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The prevalence of sleep disturbances among patients with COVID-19

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Abstract

Introduction: Due to the importance of sleep disorders and the unknown effects that they may have on the course of the disease in COVID-19 patients, in this study, we aimed to investigate the factors affecting sleep disorders in these patients.

Materials and Methods: The present research was a cross-sectional analytical study conducted in Razi Hospital in Rasht. The study population included COVID-19 patients referred to the corona clinic of Razi Hospital for follow-up. Information about age, gender, body mass index (BMI), underlying disease, drugs used, a history of using cigarette and opioids, duration of hospitalization, and type of hospitalization (normal ward or the intensive care unit (ICU) ward) was extracted from patients' files and recorded in the data collection form. The Petersburg Sleep Quality Index (PSQI) was used to assess sleep disorders. The collected data were entered into SPSS software version 24. The significance level of the tests was considered $P < 0.05$.

Results: The mean age of the subjects in this study was 43.79 years. According to the results, 52 people were male (52.5%) and the rest were female. Based on the results, it was found that age ($p = 0.540$), gender ($p = 0.141$), BMI ($p = 0.464$), cigarette use ($p = 0.675$), opium use ($p = 0.757$), underlying disease ($p = 0.430$), drug use ($p = 0.327$), and duration of hospitalization ($p = 0.203$) were not significantly associated with sleep disorders.

Conclusion: According to the findings of this study, sleep in patients with COVID-19 is not associated with age, gender, cigarette use, opium use, underlying disease, duration of hospitalization, and a history of drug use.

Keywords: Sleep disorder, COVID-19, Petersburg Sleep Quality Index, Cigarette use, Opium use

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Introduction

Since early December 2019, numerous cases of pneumonia due to an unknown etiology were reported in Wuhan, Hubei Province, China (1–3). Most patients worked in the seafood wholesale market (1–4). The cause of this disease was a new and genetically modified virus from the family of coronaviruses called SARS-CoV-2, which was named COVID-19. Unfortunately, due to its high transmissibility, the virus spread rapidly throughout the world and infected almost all countries of the world in a short time (less than 14 months) (5,6) . According to official reports, more than 7 million people in the world have been infected with the virus as of June 25, 2020, and the number of deaths due to this virus has been reported to more than 400,000 (7). Coronaviruses are a group of very diverse, single-stranded RNA viruses. They cause many diseases related to the respiratory, intestinal, hepatic, and nervous systems with varying severity in humans and animals (8,9). COVID-19 is the seventh recorded coronavirus that infects humans and has 75%-80% genomic resemblance to the severe acute respiratory syndrome coronavirus (SARS-COV), 50% to the Middle East respiratory syndrome coronavirus (MERS-COV), and 96% to bat coronavirus (3). Therefore, current evidence strongly supports that the new coronavirus (COVID-19) has been derived from bats, although its intermediate hosts are not yet known (10). Studies have shown that, like the SARS coronavirus, the COVID-19 virus uses the receptor, the angiotensin II converting enzyme (ACE2), to enter the cell (3,11). The most important clinical symptoms upon arrival of COVID-19 patients at the hospital include fever, cough, sputum, headache, vomiting, diarrhea, fatigue, rhinorrhea, and chest pain. Almost 80% of patients with the new coronavirus show mild symptoms and recover at home. In 14% of cases, the sufferer shows severe symptoms, including pneumonia and shortness of breath. In 5% of cases, the patient's condition worsens, associated with respiratory failure, infectious shock, and failure in other organs of the body (11). Given the pathogenicity of the virus, its high rate of spread, and its resulting mortality rate, this disease may affect the mental health status in different strata of society as well as the patients with this disease. Sleep disorder in COVID-19 patients is one of the problems related to individuals' mental health and well-being.

Patients with this disease should be isolated which the patient's isolation during the course of the disease may exacerbate anxiety and sleep disorders (12,13).On the other hand, sleep disorders can aggravate psychological stress and increase stress and defective cycle, followed by various changes in the body's immune and hormonal systems, which in turn intensify the destructive course of the disease. For example, with increasing levels of cortisol in the body, the mortality rate of patients with COVID-19 increases, showing the importance of the above-mentioned cases and one of the ways through which sleep disorders affect the disease (14). During sleep disorders, patients may also have to take soporific drugs, which these drugs through sedative mechanisms and muscle relaxation, may affect respiratory fatigue or other factors leading to exacerbating disease course and mortality. Because of the importance of sleep disorders and the unknown effects that they can have on the course of COVID-19, in this study, we aimed to investigate the frequency of sleep disorders in COVID-19 patients.

Materials and Methods

Study Population
The study population in this research included COVID-19 patients referred to the corona clinic of Razi Hospital for follow-up. Inclusion criteria were all patients with COVID-19 whose disease had been confirmed by computed tomography (CT) scan or polymerase chain reaction (PCR), and after treatment and discharge from the hospital of origin, they had referred to the corona clinic of Razi Hospital. Exclusion criteria were patients with incomplete files or those who were not willing to participate in this study.

Data Collection
The present research was conducted as a cross-sectional analytical study. Information about age, gender, body mass index (BMI), underlying disease, drugs used, a history of using cigarette and opioids, duration of hospitalization, and type of hospitalization (normal ward or the intensive care unit (ICU) ward) were extracted from patients' files and recorded in the data collection form. The Petersburg Sleep Quality Index (PSQI) was used to assess sleep disorders. This questionnaire is one of the best tools designed and developed to measure sleep quality which was

developed in 1989 by Dr. Boyce et al. at Pittsburgh Psychiatric Institute (15). To exclude patients who had insomnia due to depression or anxiety (exclusion criteria), the Hospital Anxiety and Depression Scale (HADS) was used. This scale was designed by Zigmond et al. in 1983 to measure patients' risk of depression and anxiety (16).

Statistical Analysis

In this research, descriptive statistical methods such as frequency, percentage, mean, and standard deviation were used to describe the obtained data. The Independent Samples Test was used to examine the relations of age and BMI to sleep disorders; the Pearson Chi-square Test was used to examine the relations of gender, cigarette use, underlying disease, and drug use to sleep disorders; the Fisher's Exact Test was used to examine the relationship between opium use and sleep disorders, and the Mann-Whitney U Test was used to investigate the relationship between duration of hospitalization and sleep disorders. The data analysis was performed using SPSS software version 24, and the significance level of all tests was considered 0.05.

Results

The mean age of the subjects in this study was 12.54 ± 43.79 years, among which 52 people were male (52.5%), and the rest were female. The mean BMI of the subjects was 3.22 ± 26.83. Table 1 shows the frequency of the type of underlying disease in the subjects.

According to the results, 35 people (35.4%) had a history of drug use, 35 (35.4%) had a history of cigarette use, and 15 (15.2%) had a history of opium use. The mean duration of hospitalization of the study subjects was 2.84 ± 4.81 days.

Based on the results, 71 people (71.7%) had mild sleep disorders. In addition, the analysis of the data of this study showed that age, gender, BMI, cigarette use, opium use, underlying disease, drug use, and duration of hospitalization were not significantly associated with sleep disorders.

Table 1. Frequency of subjects based on the underlying disease.

Disease	Number	Percent
High blood cholesterol	4	12.12
High blood pressure	8	24.24
Diabetes	4	12.12
Chronic heart failure	1	3.03
Chronic kidney failure	1	3.03
Hypothyroidism	1	3.03
Osteoarthritis	1	3.03
Fatty Liver	1	3.03
High blood pressure + high blood cholesterol	4	12.12
High blood pressure + chronic kidney failure	1	3.03
High blood pressure + prostate hypertrophy	2	6.06
Diabetes + hypothyroidism	1	3.03
High blood pressure + high blood cholesterol + diabetes	2	6.06
High blood pressure + diabetes	1	3.03
High blood pressure + chronic kidney failure + prostate hypertrophy	1	3.03
Total	33	100

Discussion

The COVID-19 disease is unique because it has infected all countries of the world due to its high transmissibility in less than a few months and creating a pandemic situation (12,13). Currently, the number of patients infected with this disease as well as the resulting mortality, is increasing rapidly worldwide (5,6). Accordingly, and considering the current emergency situation of this disease, it is predictable

that some of the symptoms of psychological disorders will appear in COVID-19 patients. In this regard, the results of numerous studies on COVID-19 patients in China during the disease spread, some of these psychological disorders, including anxiety, fear, depression, emotional changes, insomnia, and post-traumatic stress disorder (PTSD) with a high prevalence have been reported in these patients (17,18). According to previous studies, COVID-19 patients have low psychological tolerance, and due to the current state of the disease in the world, these individuals are highly exposed to psychological disorders such as anxiety, fear, depression, as well as negative thoughts (19). Also, according to the results of a study in China, the prevalence of low-quality sleep is 38.3%, the prevalence of problems related to sleep onset is 29.8%, and the prevalence of insomnia is 29.1% in patients with COVID-19 (20). In this study, the frequency of sleep disorders in COVID-19 patients was investigated. Based on the results, there was no significant relationship between age and sleep disorders. The results of a study in Bangladesh in 2020 showed that the prevalence of sleep disorders in COVID-19 patients in the age range of 31 to 40 years was much higher than in other age groups (21). The results of a study on COVID-19 patients in China in 2020 showed that sleep disorders were higher in patients older than 35 years (22). With increasing age, some changes occur in the quantity and quality of sleep, leading to sleep disorders and frequent complaints related to these disorders. On the other hand, the incidence of physical diseases exacerbates the incidence of sleep disorders in this age group. Elderly patients also experience issues such as retirement or the death of a loved one (for example, a spouse), leading to emotional stress. For this reason, they often have delays in falling asleep as well as frequent awakenings during sleep. In addition, the elderly often take medications to control and treat chronic diseases, which these medications can affect the quantity and quality of sleep. The elderly are more likely to develop primary sleep disorders such as obstructive sleep apnea, which may predispose them to chronic sleep disorders (23). However, based on the results, sleep disorders are not significantly associated with taking medication. The results of a study showed that the use of muscle relaxants can be effective in improving sleep quality and reducing anxiety in patients with COVID-19 (24).

In the following, according to the results, it was found that sleep disorders were not significantly related to gender. In line with the results of the present study, a study on COVID-19 patients in China in 2020 showed that the rate of sleep disorders was not related to patients' gender (22). Contrary to the results of the present study, a study in Bangladesh in 2020 showed that the prevalence of sleep disorders in COVID-19 patients was higher in women than in men (21). The results of another study in Bangladesh showed that the rate of generalized anxiety and subsequent sleep disorders was higher in women with COVID-19 than in men (25). Differences in the results of different studies may be due to differences in the demographic characteristics of the subjects. However, in previous studies, sleep disorders were generally associated with gender. For example, Kijna et al. have mentioned gender as one of the important effective factors in sleep disorders (26). and the study of Trible has also shown that being a woman is a factor in sleep disorders (27). This finding may be due to the home duties of women and their preoccupations at the time of hospitalization because of not doing housework and the affairs related to their children, which cause sleep disorders in them. Another reason which can be raised is the issue of women's menopause, which causes them to have trouble sleeping compared to their youth because, during menopause, sleep onset is delayed with frequent awakenings, and sleep time is shortened. Also, based on the results, there was no significant relationship between BMI and sleep disorders. Given the relationship between the negative effects of obesity and inactivity on sleep (28). it was expected that patients with higher BMI would have higher rates of sleep disorders, which was not the case. In line with the results of the present study, a study on COVID-19 patients in China in 2020 showed that the rate of sleep disorders was not related to patients' BMI (22). Based on the results, sleep disorders were not significantly associated with cigarette use. Consistent with the results of the present study, a study on COVID-19 patients in China in 2020 showed that the rate of sleep disorders was not related to cigarette use (22). It seems that the main factors in sleep disorders in COVID-19 patients are different from the common causes of sleep disorders in other individuals in the community. For example, it has been suggested that sleep disorders in COVID-19 patients are more psychological and stem

from anxiety. The results showed that sleep disorders were not significantly associated with opium use. Given the high prevalence of depression in patients who use opium and the role of depression in the development of sleep disorders (29). it was expected that the rate of sleep disorders in patients who use opium was higher, which was not the case. Also, based on the results, sleep disorders were not significantly related to the underlying diseases. According to a study by Basedosky et al., sleep disorders can lead to more activation of inflammatory processes and changes in the cytokine system in individuals with underlying diseases, and subsequently, these changes can exacerbate sleep disorders. The studies by Hung et al. have also shown that the mortality rate is higher in septic patients with sleep disorders. From the above articles, we can understand the possible prevalence of insomnia in COVID-19 patients and the role it can play in the prognosis of these patients (30–32). Therefore, it was expected that in patients with underlying diseases, due to higher levels of systemic inflammation, the rate of sleep disorders would be higher, which was not the case. In the following, based on the results, there was no significant relationship between the duration of hospitalization and sleep disorders. According to the results of a study by Guo et al. in May 2020, the rate of sleep disorders is higher in coronary patients due to isolation, hospitalization, and distance from family (33). According to a study by Zhang et al. in June 2020, it was found that many patients with insomnia were admitted to the ICU, but after investigating patients without sleep problems, it was found that none of them required ICU admission (34). Therefore, it was expected that the rate of sleep disorders would increase following increasing patients' duration of hospitalization, which was not the case.

Conclusion

The results of the present study showed that sleep disorders in COVID-19 patients were not associated with age, gender, cigarette use, opium use, underlying disease, duration of hospitalization, and a history of drug use.

Author contribution

MRT, RS, MA wrote the manuscript ,revised and conducted this study. PT, ShMO, SM, SAAM, FK and ShSMSh contributed in some sections of the article. All authors read the final edited version of the manuscript.

Ethical Considerations

Compliance with ethical guidelines: IR.GUMS.REC.1399.273.

Conflict of interest

The authors declare no potential conflicts of interest.

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