

Comparison of Sleep Quality Indices in Patients with Opium and Methamphetamine Addiction

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Abstract

Background and Objective: Sleep and sleep-related indices can be altered in substance users especially methamphetamine and opioid users. Studies have shown that sleep in substance users does not change uniformly. The aim of this study was to compare sleep and related indices in patients with opium and methamphetamine addiction.

Materials and Methods: In this descriptive study, 143 opium and methamphetamine addicts who referred to four addiction treatment clinics in Kermanshah, Iran, in 2018-2019, were evaluated by four sleep questionnaires including Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI), and Berlin Questionnaire (BQ).

Results: There was a significant difference between the two groups in the number of female participants, age of participants, education level, and years of substance use ($P < 0.05$). Patients with opium addiction, compared to methamphetamine users, had a poorer sleep quality, symptoms of insomnia, and sleepiness in everyday situations.

Conclusion: The type of substance can affect the type of sleep problems experienced by individuals. Interventions in the future should be tailored to personalized problems of sleep, depending on the type of substance (opium or methamphetamine).

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Introduction

Sleep is one of the most important behaviors comprising of about one-third of human life. Although sleep is important to health, various studies have shown that 5-40 percent of the general population suffer from chronic sleep problems (1-3). Sleep is regulated by a few basic mechanisms in the human body and sleep disorders occur when these mechanisms are inoperative (4). These natural mechanisms can be influenced by various factors such as daily stress (5), occupation (6), medi-

cal illness (7), mental disorders (8), and etc. One of the most important factors influencing sleep and its problems is substance-related disorders.

Up to now, several studies have examined the association between sleep structure and various addictive substances such as caffeine (9), nicotine (10), alcohol (11), opioids (12), amphetamines (13), and methamphetamine (14). The joint problems of sleep and drug use cause a huge cost to the economies of different countries each year. In this regard, the need for further study of the relationship between sleep and substance use becomes more important. On the other hand, in particular, the consumption of two specific types of substance including methamphetamine and opium is reported in Iran (15). In a study conducted by

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Ziaaddini and Ziaaddini in one of the cities of Iran (Kerman), 17.1% used drugs and 5.3% used opioids (16). In Shiraz City, Iran, opium use accounted for 8.8% of the study population (17). Several studies in addiction treatment clinics have reported different frequencies for opioid use (18-20). Methamphetamine consumption has been reported differently from about 6% to 20% in clinic setting studies (21). As sleep has interactive association with substance use (22), further studies to compare the quality of sleep in substance users seem warranted.

In a study by Garcia and Salloum, the results showed that the consumption of nicotine, caffeine, alcohol, cocaine, opioid, and cannabis had a significant effect on the sleep patterns of individuals based on the course of poisoning, deprivation, and chronic use. The authors also analyzed objective structure of the sleep (23). In the study of Madanifard et al., it was shown that opioid-dependent individuals had poorer sleep quality and more daytime sleepiness. In contrast to the healthy subjects, lower scores were found in the intensity index of insomnia and sleep apnea (24). In a recent study, the sleep quality of healthy subjects was compared with the ones with opium addiction. Khazaie et al. (25) showed that the sleep quality of people who used opioid was poorer than the ones with methamphetamine addiction and there was a higher level of sleep deprivation in these individuals. Other sleep indices such as obstructive sleep apnea (OSA) and insomnia were not evaluated in this study. This study has indicated that 82.5% of opium users and 94.8% of methamphetamine users had poor sleep quality (25). It is necessary to carry out further studies with a comparative approach in order to consider appropriate psychological interventions for opium and methamphetamine users.

By identifying the difference in perceived sleep quality, the type of intervention that will be used in the future will determine the maximum productivity for quitting addiction and improving the quality of sleep in these individuals. The purpose of this study was to evaluate the sleep quality of opium and methamphetamine users in a comparative approach.

Materials and Methods

This was a descriptive cross-sectional study with a comparative approach. The statistical population for this study consisted of all people with opium and methamphetamine dependency in

Kermanshah City, Iran, who referred to four addiction treatment clinics in order to take necessary therapeutic measures for quitting addiction. After completing the questionnaires and conducting clinical interview by clinical psychologists, they were referred to complete the treatment process. The inclusion criteria of the research included: 1) consumption of substance at least two months with a level of dependency, 2) not taking the other substances at the same time as taking opium or methamphetamine, 3) no history of taking any medication over the past month, 4) no history of head trauma or any neurological disorder, 5) no severe psychiatric disorders, 6) not drinking alcohol in the recent month, 7) informed consent and having enough time to answer the questionnaires, and 8) willingness to participate in the research. The exclusion criterion was the lack of desire to answer all the questionnaires. A total of 197 people were evaluated over a two-year period (from January 2018 to March 2019), of which 143 were eligible for inclusion in the study. Since the people referred to the clinics for the treatment necessary to quit addiction and the information about the questionnaires of this study would help to select the appropriate intervention, they participated in the research with the informed consent after explaining the goals. In order to comply with ethical standards, all participants were referred to specialists to follow up with their treatment process.

Pittsburgh Sleep Quality Index (PSQI): PSQI evaluates sleep quality through 19 questions in 4 options. There are seven components that distinguish optimal sleep quality from poor sleep quality during the past month. Each component is scored from 0 to 3, and the total score of the questionnaire is measured in the range of 0-21. Score 6 and above indicates poor sleep quality (26, 27). The Cronbach's alpha for the questionnaire is 0.80, and its test-retest reliability was reported to range from 0.93 to 0.98 (26, 27).

Epworth Sleepiness Scale (ESS): ESS is used to determine the level of excessive daytime sleepiness (EDS). In this questionnaire, there are 8 items that relate to a person's sleepiness in different places. Eight different positions are ranked according to the person's tendency to sleep from zero, meaning no chance of dosing, up to 3, high chance of dozing. The total scores of this questionnaire fall in the range of 0 (the person is not sleeping in any situation) to 24 (possibly sleeping in all eight situations). The Cronbach's alpha of

this questionnaire has been reported from 0.70 to 0.73 (28, 29).

Insomnia Severity Index (ISI): The ISI is a questionnaire for evaluating insomnia and its consequences. On a Likert scale, scores from zero (no problem) to four (severe problem) can change for each of the eight items. Scores from zero to seven indicate that insomnia is not clinically meaningful. Scores of 8-14 indicate subthreshold insomnia. Scores ≥ 15 indicate clinical significance. The reliability of the questionnaire was 0.74 (30) and its internal consistency was 0.91 (31). This questionnaire is also standardized in Iran (32).

The Berlin Questionnaire (BQ): BQ is a useful tool for screening risk of OSA. Netzer et al. studied efficacy of BQ in a primary care setting (33). Three sections of BQ include asking a person to score his snoring as section one, daytime fatigue and sleepiness during daily activities as section two, and medical history, demographic, and anthropometric measures such as height and weight as the last section. Amra et al. translated the BQ into Persian and validated it in Iranian general population. The reliability of BQ categories showed Cronbach's alpha of 0.70 for section 1 and 0.50 for section two (34, 35).

The Kolmogorov-Smirnov test (K-S test) was used for determining the distribution normality of the data; chi-square test and independent samples t-test were used to present the data according to the research hypotheses. Data were analyzed by SPSS software (version 22, IBM Corporation, Armonk, NY, USA). Chi-square test was used to determine the significant difference between some of the demographic variables. The aim of using

independent samples t-test was to examine significant difference between the two groups studied and some of the demographic variables.

Results

A total of 143 participants were evaluated, 119 (83.22%) were men and 24 (16.78%) were women. The mean and standard deviation (SD) of age of the participants was 29.30 ± 4.42 (range: 17-62 years). Table 1 shows the demographic characteristics of the study participants. Based on the table, there was a significant difference between the two groups of opium and methamphetamine users, the number of female participants ($P = 0.010$), age of participants ($P = 0.020$), education level ($P < 0.050$), and years of substance use ($P < 0.001$). According to the level of education, the number of illiterate subjects in both groups was not significantly different ($P > 0.050$). In terms of marital status, only the number of married people had a significant difference between the two groups ($P = 0.010$).

Based on table 2, there was a significant difference between the two groups of opium and methamphetamine users in terms of total sleep quality ($P = 0.002$). Indeed, opium addicts had poorer sleep quality than methamphetamine addicts. Investigating other sleep indices in the two groups, the results indicated that ones with opium addiction had higher ISI scores, and this difference was significant between the two groups ($P = 0.030$). In terms of ESS, participants with opium addiction also had higher scores ($P < 0.050$), but there was no significant difference between the two groups in terms of OSA using BQ ($P > 0.050$).

Table 1. Demographic features of participants

Parameters		Opium (n = 76)	Methamphetamine (n = 67)	P-value
Gender*	Male	58 (76.31)	61 (91.04)	0.130
	Female	18 (23.69)	6 (8.96)	0.010
Age (year)**		31.48 ± 3.22	26.83 ± 3.31	0.020
Education*	Illiterate	29 (38.15)	25 (37.31)	0.080
	Primary school	28 (36.84)	14 (20.89)	0.020
	High school	12 (15.78)	18 (27.86)	0.030
Marital status*	Diploma	7 (9.23)	10 (13.94)	0.040
	Single	20 (26.31)	24 (35.82)	0.090
	Married	41 (53.94)	25 (37.31)	0.010
	Divorced	13 (17.10)	16 (23.88)	0.070
	Widow	2 (2.65)	2 (2.99)	> 0.999
Duration of substance use (year)**		7.20 ± 2.12	3.10 ± 1.15	< 0.001

*Data is presented as number (percent); **Data is presented as mean \pm standard deviation (SD)

Table 2. Sleep characteristics in participants with opium and methamphetamine use

Sleep quality	Opium (n = 76)	Methamphetamine (n = 67)	P-value
PSQI score	13.48 ± 4.02	11.12 ± 3.46	0.002
ISI score	19.02 ± 3.78	18.12 ± 2.56	0.030
ESS score	11.14 ± 2.12	10.01 ± 1.46	0.030
At risk for OSA (using BQ)	N = 43	N = 38	0.120

PSQI: Pittsburg Sleep Quality Index; ISI: Insomnia Severity Index; ESS: Epworth Sleepiness Scale; OSA: Obstructive sleep apnea; BQ: Berlin Questionnaire

Discussion

Considering the importance of sleep and its related problems as well as the use of substance and drugs which has become one of the greatest social problems, the present study provided empirical evidence of the sleep indices in opium and methamphetamine users. Based on interaction of substance use and sleep characteristics, the need to examine this issue is more pronounced. Accordingly, we expect the results of this study to be useful in determining appropriate interventions to improve sleep quality and also to help in quitting addiction among opium and methamphetamine users.

Based on the results of this study, in both opium and methamphetamine groups, men were more likely to undergo the treatment process than women. In a study conducted by Khodabandeh (36), methamphetamine users who were referred to an addiction treatment clinic in Tehran, Iran, were more likely to be men (71.9%). The study conducted by Merline et al. (37), which aimed at assessing the prevalence and prediction of substance use, showed that men were more likely to use drugs, alcohol than women. Therefore, it can be expected that people who are referring to the treatment process are more likely to be men. However, cultural issues and values are also important and need to be considered in this regard.

Methamphetamine users had higher levels of education, and this was an interesting issue. A study by Viohl et al. suggested that the use of a particular substance could vary according to the city and country studied and the level of education, but more details in this study was conducted in Berlin, Germany (38), however, more details were not provided in this study. Mukherjee et al. reported that people with higher levels of education were more likely to use methamphetamine (39). However, authors of this study did not compare this finding with opium users (39). Noori et al. showed higher levels of education among stimulant users than opioid users (40). This can be a good indication that, with the recent entry of stimuli into the market, it has created more traction

among educated people .

Findings of current study indicated higher percentage of participants to be single or divorced. Another interesting point was that the methamphetamine users were more single than opium users. A study by Mukherjee et al. found that the number of methamphetamine users who were never married was more than those who were ever married (39). In the study of Noori et al., the results showed that stimulant users were more likely to be single than opioid users and to become less married (40). This illustrates well that stimulant users will probably have poorer prognosis, although they had a higher level of education.

The main goal of this study was to compare indices of sleep quality in opium and methamphetamine users. Accordingly, the results of this study showed that opium aforementioned substance users had a poorer sleep quality, more insomnia, and more daytime sleepiness. In a study by Khazaie et al. (25), it was also shown that opium users had a higher score in the ESS (consistent with results of our study), while poor subjective sleep quality had a longer sleep onset latency but a better sleep quality. This latter case was not consistent with the results of our study. This study was conducted in a similar cultural context, and in this regard, the information obtained is interesting. Examining the reasons for this issue can be seen in determining the inclusion criteria of two studies. The pattern of substance use can also explain the difference between the two studies. Albonaim et al. also showed that opium users had high ISI scores (41).

In another study, the quality of sleep, sleepiness, and severity of insomnia of opium users were evaluated and these individuals obtained high scores in these indices (42). Sleep quality is one of the most important issues for people who use drugs. Cognitive impairments such as memory, attention, concentration, and learning are serious problems that people who use the substance suffer from, and these problems can develop or worsen due to poor sleep quality. In the pre-

sent study, the average age of opium users was significantly higher than methamphetamine users. The result can be explained according to studies that have shown that the quality of sleep is worsened by age (43).

Regarding OSA, there was no significant difference between the two study groups. In a meta-analysis conducted by Filiatrault et al., the results indicated that opioid users were more at risk for central sleep apnea (CSA) than OSA (44). Up to our knowledge, there has not yet been a study about OSA in methamphetamine users in Iran. However, the relatively high number of users being at high risk for OSA in both groups suggests a greater need for clinical attention in this regard. Along with the explanation given in the preceding paragraph, with the increase in age, the problems associated with sleep apnea increase (45). Current study also showed that the number of people at high risk for sleep apnea in opium users was higher than methamphetamine users, but this difference was not significant. The authors of the study failed to find another explanatory reason for this issue based on the research literature. This conclusion suggests that more studies are needed to investigate this issue.

Several limitations in this study should be considered. First, considering the status of assessing the quality of sleep indicators of individuals using subjective questionnaires, it is recommended that future studies use actigraphy or polysomnography (PSG). Second, the types of used substance were not considered among methamphetamine users. Third, no medical tests or evaluations were performed for study participants. Fourth, the daily dose of the substance consumption in this study was unclear which is recommended to be considered in future studies.

Conclusion

It can be concluded that the type of substance used among substance-dependent individuals can possibly influence the sleep quality and its related problems. According to the results, opium users had more sleep problems and the fact that they had long duration of use would further deteriorate their quality of life. In current study, methamphetamine users had higher levels of education, and this suggests that people with higher education may use more this type of substance. This latter case is especially popular among students (46), which can greatly affect social, cultural, and eco-

nomic issues. Substance use can disturb the quality of sleep and poor sleep quality promotes more substance use. Therefore, conducting intervention studies for management of sleep problems in substance users and the influence of substance use issues are recommended for future studies.

Conflict of Interests

Authors have no conflict of interests.

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