



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

Nasrin Abdoli¹, Vahid Farnia¹, Safora Salemi ^{1*}, Hossein Zhaleh², Mehdi Khodamordi², Touraj Ahmadijouybari¹, 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

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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, researches have argued that any kind of substance that influences the nervous sys-

tem 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-

ducted 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

study was 826 individuals, which was determined according to Fergusson et al. (25). In order to access high-risk drivers, samples were selected with the simple random method from the list provided by Kermanshah county traffic police of Iran. In the next step, given the fact that such drivers were required to attend educational classes held by the traffic police, in coordination with the officials and educational experts of the traffic police, two researchers attended educational classes and distributed the questionnaires after explaining the study and obtaining consent to participate. After collecting questionnaires, 162 drivers were excluded from the final analysis due to failure to answer questions completely, and 664 subjects were hence analyzed, eventually. Of these, 315 were normal and 345 were drug-abusers, whose addiction test (stimulants and retardants) was 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.

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 first criterion to enter the study was that people should have been seized by dangerous driving offence, or their driving licenses taken away. Furthermore, having at least secondary-school education and being of male gender were other in-

clusion criteria. People with a history of mental illness or severe physical illness were excluded from the study.

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 $R_r = 0.721$, 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

Table 1. The Values Relevant to Descriptive Statistics Between Two Individual Groups i.e. the Group Without Substance Related Disorders and the Group with Substance Related Disorders

	No.	Mean	SD
Aggression			
Anger			
Without substance related disorders	315	17.38	9.36
Substance related disorders	349	20.81	9.31
Invasion			
Without substance related disorders	315	5.92	3.11
Substance related disorders	349	10.00	6.45
Obstinacy			
Without substance related disorders	315	6.86	5.08
Substance related disorders	349	8.14	5.40
Quality Sleep			
Sleep quality			
Without substance related disorders	315	1.08	0.72
Substance related disorders	349	1.41	0.81
Sleep latency			
Without substance related disorders	315	1.01	0.80
Substance related disorders	349	1.84	0.80
Duration of sleep			
Without substance related disorders	315	0.92	0.76
Substance related disorders	349	2.03	0.78
Useful sleep			
Without substance related disorders	315	0.86	0.81
Substance related disorders	349	2.22	0.74
Sleep disorder			
Without substance related disorders	315	1.09	0.79
Substance related disorders	349	1.92	0.80
Amount of sleep medication taken			
Without substance related disorders	315	0.97	0.80
Substance related disorders	349	1.42	0.96
Disruption in daily performance			
Without substance related disorders	315	1.02	0.83
Substance related disorders	349	1.65	0.83

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-

Table 2. The Results of Tests Conducted in Discriminant Analysis

Determining Correlation of Discriminant Score and Canonical Correlation Group (n)	Determining Strength of Explaining Model of Eigenvalue	Equivalence of Covariance Matrices in Two Box ('s M test) Groups			Amount of Covariance Matrices of Group (BOX 's M Test)	
		BOX's M	F	P	Drug User	Without Substance Related Disorders
0.721	1.083	339.651	6.078	< 0.0001	6.03	5.72

stant (-2.915) + anger (0.063) + invasion (0.001) + obstinacy (-0.062) + sleep quality (-0.343) + sleep latency (0.429), duration of sleep (0.805) + useful sleep (0.046) + sleep disorder (0.013) + amount of taken sleep medication (-0.139) + disruption in daily performance (0.025).

This equation indicates that when one unit of anger variable is increased, assuming other variables are fixed, the amount of discriminant function (0.063) is also increased. In addition, when one unit of "sleep quality" variable is increased, assuming other independent variables are fixed in the model, the amount of the discriminant function (0.343) is decreased. This function differentiates the two groups, including the subjects without substance related disorders and those with substance related disorders. When the values of the following equation for every person present in the study are substituted, the score of the discriminant function for that respondent is determined.

Classification of people without-substance related disorders and substance related disorders group is performed by the coefficient of the classification function as follows:

Classification function of normal- people group = constant (-4.865) + anger (0.162) + invasion (0.198) + obstinacy (0.138) + sleep quality (1.245) + sleep latency (0.943) + duration of sleep (0.287) + useful sleep (0.189) + sleep disorder (0.529) + sleep medication (0.050) + disruption in daily performance (-0.161).

Classification function of the substance-abusing group = constant (-10.821) + anger (0.185) + invasion (0.329) + obstinacy (0.137) + sleep quality (1.116) + sleep latency (1.657) + duration of sleep (1.179) + useful sleep (1.845) + sleep disorder (0.624) + sleep medication (-0.339) + disruption in daily performance (0.109).

Table 4 shows the number and percentage of people classified in the two groups correctly and mistakenly. The classification results showed that 281 people (84.0%) without substance related disorders were classified correctly in the group of without substance related disorders and 34 people (16.0%) were classified mistakenly in the group of addicted people. In the group of addicted people, 293 people (89.2%) were classified correctly in the group of addicted people and 56 people (10.8%) were classified in the group of without substance related disorders mistakenly. Therefore, the classification accuracy of without substance related disorders was equal to 85.6% and classification ac-

curacy 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.

5. Discussion

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 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 Gillin (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

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	0.162	0.176
Invasion	0.362	0.001	0.329	0.198	0.384
Obstinacy	-0.003	-0.063	0.137	0.138	0.117
Sleep quality	-0.049	-0.343	1.116	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
Useful 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	-0.0127	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	-10.821	-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		Total
	Without Substance Related Disorders	Addicted People	
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.

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Footnote

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