

## THE EFFECT OF PERCEIVED STRESS RELATED TO COVID-19 PANDEMIC ON DYSPNEA AND SLEEP QUALITY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

KRONİK OBSTRÜKTİF AKCİĞER HASTALIĞI OLAN BİREYLERİN COVID-19 PANDEMİSİ NEDENİ İLE ALGILADIKLARI STRESİN, DİSPNE VE UYKU KALİTESİNE ETKİSİ

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### ABSTRACT

**Objective:** This descriptive study was planned to evaluate the effect of perceived stress related to the COVID-19 pandemic on dyspnea and sleep quality in individuals with chronic obstructive pulmonary disease (COPD).

**Methods:** The study was conducted with 141 COPD patients who met the inclusion criteria from home care patients affiliated with a state hospital in Istanbul between July and October 2021. “Sociodemographic Characteristics Form” “Perceived Stress Scale (PSS)” “Dyspnea-12 Scale” “Pittsburgh Sleep Quality Index (PSQI)” was used to collect data.

**Results:** The mean age of the participants was 75.82±10.43. The stress scores associated with the pandemic of the individuals with chronic obstructive pulmonary disease were 27.87±3.59. The dyspnea score was 17.20±8.76 in total. The mean Pittsburgh Sleep Quality Index score was found to be 7.50±3.21.

**Conclusions:** It was determined that the stress perceptions associated with the pandemic were high in the individuals with COPD who participated in the study, the severity of dyspnea was moderate and their sleep quality was poor. It was determined that smoking increased the severity of dyspnea, decreased sleep quality, and advanced age increased perceived stress.

**Anahtar Kelimeler:** COPD, dyspnea, perceived stress, sleep quality, COVID-19.

### ÖZET

**Amaç:** Araştırma kronik obstrüktif akciğer hastalığı (KOA) hastalarında COVID-19 pandemisi ile ilgili algılanan stresin, dispne ve uyku kalitesine etkisini değerlendirmek amacıyla tanımlayıcı tasarımda planlanmıştır.

**Method:** Araştırma Temmuz-Ekim 2021 tarihleri arasında İstanbul'daki bir devlet hastanesine bağlı evde bakım hastalarından dahil edilme kriterlerine uyan 141 KOAH hastasıyla gerçekleştirildi. Verilerin toplanmasında “Sosyodemografik Özellikler Formu” “Algılanan Stres Ölçeği” “Dispne-12 Ölçeği” “Pittsburgh Uyku Kalite İndeksi (PUKİ)” kullanıldı.

**Bulgular:** Katılımcıların yaş ortalaması 75.82±10.43 idi. KOAH'li bireylerin pandemi ile ilişkilendirilen stres skorları 27.87±3.59 idi. Dispne skoru 17.20±8.76 olarak bulundu. Pittsburgh Uyku Kalitesi İndeksi ortalama skoru 7.50±3.21 olarak belirlendi.

**Sonuç:** Çalışmaya katılan KOAH'lı bireylerde pandemiyle ilişkili stres düzeylerinin yüksek olduğu, dispne şiddetinin orta düzeyde olduğu ve uyku kalitelerinin kötü olduğu saptandı. Sigara kullanımının dispne şiddetini artırdığı, uyku kalitesini azalttığı, ileri yaşın algılanan stresi artırdığı belirlendi.

**Keywords:** KOAH, dispne, algılanan stres, uyku kalitesi, COVID-19.

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**Bu makaleye atıf yapmak için / Cite this article:** Yıldız Ayvaz, M., Yeni, T., Turen, S., Efil, S., Bulbul, E., & Kaymak Yalcin, E. (2024). The Effect of Perceived Stress Related to Covid-19 Pandemic on Dyspnea and Sleep Quality in Patients with Chronic Obstructive Pulmonary Disease. *Gevher Nesibe Journal of Medical & Health Sciences*, 8 (6), 191-198. <http://doi.org/10.5281/zenodo.11373616>

## INTRODUCTION

Patients with chronic respiratory diseases, particularly COPD, are at increased risk for COVID-19 infection. It can lead to severe pneumonia, acute respiratory distress and increased mortality, especially in the elderly and individuals with chronic diseases such as cardiovascular disease, diabetes, and respiratory disease (Campo-Arias et al., 2020). In addition to its physical effects, the pandemic also brings many psychosocial problems. It has been observed to cause serious psychological problems such as depression, perceived stress, post-traumatic stress and insomnia in healthy populations and also people with chronic obstructive pulmonary disease (COPD) (Rajkumar, 2020; Philip et al., 2020). Stress is an invisible reaction and affects the individuals lives. It may cause problems in physical, social and mental areas (Kyle et al., 2010; Özel & Bay Karabulut, 2018). As a result of intense and long-term stress, people may experience many symptoms such as sleep disturbance, irritability, difficulty concentrating, anger, fatigue, palpitation, diarrhea, etc. (Özel & Bay Karabulut, 2018). In the midst of the COVID-19 pandemic, various factors, including the uncertainty surrounding diagnosis and treatment, elevated risk and mortality rates, and enforced social isolation, contribute to heightened stress levels among individuals. This stress not only impacts the immune system but also gives rise to negative consequences across psychological, social, and physiological dimensions (Atalikoğlu Başkan & Güneş, 2021). Moreover, a noteworthy psychological response to these stressors is the manifestation of sleep disorders, significantly impacting the daily lives of individuals (Özel & Bay Karabulut, 2018). Studies have indicated that amidst the COVID-19 pandemic, individuals often experience poor sleep quality, and this quality further deteriorates in correlation with elevated stress levels (Werner et al., 2021; Kabeoğlu & Gül, 2021; Atalikoğlu Başkan & Güneş, 2021).

Anxiety and uncertainty affect physical and mental health negatively in elderly individuals with a chronic disease, and mood changes may trigger the perception of dyspnea (Perissinotto et al., 2019; Akıncı et al., 2021). Dyspnea is a symptom that causes shortness of breath, is described by healthy individuals or individuals with health problems and can contain many diseases on its basis. It is predicted that COVID-19 infection, which is seen in addition to a chronic disease, will increase the severity of dyspnea (Helvacı et al., 2020; Akıncı et al., 2021; Grewal et al., 2023). In this context, the study aimed to evaluate the effect of perceived stress related to the COVID-19 pandemic on dyspnea and sleep quality in individuals with COPD.

## MATERIALS AND METHODS

### Design and Sample

This descriptive and cross-sectional study was conducted in Istanbul between July and October 2021. During the data collection period, out of 352 COPD patients affiliated with the home care center, 141 patients who agreed to participate and met the inclusion criteria were included in the study. Individuals who were older than 40 years of age, diagnosed with COPD at least one year ago, able to communicate verbally, not diagnosed with any psychiatric disorder, and who agreed to participate in study. Individuals who were diagnosed with COPD acute exacerbation, who could not cooperate and who used sleep or sedative drugs were not included. Data were collected by the researchers in an average of 20 minutes with face-to-face interview technique on weekdays when patients and researchers were available.

### Data Collection Tools

“Sociodemographic Characteristics Form”, “Perceived Stress Scale (PSS)”, “Dyspnea-12 Scale” and “Pittsburgh Sleep Quality Index (PSQI)” were used to collect data.

**Sociodemographic Characteristics Form:** In this form, there were twelve questions including age, gender, marital status, education level, cohabitants, duration since COPD diagnosis, smoking status, COVID-19 disease history, and COVID-19 vaccination status.

**Perceived Stress Scale:** The Perceived Stress Scale (PSS-14) is a valid scale consisting of 14 items in total, PSS-14 consists of 2 factors: self-efficacy and stress perception. The scores to be obtained from the 5-point Likert-type scale range from 0 to 56. A high score indicates an excess of one's perception of stress (Cohen et al., 1983; Eskin et al., 2013) The Cronbach alpha value of PSS-14 was found to be 0.94.

**Dispne-12 Scale:** It is a four-point Likert-type valid scale consisting of 12 items measuring the severity of dyspnea (Yorke et al., 2010; Gök Metin and Helvacı, 2018). The scale has two sub-dimensions, physical and affective. The maximum score for the physical dimension is 21, and the maximum score for the emotional dimension is 15. The score that can be obtained from the scale ranges from 0 to 36. As the scores increase the severity of dyspnea increases. The Cronbach's alpha value of the scale was found to be 0.98.

**Pittsburgh Sleep Quality Index:** This valid index aimed to evaluate sleep quality in the last month. PSQI consists of 7 components, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance-sleep-related conditions, use of sleep-inducing drugs/substances, and daytime dysfunction/sleepiness, and consists of a total of 18 questions. Total PSQI score between 0-4 indicates good sleep quality, and 5-21 indicates poor sleep quality (Buysse et al., 1989; Ağargün et al., 1996). The Cronbach alpha value of PSQI was found to be 0.71.

### Statistical Analysis

The data were analyzed using the SPSS program. Descriptive analysis was used to frequency, percentage, mean, standard deviation, range of distribution tests. The Kolmogorov-Smirnov test was employed to assess the normality of the data. For comparisons involving non-normally distributed data and two independent groups, the Mann-Whitney U test was utilized. The Kruskal-Wallis test was applied for the comparison of three or more independent groups. To examine the relationship between two variables, the Pearson correlation coefficient was computed. The reliability of the scales was assessed using the Cronbach's Alpha reliability coefficient.

### Ethical Consideration

This research was approved by the Scientific Research Ethics Committee with the decision numbered 22/3 (46418926-050.01.04 date: 12.07.2021). Informed consent was obtained from all of the patients who were willing to participate in the study. The study was conducted according to the Helsinki statement.

## RESULTS

The mean age of the participants in the study was  $75.82 \pm 10.43$ . Of the participants 58.2% were women, 62.4% were single, 55.3% were primary school graduates, and 38.8% were retired. Of the participants 61.7% did not smoke and 97.9% did not use alcohol.

Of the participants 89.4% have been diagnosed with COPD for more than 5 years, and 77.3% have other chronic disease other than COPD. It was determined that 79.4% of the participants were vaccinated against COVID-19, 13.5% had COVID-19, and 6.4% hospitalised to receive treatment to COVID-19 at the hospital.

**Table 1.** PSS, Dyspnea-12 Scale and PSQI mean, standard deviation, lowest and highest values that can be taken and marked, and Cronbach Alpha values

	Mean±SD	The min-max value that can be obtained from the scale	Marked min-max value	Cronbach Alpha
<b>PSS-4</b>	7.96±1.24	0-16	3-12	.84
<b>PSS-10</b>	20.24±3.03	0-40	7-30	.92
<b>PSS-14</b>	27.87±3.59	0-56	12-41	.94
<b>Dyspnea-12 Scale</b>	Physical	10.06±5.04	0-21	.98
	Affective	7.14±3.86	0-15	.97
	Total	17.20±8.76	0-36	.98
<b>PSQI</b>	7.50±3.21	0-21	1-17	.71

PSS: Perceived Stress Scale, PSQI: Pittsburgh Sleep Quality Index

The average, standard deviation, minimum, and maximum values, as well as Cronbach Alpha values for the PSS, Dyspnea-12 Scale, and PSQI are presented in Table 1.

**Table 2.** Factors affecting PSS, Dyspnea-12 Scale and PSQI

		Dyspnea-12 Scale						
		PSS14	PSS10	PSS4	Physical Sub-dimension	Affective Sub-dimension	Total	PSQI
<b>Gender</b>	Female	28,45±2,88	20,85±2,40	8,24±1,17	9,93±4,95	7,03±3,92	16,97±8,67	7,46±3,35
	Male	27,06±4,30	19,40±3,59	7,57±1,24	10,23±5,20	7,28±3,81	17,52±8,94	7,55±3,20
		p=0,055**	p=0,034**	p=0,012**	p=0,853**	p=0,697**	p=0,655**	p=0,998**
<b>Age</b>	Under 65	25,78±3,93 b	18,73±3,75b	7,15±1,46b	10,05±6,03	6,47±4,56	16,52±10,37	7,42±2,96
	Between 65-79	27,91±4,22 ab	20,26±3,42ab	8,00±1,28a	9,56±5,14	6,85±4,07	16,42±9,05	7,26±3,14
	80 years and older	28,56±2,03 a	20,77±1,87a	8,20±0,98a	10,71±4,52	7,75±3,25	18,47±7,71	7,84±3,58
		p=0,003*	p=0,045*	p=0,005*	p=0,400*	p=0,405*	p=0,382*	p=0,511*
<b>Marital status</b>	Married	27,97±4,22	20,32±3,53	7,92±1,42	9,70±5,28	6,87±4,14	16,57±9,25	7,14±3,34
	Single	27,69±2,23	20,11±1,96	8,03±0,87	10,66±4,60	7,58±3,33	18,24±7,84	8,09±3,12
		p=0,618**	p=0,331**	p=0,339**	p=0,109**	p=0,191**	p=0,133**	p=0,073**
<b>Education status</b>	Literate	28,42±3,06	20,55±2,20	8,07±1,02	10,92±5,32	7,77±3,89	18,70±9,09	6,65±3,16
	Primary School	27,89±3,65	20,39±3,15	7,98±1,34	9,85±4,90	6,98±3,91	16,84±8,65	7,71±3,26
	High School and more	26,82±4,16	19,21±3,72	7,69±1,25	9,26±5,03	6,56±3,65	15,82±8,56	8,26±3,37
		p=0,075*	p=0,250*	p=0,531*	p=0,380*	p=0,448*	p=0,462*	p=0,096*
<b>Employment status</b>	Retired	27,24±4,26	19,57±3,42	7,79±1,33	9,16±4,75	6,48±3,62	15,64±8,26	7,38±2,94
	Employed	27,11±3,82	19,73±3,37	10,53±6,06	10,53±6,06	7,53±4,43	18,07±10,43	8,42±3,64
	Unemployed	28,75±2,58	21,06±2,28	8,29±1,08	10,65±4,78	7,55±3,79	18,21±8,35	7,21±3,38
		p=0,085*	p=0,100*	p=0,078*	p=0,276*	p=0,387*	p=0,427*	p=0,359*
<b>Income status</b>	Low	29,70±3,74	21,10±3,17	8,40±1,42	11,00±7,33	7,20±5,53	18,20±12,80	9,40±3,23
	Average	27,78±3,47	20,19±2,98	7,92±1,20	10,10±4,75	7,22±3,66	17,33±8,25	7,34±3,27
	High	25,33±7,09	19,66±5,68	8,33±2,51	5,00±7,81	3,33±5,77	8,33±13,57	8,00±2,64
		p=0,344*	p=0,518*	p=0,770*	p=0,353*	p=0,360*	p=0,360*	p=0,158*
<b>Smoking status</b>	Smoking	28,46±4,73	21,06±4,33	8,00±1,69	12,06±4,69a	9,20±4,00a	21,26±8,35a	8,20±4,31ab
	Non-smoking	27,94±3,21	20,26±2,53	8,03±1,13	9,24±4,98b	6,40±3,72b	15,64±8,55b	6,86±2,90b
	Quit smoking	27,48±3,97	19,89±3,40	7,79±1,30	11,12±5,00a	8,00±3,74a	19,12±8,69a	8,66±3,35a
		p=0,900*	p=0,511*	p=0,687*	p=0,016*	p=0,005*	p=0,005*	p=0,031*
<b>Duration of COPD</b>	1-5 years	29,66±3,82	22,20±3,23	8,46±1,92	11,40±5,03	8,53±3,88	19,93±8,26	7,13±2,82
	More than 5 years	27,65±3,52	20,01±2,94	7,90±1,13	9,90±5,04	6,97±3,84	16,88±8,79	7,54±3,34
		p=0,099**	p=0,034**	p=0,128**	p=0,324**	p=0,177**	p=0,132**	p=0,652**
<b>Having a chronic diseases</b>	Yes	27,77±3,65	20,17±2,97	7,88±1,19	9,93±5,19	7,05±3,99	16,99±9,06	7,22±3,16
	No	28,18±3,43	20,50±3,27	8,25±1,39	10,50±4,53	7,43±3,42	17,93±7,71	8,43±3,56
		p=0,328**	p=0,830**	p=0,205**	p=0,666**	p=0,669**	p=0,652**	p=0,066**
<b>COVID-19 history</b>	Yes	27,05±3,51	20,05±3,34	7,84±1,16	10,68±5,41	7,57±3,90	18,26±9,32	7,68±3,75
	No	28,00±3,60	20,27±3,00	7,98±1,25	9,96±5,00	7,07±3,87	17,04±8,70	7,47±3,21
		p=0,750**	p=0,460**	p=0,764**	p=0,637**	p=0,727**	p=0,628**	p=0,775**
<b>Vaccine Status</b>	Vaccinated	27,74±3,96	20,10±3,32	7,94±1,38	10,16±5,40	7,12±4,15	17,28±9,41	7,58±3,42
	Unvaccinated	28,37±1,42	20,79±1,42	8,03±0,42	9,68±3,32	7,20±2,52	16,89±5,67	7,20±2,70
		p=0,474**	p=0,242**	p=0,634**	p=0,771**	p=0,803**	p=0,778**	p=0,971**

\* Kruskal Wallis test \*\* Mann Whitney-U test. PSS: Perceived Stress Scale , PSQI: Pittsburgh Sleep Quality Index

Factors affecting PSS, Dyspnea-12 Scale and PSQI are given in Table 2. The differences in the mean scores of PSS10 (p=0.034) and PSS4 (p=0.012) between the groups according to gender were found to be statistically significant. The mean PSS10 and PSS4 scores of the women were found to be significantly higher. The differences in the mean scores of PSS14 (p=0.003), PSS10 (p=0.045) and PSS4 (p=0.005) between the groups according to age were found to be statistically significant. PSS14 and PSS10 mean scores were found to be significantly higher in the age of 80 and over group than in the group below 65 years. It was determined that the mean PSS4 score was higher in the groups aged 65 and over than in the group under 65 years of age. The mean PSS10 score was found to be significantly

higher in the group with a diagnosis period of 1-5 years compared to the group with a diagnosis period of more than 5 years ( $p=0.034$ ) (Table 2).

The differences in physical sub-dimension ( $p=0.016$ ), affective sub-dimension ( $p=0.005$ ) and total ( $p=0.005$ ) mean scores between the groups according to smoking status were found to be statistically significant. Physical sub-dimension and total score averages were found to be significantly higher in the smoking and ex-smokers group than in the non-smoker group. Affective subscale mean scores were found to be higher in the smoking group than in the non-smoker group (Table 2).

The mean difference in PSQI ( $p=0.031$ ) between the groups according to smoking status was found to be statistically significant. It was found that the mean PSQI score was higher in the group who quit smoking compared to the non-smoker group. Emotional subscale mean scores were found to be higher in the smoking group than in the non-smoker group (Table 2). According to gender, age, marital status, education status, employment status, income status, duration of COPD diagnosis, having a chronic disease, having had COVID-19 and being vaccinated against COVID-19, no statistically significant differences were found in terms of Dyspnea-12 Scale and its sub-dimensions, PSS total and PSQI score averages ( $p>0.05$ ).

**Table 3.** Correlation between PSS, Dyspnea-12 Scale and PSQI scores

	PSS4	PSS10	PSS14	Dyspnea-12 Physical	Dyspnea-12 Affective	Dyspnea-12 Scale	PSQI
	r	r	r	r	r	r	r
PSS4	1	,786**	,819**	,224*	,282*	,254*	,144
PSS10		1	,900**	,391**	,443**	,421**	,237*
PSS14			1	,398**	,438**	,422**	,170*
Dyspnea-12 Physical				1	,933**	,987**	,411**
Dyspnea-12 Affective					1	,978**	,404**
Dyspnea-12 Scale						1	,415**
PSQI							1

r: Pearson correlation analysis test \*significant at the  $p<0.05$  level \*\*significant at the  $p<0.001$  level. PSS: Perceived Stress Scale, PSQI: Pittsburgh Sleep Quality Index

It was determined that there was a "weak" relationship between PSS 4, PSS 10, and PSS 14, and Dyspnea-12 Scale and its sub-dimensions ( $p<0.05$ ). It was determined that there was a "weak" relationship between PSS 10 and PSS 14 and PSQI ( $p<0.05$ ). No correlation was found between PSS 4 and PSQI ( $p>0.05$ ). It was determined that there was a weak correlation between the Dyspnea-12 Scale and its sub-dimensions and PSQI ( $<0.05$ ) (Table 3).

## DISCUSSION

In a study conducted with COVID-19 patients, it was found that the more severe the dyspnea, the lower the sleep quality in patients with poor sleep quality (Güngör et al., 2021). Ora et al. (2020) did not reveal a relationship between dyspnea and neurological symptoms in their study. Jiang (2020), on the other hand, reveals that environmental stressors, physical diseases, separation from family and friends, and other accompanying psychological problems cause sleep disorders. In the same study, they found that the presence of comorbid diseases reduced sleep quality. In a study conducted in Italy, it was determined that the decrease in sleep quality was associated with higher levels of depression, anxiety and stress (Cellini et al., 2020).

The perceived stress was higher in elderly COPD patients compared to the 65-year-old and younger group. Studies have found that perceived stress decreases as age increases. Contrary to the results of our research, many studies have found that the perceived stress of the young adult group is higher (Wang et al., 2020; Mazza et al., 2020). In another study, no relationship was found between stress and age (Wang et al., 2020). Since our study was conducted with individuals with COPD, it is thought that it may be associated with higher stress in older individuals due to fear of death and uncertainties regarding treatment, as well as the fact that COVID-19 infection is more deadly in older ages.

In a study conducted by Wang et al. (2020), it was observed that women, students, and individuals with chronic diseases reported higher perceived stress. Interestingly, the marital status of

participants did not appear to significantly impact perceived stress. Notably, the mean PSS10 and PSS4 scores were found to be significantly higher among women. Another study revealed that women, single individuals, and those with chronic respiratory diseases experienced higher levels of perceived stress within the participant group (Atalikoğlu Başkan & Güneş, 2021). In a separate investigation, it was concluded that women exhibited higher stress levels during the COVID-19 pandemic, while the marital status and occupation of participants did not demonstrate a significant effect on stress levels (Mazza et al., 2020). These findings align with existing literature on the subject.

Sleep has a direct impact on mental and general health. The pandemic and subsequent quarantines have had profound effects on both sleep and mental health. A systematic review exploring the relationship between sleep, mental health, and COVID-19 revealed an increase in sleep duration. However, this change was noted to be accompanied by a decrease in sleep quality and a shift in sleep timing (Neculicioiu et al., 2022). Similarly, our study identified poor sleep quality, with individuals who quit smoking exhibiting worse sleep quality compared to non-smokers. In a study investigating the impact of perceived stress due to the COVID-19 pandemic on sleep quality among adults, it was observed that women, individuals living alone, university graduates, those with chronic respiratory diseases, and those spending at least 2 hours a day following COVID-19 developments experienced lower sleep quality than other groups (Atalikoğlu Başkan & Güneş, 2021). Li et al. (2020) found that education status and gender influenced sleep quality, while marital status did not. Contrary to some findings, our research indicated that gender, age, marital status, education status, employment status, income status, COPD diagnosis period, presence of chronic diseases, COVID-19 status, and COVID-19 vaccination status did not significantly affect sleep quality. Another study, in line with our findings, reported that gender and daily time spent monitoring COVID-19-related developments did not impact sleep quality (Huang & Zhao, 2020).

When the Dyspnea-12 Scale scores were evaluated in our study, it was determined that the physical and affective subscales were moderately severe. When the severity of dyspnea was compared according to the smoking status of the participants, the physical sub-dimension and total score averages were found to be significantly higher in the smoker and ex-smokers group than in the non-smoker group. Emotional subscale mean scores were found to be higher in the smoking group than in the non-smoker group. Helvacı et al., (2020) in their study to determine the severity of dyspnea in individuals with COPD and the factors affecting it, determined that the severity of dyspnea was higher in women, in individuals with low income and unemployed, and as the number of cigarette packs/year increased, the severity of dyspnea increased. As a result of a study investigating dyspnea and related factors in individuals over the age of 65 who were subjected to home quarantine in the COVID-19 pandemic, it was observed that the perception of physical and affective dyspnea was higher in individuals with low education level and individuals with generalized anxiety disorder. In addition, it was determined that the perception of physical and affective dyspnea differs according to the region of residence and smoking history, and the sedentary time and fear of death were higher in the pandemic process, especially in individuals with dyspnea and effort restriction (Akıncı et al., 2021). In our study, unlike the literature, no relationship was found between the severity of dyspnea and other sociodemographic and disease characteristics except smoking.

## **CONCLUSION**

As a result, it was determined that the perceived stress was high, the severity of dyspnea was moderate, and the sleep quality was generally poor during the COVID-19 pandemic in individuals with COPD. Smoking increased the severity of dyspnea, decreased sleep quality, and advanced age increased perceived stress. It was found that as the stress perceived by COPD patients increased due to the COVID-19 pandemic, their sleep quality tended to decrease, and the severity of dyspnea increased. It was determined that as the severity of dyspnea increased, sleep quality decreased. In line with these results, it is vital to identify and investigate the concerns of individuals with long-term respiratory distress, especially COPD, in the COVID-19 pandemic, and to develop effective strategies to reduce the psychosocial effects of the pandemic.

## **Acknowledgment**

The authors would like to thank the participants for their co-operation.

**Conflict of interest**

There is no conflict of interest.

**Author Contributions**

Plan and desing: MYA, TY, ST; Data collection: EKY; Analysis and comments: MYA, ST, SE; Review and check: SE, EB, ST; Writing: MYA, TY, EB.

**Funding**

The authors declare no financial support.

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