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Research Article

Evaluation of Sleep Disturbances Prevalence in a Period of 6 Months after Recovery Post Covid-19 Patients Admitted to the Intensive Care Unit with Pulmonary Involvement of more than 20%

Nima Mohamadi Afrakoti[1]*, Aylin Hefzollesan[2], Mohammadsadegh Talebi Kahdouei[2], Seyyed Mojtaba Marashi[1], Arash Heroabadi[1], Samaneh Hajy Mola Rabi[3], Fatemeh Aghaei[2]

[1]*Department of Anesthesiology and Critical Care, Shariati Hospital ,Tehran University of Medical Science,Tehran,Iran.*

[2]*Medical School, Tehran University of Medical Science, Tehran, Iran.*

[3]*Department of Neurology, Alborz University of Medical Science, Alborz, Iran.*

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ABSTRACT

Background: The emergence of COVID-19 in late 2019 swiftly led to a global pandemic, prompting urgent investigation into its multifaceted impacts. While prior studies have highlighted compromised sleep quality in hospitalized COVID-19 patients, this research delves into the enduring effects on sleep patterns for those with severe pulmonary involvement post-intensive care. This study addresses a critical gap in understanding the long-term consequences of the virus, emphasizing the importance of post-recovery care.

Methods: Conducted as a cross-sectional study, we consecutively enrolled COVID-19 patients with over 20% pulmonary involvement admitted to the ICU at Shariati Hospital, Tehran, between June 2021 and January 2022. Demographic and clinical data were extracted from hospital records. After ethics committee approval, participants were contacted six months post-discharge to assess sleep quality using the Pittsburgh Sleep Quality Index (PSQI). Exclusions comprised obstructive sleep apnea patients and those with incomplete records.

Results: Of the 60 eligible post-COVID-19 patients, 56 participated. Three individuals were unresponsive to calls, while one declined. Participants, primarily female (64.3%), had a mean age of 51.7 years. Notably, 80.4% exhibited sleep disorders six months post-discharge. Gender differences were observed, with females reporting higher scores in specific sleep quality components. Intriguingly, single individuals demonstrated a higher preference for sleep medication. These findings underscore the imperative for targeted interventions to improve post-ICU sleep quality in severe COVID-19 cases.

Conclusion: The high prevalence of sleep disorders six months post-discharge underscores the enduring impact of COVID-19 on sleep quality. These findings call for targeted interventions and comprehensive post-ICU care protocols that prioritize sleep health.

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*Corresponding author.
E-mail address: n.afra63@gmai.com

Introduction

The emerging disease of Covid-19 was first reported at the end of December 2019 in the city of Wuhan, China, and since that day, it has rapidly spread to more than 180 countries around the world [1-2]. On March 11, 2020, Covid-19 was declared a pandemic by the World Health Organization (WHO) [3].

While studies have demonstrated compromised sleep quality in COVID-19 patients during their hospitalization, further research is required to thoroughly investigate sleep issues in individuals who have recuperated from the virus [4]. The exact pathophysiological mechanism underlying reduced sleep quality after COVID-19 has not been definitively determined. Throughout the SARS-CoV-2 outbreak, researchers examined sleep disorders and diminished sleep quality in diverse populations, primarily using questionnaires. It is estimated that COVID-19-related sleep disorders impact approximately 30-35% of both the general population and healthcare workers, with an even higher prevalence observed in patients experiencing acute COVID-19 [5-7].

Inadequate sleep can hinder psychological functioning and impair decision-making abilities. It can also compromise the immune system, elevate the risk of accidents, induce mood fluctuations, raise medical expenses, and make individuals more vulnerable to contracting viruses due to reduced concentration [8]. Although there are studies showing a decrease in sleep quality in hospitalized patients with Covid-19, more studies are needed to investigate sleep problems in patients who had serious levels of infection, especially in long-term follow-up.

This study is essential for gaining a comprehensive understanding of the enduring effects of the virus, particularly on sleep patterns, in patients who have undergone intensive care. By examining sleep disturbances over an extended post-recovery period, we aim to uncover valuable insights that may not be apparent in shorter-term studies.

Methods

This study is a cross-sectional study. In this study, we consecutively included the patients with covid-19 whose PCR test or throat culture was positive and were hospitalized the intensive care unit (ICU) of Shariati Hospital, Tehran, Iran between June 2021 to January 2022. Only patients with pulmonary involvement of more than 20% included in the study.

Basic information of patients, including demographic characteristics and clinical records, were collected through the archive files available in the database of Shariati Hospital after the approval of the ethics committee. Finally, a phone call was made and the selected patients were asked about their sleep quality 6 months after their discharge through the Pittsburgh sleep quality index (PSQI) questionnaire. This questionnaire questions 7 subscales: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction [9].

We included patients between 18 and 80 years of age who had lung involvement of more than 20%, positive throat culture or PCR, and have now been discharged. We excluded p atients with obstructive sleep apnea and patients whose detailed information is not available for follow-up in the file.

We used chi-square test, analysis of variance (ANOVA) and student's t-test (or their non-parametric alternatives) to compare groups. All differences with a p-values < 0.05 concidered statistically siginifcant. Stata 11.0 was used for statistical analysis.

Results

In total, 56 of the 60 discharged post-COVID-19 patients were enrolled in the study. Out of the four patients lost to follow-up, three were unresponsive to phone calls, while one expressed a reluctance to participate. Out of the total participants, there were 20 (35.7%) male participants. The mean age was 51.7 (Standard deviation = 19.3) years. Most of the patients were married (40, 71.4%). The most frequent occupation was housekeeper (24, 42.9%). The demographic and socio-economic characteristics of the participants are shown in (Table 1).

For Pittsburgh sleep quality index, the global score was 9.07 (SD = 4.83). PSQI components are also available in (Table 2). Regarding a global score of 5 or higher as sleep disorder, 45 (80.4%) patients had sleep disorder 6 month after their discharge.

Associations between basic characteristics and PSQI and its components' scores are elaborated in (Table 3). Age was categorized as two groups based on the mean value. For the global PSQI score only differences in sex variable was statistically significant (p-value= 0.03) and global PSQI score was higher in females. No significant difference was found for the sleep disorder. However for PSQI components there were significant between males and females in sleep latency (p-value = 0.02), sleep duration (p-value = 0.03), and sleep efficiency (p-value= 0.01); where females had higher scores in the mentioned components. Also single patients significantly used more sleep medications compared to married ones (p-value= 0.03).

Table 1- The demographic and socio-economic characteristics of the participants

Characteristics	N
Age, mean (SD)	51.7 (19.3)
Sex	
Male, n (%)	20 (35.7%)
Female, n (%)	36 (64.3%)
Maritial Status	
Married, n (%)	40 (71.4%)
Single, n (%)	16 (28.6%)
Occupation	
Housekeeper, n (%)	24 (42.9%)
Occupationless, n (%)	15 (26.8%)
Freelancer, n (%)	8 (14.3%)
Government employee, n (%)	7 (12.5%)
Student, n (%)	2 (3.6%)

Table 2- Pittsburgh sleep quality index scores.

Scores	N (SD)
Global PSQI Score	9.07 (4.83)
Components	
Subjective sleep quality	1.77 (0.95)
Sleep latency	1.66 (1.25)
Sleep duration	1.39 (1.07)
Sleep efciency	0.61 (0.93)
Sleep disturbance	1.34 (0.61)
Use of sleep medication	0.63 (1.18)
Daytime dysfunction	1.68 (1.11)

Table 3- Association between PSQI score, Its components and sleep disorder with patients' characteristics.

Basic characteristics	P-value Percent	P-value Mean (SD)							
	Sleep disorder (PSQI≥ 5)	Global PSQI Score	Subjective sleep quality	Sleep latency	Sleep duration	Sleep efciency	Sleep disturbance	Use of sleep medication	Daytime dysfunction
Age	0.74	0.67	0.55	0.68	0.94	0.20	0.95	0.29	0.65
≤50	78.6%	9.36 (5.18)	1.68 (1.02)	1.61 (1.23)	1.39 (1.03)	0.75 (1.00)	1.36 (0.68)	0.82 (1.33)	1.75 (1.08)
>50	82.1%	8.79 (4.54)	1.86 (0.89)	1.71 (1.30)	1.39 (1.13)	0.46 (0.84)	1.32 (0.55)	0.43 (1.00)	1.61 (1.17)
Sex	0.45	0.03	0.62	0.02	0.03	0.01	0.42	0.68	0.06
Male	75.0%	7.10 (3.49)	1.70 (0.87)	1.20 (1.06)	0.95 (0.83)	0.15 (0.37)	1.25 (0.44)	0.55 (1.15)	1.30 (1.03)
Female	83.3%	10.17 (5.16)	1.81 (0.=1.01)	1.92 (1.30)	1.64 (1.13)	0.86 (1.05)	1.39 (0.69)	0.67 (1.22)	1.89 (1.12)
Marital status	0.71	0.63	0.31	0.21	0.64	0.95	0.21	0.03	0.31
Single	75.0%	8.94 (6.40)	1.85 (0.95)	1.31 (1.35)	1.5 (1.10)	0.75 (1.24)	1.19 (0.75)	1.19 (1.42)	1.44 (1.15)
Married	82.5%	9.13 (4.15)	1.56 (0.96)	1.80 (1.20)	1.35 (1.08)	0.55 (0.78)	1.40 (0.55)	0.4 (1.01)	1.78 (1.10)
Occupation	0.08	0.08	0.74	0.09	0.11	0.19	0.76	0.54	0.30
Freelancer	75.0%	6.38 (2.62)	1.63 (0.74)	0.88 (0.99)	0.875 (0.64)	0 (0)	1.25 (0.71)	0.63 (1.19)	1.13 (0.99)

Jobless	80.0%	9.87 (6.25)	1.80 (1.08)	1.73 (1.16)	1.33 (1.11)	0.73 (1.10)	1.33 (0.72)	1.20 (1.52)	1.73 (1.10)
Housekeeper	83.3%	10 (4.25)	1.83 (0.96)	2.00 (1.25)	1.54 (1.10)	0.83 (0.96)	1.46 (0.59)	0.50 (1.06)	1.83 (1.20)
Student	100%	2.5 (0.71)	1.00 (0)	0 (0)	0 (0)	0 (0)	1.00 (0)	0 (0)	0.5 (0.71)
Government employee	100%	9.14 (4.06)	1.86 (1.07)	1.71 (1.38)	2.00 (1)	0.43 (0.79)	1.14 (0.38)	0 (0)	2.00 (0.82)

Discussion

The findings of this study shed light on the prevalence of sleep disturbances in post-COVID-19 patients who were admitted to the intensive care unit (ICU) with pulmonary involvement exceeding 20%. Our results indicate that a substantial majority, 80.4% of participants, experienced sleep disorders six months after their discharge, as assessed by the Pittsburgh Sleep Quality Index (PSQI). This high prevalence underscores the importance of considering sleep quality as a critical component of post-COVID-19 care for patients with severe pulmonary compromise.

These results align with prior research that has demonstrated a link between COVID-19 and sleep disturbances [10-11]. However, our study specifically focuses on a subset of patients who experienced severe respiratory involvement and required ICU admission. This distinction is crucial, as it highlights the unique challenges and potential long-term repercussions faced by individuals with more severe forms of the disease.

Our findings are in agreement with previous studies that have identified compromised sleep quality during hospitalization for COVID-19 [12-13]. However, this research extends beyond the acute phase of illness, providing insight into the enduring impact of COVID-19 on sleep patterns in this particular population. The persistence of sleep disturbances post-recovery underscores the need for targeted interventions aimed at improving sleep quality and overall well-being in this vulnerable cohort.

Furthermore, our study reveals interesting gender-related differences in sleep quality and its components. Females exhibited higher scores in sleep latency, sleep duration, and sleep efficiency and global PSQI score. These distinctions emphasize the importance of considering gender-specific factors in post-COVID-19 care, and warrant further investigation into the underlying causes of these disparities.

Moreover, our study highlights a noteworthy observation regarding the use of sleep medication. Single patients demonstrated a statistically significant preference for sleep aids compared to their married counterparts. This finding underscores the importance of considering socio-demographic factors in the assessment and management of sleep disturbances in post-COVID-19 patients.

While our study provides valuable insights, it is not without limitations. The sample size is relatively small, which may impact the generalizability of our findings. Additionally, our reliance on retrospective data from hospital archives could introduce potential biases. Future research with larger, more diverse cohorts and prospective data collection methods would serve to strengthen the robustness of these findings.

Conclusion

In conclusion, this study highlights the critical need to address sleep disturbances in post-COVID-19 patients with significant pulmonary involvement who have undergone intensive care. The high prevalence of sleep disorders six months post-discharge underscores the enduring impact of COVID-19 on sleep quality. These findings call for targeted interventions and comprehensive post-ICU care protocols that prioritize sleep health. By addressing this aspect of recovery, healthcare providers can enhance the overall well-being and quality of life for this vulnerable population.

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