

## Comparative Investigation of Sleep Problems in Opioid-Dependent and Normal Subjects

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### Abstract

**Background and Objective:** Sleep disorders are one of the problems of substance abusers, which might result in emotional and logical thinking breakdown in those individuals. The main aim of the current research was to compare sleep problems in two groups of substance users and normal subjects.

**Materials and Methods:** This study compared 90 substance users who were referred to the addiction treatment centers with 90 subjects who were relatives as a normal group. Participants were asked to fill out Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI), and STOP-BANG questionnaires. Data analysis was performed using independent t-test and descriptive indicators at the significant level of  $P < 0.050$ .

**Results:** The average of age was  $38.21 \pm 4.35$  years in the addict group and  $41.11 \pm 5.27$  in the normal group ( $P < 0.050$ ). All the participants were men. Our findings indicated a significant difference between the two study groups in the PSQI ( $P < 0.001$ ) and ESS ( $P < 0.010$ ) scores with a higher mean score for the addict group. However, normal group showed a significantly higher mean score on the ISI and STOP-BANG compared to the addict group ( $P < 0.010$ ).

**Conclusion:** According to the results of this study, sleep problems are common in people who are dependent on drugs, and should be given more attention.

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**Keywords:** Substance-related disorders; Sleep; Sleep initiation and maintenance disorders; Obstructive sleep apnea

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### Introduction

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) in 2013 considers the cognitive, behavioral, and physiological symptoms as the important features of drug abuse disorder, and people with substantial drug abuse problems still continue to use it. The diagnostic set also suggests that substance use disorder (SUD) can create a fundamental change in brain circuits, which may remain after the detoxification (1). One of the factors which is affected by drug dependence, and in patients who are treated with preservatives, is their sleeping mode. Sleep disorders generally cause massive daily drowsiness which could have effects on mood, alertness,

memory, security, and performance in such a way that chronic insomnia, derived from insomnia, may affect cognitive function of the brain during which the risk of relapse is high (2). In many cases, lack of quality and quantity of sleep might cause the person to use or reuse sedating medications and replaced drugs (3). Drugs cause severe sleeping problems for the person to fall sleep and even may destroy the quality of sleep. It is estimated that 10 to 12 percent of people who are suffering from chronic sleep disorder have problems of drug abuse (4). Poor sleep quality has been observed in individuals with SUD including alcohol (5), nicotine (6), marijuana (7), and heroin (8) users, and often serves as a salient trigger for relapse. Therefore, substance users usually report poor sleep and are at a greater risk for relapse and sleep disturbance (9). Sleep problems can persist for weeks and months, and sometimes years after

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substance use cessation (10). One study of 60 alcohol-dependent patients found that poor sleep, specifically sleep latency, was the best predictor of relapse after a 12-week inpatient program (11). In another study by Brower, 60% of alcohol-dependent patients with baseline insomnia had relapsed at 5-month post treatment, as compared to 30% of patients without baseline insomnia. Additionally, significantly higher rates of relapse were observed among patients who were endorsed, as compared to those not endorsed, using alcohol to self-medicate the symptoms of insomnia (59.5% vs. 37.8%) (5). Sleep problems are usually not sufficiently treated. Some of the factors related to poor quality of sleep and related disorders in abusers of opiates include: age of onset of substance abuse, addiction duration, and using alcohol or stimulant drugs such as amphetamine (12). In addition to the side effects, such as anxiety, mood problems such as depression or extreme euphoria, delusions, and lack of coordination in movements, which can be seen in many drug-dependent people, may also cause the result of long-term sleep disorders or exacerbate them. Therapeutic approaches in sleep disorders of drug abusers may be pharmacological or otherwise. Pharmaceutical approach to treating sleep disorders (including prescribed sleep aid drugs or stimulants) should coincide with withdrawal-oriented programs including maintenance treatment with Buprenorphine or Methadone or abstinence-based treatment. Some common methods of non-pharmacological approach to sleep disorders include: Cognitive Behavioral Therapy (CBT), psychotherapy, phototherapy, sleep hygiene principles, and inducing accurate sleep restriction in patients (2). Accordingly, sleep disorders are one of the problems of substance abusers, which might result in emotional and logical thinking breakdown in those individuals. The aim of this study was to compare sleep problems in two groups of substance users and normal subjects. It seems that the research and acquisition of knowledge in this field could effectively help the subjects under the drug addiction treatment and prevent reusing of drugs.

## Materials and Methods

This comparative research was conducted on people referring to 5 addiction treatment clinics in Mashhad City, Iran, in 2016, who did not initiate the treatment yet. Along with this group, 90 sub-

jects, who were the patients' relatives, were selected as a normal group. After obtaining the consent letter from the addiction treatment centers, a list of the addicts who were referred for treatment was prepared for initiation of treatment. After the initial interview, 180 individuals (90 addicts and 90 normal subjects), who had the eligibility to participate in the study, were selected. Participants with no other serious mental disorders or diseases, male gender, aged 30- 50 years, and having history of opioid addiction were recruited in the study. They were selected using convenient sampling method. After obtaining informed consent form, participants were asked to complete forms on sleep quality: Pittsburgh Sleep Quality Index (PSQI), daytime sleepiness: Epworth Sleepiness Scale (ESS), insomnia: Insomnia Severity Index (ISI), and sleep apnea: STOP-BANG questionnaire. Descriptive indices such as mean and standard deviation (SD) and independent t-test were used to analyze the data. The data analysis was performed by SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

**Pittsburgh Sleep Quality Index (PSQI):** PSQI is a useful tool designed by Buysse et al. in 1989 at the Pittsburgh Institute of Psychiatry to assess the quality of sleep quality (13). It originally consists of 9 questions; however, the question 5 contains 10 sub-items, so the whole questionnaire contains 19 items in a 4-point Likert scale from 0 to 3. The questionnaire has 7 subscales including sleep quality, sleep latency, sleep duration, sleep efficiency rate, sleep disorders, use of sleeping medication, and daytime dysfunction. Different scales of sleep quality in this tool are scored as follows: zero for no problems, 1 for serious problems, 2 for very serious problems, and the overall score above 5, meaning poor sleep quality. The reliability of this scale is calculated 0.083. Its reliability with sensitivity of 0.089 and specificity of 0.086 in patients compared to control subjects has been reported by the creators of this scale (14). A validated and reliable Persian version of the questionnaire was used (15).

**Epworth Sleepiness Scale (ESS):** ESS with eight items has been designed to determine a person's level of daytime sleepiness. All questions concern how likely persons feel sleepy in various positions. The test is a list of eight situations in which person rates his/her tendency to become sleepy on a scale of 0, no chance of dozing, to 3, high chance of dozing.

**Table 1.** Age and medication use in two different studied groups

Variable	Group	Mean (SD)	Minimum	Maximum	P-value
Age (year)	Addicts	38.21 (4.35)	30	50	0.001*
	Normal	41.11 (5.27)	31	50	
Hypnotic drugs	Addicts	68.23	-	-	0.001*
	Normal	4.12	-	-	

\*P &lt; 0.001

SD: Standard deviation

The total score of ESS ranges from zero (impossible to sleep in any position) to 24 (likely to be sleepy at all 8 items). The participant can be labeled as the following categories: "0-7" unlikely to be abnormally sleepy; "8-9" having average amount of daytime sleepiness; "10-15" being excessively sleepy depending on the situation which might need medical attention; "16-24" being excessively sleepy and medical attention should be sought. The Cronbach's alpha for ESS has been reported 0.70 to 0.73 in different studies (16, 17). A validated and reliable Persian version of the questionnaire was used (18).

**Insomnia Severity Index (ISI):** ISI contains seven questions with responses in Likert scale, ranging from zero (no problem) to 4 (severe), which has been designed to evaluate the insomnia and its consequences on daily life. The questionnaire shows 8 indices of insomnia. The total score can be evaluated using following guidelines for scoring/interpretation: "0-7" no clinically significant insomnia, "8-14" subthreshold insomnia, "15-21" clinical insomnia (moderate severity), and "22-28" clinical insomnia (severe). The reliability of the questionnaire has been reported 0.74 by Bastien et al. (18). The reliability of the ISI questionnaire using internal consistency was reported 0.91 in Morin et al. study (19). The questionnaire was translated in a reliable and validated version for Persian-speaking students (20).

**Sleep apnea questionnaire: STOP BANG:** It is a reliable instrument for screening obstructive sleep apnea (OSA) during sleep. The questionnaire consists of eight items that include snoring, exhaustion, daily drowsiness, high blood pressure (HBP) or use of antihypertensive drugs, body mass index (BMI) higher than 30 kg/m<sup>2</sup>, old age (above 50 years), neck circumference of more than 40 cm, and the male gender. The positive answer to each question was scored 1 and the negative answer (absence of the item) was scored zero. Out of 8 items, 3 or more positive responses indicate a high risk of OSA, while less than 3 positive responses indicate a lower risk of OSA (21). The content validity of this questionnaire was

confirmed by Chung et al. (21), and its reliability was measured by retest (0.96) in test-retest (0.90) methods (22). The reliability of this tool in the present study was calculated as 0.90.

## Results

The mean age of the subjects was  $38.21 \pm 4.35$  years in the addict group and  $41.11 \pm 5.27$  in the normal group ( $P = 0.024$ ). Of all the participants, 58% were married and 42% were single. All the participants were men (Table 1).

In the following, some descriptive (mean and SD) and inferential (independent t) indices related to the variables of sleep problems were calculated in the two groups (addicts and normal subjects).

Table 2 shows some descriptive characteristics of the two study groups. Higher scores of sleep quality and sleepiness were observed in the addict group compared to normal subjects. The scores of severity of apnea and insomnia were lower in addict group compared to normal group. These significant differences were sustained after adjusting for age.

**Table 2.** Mean and standard deviation (SD) of four sleep questionnaires' scores in two different studied groups

Variables	Group	Mean	SD	P-value
PSQI	Addicts	12.42	3.16	< 0.001**
	Normal	8.63	2.48	
ESS	Addicts	9.14	2.21	0.001*
	Normal	8.25	1.32	
ISI	Addicts	18.52	3.78	0.001*
	Normal	22.91	2.23	
STOP BANG	Addicts	1.35	1.64	0.001*
	Normal	3.56	1.26	

PSQI: Pittsburgh Sleep Quality Index; ESS: Epworth Sleepiness Scale; ISI: Insomnia Severity Index; STOP BANG: Sleep apnea questionnaire; SD: Standard deviation

\*P &lt; 0.010; \*\*P &lt; 0.001

## Discussion

Our study found a significant difference between the two groups of substance users and normal subjects in terms of quality of sleep. Our results also indicated that normal subjects showed a better performance on sleep quality and sleepiness scales. Furthermore, our findings showed that no-

normal group reported more problems in the scales of severity of insomnia and sleep apnea. Insomnia in the addict group can be due to numerous respiratory pauses and so waking up, and disturbance of the sleep cycle leads to chronic fatigue and frustration during the day. These findings are consistent with the results of the study by Mahfoud et al. (12) on people who suffered from substance abuse and were not under specific treatment, they answered to a set of questionnaires of sleep disorders including PSQI, ISI, and STOP-BANG (screening apnea during sleep). In these people, 80 percent had alcohol addiction and 40 percent had alcohol and opiates addiction. Overall, 26 percent of people had interdependent drugs addiction. More than 40 percent of the participants in this study reported self-medication with drugs or stimulants to improve their sleep. The prevalence of sleep disorders in abusers in this study, on the basis of PSQI, was higher than 5 times in 96 out of one-hundred times. 56 percent of these people suffered from moderate to severe insomnia; 53 percent suffered from sleep apnea, and 33 percent suffered from restless leg syndrome (RLS) or periodic limb movements during sleep (12). On the basis of this report and similar studies, the prevalence of sleep problems in drug abusers is 5-10 times higher than general population (12).

In the study by Wang and Teichtahl, participants completed standardized questionnaires including the ESS and Functional Outcomes of Sleep Questionnaire (FOSQ) (9). They found that addict patients had significantly worse daytime function and increased daytime sleepiness when compared to control subjects. Similarly, our opioid-dependent patients had higher daytime dysfunction scores compared to control subjects. Almost all previous studies reported significant differences in sleep quality between opioid-dependent patients and control subjects. Our study confirmed the results of an earlier study (22) showing poorer sleep quality among opioid-dependent patients compared to the general population.

Sleep disturbance is known as one of the most important aspects of physical and mental disorders of people with SUD. Cognitive disabilities including memory, learning, attention, and executive dysfunctions have been seriously affected by inadequate or poor sleep, and might commonly be observed as a type of cognitive disorders in substance abusers. In addition to the side effects, such as anxiety, mood problems such as depression or

extreme euphoria, delusions, and lack of coordination in the movements were seen in many drug dependents and may cause or exacerbate the long term sleep disruption. It is expected that appropriate treatment and management of sleep disorders in this group play an important role in increasing success of treatment methods for quitting drugs and improvement of cognitive function in these patients. This research had some limitations including a control variable, material consumption, and lack of control for patients with HIV infection. Since the study was conducted in Mashhad City, generalization of the results should be used with caution.

### Conclusion

People with substance use had worse sleep quality indices such as delay in falling sleep, sleep duration, sleep efficiency, and frequent wake-ups compared to the normal subjects.

### Conflict of Interests

Authors have no conflict of interests.

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