



Original Article

# Substance Abuse and Sleep Quality in University Students

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## Abstract

**Background:** Substance abuse remains a challenging public health issue, especially among young people. It has been shown that poor sleep and substance abuse may have mutual intensifying effects. This study aimed to evaluate the rates of substance abuse, cigarette smoking, and alcohol consumption and their association with sleep disturbances among university students in 2021.

**Methods:** The participants were the students of the Faculty of Sciences, University of Guilan, Iran in 2021. Data were collected through a researcher-made demographic questionnaire, the first two questions of the translated version of the World Health Organization (WHO) Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST), and the Pittsburgh Sleep Quality Index (PSQI).

**Findings:** A total of 222 students entered the study from March to August 2021. The rates of substance abuse in the past three months and lifetime were 35.6% and 45.5%, respectively. The most common type of substance abuse was related to the 'other substances' category. Substance abuse was significantly higher in students living in dormitories and those with a family history of substance abuse. Poor sleep was found in 34.2% of the students, and substance abuse and alcohol consumption both in the past three months and lifetime were significantly associated with lower sleep quality.

**Conclusion:** This study showed that substance abuse was significantly associated with sleep disturbances. The study results also illustrated an upward trend of substance abuse in recent years among students in Rasht, which may be related to economic issues in the country and/or the effects of the COVID-19 pandemic. Considering the rising prevalence of substance abuse and its impacts on society, policymakers are highly recommended to pay special attention to its risk factors.

**Keywords:** Substance abuse, Drug abuse, Substance use, Students, Sleep disorders

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## Introduction

Substance abuse is a multifactorial and challenging public health issue, especially in young people. It affects society in different direct and indirect ways.<sup>1</sup> It is also associated with high morbidity and mortality and contributes to considerable annual healthcare costs globally.<sup>2</sup>

Substance abuse is a threat to public health in different populations, especially in young people. The literature shows an increase in substance abuse along with a reduction in the age of substance abuse onset in recent decades. Previous studies have shown that substance abuse has been most prevalent in the 18- to 25-year age group. Moreover, men and people living in low socioeconomic neighborhoods have a higher rate of substance abuse.<sup>3</sup>

Multiple factors are involved in the development of substance abuse behavior. It has been shown that this behavior is used as a way to reduce the pains of unwanted emotions through escaping from reality.<sup>4</sup> University students are an at-risk population for substance abuse. They experience distance from family and enter a new big environment along with a lot of competition and the

pressure of examinations. Moreover, students in certain countries deal with economic problems and cannot have a clear view of their future.<sup>5</sup> Despite the lower rate of substance abuse among Iranian students compared with the students in European or American countries, the prevalence of tobacco abuse raises an alarm in this population.<sup>6</sup>

Substance abuse has been shown to be closely related to disturbances in sleep, which is an important factor in individual and societal health and function.<sup>7</sup> Poor sleep is associated with considerable harm in young people, such as disturbances in the immune system, metabolism, creativity, and memory. It also contributes to higher rates of accidents and failures in education and social relationships.<sup>7,8</sup>

Despite many lifestyle modifications in recent years due to the COVID-19 pandemic and technological developments, there is a lack of evidence regarding the trend of substance abuse in the past decade following the COVID-19 pandemic among students in Rasht, Iran, as a major city in a developing country, as well as its related



factors and the impact of different types of substance abuse on sleep quality. Additionally, it has been shown that the COVID-19 pandemic has changed people's lifestyles in some ways,<sup>9,10</sup> and it may have had an effect on substance abuse. The present study aimed to evaluate the association of substance abuse, cigarette smoking, and alcohol consumption with sleep disturbances in university students.

## Methods

The participants of this study were the students of the Faculty of Sciences, University of Guilan, Iran in 2021. The participants with a history of mental (psychiatric) or physical illness were excluded from the study. All questionnaires were completed anonymously with informed consent. The link to the questionnaires was sent to the students in class groups (online), and the IP limitation did not let one student submit more than one answer. Different substances were categorized into 10 groups, including tobacco compounds, opioids, amphetamines, cannabis compounds, sedatives/narcotics, alcoholic drinks, inhalants, hallucinogens, cocaine, and other substances.

## Sample size

First, considering the 30.1% prevalence of substance abuse in university students in the study by Zarrabi et al, a sample size of at least 325 was determined, with a 5% margin of error and a 95% confidence interval.<sup>11</sup> Then, the sample size was calculated as 222 using the Cochran formula according to the limited number of students in the Faculty of Sciences, University of Guilan (nearly 700).<sup>12</sup>

## Measures

Three questionnaires were used for data collection. First, a researcher-made demographic questionnaire was used as a self-report tool to investigate demographic characteristics including age, sex, marital status, residential status, family economic status, parental education, education level, grade point average (GPA), and the family history of substance abuse. Furthermore, the first two questions of the translated version of the World Health Organization (WHO) Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) were used to assess the rates of smoking, alcohol consumption, and substance abuse.<sup>13</sup> This questionnaire was translated into Persian by the Ministry of Health and Medical Education and its validity and reliability were confirmed.<sup>14</sup> Finally, sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).<sup>15</sup> This scale was translated into Persian and its validity and reliability were tested by Farrahi Moghaddam et al (Cronbach's alpha coefficient).<sup>16</sup> They found the sensitivity and specificity of discrimination of insomniac patients were 94% and 72% for a PSQI cut-off value of 5.

## Statistical analysis

All data were analyzed using SPSS version 22 (SPSS Inc., Chicago, IL). Descriptive data were analyzed using frequency distributions and graphs. For quantitative variables, first, the normality of the data was checked with Kolmogorov-Smirnov and Shapiro-Wilk tests; then, parametric and non-parametric significance tests were used for comparisons. The chi-square test was utilized for comparing qualitative variables. A *P* value less than 0.05 was considered significant.

## Results

A total of 222 students entered the study from March to August 2021. Demographic characteristics of the participants are presented in Table 1. About 45.5% of the students had a history of lifetime substance abuse and 35.6% of them abused substances during the past three months. The most frequently abused type of substance both in the past three months and lifetime was tobacco compounds followed by alcoholic drinks, sedatives, and cannabis (Figures 1 & 2 and Table 2).

The rates of substance abuse are shown in Table 2. Besides, the frequency of the substance abuse behavior is illustrated in Figure 3.

There was a significant relationship between the place of

**Table 1.** Demographic characteristic of study participants

Characteristic		Number	Percent
Gender	Female	111	50
	Male	111	50
Age (y) (Age mean $\pm$ SD = 24.41 $\pm$ 3.39)	Less than 20	29	13.1
	21-24	117	52.7
	More than 25	76	34.2
Marital status	Unmarried	166	74.8
	Married	54	24.3
	Divorced/widowed	2	9.0
Residential status	With spouse or family	109	49.1
	Single or with friends	64	28.8
Socioeconomic status	Dormitory	49	22.1
	Low	42	18.9
	Middle	143	64.4
Education level	High	37	16.7
	Bachelor's degree	93	41.9
	Masters's degree	99	44.6
Grade point average	Doctorate	30	13.5
	20-17	25	11.3
	17-14	73	32.9
	14-12	83	37.4
Family history of substance abuse	12-10	41	18.5
	Positive	75	33.8
	Negative	147	66.2

residence and lifetime family history of substance abuse. On the other hand, substance abuse in the past three months was significantly different between males and females. It was also associated with the family's substance abuse behavior. In addition, there was a significant relationship between using cannabis and amphetamine compounds and the GPA of the students (significantly lower use in students with higher GPA).

Considering a PSQI cut-off value of 5, 34.2% of the

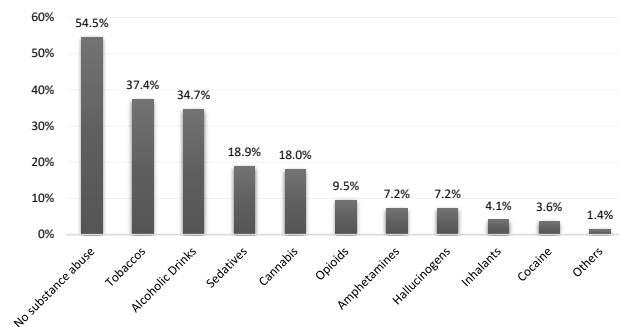
students had poor sleep quality. Substance abuse was significantly associated with sleep disturbances. Tobacco, opioid, amphetamine, and sedative abuse and using alcoholic drinks both in the past three months and lifetime were significantly associated with lower sleep quality (Table 3). The rates of poor sleep quality in abusers of different substances in the past three months and lifetime and non-abusers are shown in Figures 4 and 5, respectively.

**Table 2.** Rates of abusing different substances by students

Substances	Past 3 months		Lifetime	
	N	%	N	%
No substance abuse	143	64.4	121	54.5
Tobaccos	61	27.5	83	37.4
Opioids	12	4.5	21	5.9
Cannabis	26	11.7	40	18
Amphetamines	9	1.4	16	2.7
Sedatives	25	11.3	42	18.9
Alcoholic drinks	39	17.6	57	25.7
Inhalants	6	7.2	9	1.4
Hallucinogens	8	6.3	16	2.7
Cocaine	6	7.2	8	6.3
Other substances	1	5.0	3	4.1

**Discussion**

Substance abuse is one of the most important factors affecting the health of people, especially the young, in different ways.<sup>2</sup> The prevalence of substance abuse has



**Figure 1.** The rate of lifetime substance abuse in students

**Table 3.** Students' sleep quality according to PSQI; Acceptable sleep quality: score <5; Low sleep quality: score >5

Substances	Sleep quality	Lifetime substance abuse			Substance abuse in past 3 month		
		Yes	No	P value	Yes	No	P value
All substances	Acceptable	55	91	0.001	38	108	0.0001
	Low	46	30		41	35	
Tobaccos	Acceptable	45	101	0.005	32	114	0.01
	Low	38	38		29	47	
Opioids	Acceptable	8	138	0.005	3	143	0.004
	Low	13	63		9	67	
Cannabis	Acceptable	23	123	0.224	14	132	0.173
	Low	17	59		12	64	
Amphetamines	Acceptable	5	141	0.003	1	145	0.001
	Low	11	65		8	68	
Sedatives	Acceptable	21	125	0.017	9	137	0.001
	Low	21	55		16	60	
Alcoholic drinks	Acceptable	31	115	0.036	18	128	0.004
	Low	26	50		21	55	
Inhalants	Acceptable	3	143	0.066	2	144	0.184
	Low	6	70		4	72	
Hallucinogens	Acceptable	6	140	0.013	4	142	0.45
	Low	10	66		4	72	
Cocaine	Acceptable	5	141	0.843	3	143	0.414
	Low	3	73		3	73	
Other substances	Acceptable	2	144	0.974	0	146	0.342
	Low	1	75		1	75	

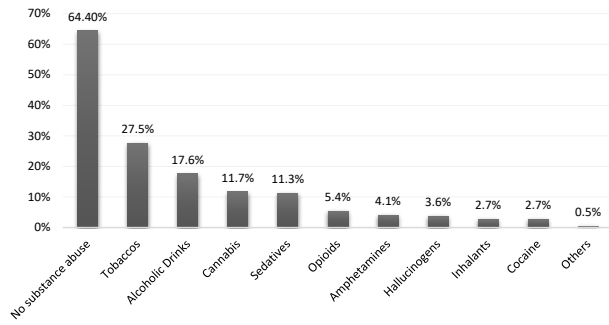


Figure 2. The rate of substance abuse in the past three months in students

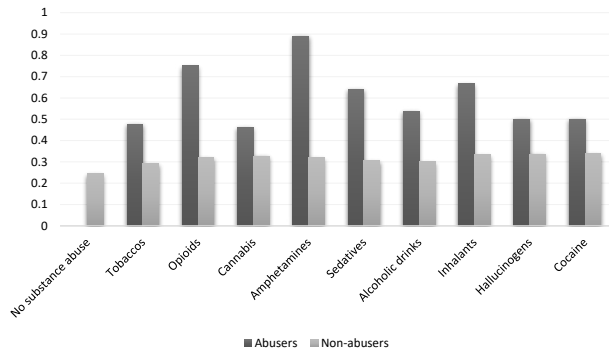


Figure 4. The rates of poor sleep quality in abusers of different substances in the past three months and non-abusers

shown an upward trend in recent years.<sup>17</sup> This study aimed to evaluate the prevalence of substance abuse in university students in Rasht, Iran in 2021 as well as its correlation with sleep disturbances.

**Substance abuse and sleep quality**

Insomnia, as defined by the American Psychiatric Association in DSM-5, is frequent dissatisfaction with sleep quality or quantity not caused by medication, drug abuse, or mental and physical disorders. It is associated with difficulty in initiating or maintaining sleep or awakening early in the morning with the inability to return to sleep.<sup>18</sup> Although alcohol and drugs such as marijuana have been reported as self-medication methods for sleep disruptions, their consumption leads to insomnia along with dependency, which may result in even lower productivity and more serious health issues.<sup>19-22</sup>

This study showed a significant association between sleep quality and substance abuse both in the past three months and lifetime. Using tobaccos, opioids, amphetamines, sedatives, alcoholic drinks, or hallucinators either in the past three months or lifetime was significantly associated with poorer sleep quality in students. This finding is in line with the results of the study by Mahfoud et al, indicating a high prevalence of sleep disturbances in substance abusers.<sup>23</sup> The literature supports the association of alcohol dependence and substance abuse with insomnia.<sup>21,22,24</sup> However, other psychiatric conditions including major depressive disorder and anxiety were found to play a role in this

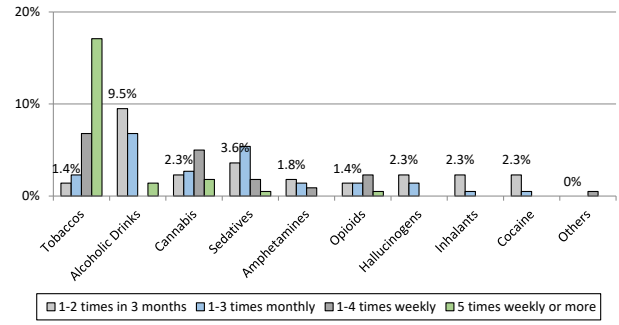


Figure 3. The frequency of abusing different substances during the past three months by students

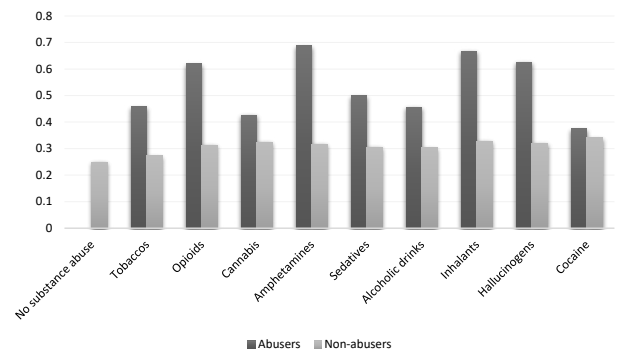


Figure 5. The rates of poor sleep quality in lifetime substance abusers and non-abusers

association.<sup>25</sup> Evidence shows that alcohol-dependent individuals with active drinking have longer sleep onset latency along with sleep fragmentation and reduced total sleep time.<sup>26</sup> Studies have also shown that alcohol dependence can lower rapid eye movement (REM) sleep and increase REM latency.<sup>21,22</sup> Sleep disturbance was shown to be also prevalent during alcohol withdrawal and recovery from alcohol abuse, even up to three years.<sup>27-31</sup> Moreover, alcohol abuse was reported to be accompanied by strange dreams, contributing to even lower sleep quality via sleep fragmentation.<sup>32,3</sup> On the other hand, poor sleep quality was shown to predispose adolescents and adults to alcohol consumption.<sup>34-39</sup> A considerable percentage (more than half) of adults with alcohol dependence and insomnia have sleep disruption prior to the beginning of alcohol dependence.<sup>40</sup> The association between substance abuse and sleep disturbances, at least in part, may be contributed to the consumption of alcohol and sedatives for sleeping or stimulants for staying awake during the day in patients with sleep problems. Furthermore, insomnia has been shown to increase drinking relapse in alcohol-dependent patients. Therefore, it may be an important factor in the treatment of substance abuse.<sup>40-42</sup>

**Rate of substance abuse among students**

This study showed the rate of lifetime substance abuse among students was 45.4%, which is considerably higher compared with the findings of the study by Zarrabi et al,<sup>11</sup> showing an increase in substance abuse among students in Rasht in recent years. Additionally, in the present

study, 35.6% of students had substance abuse in the past three months, which also shows a considerable increase compared with the results of the study by Zarrabi et al.<sup>11</sup> This might be related to the COVID-19 pandemic and its consequences, such as the closure of universities, isolation from social and university environments, and lifestyle modifications.

In the current study, the most common substances used in the past three months and lifetime were tobaccos and alcoholic drinks. The third most common substances used in the past three months and lifetime were sedatives and cannabis, respectively. Previous studies in Iran have also reported tobaccos, alcoholic drinks, and opioids as the most commonly used substances in the students' lifetime.<sup>6,11</sup> This shows that the use of opioids is reduced compared with other substances, whereas cannabis and sedatives have shown an increase in use compared with the past decades. Mahfoud et al reported alcohol, opiates, and narcotics as the most prevalent active substances abused in Cleveland, Ohio, USA. The difference between the results of this study and those of the present study might be due to the legal limitations of alcoholic drinks by the Iranian government.<sup>23</sup>

#### **Risk factors for substance abuse**

In the present study, there was no significant relationship between male gender and lifetime substance abuse, which was not coherent with the results of previous studies.<sup>6,11,43,44</sup> This may suggest the higher accessibility of drugs for girls compared to the past, or that women tend more to try them. However, the rate of substance abuse in the past three months was significantly higher in men, which is in line with the results of other studies, confirming a higher rate of active substance abuse in men.<sup>11,45,46</sup> This may be due to the cultural differences in Iran which gives more freedom to men, or that the men generally show more high-risk behaviors.

This study found no significant relationship between older age and substance abuse, which is not in line with the results of the previous studies,<sup>11,44</sup> suggesting that substance abuse is more prevalent among younger individuals compared with the past. There was no significant difference between different marital statuses in substance abuse rates in the past three months or lifetime, which is consistent with the results of some studies.<sup>3,44</sup> However, other studies have reported controversial results regarding the effects of marriage on substance abuse.<sup>11,14</sup> The difference between the study populations may have had an effect on the results. Therefore, the protective role of marriage in this self-harming behavior is controversial among students and may need more investigation.

As was expected, the rate of substance abuse was significantly related to the place of residence. The highest abuse rate was among students living in dormitories. This finding is coherent with the results of other studies,<sup>11,14</sup>

which may be due to the special lifestyle of dormitories and also related to the union of young people that can affect each other.<sup>47</sup> On the other hand, according to Shams et al, living with the family can have a protective effect against substance abuse.<sup>48</sup> Furthermore, in this study, no relationship was observed between economic status and substance abuse. According to Azizi, although poor economic status is not directly related to substance abuse, it may be associated with the development of a basis for drug and alcohol abuse.<sup>49</sup> The family history of substance abuse was shown to contribute to higher substance abuse among the students, which is in line with the results of the study by Mardani et al.<sup>3</sup> This may be due to the higher accessibility and early introduction of the drugs in this population.

The strength of this study was that it investigated all different substances abused among university students as an important group in society, who can highly benefit from productivity. The most important limitation of the study was that online self-report questionnaires were used which limited the reliability. Moreover, in this study, only substance abuse, not substance dependence, was evaluated. Considering the potentially different impacts of substance withdrawal and dependence on sleep, further studies on patients in either phase are highly recommended. This study also did not investigate the types of sleep disturbances and the relationship between poor sleep quality and the severity of substance abuse, which is an important factor in this era.

#### **Conclusion**

This study showed substance abuse is significantly associated with sleep disturbances, which can further reduce the productivity and quality of life of students. In clinical settings, it is highly recommended to take the influence of substance abuse in patients with sleep problems into careful consideration. Besides, given that using drugs as a self-medication for insomnia has a considerable prevalence, education regarding insomnia and substance abuse is highly recommended, especially for adolescents. In addition, compared with previous studies on university students in Rasht, Iran, the present study indicated an upward trend of substance abuse in recent years among students in Rasht, which may be related to the economic issues of the country and/or the effects of the COVID-19 pandemic. Furthermore, male gender, living in a dormitory, and a family history of substance abuse were detected as possible risk factors for the occurrence of substance abuse. Considering the rising prevalence of this behavior and its impacts on society, policymakers are highly recommended to pay special attention to its risk factors.

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#### Authors' Contribution

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**Investigation:** Amirhossein Tamimi, Mitra Farsam.

**Methodology:** Maryam Kousha.

**Project administration:** Maryam Zavar Mousavi.

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#### Competing Interests

None.

#### Ethical Approval

The research ethics committee of Guilan University of Medical Sciences granted approval for the study (ID: IR.GUMS.REC.1400.132).

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