected. This study aimed to compare people with and without the risk of PTSD in terms of substance use features and psychological problems on the basis of their substance preferences.

Methods: The study was conducted with 614 individuals hospitalized in an addiction recovery center because of an alcohol and substance use disorder. Development of the addiction profile index (BAPI) clinical form was used to measure the addiction features and their severity, psychological condition, and some personal characteristics of the patients. The Kocaeli short screening scale for psychological trauma was used to determine traumatic life events and evaluate traumatic stress symptoms.

Results: PTSD frequency of the participants with an alcohol-substance use disorder was 29.8% (n = 162). Considering the frequency of PTSD risk, 29.2% (n = 98) of the participants with opioid use disorder, 33.3% (n = 13) of the participants with cannabis use disorder, and 35.7% (n = 20) of the participants with alcohol use disorder had a risk of PTSD. Participants with PTSD symptoms had higher scores in substance use features, diagnosis, effect of substance use on life, cravings, greater addiction severity, difficulty in anger control, more excitement seeking behaviors, safe behavior deficiency, depression, and anxiety.

Conclusion: Substance use features and psychological problems varied in individuals with and without the risk of PTSD. Configuration of the treatment plan considering this differentiation is significant in terms of the course of the treatment.

Keywords: Alcohol use disorder, post-traumatic stress disorder, trauma, substance use disorder





Introduction

Post-traumatic stress disorder (PTSD) is a psychiatric disorder that is caused by a physical threat or a threat to the integrity of life, with symptoms such as re-experiencing the traumatic event, avoidance of stimuli that remind of the event, and hyperarousal.¹ Of the PTSD patients, 80% experience at least one of the following disorders; major depression, anxiety disorder, somatization, and substance abuse.²

Many studies today report that the experience of traumatic life events is a significant factor in the development and continuation of addiction.³ Studies have shown that the risk of PTSD as a comorbidity in individuals with substance use disorder ranges from 15% to 42%.^{4,5} In addition, an experience of traumatic life events such as serious physical injury, death threats, witnessing someone being injured or killed, sexual trauma, and childhood trauma increase the risk of substance use.^{6,7}

PTSD and alcohol and substance use disorders frequently co-exist. Epidemiological studies have shown that individuals with PTSD were 4 to 5 times more likely to have an alcohol-substance use disorder at some point in their lives compared to individuals without PTSD.⁸ Examining the co-existence of PTSD and alcohol-substance use disorders on the basis of the substance



David Guliyev 
Özge Kalkan 
Kinyas Tekin 
Zehra Olcay Tuna 
Kültegin Ögel 

Clinic of Psychiatry, Moodist Psychiatry and Neurology Hospital, İstanbul, Turkey

Corresponding Author:
David Guliyev
✉ cavid00@yahoo.com

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preferences, Mills et al⁹ have reported that individuals with opioid addiction have the highest prevalence of PTSD (33%) compared with all other substance users. From the analysis results, individuals with PTSD were found to have a higher risk of depression and anxiety.

There is a cyclical relationship between PTSD and alcohol-substance use. Exposure to traumatic life events is a factor that increases alcohol-substance use, and alcohol-substance use increases the frequency of exposure to traumatic life events and the risk of PTSD.^{10,11}

There are different hypotheses that explain alcohol-substance use and the risk of PTSD. According to the self-medication hypothesis, individuals with trauma-related symptoms use alcohol-substance to control emotional pain.¹² According to another hypothesis called the high-risk hypothesis, substance use increases individuals' risk of exposure to trauma and their likelihood of displaying risky behavior.¹³

According to the susceptibility hypothesis which explains the relationship between alcohol-substance use and PTSD, individuals who use substances are more susceptible to PTSD or other trauma-related disorders after exposure to traumatic events.¹⁴ According to the third factor hypothesis, there is no direct relationship between substance use and PTSD; however, the relationship arises owing to a third factor such as genetics (influence of other variables).¹⁵

When the alcohol-substance disorder is accompanied by PTSD, it negatively affects the course of the treatment. Studies have reported that in cases where these disorders co-exist, the stay in and the response to the treatment are reduced, and people quit the treatment early.¹⁶⁻¹⁹

Therefore, it is important to research the relationship between traumatic events and substance use features in both determinations of the quality of alcohol-substance use prevention activities and creation of an addiction treatment plan. This study aimed to compare individuals with and without a risk of PTSD and with alcohol and substance use disorders in terms of their substance use features and psychological problems and to determine the effects of the risk of PTSD on the substance use features and psychological problems according to the substance preferences.

Methods

Sample

The study was carried out with 614 people who visited the Moodist Psychiatry and Neurology Hospital between October 2019 and May 2020 and were admitted with an "alcohol and substance use disorder" diagnosis. Substance preferences of the participants were varied. Heroin, cannabis, and alcohol were found to be the most frequently used substances. Because of the few numbers of individuals using substances such as synthetic cannabinoids, volatile substanc-

es, cocaine, clonazepam, amphetamine, lysergic acid diethylamide (LSD), and 3,4-methylenedioxymethamphetamine (MDMA), these individuals were separated as "individuals with other substance use" and were excluded from the study. Furthermore, individuals under the influence of alcohol or substances and with psychotic symptoms were not included in the study. Informed consent forms were signed by and obtained from the participants. The Hasan Kalyoncu University gave the ethics committee approval for this study (Approval Date: October 21, 2019; Approval Number: 74).

Tools

Addiction Profile Index (BAPI): The BAPI is a 37-item scale developed by Ögel et al²⁰ to evaluate the different dimensions of addiction and to evaluate addiction severity. The scale includes 5 subscales: substance use features, addiction diagnosis criteria, the effect of substance use on an individual's life, the desire to use substances, and the motivation to quit substance use. Cronbach's alpha value of the scale was found to be 0.89; Cronbach's alpha values of the subscales ranged from 0.63 to 0.86.

The addiction profile index clinical form (BAPI-K) has been developed to evaluate psychological problems in clinical practices and included an additional 21 questions to the questions in the BAPI.²¹ This section examines factors such as difficulty in anger control, safe behavior deficiency, excitement seeking behaviors, impulsivity, depression, and anxiety risks that cause the use or the continuation of substance use. Cronbach's alpha value of this section was found to be 0.80; Cronbach's alpha values of the subscales ranged from 0.66 to 0.75. When the questions of the section that directly evaluated addiction were included in the analysis, Cronbach's alpha value of the entire scale was 0.81. The 4 factors accounting for 53% of the total variance were obtained from the exploratory factor analysis. The first factor includes questions related to depression and anxiety; the second factor includes questions related to difficulty in anger control and impulsivity; the third factor includes questions related to safe behavior deficiency; and the fourth factor includes questions related to excitement seeking behaviors.

Kocaeli Short Screening Scale for Psychological Trauma (Kocaeli SHORT):

The scale that evaluates 12 different traumatic life events such as natural disasters; accidents; physical and sexual abuse; and 4 traumatic stress symptoms such as hyperarousal, re-experiencing, blunting, and avoidance was developed by Aker et al.²² The Kocaeli SHORT includes 2 stages to evaluate traumatic life events and post-traumatic stress symptoms.²² It is scored according to the PTSD symptoms. The responses to the questions are "yes," "no," and "unanswered." They are evaluated as follows: "yes = 1," "no = 0." The maximum score that can be obtained from the scale is 4, whereas the minimum score is 0. Responding "yes" to 3 or more questions indicates the risk of PTSD. The sensitivity level of the scale was found to be 0.93, and its discrimination level was 0.77. The scale had a Cronbach's alpha internal consistency value of 0.63.

Administration

The BAPI-K and the Kocaeli SHORT were administered by the clinician to the participants during their stay at the hospital.

Statistical Analysis

All statistical analyses were done with the SPSS version 21.0 (IBM Corp.; Armonk, NY, USA). To easily evaluate the educational status,

MAIN POINTS

- *Craving and addiction severity levels were observed to be higher in the participants with the risk of Post-Traumatic Stress Disorder (PTSD).*
- *The participants with a risk of PTSD had higher deficiency of safety behaviors and more excitement seeking behaviors.*
- *Participants with a risk of PTSD and using opioids and alcohol had higher craving levels than participants using cannabis.*

literate participants and elementary and secondary school graduates were categorized under the low education level and high school and university graduates under the high education level.

As the participants responded “unanswered” to the questions in the Kocaeli SHORT, 8 missing data were identified in the participants using cannabis, and 10 missing data were identified in the participants using alcohol.

A frequency analysis was performed to evaluate the prevalence of PTSD in the participants with alcohol-substance use disorder. The comparison of the participants with and without the risk of PTSD in terms of substance use features and accompanying psychological problems on the basis of the substance preferences was carried out using an independent samples t-test and the Mann-Whitney U test for the participants using opioid and for those using cannabis and alcohol, respectively.

Results

The study included 614 participants. Table 1 shows the sociodemographic characteristics of the participants with addiction. Of the participants, 562 (91.5%) were men, and 52 (8.5%) were women. Of the participants, 606 (98.7%) indicated that they lived with their family in a house, and 8 participants (1.3%) lived in an inappropriate environment (Table 1). A total of 341 (55.6%) participants stated that they worked in a regular job. The mean age of the participants was 30.24 (SD = 8.39) years.

Table 1. Sociodemographic Characteristics of the Participants With an Alcohol and Substance Use Addiction

| | n (%) |
|---|------------|
| Sex | |
| Female | 52 (8.5) |
| Male | 562 (91.5) |
| Education level | |
| Low | 311 (50.7) |
| High | 303 (49.3) |
| Marital status | |
| Married | 199 (32.4) |
| Single | 380 (62.0) |
| Other (separated, divorced, widowed) | 35 (5.6) |
| Economic level | |
| High | 290 (47.3) |
| Middle | 270 (44.0) |
| Low | 54 (8.7) |
| Place of living | |
| House | 606 (98.7) |
| Inappropriate environment (streets, construction site, shelter etc) | 8 (1.3) |
| Living | |
| With family | 544 (88.6) |
| With relative(s), friend(s) etc. | 18 (2.9) |
| Alone | 43 (7.0) |
| Other | 9 (1.5) |
| Occupation | |
| Regular job | 341 (55.6) |
| Irregular job | 86 (13.9) |
| Unemployed | 187 (30.5) |

In terms of the substance preferences, 378 (61.7%) used heroin, 66 (10.7%) used alcohol, and 48 (7.8%) used cannabis. The 8 missing data of the participants using cannabis and 10 missing data of the participants using alcohol affected the results of the substance use features subscale in the BAPI-K.

The PTSD risk prevalence of the participants with alcohol-substance use disorder was found to be 29.8% (n = 162). Looking at the prevalence of PTSD risk according to the substance preferences, the risk of PTSD was identified in 29.2% (n = 98) of the participants with opioid use disorder, in 33.3% (n = 13) of the participants with cannabis use disorder and in 35.7% (n = 20) of the participants with alcohol use disorder. When the participants with and without PTSD symptoms were compared on the basis of their substance use features and accompanying psychological problems with the BAPI-K, substance use features, diagnosis, effect of substance use on life, cravings, addiction severity, difficulty in anger control, excitement-seeking behaviors, safe behavior deficiency, depression, and anxiety symptoms were found statistically significantly higher in the participants with PTSD symptoms (Table 2). Comparison of substance use features and accompanying psychological problems of the participants with and without the risk of PTSD according to their substance preferences were presented in Table 3.

Discussion

This study aimed to investigate the differences of the substance use features and accompanying psychological problems according to the substance preferences in patients with alcohol-substance use disorder and with the risk of PTSD.

The study found that the participants with an alcohol-substance use disorder had a high risk of PTSD. The prevalence of PTSD in the participants was 29.8%. Studies have shown that the risk of PTSD in individuals with an alcohol-substance use disorder ranged from 15%

Table 2. Comparison of Substance Use Features and Accompanying Psychological Problems of Participants With and Without the Risk of PTSD

| | PTSD symptoms | | | | t | P |
|------------------------------|---------------|-------------|---------|-------------|-------|------|
| | Absent | | Present | | | |
| | n | Mean (SD) | n | Mean (SD) | | |
| Addiction severity | 452 | 2.78 (0.67) | 162 | 3.06 (0.61) | 4.76 | .001 |
| Substance use features | 447 | 1.79 (1.54) | 161 | 2.34 (1.70) | -3.76 | .001 |
| Effect on life | 452 | 2.70 (0.76) | 162 | 2.98 (0.67) | -4.10 | .001 |
| Diagnosis | 452 | 2.97 (0.96) | 162 | 3.22 (0.90) | -2.95 | .001 |
| Craving | 452 | 2.72 (1.22) | 162 | 2.99 (1.09) | -2.56 | .01 |
| Motivation | 452 | 3.71 (0.70) | 162 | 3.77 (0.59) | -1.05 | .29 |
| Depression | 452 | 0.88 (0.56) | 162 | 1.28 (0.53) | -7.85 | .001 |
| Anger management difficulty | 452 | 0.98 (0.65) | 162 | 1.22 (0.64) | -4.03 | .001 |
| Safe behavior deficiency | 452 | 0.84 (0.51) | 162 | 1.00 (0.56) | -3.60 | .001 |
| Excitement seeking behaviors | 452 | 0.94 (0.66) | 162 | 1.14 (0.65) | -3.29 | .001 |
| Anxiety | 452 | 0.69 (0.54) | 162 | 1.15 (0.59) | -9.07 | .001 |
| Impulsivity | 452 | 1.13 (0.62) | 162 | 1.32 (0.58) | -3.53 | .001 |

Independent samples t-test was used.

Abbreviations: PTSD, post-traumatic stress disorder; SD, standard deviation.

Table 3. Comparison of Substance Use Features and Accompanying Psychological Problems of the participants With and Without The Risk of PTSD According to Their Substance Preferences

| | Opioid use | | | | Cannabis use | | | | Alcohol use | | | | | | | | | |
|------------------------------|------------|-------------|---------|-------------|--------------|-----------|---------|-------------|-------------|-------------|---------|-----------|----|-------------|----|-------------|-------|------|
| | PTSD risk | | | | PTSD risk | | | | PTSD risk | | | | | | | | | |
| | Absent | | Present | | Absent | | Present | | Absent | | Present | | | | | | | |
| | n | Mean (SD) | n | Mean (SD) | n | Mean (SD) | n | Mean (SD) | n | Mean (SD) | n | Mean (SD) | | | | | | |
| Addiction severity | 238 | 2.97 (0.49) | 98 | 3.21 (0.48) | 4.02 | .001 | 26 | 2.29 (0.95) | 13 | 2.91 (0.69) | 2.08 | .04 | 36 | 2.04 (0.67) | 20 | 2.66 (0.69) | 3.27 | .001 |
| Substance use features | 238 | 1.74 (1.54) | 98 | 2.09 (1.63) | 1.89 | .046 | 26 | 1.72 (1.31) | 13 | 2.38 (1.88) | 1.28 | .21 | 36 | 1.79 (1.36) | 20 | 2.68 (1.38) | 2.32 | .02 |
| Effect on life | 238 | 2.88 (0.61) | 98 | 3.19 (0.55) | 4.27 | .00 | 26 | 2.26 (0.86) | 13 | 2.90 (0.69) | 2.33 | .03 | 36 | 1.89 (0.84) | 20 | 2.24 (0.64) | 1.61 | .11 |
| Diagnosis | 238 | 3.31 (0.71) | 98 | 3.56 (0.58) | 3.09 | .02 | 26 | 2.25 (1.18) | 13 | 2.90 (1.29) | 1.59 | .12 | 36 | 1.72 (0.89) | 20 | 2.37 (0.97) | 2.51 | .02 |
| Craving | 238 | 3.05 (0.98) | 98 | 3.27 (0.89) | 1.97 | .04 | 26 | 1.93 (1.44) | 13 | 2.56 (1.35) | 1.30 | .20 | 36 | 1.41 (1.20) | 20 | 2.75 (1.08) | 4.13 | .001 |
| Motivation | 238 | 3.87 (0.43) | 98 | 3.90 (0.30) | 0.72 | .47 | 26 | 3.24 (1.15) | 13 | 3.82 (0.39) | 1.75 | .09 | 36 | 3.38 (0.81) | 20 | 3.25 (1.23) | -0.48 | .64 |
| Depression | 238 | 0.88 (0.58) | 98 | 1.30 (0.53) | 6.53 | .001 | 26 | 0.91 (0.52) | 13 | 1.37 (0.61) | 2.41 | .02 | 36 | 0.71 (0.49) | 20 | 1.08 (0.44) | 2.79 | .001 |
| Anger management difficulty | 238 | 0.98 (0.65) | 98 | 1.21 (0.67) | 2.86 | .01 | 26 | 1.14 (0.58) | 13 | 1.46 (0.59) | 1.62 | .11 | 36 | 0.73 (0.57) | 20 | 0.95 (0.53) | 1.41 | .16 |
| Safe behavior deficiency | 238 | 0.82 (0.51) | 98 | 1.01 (0.54) | 3.09 | .001 | 26 | 0.87 (0.47) | 13 | 1.03 (0.60) | 0.92 | .36 | 36 | 0.68 (0.43) | 20 | 0.88 (0.46) | 1.65 | .11 |
| Excitement seeking behaviors | 238 | 0.92 (0.65) | 98 | 1.16 (0.67) | 3.06 | .001 | 26 | 1.23 (0.58) | 13 | 1.23 (0.55) | 0.00 | 1.00 | 36 | 0.58 (0.52) | 20 | 0.85 (0.66) | 1.67 | .10 |
| Anxiety | 238 | 0.64 (0.49) | 98 | 1.13 (0.63) | 7.45 | .001 | 26 | 0.79 (0.54) | 13 | 1.36 (0.49) | 3.14 | .001 | 36 | 0.64 (0.50) | 20 | 1.17 (0.54) | 3.69 | .001 |
| Impulsivity | 238 | 1.09 (0.62) | 98 | 1.34 (0.58) | 3.37 | .001 | 26 | 1.33 (0.49) | 13 | 1.44 (0.54) | 0.57 | .57 | 36 | 1.01 (0.50) | 20 | 1.33 (0.49) | 0.74 | .46 |

Independent samples t-test was used.

Abbreviations: PTSD, post-traumatic stress disorder; SD, standard deviation.

to 45%.^{4,5} This finding supports the literature that indicates there is a strong correlation and association between alcohol-substance use disorders and PTSD.^{4,5}

Craving and addiction severity levels were observed to be higher in the participants with the risk of PTSD, which is similar to the results in the literature.^{3,12} Studies have indicated that individuals with PTSD have a high craving severity.³ In addition, there are studies showing that individuals with PTSD have a high addiction severity.³ Individuals who show PTSD symptoms may resort to alcohol or substance use as a way of “self-medication.”¹² Considering these findings, the risk of PTSD can affect addiction severity and craving levels.

This study found no differences between the participants with and without the risk of PTSD in terms of motivation. This may be related to the fact that the participants visited the hospital of their own volition and that they had high motivation at the beginning of the treatment.

In terms of psychological problems, the participants with a risk of PTSD had higher deficiency of safe behaviors and more excitement seeking behaviors than the participants without the risk of PTSD. Similarly, Şeker et al²³ have reported that participants with a risk of PTSD had higher scores of impulsivity and safe behavior deficiency. Studies have found that there is a correlation between the comorbidity of PTSD and an alcohol-substance use disorder and the emotion dysregulation hypothesis.²⁴ According to this hypothesis, individuals

with PTSD and an alcohol-substance use disorder have difficulty in tolerating negative feelings and in emotion regulation when they encounter trauma-related stimuli.²⁵ This situation increases the likelihood of individuals displaying risky behaviors, such as aggressive behavior, more frequent use of alcohol and substances, and having random sexual relations.²⁴ In this context, high safe behavior deficiency and more excitement seeking behaviors in individuals with a risk of PTSD and using alcohol-substances can be explained by the display of more risky behaviors by these individuals.

According to the analysis results, the participants with PTSD were found to have a higher risk of depression and anxiety. In the literature, the presence of PTSD in individuals using alcohol-substance correlates with more anxiety and depressive symptoms.²⁶ In addition, Şeker et al²³ have reported that individuals with PTSD had higher depression and anxiety scores. The high risk of depression and anxiety in individuals with a risk of PTSD is in line with the literature.^{23,26}

Comparing the participants according to their substance preferences, participants with a risk of PTSD and using opioids and alcohol had higher craving levels than participants using cannabis. Studies have shown that PTSD symptoms such as nightmares, hyperarousal, and re-experiencing increased craving levels in individuals using alcohol and opioids.²⁷ This can be explained by the fact that addicted individuals with PTSD resort to alcohol substance use as a way of self-medication.²⁸ A study found that individuals using alcohol, opioid, canna-

bis, and benzodiazepines used the method of self-medication more frequently than individuals using cocaine.²⁹

The participants with the risk of PTSD and using opioids differ from the participants using alcohol and cannabis in terms of excitement seeking behavior, safe behavior deficiency, difficulty in anger control, and impulsivity features. The literature explains this by noting that an increase in opioid use increases the risk-taking behavior resulting in more intense traumatic experiences.^{30,31} Therefore, evaluation of the risk of PTSD and risk-taking, excitement seeking behaviors, and safe behavior deficiency of individuals with opioid use disorder can be important in preventing the development of comorbidity.

One of the limitations of this study was that substance preferences were limited to alcohol, cannabis, and opioids. Another limitation was that the number of the participants with alcohol and cannabis use disorder was fewer than those with opioid use disorder. In addition, a lesser number of female applicants for treatment negatively affected the homogeneity in sex distribution.

Despite these limitations, the study provides information about substance use features and accompanying psychological problems in individuals with the risk of PTSD. In addition, it presents an idea regarding the identification of factors that affect the risk of PTSD based on the substance preferences.

There are few studies that compare substance use features and accompanying psychological problems in individuals with and without the risk of PTSD and with an alcohol-substance use disorder. Although there are studies examining the factors that affect addiction features and psychological problems in the co-existence of PTSD and alcohol-substance use disorders, few studies have examined these features according to the substance preferences. Therefore, the strength of this study was that it showed the differences in terms of substance use features and psychological problems among individuals with and without the risk of PTSD as well as investigating the factors that affected the risk of PTSD on the basis of substance preferences.

Ethics committee approval: Ethics committee approval was received for this study from the Ethics Committee of Hasan Kalyoncu University (Approval Date: October 21, 2019; Approval Number: 74).

Informed consent: Informed consent was obtained from the individuals who participated in this study.

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References

- Aker AT. *Temel Sağlık Hizmetlerinde Ruhsal Travmaya Yaklaşım* [Approach to Mental Trauma in Primary Health Care]. 1st ed. Ankara: Türkiye Psikiyatri Derneği; 2012.
- Asmundson GJG, Coons MJ, Taylor S, Katz J. PTSD and the experience of pain: research and clinical implications of shared vulnerability and mutual maintenance models. *Can J Psychiatry*. 2002;47(10):930-937. [Crossref]
- Evren C, Çetin R, Durkaya M, Dalbudak E, Çakmak D. Relationship of alcohol craving with posttraumatic stress disorder and severity of general psychopathology in male alcohol dependent inpatients. *Arch Neuropsychiatry*. 2008;46(1):3-7.
- Pietrzak RH, Goldstein RB, Southwick SM, Grant BF. Prevalence and Axis I comorbidity of full and partial posttraumatic stress disorder in the United States: results from Wave 2 of the National Epidemiologic Survey on alcohol and related conditions. *J Anxiety Disord*. 2011;25(3):456-465. [Crossref]
- Vujanovic AA, Back SE. *Posttraumatic Stress and Substance Use Disorders*. 1st ed. New York, NY: Routledge; 2019. [Crossref]
- Fetzner MG, McMillan KA, Sareen J, Asmundson GJG. What is the association between traumatic life events and alcohol abuse/dependence in people with and without PTSD? Findings from a nationally representative sample. *Depress Anxiety*. 2011;28(8):632-638. [Crossref]
- Walsh, K, Elliott JC, Shmulewitz D, et al. Trauma exposure, posttraumatic stress disorder and risk for alcohol, nicotine, and marijuana dependence in Israel. *Compr Psychiatry*. 2014;55(3):621-630. [Crossref]
- Patten SB, Wilkes TC, Williams JV, et al. Retrospective and prospectively assessed childhood adversity in association with major depression, alcohol consumption and painful conditions. *Epidemiol Psychiatr Sci*. 2015;24(2):158-165. [Crossref]
- Mills KL, Teesson M, Ross J, Darke S, Shanahan M. The costs and outcomes of treatment for opioid dependence associated with posttraumatic stress disorder. *Psychiatr Serv*. 2005;56(8):940-945. [Crossref]
- Haller M, Chassin L. The influence of PTSD symptoms on alcohol and drug problems: internalizing and externalizing pathways. *Psychol Trauma*. 2013;5(5):484-493. [Crossref]
- Straus E, Haller M, Lyons RC, Norman SB. Functional and psychiatric correlates of comorbid post-traumatic stress disorder and alcohol use disorder. *Alcohol Res*. 2018;39(2):121-129.
- Khantzian EJ. The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence. *Am J Psychiatry*. 1985;142(11):1259-1264. [Crossref]
- Danovitch I. PTSD and opioid use disorder: a narrative review of conceptual model of addictive diseases. *J Addict Dis*. 2016;35(3):169-179. [Crossref]
- Logrip ML, Zorrilla EP, Koob GF. Stress modulation of drug self-administration: implications for addiction comorbidity with post-traumatic stress disorder. *Neuropharmacology*. 2012;62(2):552-564. [Crossref]
- Lanius RA, Bluhm RL, Frewen PA. How understanding the neurobiology of complex post-traumatic stress disorder can inform clinical practice: a social cognitive and affective neuroscience approach. *Acta Psychiatr Scand*. 2011;124(5):331-348. [Crossref]
- Norman SB, Tate SR, Anderson KG, Brown SA. Do trauma history and PTSD symptoms influence addiction relapse context? *Drug Alcohol Depend*. 2007;90(1):89-96. [Crossref]
- Ross HE, Cutler M, Sklar SM. Retention in substance abuse treatment: role of psychiatric symptom severity. *Am J Addict*. 1997;6(4):293-303. [Crossref]
- Brown VB, Melchior LA, Huba GJ. Level of burden among women diagnosed with severe mental illness and substance abuse. *J Psychoactive Drugs*. 1999;31(1):31-40. [Crossref]
- Claus RE, Kindleberger LR. Engaging substance abusers after centralized assessment: predictors of treatment entry and dropout. *J Psychoactive Drugs*. 2002;34(1):25-31. [Crossref]
- Ögel K, Evren C, Karadağ F, Tamar Gürol D. Bağımlılık Profil İndeksi'nin (BAPI) geliştirilmesi, geçerlik ve güvenilirliği [The development, validity, and reliability of the Addiction Profile Index (API)]. *Türk Psikiyatri Derg*. 2012;23:263-75.
- Kültegin Ö, Koç C, Başabak A, İşmen EM, Görücü S. Development of Addiction Profile Index (Bapi) Clinical Form: reliability and validity study. *Bağımlılık Dergisi*. 2015;16(2):57-69.

22. Aker AT, Hamzaoglu O, Boşgelmez Ş. Validity of Kocaeli Short Screening Scale for Psychological Trauma (Kocaeli - SHORT). *Dusunen Adam*. 2007;20(4):172-8.
23. Şeker BC, Dinç M, Işık S, Ögel K. Incidence and characteristics of psychological trauma in alcohol and substance abuse disorder. *Addicta: The Turkish Journal on Addictions*. 2019;6:315-336. [\[Crossref\]](#)
24. Vidana AG, Forbes CN, Gratz KL, Tull MT. The influence of posttraumatic stress disorder and recurrent major depression on risk taking propensity following trauma script exposure among patients with substance use disorder. *Addict Behav*. 2020;102:106181. [\[Crossref\]](#)
25. McDermott MJ, Tull MT, Gratz KL, Daughters SB, Lejuez CW. The role of anxiety sensitivity and difficulties in emotion regulation in posttraumatic stress disorder among crack/cocaine dependent patients in residential substance abuse treatment. *J Anxiety Disord*. 2009;23(5):591-599. [\[Crossref\]](#)
26. Norman SB, Tate SR, Anderson KG, Brown SA. Do trauma history and PTSD symptoms influence addiction relapse context? *Drug Alcohol Depend*. 2007;90(1):89-96. [\[Crossref\]](#)
27. Grüsser SM, Mörsen CP, Wölfling K, Flor H. The relationship of stress, coping, effect expectancies and craving. *Eur Addict Res*. 2007;13(1):31-38. [\[Crossref\]](#)
28. Coffey SF, Stasiewicz PR, Hughes PM, Brimo ML. Trauma-focused imaginal exposure for individuals with comorbid posttraumatic stress disorder and alcohol dependence: revealing mechanisms of alcohol craving in a cue reactivity paradigm. *Psychol Addict Behav*. 2006;20(4):425-435. [\[Crossref\]](#)
29. Bremner JD, Southwick SM, Darnell A, Charney DS. Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *Am J Psychiatry*. 1996;153(3):369-375. [\[Crossref\]](#)
30. Bhatia D, Mikulich-Gilbertson SK, Sakai JT. Prescription opioid misuse and risky adolescent behavior. *Am Acad Pediatrics*. 2020;145(2): e20192470. [\[Crossref\]](#)
31. Fareed A, Eilender P, Haber M, Bremner J, Whitfield N, Drexler K. Comorbid posttraumatic stress disorder and opiate addiction: a literature review. *J Addict Dis*. 2013;32(2):168-179. [\[Crossref\]](#)