COVID-19 GEÇİREN HEMŞİRELER İLE SAĞLIKLI MESLEKTAŞLARININ YORGUNLUK VE UYKU KALİTESİNİN KARŞILAŞTIRILMASI

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Öz

Bu çalışmanın amacı COVID-19 geçiren hemşireler ile sağlıklı meslektaşlarının yorgunluk ve uyku kalitesi açısından karşılaştırılmasıdır. Araştırma bir üniversite hastanesinde kesitsel yaklaşım kullanılarak yürütüldü. Veriler, 2 Eylül- 29 Ekim 2021 tarihleri arasında, Google Forms üzerinden "Sosyo-demografik Form", "Piper Yorgunluk Ölçeği (PFS)" ve "Pittsburgh Uyku Kalitesi İndeksi (PSQI)" kullanılarak toplandı. Çalışmaya toplam 224 hemşire katıldı. COVID-19 tanısı alan katılımcıların %76,8'inin kadın, %57,3'ünün 18-29 yaş aralığında olduğu ve %82,9'unun herhangi bir kronik hastalığı olmadığı tespit edildi. Katılımcıların %36,6'sına COVID-19 tanısı konulmuş olduğu, bu tanıların %78'inin Temmuz-Aralık 2020 arasında konulduğu saptandı. COVID-19 tanısı alan hemşirelerin toplam PFS ve PSQI puan ortalamaları sırasıyla 6,2±2,2 ve 10,1±3,2 idi. COVID-19 tanısı almayan hemşirelerin PFS toplam puan ortalaması 5,6±2,4 ve PSQI toplam puan ortalaması 9,5±3,3 idi. Buna göre iki grup arasında anlamlı bir fark yoktu (p>0,05). Sonuç olarak hemşirelerin orta düzeyde yorgunluğa ve kötü uyku kalitesine sahip olduğu belirlenmiştir. Ancak COVID-19'a sahip olmak hemşirelerin yorgunluk düzeyini ve uyku kalitesini etkilememiştir.

Anahtar Kelimeler: COVID-19, Hemşirelik, Uyku kalitesi, Yorgunluk.

COMPARING FATIGUE AND SLEEP QUALITY OF NURSES WITH COVID-19 AND THEIR HEALTHY COUNTERPARTS

Abstract

The study aims to compare the fatigue and sleep quality of nurses who had COVID-19 and their healthy counterparts. A cross-sectional design was employed at a university hospital. Data were collected between September 2 and October 29, 2021, using the "Socio-demographic Form", "Piper Fatigue Scale (PFS)", "Pittsburgh Sleep Quality Index (PSQI)" via Google Forms. A total of 224 nurses took part in the study. Among the participants who were diagnosed with COVID-19, 76.8% were female, 57.3% were aged between 18 and 29 years, and 82.9% reported no chronic diseases. Overall, 36.6% of participants had been diagnosed with COVID-19, with 78% of these diagnoses occurring between July and December 2020. Total PFS and PSQI mean scores of the nurses who were diagnosed with COVID-19 were 6.2±2.2 and 10.1±3.2. Nurses who were not diagnosed with COVID-19 had a PFS total mean score of 5.6±2.4 and a PSQI total mean score of 9.5±3.3. Accordingly, no significant difference was found between the two groups (p>0.05). In conclusion, the results showed that the nurses experienced moderate fatigue and poor sleep quality. However, having COVID-19 did not affect the nurses' fatigue level and sleep quality.

Keywords: COVID-19, Fatigue, Nursing, Sleep quality.

1. INTRODUCTION

Fatigue and sleep related disorders are frequent problems among nurses. These problems are related to many factors, such as the defining characteristics of nurses, financial difficulties, and insufficient support from managers. Therefore, fatigue and sleep disorders are problems that negatively affect the quality of life of nurses (1-3). In particular, nurses employed in shift rotations often experience poor sleep quality (4, 5). Shift-working nurses also experience high levels of fatigue (5). Furthermore, the COVID-19 pandemic has triggered a rise in sleep problems and fatigue, particularly among frontline healthcare professionals (6, 7).

As it is known, continuous exposure to COVID-19 patients increases the risk of infection among healthcare professionals. This situation is among the factors that trigger sleep problems and fatigue in healthcare professionals. Especially busy and long working hours, long-term contact with the patient, use of inappropriate personal protective equipment, and insufficient hand hygiene increase the risk of infection (8, 9). Moreover, a meta-analysis study reported that nurses were the healthcare professionals most frequently affected by the virus (10).

COVID-19 is known to induce a wide spectrum of symptoms in the human body. Nevertheless, the most commonly reported symptoms among adults diagnosed with COVID-19 include dyspnea, fatigue, myalgia/arthralgia, fever, cough, headache, nausea/vomiting, depression, and sleep disturbances (11-15). These symptoms continue even after the patient recovers (12, 14, 15). However, there is no relationship between the seriousness of acute phase of COVID-19 disease and the presence of symptoms associated with the disease (15).

The extent to which nurses who have survived COVID-19 are affected by the disease's known long-term symptoms has yet to be fully clarified. It is believed that existing problems such as fatigue and sleep disturbances may worsen, particularly among nurses working under challenging conditions and intense workloads. In this context, the study aims to compare nurses who have had COVID-19 with their healthy counterparts regarding fatigue and sleep quality. In this way, it is to contribute to the literature on the effects of COVID-19 among nurses.

Research hypotheses:

H1. The fatigue levels of the nurses who have had COVID-19 will be higher than those of their healthy counterparts.

H2. The sleep quality of the nurses who have had COVID-19 will be poorer than those of their healthy counterparts.

2. METHOD

The reporting of this study followed the "Strengthening the Reporting of Observational Studies in Epidemiology-STROBE" guidelines for cross-sectional research (Appendix1).

2.1. Design and participants

The study was conducted using a cross-sectional design. The population of the study consisted of 318 nurses who were on active duty (not on vacation and maternity leave) in a university hospital. The study aimed to include the whole population, with no sampling procedure applied. All nurses in the hospital were informed about the study, and those who did not volunteer to participate were excluded. An online survey was conducted using Google Forms from September 2 to October 29, 2021. Researchers informed the participants about the data collection through an online application, and a link to the consent and data collection forms was subsequently shared with them. The reminders were set up multiple times between the specified dates. 224 nurses participated in the study and the participation rate was found to be 70.4%.

2.2. Data collection

Data were gathered through a "Socio-demographic Form", the "Piper Fatigue Scale (PFS)", and the "Pittsburgh Sleep Quality Index (PSQI)".

Socio-demographic Form: The survey was developed by the researchers in accordance with relevant studies (13, 16). The survey questions covered the socio-demographic characteristics of the participants, such as age, gender, and employment status. Additionally, the questions addressed factors related to the COVID-19 pandemic, including COVID-19 infection status, COVID-19-related symptoms, etc.

Piper Fatigue Scale-PFS: The scale comprises of 22 items, each rated on a 0 to 10 Visual Analog Scale-VAS, and is designed to assess the patient's subjective perception of fatigue across four subcomponents. These subcomponents are 'behavioral-severity', 'affective meaning', 'sensory', and 'cognitive-mood'. Subcomponent scores are calculated by summing the item scores within each subscale and then dividing by the number of items in that subscale. The overall fatigue score is derived by summing all item scores and dividing by the total number of items.

Based on the mean score, fatigue levels are categorized as follows: a score of 0 indicates 'no fatigue', 1–3 indicates 'mild fatigue', 4–6 indicates 'moderate fatigue', and 7–10 indicates 'severe fatigue' (17, 18). The original Cronbach's alpha of the tool was reported as .872 (17), whereas in the present study, it was found to be .967, indicating excellent internal consistency.

Pittsburgh Sleep Quality Index-PSQI: The PSQI is a subjective instrument consisting of 24 items and comprising 7 components. The PSQI is used to evaluate individuals' sleep quality as well as the type and severity of sleep problems experienced over the past month.

Each component is rated on a scale from 0 ("no difficulty") to 3 ("severe difficulty"). The global PSQI score, ranging from 0 to 21, is calculated by summing the scores of all 7 components. A global score ≤5 indicates *'good sleep quality'*, whereas a score >5 reflects *'poor sleep quality'* (19, 20).

The original version of the instrument demonstrated a Cronbach's alpha of .80, reflecting good internal consistency. In the current study, the overall Cronbach's alpha was calculated as .791.

2.3. Ethical Considerations

The study received ethical approval from the Ministry of Health and the Non-Invasive Research Ethics Committee (Decision No.: 26/08/2021-08). The necessary permission was obtained from the authors who translated and adapted the scales into the native language. Before answering the questions, participants were asked to read an informational text stating that anonymity and confidentiality would be maintained, data security ensured, and participation was voluntary with the option to withdraw at any time. They were then required to click a checkbox indicating their consent to participate in the study.

2.4. Data Analysis

After scanning the data set, no error was found. Therefore, the data of 224 nurses were analyzed. The demographic and clinical characteristics of the sample were presented within the scope of descriptive analyses by calculating means-M, frequencies-n, standard deviations-SD, and percentages-%. The 'chi-square' test was applied, and categorical variables were compared accordingly. Normality was tested via the Shapiro–Wilk test, and variables that do not meet normality assumptions, the Mann–Whitney U and Kruskal–Wallis H tests were employed for intergroup comparisons. SPSS (version 22) was used to perform the statistical analyses. Statistical significance was defined as $p < 0.05$.

3. RESULTS

3.1. Socio-demographic Characteristics of the Nurses

Table 1 presents a comparison of the participants' socio-demographic characteristics. Among the participants who diagnosed with COVID-19, 76.8% were female, and 57.3% were aged between 18 and 29 years. The majority of participants diagnosed with COVID-19, 82.9%, reported no chronic diseases and 92.7% had received the COVID-19 vaccine. Regarding COVID-19 diagnosis, it was found that only 82 out of 224 nurses (36.6%) had been diagnosed with the disease. No significant differences were found between nurses who had COVID-19 and those who were healthy in terms of gender, age, education, marital status, smoking habits, alcohol habits, chronic diseases status, regular medication use, and COVID-19 vaccination status (p>0.05).

Table 1. Comparison of Nurses' Socio-Demographic Characteristics (n=224)

Characteristics	COVID-19 (+)	COVID-19 (-)		
	n(%)	n(%)	x^2	p
Gender				
Female	63(76.8)	101(71.1)	.862	0.353
Male	19(23.2)	41(28.9)		
Age				
18-29	47(57.3)	66(46.5)	2.928	0.231
30-39	25(30.5)	49(34.5)		
40 and over	10(12.2)	27(19)		
Education				
High school	8(9.8)	16(11.3)	.260	0.878
Bachelor's degree	67(81.7)	112(78.9)		
Postgraduate	7(8.5)	14(9.8)		
Marital status				
Married	52(63.4)	89(62.7)	.012	0.912
Single	30(36.6)	53(37.3)		
Smoking habit				
Yes	25(30.5)	44(31.0)	.006	0.938
No/I quit	57(69.5)	98(69.0)		
Alcohol habit				
Yes	14(17.1)	25(17.6)	.010	0.919
No/I quit	68(82.9)	117(82.4)		
Chronic disease				
Yes	14(17.1)	31(21.8)	.733	0,.92
No	68(82.9)	111(78.2)		
Regular medication				
Yes	17(20.7)	28(19.7)	.033	0.855
No	65(79.3)	114(80.3)		
COVID-19 vaccine				
Yes	76(92.7)	124(87,3)	1.561	0.212
No	6(7.3)	18(12.7)		
Total	82(36.6)	142(63.4)		

n=Frequency, %=Percent, x^2= Chi square Test. *p<0.05

3.2. Comparison of Nurses' Working Conditions

When comparing participants' working conditions, no significant differences were detected between the two groups regarding working years and the units in which they were employed (p>0.05). In addition, nurses' working type differed significantly between the two groups (p<0.05) (Table 2).

Table 2. Comparison of Nurses' Working Conditions (n=224)

Characteristics	COVID-19 (+) n(%)	COVID-19 (-) n(%)	x^2	p
Working years				
1-5	35(42.7)	44(31)		
6-9	22(26.8)	45(31.7)	3.125	0.210
10 and above	25(30.5)	53(37.3)		
Working Unit				
Ward	42(51.2)	62(43.7)		
Intensive care	29(35.4)	48(33.8)	2.984	0.394
Outpatient clinic	9(11)	25(17.6)		
Operating room	2(2.4)	7(4.9)		
Working Type				
Daytime only	22(26.8)	64(45.1)		
In Shifts	54(65.9)	74(52.1)	8.581	**0.014***
Only night	6(7.3)	4(2.8)		
Total	82(36.6)	142(63.4)		

n=Frequency, %=Percent, x^2= Chi square Test. *p<0.05

3.3. Comparison of nurses' fatigue total and subscale mean scores, and sleep quality

Table 3 shows fatigue total mean scores, subscale mean scores, and sleep quality of the nurses. It was identified that the PFS total mean score of the nurses who had COVID-19 was 6.2 ± 2.2, and their PSQI total mean score was 10.1 ± 3.2. The nurses who did not have COVID-19 had a mean PFS total score of 5.6 ± 2.4 and a mean PSQI total score of 9.5 ± 3.3. According to these results, fatigue level was "moderate" and sleep quality was "poor" in both groups. However, there was no statistically significant difference between the scores of groups (p>0.05).

Table 3. Comparison of Nurses' Fatigue Total and Subscale Mean Scores, and Sleep Quality (N=224)

Characteristics	COVID-19 (+) (M±SD)	COVID-19 (-) (M±SD)	U	p
Total PFS	6.2±2.2	5.6±2.4	5085.000	0.115
PFS Subscales				
Behavioral/Severity	5.5± 2.5	5.0± 2.6	5281.000	0.247
Affective meaning	6.8± 2.5	6.3± 2.7	5252.500	0.222
Sensory	6.4± 2.3	5.7± 2.6	4911.000	0.051
Cognitive/Mood	6.1± 2.3	5.5± 2.5	5034.500	0.092
PSQI	10.1±3.2	9.5±3.3	5198.000	0.180
Total	82(36.6)	142(63.4)		

n=Frequency, %=Percent, M=Mean, SD=Standard deviation, U=Mann-Whitney U Test, PFS=Piper Fatigue Scale, PSQI=Pittsburgh Sleep Quality Index. *p<0.05

3.4. The correlation between COVID-19 characteristics and fatigue and sleep quality in nurses diagnosed with COVID-19

The majority of nurses diagnosed with COVID-19 (78%) contracted the disease between July and December 2020, with only one nurse requiring hospitalization. The most commonly reported symptoms among these nurses included fatigue (69.5%), myalgia/arthralgia (68.3%), loss of taste and smell (68.3%), fever (43.9%), cough (36.6%), dyspnea (25.6%), and other symptoms (8.5%). Additionally, 29.1% of the nurses reported infecting their relatives with the virus, 68.3% adhered to the recommended treatment, and the majority (86%) did not experience any side effects.

Table 4 shows the correlation between their COVID-19 characteristics, fatigue and sleep quality. It was found that 53 (64.6%) of the nurses had fatigue and 37 (45.1%) suffered from sleep problems before they were diagnosed with COVID-19. After the nurses were diagnosed with COVID-

19, their fatigue level increased and their sleep quality was worse (p<0.05). Also, sleep quality of the nurses who experienced sleep problems before the diagnosis of COVID-19 was worse (p<0.05) (Table 4).

Table 4. The Correlation Between COVID-19 Characteristics and Fatigue and Sleep Quality in Nurses Diagnosed With COVID-19 (n=82)

Characteristics	n(%)	PFS		PSQI	
		(M±SD)	p	(M±SD)	p
Fatigue before the diagnosis of COVID-19			0.771		0.930
Yes	53(64.6)	6.2±2.3		10.0±3.3	
No	29(35.4)	6.1±2.1		10.3±3.1	
Fatigue after the diagnosis of COVID-19					**0.045***
Increased	40(75.5)	6.3±2.3	0.301	10.5±3.1	
Decreased	13(24.5)	5.7±2.3		8.3±3.4	
Sleeping problem before the diagnosis of COVID-19			0.720		**0.009***
Yes	37(45.1)	6.1±2.2		11.1±3.1	
No	45(54.9)	6.2±2.2		9.2±3.1	
Sleeping problem after the diagnosis of COVID-19					
İncreased	17(45.9)	6.0±2.6	0.405	11.8±3.4	0.359
Decreased	18(48.6)	6.0±1.8		10.5±3.0	
Did not change	2(5.5)	8.0±1.6		10.5±2.1	

PFS=Piper Fatigue Scale, PSQI=Pittsburgh Sleep Quality Index, n=Frequency, %=Percent, M=Mean, SD=Standard deviation. *p<0.05

5. DISCUSSION

Results of the current study revealed that only 36.6% of the nurses were diagnosed with COVID-19. However, several studies in the literature have reported contrasting results. In a systematic review examining the prevalence of COVID-19 among healthcare workers—approximately half of whom were nurses—the overall prevalence was reported as 10% (10). Another systematic review and meta-analysis reported a prevalence of 51.7% (9), while a cross-sectional study found a prevalence of 24% (21). Other related studies have indicated that the prevalence rate of COVID-19 in nurses was 10.9% (22) and 4.1% (23). When the findings of the current study are compared with the data reported in previous studies, it is seen that the rate of nurses with COVID-19 is quite high. It is thought that this difference may be associated with the data collection times of the studies. The reason is that as the pandemic deepens, the number of nurses with COVID-19 is increasing. However, it is stated that the rate of being infected in nurses is lower than the rate of being infected in the general population (9). The morbidity and mortality rates of COVID-19 in healthcare workers were found to be lower, as well. This can be attributed to healthcare workers being generally younger and having fewer comorbid conditions (8).

The literature predominantly focuses on nurses who have provided direct care to COVID-19 patients (6, 22, 24). A study reported that nurses involved in the care of COVID-19 patients experienced fatigue (6) and had poor sleep quality (6, 22, 24). The pandemic also caused nurses to experience moderate fatigue and this pandemic fatigue adversely affected their sleep quality (25). In the general population, fatigue increase and sleep quality became poor in 2020 compared to 2018 (26). The present study found no significant differences between the two groups regarding fatigue and sleep quality. Both groups had moderate fatigue and poor sleep quality. However, sleep quality was poorer among nurses whose fatigue levels increased following COVID-19 infection. In contrast,

another study (27) demonstrated that fatigue severity did not significantly differ between healthcare workers with good and poor sleep quality.

It was observed that nurses working in shifts had a higher incidence of COVID-19 diagnosis compared to those working exclusively only during the day or only at night. In addition, only one nurse was treated as an inpatient. In the present study, only one of the participants was treated at the hospital, while the other participants had the disease as an outpatient. This finding is in agreement with the results reported by Al Maskari, Al Blushi (23). In addition, findings from this study indicated that most nurses had a "mild/moderate" disease but they were symptomatic. This finding supports that the symptom burden caused by COVID-19 is not dependent on mild or severe illness (15, 28). The symptoms caused by the disease can be seen alone or together and can be short or long-term (16). Bell, Catalfamo (29), in their study with 303 individuals who had COVID-19 but were not treated at the hospital, found that 50% of the participants experienced three or more symptoms and 25% experienced seven or more symptoms during 60-day or longer follow-ups. In a meta-analysis study, a total of 55 long-term effects related to COVID-19 were determined (30). In the present study, the symptoms stated by the nurses also varied. Although many of these symptoms were associated with COVID-19, they were not specific to the disease.

Studies examining the long-lasting effects of COVID-19 have frequently reported fatigue as a prevalent symptom (13, 16, 28-31). In addition, the studies on the general population have reported that 37.5% of individuals with mild to moderate COVID-19 experienced fatigue (29). Kayaaslan, Eser (13) determined that fatigue persisted four to five months after diagnosis in inpatients or outpatients. In another study revealing the long-term effects/symptoms of COVID-19, fatigue ranked first with an incidence of 58% (30). A study on healthcare professionals found that 39% of participants experienced moderate to severe fatigue. (21). However, fatigue decreased from the fourth month in a study conducted on the non-hospitalized population (28). Despite conflicting findings in the literature, most nurses in the current study continued to experience fatigue nearly one year after contracting the disease. The fatigue level of the nurses was 6.2±2.2 in those who had COVID-19 and 5.6±2.4 in their healthy counterparts, respectively. Although no significant difference was detected between the groups, fatigue levels were higher in nurses who had contracted COVID-19. The results of the present study support the notion that fatigue may become a serious, prolonged complication following COVID-19, adversely affecting quality of life.

The COVID-19 pandemic has led to sleep disturbances across all segments of society. It has been emphasized that patients experiencing long-term symptoms related to COVID-19 exhibit significantly higher levels of insomnia compared to individuals who have never contracted the virus (14). In a cohort study involving the general population, the participants' mean total PSQI score increased from 5.5 ± 0.1 in 2018 to 6.0 ± 0.1 in 2020. The difference was also significant (26). When the nurses and the general population are compared, it is seen that the nurses will suffer from more sleep disorders due to the stressful nature of their work environment and intense work (24). However, it was found that prior to the emergence of COVID-19 patients in Turkey, close to half of the nurses (49.2%) exhibited poor sleep quality, as indicated by a PSQI total score of 5.0 or higher (32). Among healthcare professionals who were in contact with COVID-19 patients throughout the pandemic, nurses demonstrated worse sleep quality than physicians and allied health professionals, with a mean total PSQI score of 6.1 ± 4.0 (24). In contrast, the study by Akıncı and Başar (27) reported that the quality of sleep was similar among nurses, physicians, and allied health staff. The same study reported no significant association between the group with poor sleep quality and the group with good sleep quality in terms of having had COVID-19 (27). The results of the current study corroborate these data. Nurses who had COVID-19 had a mean total PSQI score of 10.1 ± 3.2, whereas those who did not contract COVID-19 had a score of 9.5 ± 3.3. Although the groups did not differ significantly in statistical terms, suggesting that a COVID-19 diagnosis may not have a direct effect, the present study

found that nurses who had COVID-19 exhibited relatively higher PSQI scores. However, the literature reports that sleep disorders are one of the neurological effects of COVID-19 (13, 16). Also sleep disorders persist for more than four months in individuals with COVID-19 (13). In their study, Gaber, Ashish (21) identified sleep disturbance as a prevalent long-term issue among healthcare workers infected with COVID-19, with 44% of participants experiencing sleep disorders (21).

5. CONCLUSION

No correlation was found between nurses who had COVID-19 and their healthy counterparts regarding either fatigue or sleep quality. Therefore, it is recommended that nurse managers implement support programs and optimize working conditions to allow nurses adequate time for fatigue and sleep quality assessment. Such measures may help reduce fatigue levels before and during pandemics and improve poor sleep quality among nursing staff.

Limitations

This study adopted a cross-sectional design and was conducted in the southern region of a single country, relying primarily on self-reported measures. Consequently, the findings may have limited generalizability to other populations.

Ethics Statement

"COMPARING FATIGUE AND SLEEP QUALITY OF NURSES WITH COVID-19 AND THEIR HEALTHY COUNTERPARTS" Research and Ethics Statement Information for the Article with Title	
This study has been prepared in accordance with the values of "Research and Publication Ethics" and has been checked by a plagiarism control programme. All responsibility for the study lies with the author(s).	
Information	-
Author Conflict of Interest Statement	There is no conflict of interest between the authors.
Financial Support	No
Author Contribution Statement	The authors contributed equally to this article.
Thanks	We would like to thank the participants who took part in the study.
Ethics Committee Approval Certificate	Ethics Committee approval has been obtained.
Scale Permit	Scale permission has been obtained.

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