The Role of Aggression and Sleep Quality on Substance Abuse in Risky Drivers

Nasrin Abdoli¹, Vahid Farnia¹, Safora Salemi¹,*, Hossein Zhaleh², Mehdi Khodamordi², Touraj Ahmadjouybari¹, Sanobar Golshani¹ and Mostafa Alikhani¹

¹Department of Psychiatry, Substance Abuse Prevention Research Center, Kermanshah University of Medical Science, Kermanshah, Iran
²Substance Abuse Prevention Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

Corresponding author: Safora Salemi, Department of Psychiatry, Substance Abuse Prevention Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran. Tel: +98-9366143637, Fax: +98-8338264513, Email: s_salemi85@yahoo.com

Received 2017 August 19; Revised 2018 February 07; Accepted 2018 June 23.

Abstract

Background: Substance-related disorders has become an important challenge in family, social, and individual health. Given the risks caused by ignoring substance related disorders, it is necessary to analyze factors effective on reckless driving.

Objectives: The aim of this study was to predict substance-related disorders based on aggression and sleep quality in reckless drivers in Kermanshah city.

Patients and Methods: This study was a descriptive-analytical cross-sectional research. Overall, 644 reckless drivers were selected by simple random method among drivers referred to the Iranian traffic police. Data collection was performed by means of the Aggression questionnaire (compiled by Zahedifar et al.) and Petersburg Sleep Quality questionnaire, and the data was analyzed by SPSS (version 22) and discriminant analysis test.

Results: The standardized discriminant function coefficients showed that time of sleep, aggression, and sleep latency had the highest effect on the discriminant function; variables including obstinacy, daily dysfunction, sleep disturbance, sleep quality, anger and the amount of taken sleep medication played the most negligible role in discriminant function and its success. Furthermore, the discriminant analysis method showed that the linear combination of the above-mentioned variables could explain approximately 86.4% of the variance in both groups.

Conclusions: As aggression and sleep quality play a highly critical role in inclination towards substance-related disorders, the two factors should be considered in prevention, treatment, and recovery programs of substance-related disorders.

Keywords: Aggression, Sleep Hygiene, Substance Related Disorders, Automobile Driving, Health Risk Behaviors

1. Background

The damages caused by vehicles is one of the biggest health problems, the prevention of which requires effective and sustainable action. The main reasons underlying such events are individual, subjective, and social agents, such as substance-related disorders (1, 2). Driving in Iran is one of the toughest jobs. Bad weather conditions, lack of amenities for resting, and separation from family are the most common hardships encountered by Iranian drivers. Vehicle drivers are susceptible to fatigue, drowsiness, musculoskeletal pain, and driving accident risks because they drive long hours in most cases. Some drivers believe that substance-related disorders can reduce fatigue and drowsiness, therefore, they are inclined to substance related disorders. On the other hand, researchers have argued that any kind of substance that influences the nervous system and mind can contribute to driving risks (3-5).

Substance-related disorders can influence driving skills, safety of driving, attention and carefulness, reaction time, judgment, and problem solving skills (5-7). The results obtained from the study conducted by Zhou (2010) showed that drug testing was positive for 10.5% of drivers (7). Regarding difficulties in giving up substance-related disorders and the relevant addiction recurrence, it is necessary to recognize risk factors causing the problem in different populations, including drivers.

Several factors and backgrounds contribute to addiction; one important factor is aggression. Many researchers have shown that taught pattern of conduct plays an important role in drug use. Some people believe that when they are solving a problem, they feel more anger and frustration, so they are tempted to use such substance in order to overcome these emotions (8, 9). In a study con-
duced by Martinotti et al. (10), it was shown that people experiencing failure and frustration may release their emotion in criminal activity and substance-related disorders. The authors in the study argue that anger and aggression play significant roles in substance-related disorders. Therefore, it seems that problematic behavior is a result of ineffective coping responses, culminating in uncontrolled anxiety and anger. Anger may contribute to non-adaptive coping responses, such as criminal action, including substance-related disorders. The research performed by Bushman as a prominent relevant study showed that there is a high correlation between anger and drug addiction (11). The research conducted by Hayatbakhsh et al. showed that among factors influential on predicting the tendency to drugs, aggression plays an important role (12). In another research conducted by Epstein et al. (13), 517 teenagers were assessed. The study results showed that aggression and maladaptive behaviors are associated with taking drugs. Jaffe in his research sought to assess the relationship between aggression and drug use. The authors concluded that there is a positive correlation between aggression and drug use (14).

Another variable that was influential on substance-related disorders is sleep quality. Sleep quality is one of the main circadian cycles and complex biological patterns having effect on physical and mental health (15). Sleep is not influenced by time and processes of homeostasis, rather, some factors including environmental factors (e.g. sound), psychosocial factors (e.g. stress), physical illnesses (e.g. respiratory failure in the lungs), and lifestyle factors (such as alcohol, caffeine, and drug substances) can strongly influence sleep (16). Low sleep quality can result in daily fatigue, irritability and lack of concentration. Along with earlier-mentioned factors, alcohol and drugs can influence individual tendency to addiction. On the other hand, alcohol and drug abuse can intensify sleep disorder and also lower sleep quality. As a result, a cycle is formed that can intensify sleep problem and tendency to drug use (17-20). Bootzin and Stevens conducted a study, in which they showed that teenagers, whose sleep problems were obviated had lower tendency to substance related disorders (21). Ashoori assessed the relationship between sleep quality and temptation of using drugs among 83 addicted patients, and showed that there was a significant relationship between sleep quality and rate of temptation. In other words, a lower sleep quality is associated with higher rate of drug-use temptation in individual (22).

Generally, substance-related disorders can be considered a serious problem that contribute to addiction. Assessing and recognizing factors associated with substance-related disorders is important because they cause many problems for human’s health. The factors effective on substance-related disorders in reckless drivers have been assessed for decades and the relationship between aggression and sleep quality was analyzed in previous studies, yet the variables were not assessed sufficiently in the samples of reckless drivers (16, 19, 23, 24).

Therefore, the present study addressed this group of individuals. The reason underlying the examination of drug abuse in high-risk drivers was that drug abuse influences driving skills, balance and coordination, human understanding of driving, attention and accuracy, reaction time, and ultimately problem-solving skills of drivers. Drug abuse puts the individuals at risk, and endangers pedestrians and other people as well. Driving under these conditions can contribute to the risk of driving accidents and can badly affect the severity and consequences of an accident. On the other hand, factors, including sleeping habits and aggression and their control influences the reactions to driving conditions, cause numerous problems during driving, and culminate in numerous driving accidents. Therefore, with regards to the above and the effect of drug abuse on driving behavior, it is necessary to examine drug abuse consequences. It is noteworthy that previous studies have mostly examined the epidemiology of drug abuse among drivers and have failed to consider the predictive variables of drug abuse, such as sleep quality and aggression. Accordingly, the present study aimed at evaluating the function and effect of aggression and sleep quality in drug abuse among high-risk drivers.

2. Objectives

The current study aimed at predicting substance-related disorders based on aggression and sleep quality in reckless drivers of Kermanshah city.

3. Patients and Methods

3.1. Study Design

The study was predictive correlational, designed to predict group membership (people with and without drug abuse) and to achieve an audit equation. The study population included all high-risk drivers. The high-risk drivers were identified based on the Act No. 204361/T41646 of Iranian traffic police, and had instances and titles of high-risk driving offenses at the ministry of interior. As a result of prohibited overtakes, exceeding speed limits, drowsiness, drug abuse, alcohol abuse, or driving violence resulted in accidents inside or outside of urban areas, the vehicle or driving license of these drivers were confiscated by the traffic police during year 2014 and 2015. The sample size of the
The current study was a correlational research of prediction type and mainly sought to predict group membership (people with drug use and without substance related disorders) and to achieve discriminant equation, which is distinguished from method of discriminant analysis based on the relationship between structures of two groups of drug-addicted people and without substance related disorders.

3.2. Population

The research population comprised of all reckless drivers, who caused accidents due to unauthorized overtaking or speed, drowsiness, substance related disorders, alcohol or driving-related violence in and out of the city and their vehicles and driving license were taken away during year 2014 and 2015. The study sample size was 826 individuals.

The authors of the current research distributed the questionnaires after they explained the objectives of the research to the drivers, and received consent forms. After data collection, it was determined that 162 subjects should be excluded from the final analysis due to the incomplete responses to the questions. Therefore, the total sample size was 664 individuals. Of these people, 315 people did not have substance-related disorders, and 345 people had substance-related disorders, whose addiction test (stimulants and retardants) was reportedly positive. The inclusion criteria were confiscation of vehicle or driving license by the traffic police due to having high-risk traffic offenses, as well as being male and having at least secondary school education. The exclusion criteria included a history of mental illness or severe physical illness.

3.3. Measurement

3.3.1. Aggression Questionnaire

This questionnaire was a self-report paper-and-pencil scale compiled by Zahedifar et al. (26), and is comprised of 30 items, including 14 items on anger, eight on aggression, and eight on other factors i.e. obstinacy. In the questionnaire, the subjects respond to the questions, with four choices, including “never”, “rarely”, “sometimes” and “always”. The scores relevant to each option are zero, one, two, and three, respectively. Except for the article 18, whose factor loading is negative and whose scoring is in the reverse direction, the total score of the questionnaire ranges from 0 to 90 and is scored by the total scores of each item. People with scores of less than average, have lower aggression. Also, a higher score indicates greater aggression. The reliability underlying the questionnaire is satisfactory based on the test-retest coefficients and Cronbach’s alpha, and its validity is evaluated by correlation with Minnesota Multiphasic Personality Inventory (MMPI) and suitable Eysenck Personality Inventory (26).

The re-test coefficients among subjects’ scores in two stages (test and re-test) for all subjects (N = 90), female subjects (N = 48), and male subjects (N = 38) were r = 0.79, r = 0.64, r = 0.7, respectively. The Cronbach’s alpha coefficients were 0.87, 0.86, and 0.89 for all, female, and male subjects, respectively. Correlation coefficients between the subscales of personality disorder (PD) in the MMPI and Aggression questionnaire was 0.58 for all subjects; and the correlation coefficient of hostility-guilt inventory (Buss and Durkee, 1957) for all subjects was r = 0.56.

3.3.2. Pittsburgh Sleep Quality Index (PSQI)

This questionnaire was designed by Boyce et al. (27), to evaluate individual attitudes about sleep quality during the four last weeks. The questionnaire has seven scales, including a person’s overall description of sleep quality, sleep onset latency, duration of sleep, useful sleep, sleep disorder, amount of sleep medication taken, and disruptions in daily performance. The score relevant to each scale of the questionnaire is between zero and three. Scores zero, one, two, and three in every scale indicate natural conditions with regards to no, mild, moderate, and severe problems. The questionnaire has validity of 86.6 and reliability of 89.5. Farahi et al. (28), calculated the reliability of this questionnaire (equal to 0.77) by the Cronbach’s alpha method. Descriptive statistics (mean and standard deviation) and clean analysis were used for data analysis. The analysis method was performed by SPSS software (version 22) at the level of 0.05.
4. Results

The current research assessed the role of aggression and sleep quality on substance-related disorders, by using discriminant analysis. Independent variables entered in the analysis as the predictor of substance-related disorders included aggression (anger, invasion, and obstinacy) and sleep quality (sleep quality, sleep latency, duration of sleep, useful sleep, sleep disorder, amount of sleep medication taken, and disruption in daily performance). The analysis results showed that all 664 individuals entered the analysis. Table 1 shows mean and standard deviation of each independent variable among the two groups (i.e. without substance related disorders and substance related disorders).

The results showed the matrices of the two groups and their insignificant differences. This significance can be attributed to the high sensitiveness of the test to a large sample size. With regards to Table 2, BOX’s test shows that amount of covariance matrix in those without substance related disorders measures equivalence of covariance matrices between the two groups; means of BOX’s M test it was shown that covariance matrices of the two groups have significant differences (P < 0.0001; F = 6.087). With regards to the amount of covariance canonical correlation coefficient that is equal to Rr = 0.721, there was a strong relationship between the discriminant scores and study groups, and the intended discriminant function could be differentiated between those without substance related disorders and substance related disorders. The values obtained from the statistics of Wilks Lambda (0.480) and chi square (480.235) as well as their significance level (P < 0.0001) show the different means of the groups (Table 2).

Canonical discriminant function coefficients along with standardized canonical discriminant function coefficients, classification function coefficients as well as structure coefficient matrices are shown in Table 3. The results showed that out of ten independent variables under consideration, the variables including useful sleep, duration of sleep, invasion, sleep latency that had the standard coefficients 0.626, 0.332, 0.323, and 0.276, respectively, had more independent dispersion than other independent variables and played a more prominent role in the discriminant function. The variables, including obstinacy, disruption in daily performance, sleep disorder, sleep quality, anger, and sleep medication with coefficients of 0.003, 0.021, 0.037, 0.049, 0.102, and 0.123, respectively, played the least role in the discriminant function and its success. Furthermore, the structure coefficient showed that the variables, including useful sleep (0.835), sleep disorder (0.498), sleep latency (0.494), invasion (0.381), disruption in daily performance (0.356), amount of sleep medication taken (0.245), sleep quality (0.199), anger (0.176), and obstinacy (0.117) had a strong relationship with the discriminant function. The canonical discriminant function coefficients include the estimation of the discriminant function with other non-standard coefficients, and according to this estimation, the discriminant function equation is as follows:

The score of the discriminant function (DF1) = 1 con-
The current study aimed at predicting substance-related disorders based on the aggression and quality sleep among reckless drivers. Among the sub-scales relevant to aggression, invasion played an important role in predicting substance-related disorders based on the analyzed findings. This finding is in line with the findings of the research performed by Martinotti et al. (10), Epstein et al. (13), and Bushman (11). In order to explain the findings, it could be said that people with a high level of invasion have less power to control impulses. This weak point can provide the fertile background for drug use among the affected people. Furthermore, in order to explain the findings, it could be argued that aggressive people do not use drugs only for enjoyment, and use drugs for suppressing and overcoming the internal turbulence. On the other hand, it is possible for an aggressive person to be rejected by friends and peers that encounter life difficulties and show logical and stoical reaction. This factor can provide a fertile background for drug use among people's inclination towards drugs. On the other hand, based on the frustration-aggression theory, when people encounter personal and social problems, aggression and aggressive behavior are regarded as an unpleasant act. This can make a person angry and aggressive since aggression and aggressive acts are considered undesirable in terms of social culture and training. Such people may use drugs in order to overcome the emotion and receive internal comfort. They may achieve relaxation temporarily, and some people find this soothing effect in narcotic drug (23, 29, 30).

Another finding obtained from the current study was that useful sleep and sleep latency plays a more important role in predicting the tendency to substance-related disorders. This finding is in line with the findings of Landolt and Gllin (31), Teplin et al. (32), Fisk and Montgomery, and also findings of Peles et al. In other words, people with high quality sleep have less substance-related disorders. In order to explain this, it could be argued that people with

| Determining Correlation of Discriminant Score and Canonical Correlation Group (r) | Determining Strength of Explaining Model of Eigenvalue | Equivalence of Covariance Matrices in Two Box- M Test Groups | Amount of Covariance Matrices of Group (Box's M Test) |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Re.                             | v                               | BOX's M | F          | F          | Drug User | Without Substance Related Disorders |
|---------------------------------|---------------------------------|---------|------------|------------|-----------|------------------------------------|
| 0.326                           | 1.483                           | 139.63  | 4.179      | < 0.0001   | 0.03      | 5.72                               |

Table 2. The Results of Tests Conducted in Discriminant Analysis

5. Discussion

Accuracy of the addicted people was equal to 91.7%; 86.4% of people were classified correctly in the two groups based on the accuracy amount of the classification in the two groups.
Table 3. Amount of Canonical Discriminant Function Coefficients Along with Standardized Canonical Discriminant Function Coefficients, Classification Function Coefficient, and Matrices of Structure Coefficient

|                         | Canonical Discriminant Function Coefficients | Standardized Discriminant Function Coefficients | Discriminant Function Coefficients for Categorization | Matrix of Structure Coefficient |
|-------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------------|---------------------------------|
|                         | Substance Related Disorders                   | Without Substance Related Disorders             |                                                      |                                 |
| Anger                   | 0.102                                         | 0.063                                          | 0.185                                                | 0.062                           | 0.176                           |
| Invasion                | 0.362                                         | 0.001                                          | 0.329                                                | 0.198                           | 0.384                           |
| Obstinacy               | -0.003                                        | -0.063                                         | 0.117                                                | 0.118                           | 0.117                           |
| Sleep quality           | -0.049                                        | -0.343                                         | 1.166                                                | 1.245                           | 0.199                           |
| Sleep latency           | 0.276                                         | 0.429                                          | 1.657                                                | 0.943                           | 0.494                           |
| Duration of sleep       | 0.332                                         | 0.805                                          | 1.179                                                | 0.287                           | 0.689                           |
| Useless sleep           | 0.626                                         | 0.046                                          | 1.854                                                | 0.189                           | 0.835                           |
| Sleep disorder          | 0.037                                         | 0.013                                          | 0.624                                                | 0.529                           | 0.498                           |
| Amount of sleep medication taken | -0.027                                      | 0.139                                          | -0.339                                               | 0.050                           | 0.245                           |
| Disruption in daily performance | -0.021                                       | -0.025                                         | 0.109                                                | -0.161                          | 0.366                           |
| Constant                | -                                             | -2.915                                         | -0.821                                               | -4.865                          | -                               |

Table 4. Classification of People in the Two Groups, i.e. Without Substance Related Disorders and Addicted People Based on the Leave-One-Out Method

| Groups                            | Group Predicted for Membership | Without Substance Related Disorders | Addicted People | Total |
|-----------------------------------|--------------------------------|-------------------------------------|-----------------|-------|
| Main group, No. (%)               |                                |                                     |                 |       |
| Without substance related disorders | 281 (84.0)                     | 34 (16.0)                           | 315 (100.0)     |
| Substance related disorders       | 56 (10.8)                      | 293 (89.2)                          | 349 (100.0)     |
| Cross reliable group, No. (%)     |                                |                                     |                 |       |
| Without substance related disorders | 280 (88.9)                     | 35 (11.1)                           | 315 (100.0)     |
| Substance related disorders       | 59 (16.9)                      | 290 (83.1)                          | 349 (100.0)     |

Less useful sleep and delayed sleep generally experience less sleep (33, 34). They may have active and passive readiness for inclination towards substance-related disorders. Because this factor plays an important role in health, lack of suitable sleep quality results in different disorders, such as depression, eating disorders, and anxiety disorders. Low quality sleep consists of irregular and shallow sleep and inability to sleep, resulting in daily fatigue, irritability, and lack of concentration. This, in turn, can underlie the inclination towards sleep medication.

In general, by virtue of data analysis, it could be inferred that a person with little useful sleep, problems during sleep or aggressive spirit is more likely to be afflicted with substance-related disorders. Regarding important limitations of the present study, the following can be mentioned: Cross-sectionalist, probability of choice bias, and possibility of unrealistic responses due to the use of self-report questionnaires. Another limitation of the study was ignorance of mediator variables in the analysis. With regards to the high prevalence of drug use in the society and also financial costs and psychological consequences for addicts, their family and society, it is usually important to recognize people, who are subjected to risk of substance-related disorders and people, who use drugs as part of treatment and prevention interventions. The results of the current study are useful for therapists that are engaged in the field of substance-related disorders treatment.

In general, it can be said that in this study, the authors sought to examine whether sleep quality and aggression have any influence on drug abuse in high-risk drivers. For this purpose, the drivers that were identified as high-risk drivers by the traffic police were selected and examined. The results of the statistical analysis indicated that good sleep, sleep time, and invasive and delayed sleep had the...
greatest role in drug abuse among high-risk drivers. Addiction researchers and therapists are hence advised to pay attention to sleep habits and ways of expressing anger as factors influencing drug abuse. These will have more importance when studied in drivers, as drug abuse in high-risk drivers can place other people at risk, as well, because of high-risk behaviors.

With regards to different factors that influence the substance-related disorders, it is suggested that effective factors should be recognized and paid attention to, so accurate judgment is achieved in predicating factors of inclination towards substance related disorders.

Acknowledgments

The authors would like to thank the Substance Abuse Prevention Research Center and Clinical Research Development Unit (CRDU) of Emam Khomeini Hospital, Kermanshah University of Medical sciences, Kermanshah, Iran for their support, cooperation and assistance throughout the period of study.

Footnote

Conflict of Interests: No potential conflict of interest relevant to this article was reported.

References

1. Chekijian S, Paul M, Kohl VP, Walker DM, Tomassoni AJ, Cone DC, et al. The global burden of road injury: Its relevance to the emergency physician. Emergen Med Int. 2014;2014:9. doi: 10.1155/2014/13929.
2. Holakoi Naeini A, Moradi A. Knowledge, attitude and practice of pedestrians about driving laws in Tehran. J Iran Inst Health Sci Res. 2007;6(1):27-35. Persian.
3. Sewell RA, Poling J, Sofooglu M. The effect of cannabis compared with alcohol on driving. Am J Addict. 2009;18(3):185-93. doi: 10.1111/j.1521-0391.2009.00069.x. [PubMed: 19340616]. [PubMed Central: PMC2722955]
4. Bramer NG, Skurtevit S, Morland J, Engeland A. An increased risk of motor vehicle accidents after prescription of methadone. Accid Anal Prev. 2005;37(5):629-44. doi: 10.1016/j.cpr.2005.04.007. [PubMed: 15953666]. [PubMed Central: PMC2572740]
5. Motevalian SA, Holakouie Naieni K, Mahmoodi M, Majdzadeh R, Akbari ME. [Estimation of death due to road traffic injuries in Kerman district: Application of capture-recapture method]. J Sch Pub Health Inst Pub Health Res. 2007;5(2):65-72. Persian.
6. Gururaj G. Alcohol and road traffic injuries in South Asia: Challenges for prevention. J Coll Physicians Surg Pak. 2004;14(12):731-8. [PubMed: 1560627].
7. Zhuo X, Cang Y, Yan H, Bu J, Shen B. The prevalence of drugs in motor vehicle accidents and traffic violations in Shanghai and neighboring cities. Accid Anal Prev. 2005;37(6):2179-84. doi: 10.1016/j.aap.2005.07.004. [PubMed: 20728679].
8. Bliswode DL. Sleep in normal aging and dementia. Sleep. 1993;16(1):40-81. [PubMed: 8456235].
9. Sommer J, Hinsberger M, Elbert T, Holzhauslen L, Kaminer D, Seidat S, et al. The interplay between trauma, substance abuse and appetitive aggression and its relation to criminal activity among high-risk males in South Africa. Addict Behav. 2017;64:29-34. doi: 10.1016/j.addbeh.2016.08.008. [PubMed: 27540760]. [PubMed Central: PMC5502240].
10. Martitoni G, Cinosi E, Santacroce R, Papanti D, Pasquini A, Mancini V, et al. Substance-related psychopathology and aggressiveness in a nightlife holiday resort: Results from a pilot study in a psychiatric inpatient unit in Ibiza. Hum Psychopharm Clin Exp. 2017;32(4), e2586. doi: 10.1002/hup.2586.
11. Bushman BJ. Effects of alcohol on human aggression. Validity of proposed explanations. Recent Dev Alcohol. 1997;33:227-43. [PubMed: 9212497].
12. Hayatbakhsh MR, Najman JM, Bor W, O'Callaghan MJ, Williams GM. Multiple risk factor model predicting cannabis use and use disorders: A longitudinal study. Am J Drug Alcohol Abuse. 2009;35(6):399-407. doi: 10.1080/00952990903353415. [PubMed: 20049490].
13. Epstein JA, Botvin GJ, Diaz T, Williams C, Griffin K. Aggression, victimization and problem behavior among inner-city minority adolescents. J Child Adoles Subst. 2000;9(3):51-66. doi: 10.1300/J029v09n03_04.
14. Jaffe A. Drug use and aggression: The effect of rumination and other person-related variables. California State University. 2005.
15. Carskadon MA, Dement WC. Effects of total sleep loss on sleep tendency. Percept Mot Skills. 1979;48(2):495-506. doi: 10.2466/pms.1979.48.2.495. [PubMed: 46051].
16. Mahfoud Y, Talib F, Streem D, Budur K. Sleep disorders in substance abusers: how common are they? Psychiatry (Edgmont). 2009;6(9):38-42. [PubMed: 19855859]. [PubMed Central: PMC2766287].
17. Roane BM, Taylor DJ. Adolescent insomnia as a risk factor for early adult depression and substance abuse. Sleep. 2008;31(10):1351-6. doi: 10.1093/sleep/31.10.1351. [PubMed: 18853932]. [PubMed Central: PMC2727440].
18. Wong MM, Brower KJ, Fitzgerald HE, Zucker RA. Sleep problems in early childhood and early onset of alcohol and other drug use in adolescence. Alcohol Clin Exp Res. 2004;28(4):578-87. [PubMed: 1500609].
19. Johnson EO, Breslau N. Sleep problems and substance use in adolescence. Drug Alcohol Depend. 2003;64(1):7-17. doi: 10.1016/S0376-8716(02)00057-4.
20. Crum RM, Ford DE, Storr CL, Chan YF. Association of sleep disturbance with chronicity and remission of alcohol dependence: Data from a population-based prospective study. Alcohol Clin Exp Res. 2004;28(10):1533-40. [PubMed: 15597066].
21. Rootzin RR, Stevens SJ. Adolescents, substance abuse, and the treatment of insomnia and daytime sleepiness. Clin Psychol Rev. 2005;25(5):629-44. doi: 10.1016/j.cpr.2005.04.007. [PubMed: 15953666].
22. Ashoori A. The relationship between sleep quality and narcotic substance temptation in addict under the therapy. Iran J Child Adoles Subst. 2011.
23. Boles SM, Miotto K. Substance abuse and violence: A review of the literature. Aggress Violent Behav. 2003;8(2):155-74. doi: 10.1016/S1359-1781(03)00057-4.
24. Conroy DA, Arndt T. Sleep and substance use disorders: An update. Curr Psychiatry Rep. 2014;16(10):487. doi: 10.1007/s11920-014-0487-3. [PubMed: 25135784].
25. Fergusson D, Swain-Campbell N, Horwood J. Risky driving behaviour among young people: Prevalence, personal characteristics and traffic accidents. Aust NZ J Publ Heal. 2003;27(1):137-42. doi: 10.1111/j.1448-4226.2003.tb00404.x.
26. Zahedifar NB, Shokrkon H. Construction and Validation of a Scale to measure aggression. J Educ Sci Psychol. 2008;2(2):73-102.
27. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213. doi: 10.1016/0165-1788(89)90047-4.
28. Farrahi Moghaddam J, Nekhasee N, Sheibani V, Garrusi B, Amirkafi A. Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). Sleep Breath. 2012;16(1):79-82. doi: 10.1007/s11325-010-0478-5. [PubMed: 21614577].

29. Moss HB, Tarter RE. Substance abuse, aggression, and violence. Am J Addiction. 1993;2(2):149-60. doi: 10.1111/j.1521-0391.1993.tb00215.x.

30. Fauziah I, Mohamad MS, Chong ST. Substance abuse and aggressive behavior among adolescents. Asian Social Sci. 2012;8(9):92-7.

31. Landolt HP, Gillin JC. Sleep abnormalities during abstinence in alcohol-dependent patients. Aetiology and management. CNS Drugs. 2001;15(5):431-5. [PubMed: 11475945].

32. Teplin D, Raz B, Daiter J, Varenbut M, Tyrrell M. Screening for substance use patterns among patients referred for a variety of sleep complaints. Am J Drug Alcohol Abuse. 2006;32(1):11-20. [PubMed: 16450646].

33. Fisk JE, Montgomery C. Sleep impairment in ecstasy/polydrug and cannabis-only users. Am J Addict. 2009;18(5):430-7. doi: 10.3109/10550490903077762. [PubMed: 19874164].

34. Peles E, Schreiber S, Adelson M. Variables associated with perceived sleep disorders in methadone maintenance treatment (MMT) patients. Drug Alcohol Depend. 2006;82(2):103-10. doi: 10.1016/j.drugalcdep.2005.08.001. [PubMed: 16154297].