Original Article

Association Between Addiction Severity and Sleep Quality among Patients with Substance Use Disorders: A Secondary Analysis of a Virtual Reality Intervention Study

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ABSTRACT

Objective: To evaluate the relationship between the severity of addiction and sleep quality among patients actively receiving substance use disorder treatment.

Study Design: Cross-sectional quasi-experimental study

Place and Duration of Study: This study was conducted at the National Addiction Rehabilitation Center in Mosul, Iraq from 15th September 2024 to 15th February 2025.

Methods: 60 patients were enrolled. The participants were divided into an intervention group receiving virtual reality relaxation therapy (n = 30) and a control group receiving routine care (n = 30). Assessments were performed using the Addiction Severity Index (ASI) to measure addiction levels and the Pittsburgh Sleep Quality Index (PSQI) to evaluate sleep quality.

Results: The sample demonstrated widespread sleep disruption, with 86.7% of participants reporting poor sleep and an overall mean PSQI score of 12.7±2.5. A significant positive correlation was identified between addiction severity and PSQI scores ($r=0.51$, $p<0.001$), indicating that higher addiction severity correlates with poorer sleep. Furthermore, linear regression analysis confirmed that both the severity of addiction (0.47, $p<0.001$) and the duration of substance use (0.32, $p=0.003$) were significant predictors of sleep disturbances.

Conclusion: There is a robust association between addiction severity and poor sleep quality in patients with SUD. Integrating targeted sleep management protocols into standard addiction treatment could significantly enhance overall recovery outcomes and reduce the likelihood of relapse.

Key Words: Insomnia, Rehabilitation, Psychological health

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INTRODUCTION

Substance use disorders (SUD) are also one of the key problems of global public health impacting millions of people every day and causing a significant burden of morbidity, mortality, and dysfunction of society.[1] Persistent use of psychoactive drugs may cause enduring neurobiological changes impacting mental activity, emotional control, and physiological activities such as sleeping regulation.[2,3] The reports of sleep disturbances are thus also common in people who are dependent on substances and are believed to be one of the most common clinical complications prevalent in the addiction treatment and recovery.[4]

Somatic and/or substance use disorders Insomnia, prolonged sleep latency, reduced sleep efficiency, fragmented sleep, and disrupted rapid eye movement (REM) sleep are among the sleep problems among people with substance use disorders.[5] Past epidemiology research has revealed that about 70-90% of the people receiving a substance dependence treatment suffer serious sleeping issues.[6] The disturbances can be experienced when one is under active substance use, withdrawal, and even during the prolonged abstinence period since the neurobiological changes in the central nervous system are persistent.[7]

These drugs include opioids, stimulants, alcohol, and sedative-hypnotics, which influence the sleep regulation systems; they are dopamine, serotonin, and gamma-aminobutyric acid (GABA) systems.[8] Their interference can cause changes in circadian rhythm and sleep architecture, which are the causes of chronic insomnia and poor sleep quality.[9]

Sleep quality of the individuals with substance use disorders has been linked to many adverse consequences. It has been established that sleep

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disturbances can make psychological distress more prevalent, worsen cognitive abilities, and make mood unstable.[10] In addition, chronic insomnia has been found to be another factor that is predictive of relapse in people who are recovering substance dependence.[11] Therefore, sleep problems are also becoming an urgent area of clinical intervention in the course of the addiction treatment programs.[12]

Another factor that could affect patient sleep is addiction severity. The neurophysiological disruption, psychological distress, and social impairment of persons with more severe substance dependence is more frequent than in persons with less severe substance use problems.[13] The Addiction Severity Index (ASI) is regarded as one of the most commonly used tools in addiction studies and clinical settings to determine the extent of substance consumption and how it affects different areas of functioning.[14]

In the past, researchers have proposed that participants who score high in terms of addiction severity are more likely to report more serious sleeping disorders.[15] The neurobiological processes of this association could be the long-term changes in the brain reward systems, the maladaptation of circadian mechanisms, and the elevated aspects of stress and anxiety in people with severe substance dependence.[16]

Although this relationship faces increasing evidence on its importance, there is little research available on the interaction between the severity of addiction and sleeps disturbances in Middle Eastern societies, especially with regard to patients receiving treatment in rehabilitation facilities. The knowledge about the correlation between the degree of addiction and the quality of sleep can assist healthcare specialists in creating specific intervention to enhance sleep wellness and promote recovery outcomes in persons with substance use disorders.[17]

Thus, the current study was conducted to determine the relationship between the degree of addiction and the quality of sleep in patients who are receiving treatment of substance use disorders in Mosul, Iraq.

METHODS

The cross-sectional quasi-experimental intervention study was carried out in the National Addiction Rehabilitation Center at Mosul, Iraq from 15th September 2024 to 15th February 2025. vide letter No.44 Dated 12.09.2024. It is a special center that is able to offer inpatient treatment and rehabilitation programs to patients diagnosed with substance use disorders. The facility has extensive addiction treatment initiatives, which comprise medical care, psychological guidance, and behavioral counseling. The choice of the setting to carry out the study enabled patients undergoing organised treatment of substance dependence to be accessed hence enabling the severity of the addiction and sleep disturbances to be evaluated in a fitting environment. A total of 60 patients diagnosed with substance use disorders being treated in the rehabilitation center in the time of the study. They were initially identified as the larger study aimed to test the productivity of virtual reality-based relaxation therapy in individuals with the substance dependence in context of sleep disturbance reduction. As per the overall intervention study, the study participants were separated into two equal groups. The intervention group comprised 30 patients who underwent virtual reality relaxation therapy sessions and the control group comprised 30 patients who had the regular treatment as offered by the rehabilitation center. They were carried out by using the data obtained in both groups to determine the relationship between the level of addiction and the quality of sleep. The participants were to be diagnosed with substance use disorders based on the diagnostic criteria, the age of the eligible participants was to be 18-50 years, having disturbances in sleep during the time of recruitment and to give informed consent and show readiness to undergo the process were included.

The Sleep quality was measured by means of a Pittsburgh Sleep Quality Index (PSQI), a common standardized self-report measure that is supposed to assess the sleep quality in the last month. PSQI has seven items that measure various sleeping factors such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleeping disturbances, sleep medication use, and dysfunction daytime. All the components are rated out of 0 to 3 and the scores of the components are added up to get the final score that is out of 0 to 21. A high score means worse sleep, and a global score more than five is usually seen to refer to poor sleep.

The severity of addiction was measured with the help of the Addiction Severity Index (ASI), a structured clinical assessment instrument that determines the degree of substance being used and how it affects other spheres of the life of a particular person. The ASI evaluates a number of areas, such as medical status, employment and assistance, alcohol/drug use, legal status, family and social relationships, and psychiatric status. The instrument is a very thorough assessment of the severity of addiction, which is highly utilized both in clinical and research environments to assess patients with substance use disorder. The data was analyzed with the use of IBM SPSS-26. The Pearson correlation analysis was examined to determine the correlation between severity of the addiction and the scores of the sleep quality. Moreover, linear regression analysis has been conducted to reveal possible predictors of sleep disturbances of the participants. A p-value <0.05 was considered as a statistically significant value.

RESULTS

The demographic characteristics of participants were similar across the two groups, indicating homogeneity in baseline characteristics (Table 1). The majority of participants exhibited severe addiction levels, reflecting the clinical nature of the rehabilitation setting (Table 2).

Most participants experienced poor sleep quality according to PSQI classification (Table 3).

Table No. 1: Sociodemographic characteristics of participants (N = 60)

Variable	Intervention (n=30)	Control (n=30)
Age (years)	31.8±6.4	32.5±6.9
Gender		
Male	27 (90%)	26 (86.7%)
Female	3 (10%)	4 (13.3%)
Marital status		
Single	18 (60%)	17 (56.7%)
Married	12 (40%)	13 (43.3%)

Table No. 2: Addiction severity levels

Addiction Severity	No.	%
Moderate	22	36.7
Severe	38	63.3

Table No. 3: Sleep quality distribution

Sleep Quality	No.	%
Good sleep quality	8	13.3
Poor sleep quality	52	86.7

Table No. 4: Correlation between addiction severity and sleep quality

Variable	r	p-value
Addiction severity vs PSQI	0.51	<0.001

Table No. 5: Regression analysis predicting sleep quality

Predictor	β	Standard Error	p-value
Addiction severity	0.47	0.11	<0.001
Age	0.09	0.07	0.21
Duration of substance use	0.32	0.10	0.003

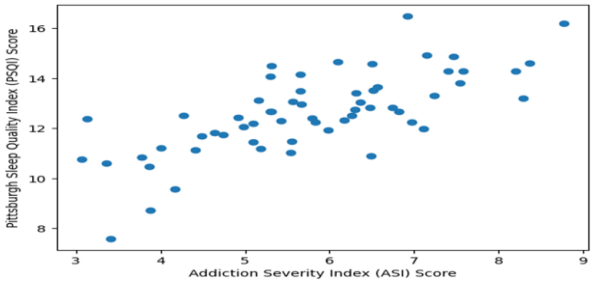

Figure No. 1: Relationship between addiction severity and sleep quality

A moderate positive correlation was found between addiction severity and sleep disturbances (Table 4). Addiction severity and duration of substance use were significant predictors of poor sleep quality (Table 5). The positive association between Addiction Severity Index (ASI) scores and Pittsburgh Sleep Quality Index (PSQI) scores among patients with substance use disorders (Fig. 1). Regression analysis demonstrates the positive linear relationship between addiction severity and sleep disturbance (Fig. 2).

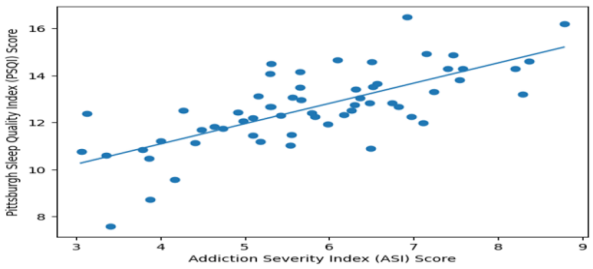

Figure No. 2: Linear regression between addiction severity and sleep quality

DISCUSSION

The current research investigated the level of the addiction and the quality of sleep among patients with substance use disorders in the treatment process. The results revealed that most participants had low quality of sleep, PSQI score of 12.7 on average showed that there was a high level of sleep deprivation in the population of the study. The results are in line with other studies that suggest that sleep disorders are very common in patients with substance use disorders.[18]

In the current research almost 86.7 percent of those interviewed reported poor sleep quality by PSQI categories. Prior studies that have been done on people undergoing treatment of addiction have also shown similar prevalence rates, with more than three-quarters of the patients being reported to have sleep disturbances.[19] Persistent insomnia and sleep fragmentation is proven to be a result of chronic exposure to psychoactive substances by discontinuing normal sleep architecture, and circadian cycling.[20]

Findings of this study also showed that there was a strong positive relationship between the severity of addiction and sleep disturbances. The patients scoring higher on the addiction severity scales reported the poor sleep quality more. These results align with other studies that propose more profound substance dependence to correlate with increased physiological and psychological dysfunction that could be linked with sleep disturbances.[21]

There are a number of biological processes that could help in the explanation of a correlation between the severity of addiction and sleep disturbances. Chronic substance use can modify the work of neurotransmitters that are used in the regulation of sleep, such as dopamine, serotonin and GABA.[22] Such alterations in the neurochemical system can result in the disruption of sleep-wake system and poor sleep in people with severe substance dependence.

The other possible cause of the observed relationship is psychological stress connected with an extreme addiction. Anxiety, depression, and emotional distress are more frequently seen in the individuals with the

high severity of addiction.[23] These are psychological factors that have been closely associated with insomnia and other sleeping disturbances.[24]

The current paper also revealed that the time of substance use was also a strong predictor of sleep disruptions. The longer the duration of the use of the substances, the more likely the patients were to report poor sleep quality. This has been observed in the past research that suggested that chronic exposure to substances can cause chronic changes in brain activity and attire sleep.[25]

Clinically, the results of this study underscore the need to examine the quality of sleep to be used in the process of treating an addiction. The treatment of sleep disorders can help to enhance the psychological well-being and treatment outcomes of persons affected by substance use disorders. As the previous research has shown, the method of enhancing the quality of sleep can be used to help decrease the risk of relapse and promote long-term recovery.[26]

Cognitive behavioral therapy of insomnia, mindfulness-based therapies, and relaxation methods are all non-pharmacological interventions that have been found to enhance the quality of sleep in substance use disorder victims.[27] The new technologies like the use of virtual reality to create relaxation therapy can also offer good potential in enhancing sleep health in addiction treatment environments.

CONCLUSION

The severity of substance use disorder addictions is strongly correlated with low sleep quality in substance use disorder people. Patients who are highly addicted are more likely to suffer sleeps disturbance and sleep management approaches should be included in the addiction treatment programs.

Recommendations: Medical staff members need to evaluate patients with addiction status on their sleep quality regularly. The rehabilitation programs should include interventions that enhance the quality of sleep. It is advised that future research should be conducted on a larger scale with longitudinal designs.

Author's Contribution:

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