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ASSESSMENT OF EARLY SLEEP QUALITY DURING THE COVID-19 PANDEMIC

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ABSTRACT

Aim: The aim of the study was to evaluate the relationship between COVID-19 and early sleep quality and to reveal the influencing factors.

Methods: This cross-sectional study included 443 participants. The COVID-19 history and sociodemographic characteristics of the participants were evaluated, and the Pittsburgh Sleep Quality Index (PSQI) was administered.

Results: The participants included 234 (52.8%) women and 209 (47.2%) men, and the mean age was 40.7±13.7 years. The mean PSQI scores of the participants were 3.7±4.1 and 220 (49.7%) had poor sleep quality. Individuals who had been infected with COVID-19 had significantly worse sleep quality compared to those who have never been infected or those who had only been in contact (p=0.015). The Multivariate Binary Logistic Regression Analysis found that female gender and actively working improved sleep quality (p=0.013, p=0.039). It was also determined that COVID-19 infection history resulted in poor sleep quality (p=0.010).

Conclusions: COVID-19 infection was associated with worse sleep quality in the early period compared to those who had not been infected or had only been in contact. With holistic approach modeling, family physicians should conduct screenings using appropriate scales to evaluate the quality of life of disadvantaged groups in primary care, and the relevant segments of society, especially health professionals, should be encouraged to increase the quality of life of the individuals at risk.

Keywords: COVID-19; family physician; pandemics; sleep quality

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INTRODUCTION

COVID-19 (Coronavirus Disease 2019) emerged as pneumonia cases with an unknown origin in Wuhan, China in December 2019. Then, it swiftly dispersed around the world and triggered unprecedented changes in our lives, creating a global crisis [1]. Due to its spread to countries with weaker health systems, the World Health Organization (WHO) declared COVID-19 a public health emergency of international concern in January 2020 and a pandemic in March 2020 [2, 3].

During the pandemic, social life restrictions were put in place by countries to ensure that individuals stayed in quarantine at home within the scope of combating the global crisis and aiming to reduce transmission and spread. As a result of these restrictions, and along with the change in daily routines, negative mental effects such as loneliness, anger problems, sleep disorders, domestic violence, anxiety, depression, and suicide were detected in the society [4, 5]. Various reasons such as increased anxiety levels due to the pandemic, increased caffeine and alcohol intake, and increased screen time have led to difficulty falling asleep and staying asleep, poorer quality sleep, sleep phase delays, and changes in the circadian rhythm of sleep [6]. On the other hand, COVID-19 can cause a persistent viral infection that lasts up to 230 days after the onset of symptoms. This can affect the hypothalamus and brainstem, disrupting the sleep-wake cycle and leading to poor sleep quality [7, 8].

Sleep is a crucial biological process that plays a vital role in maintaining not only cognitive but also physical health while optimizing the functioning of the immune system. It is thought that poor sleep quality may also make people more vulnerable to infectious diseases. Disrupted sleep patterns can result in alterations in gene expression, hormone release and action mechanisms, as well as the circadian rhythm [9]. Because sleep disorders are usually associated with psychiatric diseases or are predictors of these diseases, individuals who have sleep disorders during the pandemic may be at greater risk of negative consequences in the long term. The sudden emergence of the pandemic and the negative consequences of the global crisis that followed have affected the whole world. It is thought that large-scale and community-based interventions necessary to protect people from the psychological effects of this new crisis may have positive effects on global mental health [1].

For all these reasons, it is believed that detecting sleep disorders that may occur as a result of the mental and social problems caused by the COVID-19 pandemic will provide an opportunity to intervene earlier by screening with scales suitable for mental conditions such as depression, anxiety, and family problems that people may experience during and after the pandemic. It may also be possible to reduce the biopsychosocial problems caused by the pandemic with early intervention.

This study aimed to assess the sleep quality after isolation of individuals who were either infected or in contact with infected people by comparing them

with individuals who had never been infected, and to reveal the influencing factors.

METHODS

Ethical statements

This study was approved by the Institutional Review Board (IRB) of Kartal Dr. Lutfi Kirdar City Hospital (No: 2021/514/202/47), and the requirement for informed consent was waived.

Study population

This cross-sectional study conducted between June and October 2021, with a 95% confidence interval, 5% margin of error, 20% drop-out, and an incidence of 6.18% in May 2021, was based on the population registered at the Istanbul Kartal Dr. Lütfi Kırdar City Hospital Education Family Health Centers. Participants were literate individuals aged 18 and over who had experienced COVID-19 with 10-14 weeks since their isolation, had not infected by COVID-19 but were suffered contact 10-14 weeks ago, or had never been infected byCOVID-19. Our study was conducted in accordance with the principles of the Helsinki declaration. The participants provided written informed consent.

Data collection

The COVID-19 history, sociodemographic information, habits, and chronic diseases of the participants were questioned, and their sleep quality was evaluated with the Pittsburgh Sleep Quality Index (PSQI). PSQI was developed by Buysee et al. in 1989, and a Turkish validity and reliability study was performed by Ağargün et al. in 1996 [10, 11]. The total score of the scale, which assesses sleep quality and disturbance over the past month, ranges from 0 to 21. A PSQI total score of 5 and above indicates poor sleep quality. By grouping the items on the scale, seven components that show various findings are obtained. Some of the components are derived from a single item, and others from a grouping of several items The total score obtained from the components, each of which is evaluated between 0-3 points, shows the index score. The components are as follows: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficacy, sleep disturbance, use of sleep medication, and daytime dysfunction.

Statistical analysis

Study data were analyzed in the SPSS v 17.0 program for Windows (IBM Corp., Armonk, NY, USA). In this analysis, descriptive statistics such as frequency, percentage, frequency, mean, median, minimum, maximum value, and standard deviation were evaluated. The assumption of normal distribution of all variables was evaluated with the Kolmogorov-Smirnov test, and since all data showed normal distribution, Student's t-test and ANOVA test were used for continuous variables. In addition, categorical variables were evaluated with the chi-square test. All analyses considered values with $p<0.05$ as significant.

RESULTS

A total of 443 individuals, consisting of 234 (52.8%) females and 209 (47.2%) males, participated in the study. The average age of the participants was 40.7±13.7 years. The sociodemographic characteristics of the participants are given in Table 1. There were 218 (49.2%) participants with at least one chronic disease. The most common chronic diseases were obesity (n=105; 23.7%;), hypertension (n=68; 15.3%;), and diabetes (n=47; 10.6%;).Only 19 (4.3%) participants had a history of psychiatric illness.

Table 1. Sociodemographic characteristics of the participants.

		n (%)
Age	**Mean±SD**	40.7±13.7
	18-33	159 (35.9)
	34-49	173 (39.1)
	50-65	83 (18.7)
	≥65	28 (6.3)
Marital Status	Single	118 (26.6)
	Married	308 (69.5)
	Widowed/Divorced	17 (3.9)
Educational Status	≤ 8 Years (Primary Education)	139 (31.4)
	9-12 Years (High School)	95 (21.4)
	≥12 Years (University)	209 (47.2)
Employment Status	Not Employed	200 (45.1)
	Working	243 (54.9)

When the COVID-19 history of the participants was examined, it was determined that 161 (36.3%) had never infected, 115 (26%) had never infected but had a history of contact, and 167 (37.7%) infected. Considering only the participants with a history of contact, the mean quarantine period was 9.4±3.4 days. Contact participants were asked whether they had any symptoms during the current contact period, and only 28 (25.5%) of them had symptoms. The average quarantine period of the participants who passed COVID-19 infection is 11.7±5.6 days. 161 (96.4%) of the participants who have passed the disease have at least one symptom. When the complaints of the participants with symptoms are grouped according to the clinical classification in the WHO guidelines, 107 (66.5%) of the participants had mild, 48 (29.8%) had moderate and 6 (3.7%) had severe infection.

The mean PSQI score of the participants was 3.7±4.1, and these scores revealed that 220 (49.7%)

of the participants had poor sleep quality. The relationship between the COVID-19 history of the participants and their PSQI components are given in Table 2.There was a statistically significant relationship between the participants' sleep quality and their COVID-19 history (p=0.015). The Multivariate Binary Logistic Regression Analysis found that female gender and active working improved sleep quality (p=0.013, p=0.039). It was also determined that COVID-19 infection history resulted in poor sleep quality (p=0.010) (Table 3).

"Table 2. COVID-19 History and PSQI Components Relationship"

	COVID-19 History			p
	Infected Mean±SD	Contacted Mean±SD	Not infected/no contact history Mean±SD	
Subjective Sleep Quality	1.2±0.8	0.9±0.8	1.0±0.7	0.008
Sleep Latency	1.3±1.1	1.1±0.9	1.2±1.1	0.064
Sleep Duration	0.7±0.8	0.4±0.6	0.6±0.8	0.047
Habitual Sleep Efficiency	0.2±0.5	0.1±0.5	0.7±0.6	0.100
Sleep Disturbance	1.1±0.5	0.9±0.6	1.1±0.6	0.006
Use of Sleep Medication	0.2±0.7	0.1±0.5	0.1±0.4	0.139
Daytime Dysfunction	0.9±1.0	0.7±0.8	0.7±0.8	0.073
Total Score	5.6±3.4	4.2±3.1	5.0±3.5	0.002

* ANOVA test. SD: Standard Deviation.

Table 3. Effectiveness of sociodemographic characteristics, BMI and COVID-19 history in decreasing the risk of sleep quality.

	B	SE	Wald	df	p-value	OR	95% CL	
							LL	UL
Age	-0.015	0.009	2.644	1	0.104	0.986	0.968	1.003
Gender (Female)	0.515	0.208	6.116	1	0.013	1.673	1.113	2.516
Marital Status (Single)	-0.283	0.245	1.331	1	0.249	0.753	0.466	1.219
Employment Status(Working)	0.447	0.217	4.257	1	0.039	1.564	1.023	2.392
Chronic Disease (Yes)	-0.214	0.242	0.786	1	0.375	0.807	0.502	1.296
BMI	0.020	0.768	0.768	1	0.381	1.021	0.975	1.068
COVID-19 History(Infected)	-.0656	0.254	6.685	1	0.010	0.519	0.315	1.364

*Multivariate Binary Logistic Regression Analysis. BMI; OR: Odds Ratio; LL: Lower Limit; UL: Upper Limit.

DISCUSSION

Sleep, which is necessary for a healthy life, can directly affect the quality of life. The biopsychosocial problems caused by the pandemic period are also related to the quality of sleep of individuals. Looking at the results; it was found that one out of every two people had poor sleep quality during the pandemic, the status of being infected with COVID-19 was closely associated with poor sleep quality compared to other groups, and poor sleep quality was more pronounced in males, unemployed people, and people infected with COVID-19.

In 2023, Limongi et al. conducted a meta-analysis of 63 studies that investigated changes in sleep quality and sleep disorders in the general population before and during quarantine. The study showed a significant deterioration in sleep quality during quarantine compared to before, with a 40% increase in the probability of reporting poor sleep quality [12].

Riva et al. conducted a study examining sleep problems in a total of 883 people over 16 years of age living in Italy with known pre-pandemic data during the pandemic in 2020 and within 6 months of ending isolation. According to the results of the study; it was found that isolation increased the prevalence of sleep disturbances compared to the pre-pandemic period, and sleep disturbances did not improve immediately with the decrease in precautions but an improvement was observed within 6 months compared to the beginning, although remaining significantly higher than the pre-pandemic period [13].

Targa et al. reached 71 people whose PSQI and ESS scores were determined in 2017, and they administered these scales during the pandemic period in 2020. According to the results of the study, they found that there was a decrease in sleep quality during the pandemic, but the state of sleepiness did not change [14].

In 2022, Munteanu et al. found in 65 adult patients with confirmed COVID-19 that sleep quality as assessed by the PSQI was 51% at baseline and that poor sleep quality persisted 6 months later. They did not find a clear relationship between disease severity and sleep quality [15].

According to a study conducted by Tanrıverdi et al., in which 48 participants, 54% of whom were women, and with a mean age of 39.2±7.9 years, were evaluated for extrapulmonary characteristics 12 weeks after the COVID-19 infection, it was reported that 50% of the participants had poor sleep quality [16].

In a study by Gupta et al., where 958 subjects participated with the online survey method, and in which the effect of the presence of quarantine on sleep quality was investigated during the pandemic period; the mean age of the participants was 37; 41% were female, 67% were married, 9% smoked, 11% used alcohol, 12% had hypertension, and 7% had diabetes. Based on the results of the study, participants went to bed later, couldn't fall asleep, had interrupted nighttime sleepovers, and required increased daytime naps [17].

A meta-analysis by Liu et al. with 10948 adult patients diagnosed with COVID-19 aged 32-64 years and with a median age of 52 years, has reported that 20% of the participants had hypertension and 10% had diabetes, and the presence of chronic disease was associated with COVID-19severity [18].

According to the literature, sleep quality has become worse during the COVID-19 pandemic compared to previous periods. However, it is difficult to say whether these findings are due to the disease itself or to pandemic-related restrictions such as curfews and social isolation.

Furthermore, based on the results obtained, various factors caused by the pandemic process are considered among the reasons why disadvantaged groups have worse sleep quality but it is thought that the sleep quality of these people may already have been low in the pre-pandemic period. Therefore, it can be expected that disadvantaged groups will be affected not only by poor sleep quality due to the ongoing pandemic process, but also by possible future outbreaks, wars, and events.

Despite obstacles such as changes in daily routines, social limitations, and straining the capacity of the health system, this study that provides information about the prevalence of poor sleep quality during the COVID-19 pandemic and the fact that sleep quality is worse in those infected, and many similar studies conducted with different groups, are valuable in terms of providing information about the extent of the reflection of the significant relationship between sleep quality and COVID-19 on the individual and society.

Limitations of the Study

The limitations of our study may be that few participants participated in the telephone interview study despite repeated calls, the PSQI scale reflects sleep quality over the past month, and participants provided subjective information through recall and perception.

CONCLUSIONS

Since infectious diseases such as COVID-19 that can cause pandemics can create biopsychosocial effects, especially in disadvantaged groups, it is important for these groups to be screened with the appropriate scales for the protection and development of public health, and for the competent authorities to take the necessary initiatives.

Conflicts of interest: The authors have nothing to disclose.

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