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EXAMINATION OF FATIGUE SITUATIONS OF NURSES IN THE PROLONGED COVID-19 INFECTION

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Abstract

Objective: This study was conducted to determine the effect of prolonged Covid-19 pandemic on the fatigue status of nurses.
Methods: The effect of prolonged Covid-19 on the fatigue status of nurses was evaluated, and 185 nurses who had Covid-19 were included in this descriptive study. The data were collected using the "Patient Information Form" and "Chalder Fatigue Scale" in the electronic environment during the working hours of the nurses who had Covid-19 and at times that would not disrupt their workflow order.
Results: It was determined that 62.6% of the nurses who were tired were female, 61.6% were tired, and the level of physical fatigue was higher than mental fatigue. The most common symptom among nurses during the acute and prolonged Covid-19 period was fatigue. There was a statistically significant difference between fatigue and headache($p<0.05$).
Conclusion: As a result of the study, it was determined that the majority of the nurses experienced fatigue after the Covid-19 pandemic, the severity of physical fatigue was higher than the severity of mental fatigue, and headache affected the level of fatigue. In line with these results, considering the negative impact of fatigue on quality of life and daily functionality, it is recommended to conduct periodic physical and mental health screenings for nurses and to provide training on methods such as effective exercise and stress management to help nurses cope with fatigue and regain optimal health.

Keywords: *Prolonged Covid-19, fatigue, nurse.*

Introduction

On March 11, 2020, the World Health Organization announced that the Coronavirus (Covid-19) pandemic had spread worldwide.[1] Covid-19 pandemic, which continues as a global problem, can cause physical and psychological difficulties for nurses, given the virus's uncertain and highly contagious nature.[2] The high workload of nurses in Turkey and the world shows that nurses experienced high fatigue levels even before Covid-19.[3] During the Covid-19 pandemic, the conditions for nurses became more difficult.[2]

The Covid-19 pandemic has permanent effects such as fatigue, dyspnea, chest pain, anxiety, and depression. These symptoms can last for months, and the quality of life of people deteriorates. Recently, the term "prolonged Covid-19" has been used in the literatüre.[4] The remarkable variety of symptoms of prolonged Covid-19, the underlying mechanisms, and how these symptoms will affect future health outcomes is unknown. However, it is reported that the most common symptom of prolonged Covid-19 is fatigue.[5,6]

Fatigue observed in nurses is "a work-related condition that ranges from acute to chronic in nature and affects physical and cognitive functions, resulting in feelings of extreme fatigue, decreased energy, and exhaustion." Fatigue in nurses is a complex process and occurs in response to the demands of the unit and health care system she works for.[7] Shift work, such as night shifts, long and/or alternating working hours, and multiple shifts in a row, shortens the sleep duration of the nurses and reduces their sleep quality. This causes fatigue, excessive daytime sleepiness, and poor performance. Nurses are exposed to high-stress factors during work with limited recovery, and intense stress causes increased fatigue and deterioration of psychological health.

Factors such as fear of contagion, fear of pandemic, and loneliness put healthcare workers' physical and psychological health at risk.[8] This psychological burden causes fatigue symptoms to aggravate various psychological problems among nurses. It has been reported that a decrease in nurses' resistance to physical, mental, and emotional stress will result in anxiety, depression, and fatigue.[2,7]

There is a limited number of data describing the level of functionality and impact of the prolonged Covid-19 pandemic on the life of healthcare workers other than working conditions; and its effects on respiratory functions, quality of life, and psychological state.[9] However, it has been reported that fatigue becomes chronic after the acute phase of Covid-19 disease, and its frequency is between 38% and 70%.[10-13] It has been reported that the prevalence of fatigue (53.1%) during and after Covid-19 pandemic is higher than symptoms such as joint (27.3%), dyspnea (43.4%), and chest (21.7%) pains.[10,14] This condition, which is more common in women and individuals with a history of depression/anxiety disorder, is thought to be similar to post-viral fatigue syndrome seen after MERS-CoV and Epstein-Barr infections.[12,13] Basically, in the physiopathology of this symptom, changes in the number of cells responsible for the immune system in the infectious state and stimulation of the central nervous system by proinflammatory cytokines are thought to cause changes in fatigue, sleep cycle, and social processes.[15,16]

It is stated that the risk of chronic fatigue is high due to the biological, social, behavioral, cognitive, and emotional factors of the disease after Covid-19 pandemic.[15,16] To better understand how nurses are affected by Covid-19 pandemic in the long term and to support nurses psychologically, it is important to reveal the prevalence of insomnia, fatigue, and psychological disorders and the factors affecting them to protect nurses' mental health and to draw attention to the measures that can be taken to prevent mental traumas that may be caused by fatigue. In this context, the research was carried out to determine the effect of prolonged Covid-19 pandemic on the fatigue status of nurses.

Methods

Type of Research

The research was the cross-sectional design type.

Population and Sample Selection of the Research

This research was carried out in 2021 with the participation of nurses working at Istanbul University-Cerrahpaşa, Cerrahpaşa Medical Faculty Hospital, who had a Covid-19 pandemic.

The study sample consisted of patients who met the research criteria and gave permission to participate in the research after the purpose of the research was explained to the participants.

The sample number was calculated by adding the study population with the Raosoft program. For the sample, it was planned to reach 140 nurses due to the calculation made with a ±5 margin of error, 95% of the research power; however, two subjects were excluded because they did not meet the research criteria (pregnancy). Thus, 63% of the population (n=138) was reached.

Inclusion criteria for the study were to have received Covid-19 treatment; exclusion criteria from the study were: Having a psychiatric or neurological disease that may cause fatigue before the Covid-19 pandemic, receiving corticosteroid treatment at least one week before the data collection date, and having an pandemic during the treatment, receiving cancer treatment (chemotherapy, radiotherapy, hormone therapy, surgical treatment) in the last six months, and being pregnant.

Data Collection Tools

Patient Information Form: Patients' socio-demographic characteristics (gender, age, weight, height, body mass index, marital status, education level, occupation, employment status, chronic illness, etc.), disease and intervention (time elapsed after Covid-19 pandemic, treatment content, etc.) were collected by the researchers with a questionnaire developed in line with the relevant literatüre.[10,11]

Chalder Fatigue Scale: It was developed by Chalder et al. (1993)[17] to measure the severity of fatigue perceived by the individual during the last month. The construct validity and reliability of the Turkish version was created by Adın (2019).[18] The scale's internal consistency was found to be at a good level (Cronbach's alpha value: 0.897), and it was found in this study as 0.894. The scale consists of 11 items and evaluates physical fatigue with seven items and mental fatigue with four items. The items on the scale are answered over four options (less than usual, no more than usual, more than usual, and much more than usual). The overall fatigue score is obtained by summing the physical fatigue subsection score and the mental fatigue subsection score of the scale. The physical fatigue subsection score can vary between 0-21, the mental fatigue subsection score can vary between 0-12, and the total fatigue score can vary between 0-33. The normative score of the scale is 12, and an increase in the score indicates an increase in the severity of fatigue. When the bi-modal scoring system of the scale is used, the physical fatigue subsection score can vary between 0-7, the mental fatigue subsection score can vary between 0-4, and the total fatigue

score can vary between 0-11. High scores indicate that the severity of fatigue is high.[17,18] In this study, the bi-modal scoring system was used because the scale did not give a cut-off point in the first calculation method and was more compatible with the scope of the research.

Data Collection

The data were collected electronically during the working hours of the nurses who had Covid-19, and at times that would not disrupt the workflow order. Nurses were asked to complete the "Patient Information Form" and the "Chalder Fatigue Scale." Answering the data collection form took an average of 5-10 minutes.

Ethical Aspect of Research

Ethical permission from Cukurova University Clinical Research Ethics Committee (Number:71/ 2021) to conduct the research and institutional permission from the hospital where the study was conducted were obtained. The face-to-face interview method was used while collecting the data. Verbal and written consent was obtained from the participants, who were informed in detail about the study to participate. In all stages of the research, the Declaration of Helsinki[19] was followed.

Statistical Analysis

Statistical analysis was done with IBM SPSS 21.0 (Released 2016, IBM Corp., Armonk, NY, USA) package program. Normal distribution was evaluated with the Kolmogorov-Smirnov test. Normally distributed variables were given as mean±standard deviation, and non-normally distributed variables were given as median (25th-75th percentile). Categorical variables were given as frequency (percentage). Differences between groups were determined by the independent sample t-test for normally distributed variables and by the Mann-Whitney U test for non-normally distributed variables. Logistic regression analysis was performed to determine the factors affecting the outcome variable. Relationships between categorical variables were evaluated by chi-square analysis. $P<0.05$ was considered sufficient for statistical significance.

Results

According to the Chalder Fatigue Scale, it was found that 62.6% of the tired individuals were women, 58.8% were married, 77.6% did not smoke, and 89.4% did not use alcohol; 75.3% did not have a chronic disease, 89.4% did not have flu and 84.7% did not have the pneumococcal vaccine, 63.5% had prolonged Covid-19, 83.5% had acute Covid-19, 91.8% of them were not hospitalized during the acute Covid-19 pandemic, and there was no statistically significant difference in these parameters ($p>0.05$) (Table 1).

It was determined that 61.6% f the participants were tired. Furthermore, it was determined that individuals' Chalder Fatigue Scale total score average was 5.09±3,6 ($p=0.25=1$; $p=0.75=8$), physical fatigue average was 3.76±2,7 ($p=0.25=1$; $p=0.75=1$), one of the sub-dimensions of the scale, mental fatigue average was 1.33±1,3 ($p=0.25=<0.01$; $p=0.75=8$) (25th and 75th percentiles) (Table 2).

Table 1: Descriptive and univariate analyzes of participants' social-demographic factors and fatigue (n=138)

Socio-demographic factors		Tired		Not tired		Analysis	
		n	%	n	%	χ2	*p*
Gender	Woman	77	62.6	46	37.4	0.17	0.67
	Men	8	53.3	7	46.7		
Marital status	Married	50	58.8	30	56.6	0.06	0.93
	Single	35	41.2	23	43.4		
Smoking	Yes	19	22.4	16	30.2	0.68	0.40
	No	66	77.6	37	69.8		
Alcohol use	Yes	9	10.6	7	13.2	0.38	0.84
	No	76	89.4	46	86.8		
Existing chronic illness	Yes	21	24.7	10	18.9	0.34	0.55
	No	64	75.3	43	81.1		
Have you had the seasonal flu vaccine?	Yes	9	10.6	1	1.9	-	0.08
	No	76	89.4	52	98.1		
Have you had the pneumococcal vaccine?	Yes	13	15.3	3	5.7	2.09	0.14
	No	72	84.7	50	94.3		
How long is it after Covid-19?	0-6 months	31	36.5	16	30.2	1.03	0.61
	7-12 months	44	51.8	28	52.8		
	>13 months	10	11.7	9	17		
Have you been diagnosed with 15neumoniae during acute covid-19 pandemic?	Yes	14	16.5	1	1.9	5.74	0.017
	No	71	83.5	52	98.1		
Have you been hospitalized during acute covid-19 pandemic?	Yes	7	8.2	2	3.8	-	0.48
	No	78	91.8	51	96.2		

Table 2: Chalder fatigue scale mean scores of the participants (n=138)

	Total		Tired		Not tired	
	138		**n**	**%**	**n**	**%**
			85	61.6	53	38.4
	Mean±SD	**(25.-75.)**	**Mean**	**(25.-75.)**	**Mean**	**(25.-75.)**
Total fatigue	5.09±3,6	(1.0-8.0)	7.62	(6-9)	1.03	(<0.01-2)
Physical fatigue	3.76±2,7	(1.0-7.0)	5.68	(5-7)	0.67	(<0.01-1)
Mental fatigue	1.33±1,3	(<0.01-8.0)	1.94	(1-3)	0.35	(<0.01-1)

For continuous variables, median (25th and 75th percentiles) are displayed.

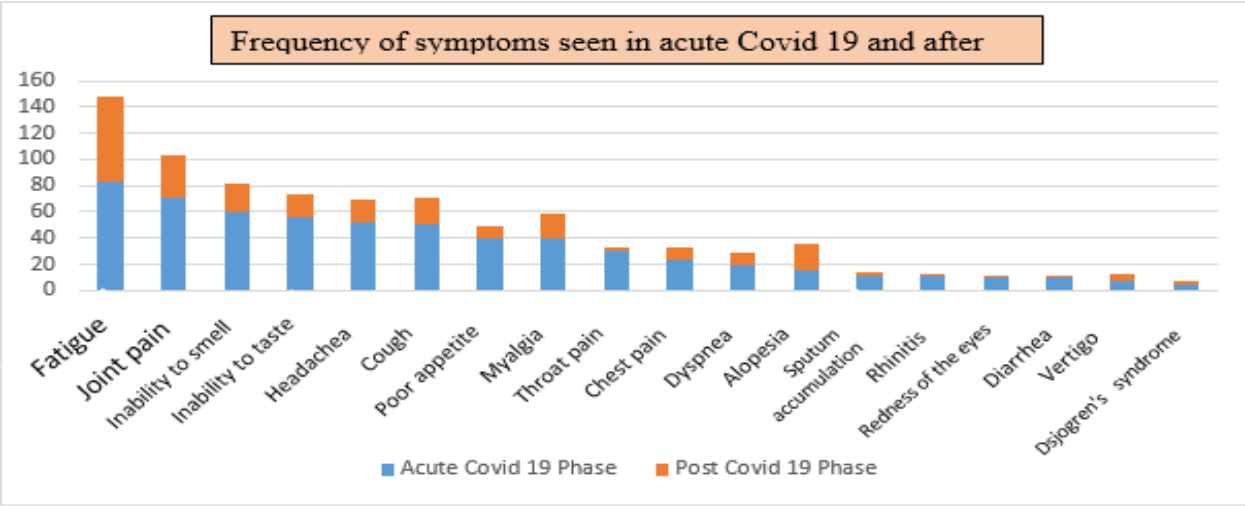

Figure 1: Frequency of symptoms reported in Acute and Prolonged Covid-19

The ten most common symptoms reported (Figure 1) by the participants during the acute Covid-19 process were fatigue, joint pain, loss of smell and taste, headache, cough, loss of appetite, myalgia, and chest pain; the ten most common symptoms after prolonged Covid-19 are fatigue, joint pain, loss of smell, cough, myalgia, hair loss, headache, loss of taste, dyspnea, and loss of appetite (Table 3).

Table 3: Symptoms seen in acute and prolonged Covid-19 pandemic according to the reports of the participants (n=138)

	Acute Covid-19 period		**The post-covid-19 period**		**Analysis**
Symptom	**n**	**%**	**n**	**%**	**p**
Fatigue	115	83.3	89	64.5	**<0.01**
Joint pain	98	71	45	32.6	**<0.01**
Inability to smell	83	60.1	29	21	**<0.01**
Inability to taste	77	55.8	26	18.8	**<0.01**
Headache	71	51.4	25	18.1	**<0.01**
Cough	70	50.7	27	19.6	**<0.01**
Anorexia	55	39.9	13	9.4	**<0.01**
Myalgia	54	39.1	27	19.6	**<0.01**
Chest pain	33	23.9	12	8.7	**<0.01**
Dyspnea	27	19.6	13	9.4	**0.003**
Hair loss	22	15.9	27	19.6	0.302
Vertigo	10	7.2	8	5.8	0.75

When the effects of the symptoms reported after Covid-19 on the fatigue levels of individuals were evaluated by logistic regression, it was found that headache affected the fatigue level (Table 4).

Discussion

While fatigue is a common symptom in those applying with symptomatic Covid-19 pandemic, it has been reported that persistent fatigue may develop in those recovering from active pandemic of Covid-19. Persistent fatigue lasting six months or more is called chronic fatigue syndrome and can be observed after viral-bacterial infections. In particular, there are concerns that SARS-CoV-2 can potentially trigger post-viral fatigue syndrome.[12,20]

It is stated that there are significant differences in the prevalence of fatigue in studies based on assessment methods for fatigue.[21] The prevalence of fatigue following hospitalization due to Covid-19 ranges from 52% to 70%, 1-3 months after hospital discharge.[14] Stavem et al.[14] reported fatigue approximately four months after the start of Covid-19 symptoms.

Table 4. Independent correlates of post-Covid-19 fatigue with logistic regression analysis (n=138)

Variables	**OR (%95 CI)**	***p***
Joint pain		
Yes	2.16 (0.77-6.04)	0.144
No	1.00 (reference)	
Dyspnea		
Yes	2.87 (0.45-18.31)	0.265
No	1.00 (reference)	
Cough		
Yes	2.19 (0.74-6.46)	0.156
No	1.00 (reference)	
Chest pain		
Yes	0.94 (0.15-5.73)	0.943
No	1.00 (reference)	
Headache		
Yes	4.89 (1.29-18.59)	**0.020**
No	1.00 (reference)	
Vertigo		
Yes	1.29 (0.10-16.26)	0.844
No	1.00 (reference)	
Myalgia		
Yes	2.94 (0.76-11.39)	0.118
No	1.00 (reference)	

OR: Odds Ratio, CI: Confidence Interval

Del Rio and Malani[22] report that fatigue is common in the Covid-19 pandemic and that patients still experience high levels of fatigue and anhedonia after the infection has healed; similarly, El Sayed et al.[21] reported that patients gradually developed sad moods, bad taste, lethargy, loss of appetite, and insomnia weeks after Covid-19 treatment. Teng et al.[23], it has been reported that most frontline workers (including doctors, nurses, police officers, volunteers, community workers, and journalists) developed fatigue during the Covid-19 pandemic in China. Liu et al.[20] found that the prevalence of fatigue among nursing students in the post-Covid-19 period was 67.3%. Similarly, in this study, it was found that most nurses had Covid-19 pandemic, and most developed fatigue. This finding supports the literature that SARS-CoV-2 can potentially trigger post-viral fatigue syndrome.

Fatigue refers to abnormal exhaustion after normal activities. Fatigue is associated with lifestyle factors (e.g., physical exertion, lack of sleep, antidepressant use), physical health problems (e.g., anemia, autoimmune disorders, and chronic obstructive pulmonary disease), and mental health problems (e.g., sleep disorders, anxiety, depression).[24-26] All of these factors may lead to additional harmful consequences, such as headaches, fainting, shortness of breath, and an increased risk of suicide. In the study, it was found that similar to the literature, fatigue had physical and mental effects, and the severity of physical fatigue was higher than mental fatigue after the Covid-19 pandemic, according to the Chalder Fatigue Scale of nurses. This situation may be related to nurses continuing to work in heavy and intense working conditions and do not get enough rest after being infected with Covid-19. Recently, it has been observed that the term prolonged Covid-19 has appeared in the literature. Prolonged Covid-19 is defined as the longer than the known and expected duration of the persistent effects of infection after recovery. While 10% to 20% of patients diagnosed with Covid-19 have symptoms lasting longer than one month, symptoms have been observed lasting longer than 12 weeks in 2.3% of patients.[26,27]

According to the King's College London study[28], it was stated that the risk factors for prolonged Covid-19 are being over 50 years old and female, obesity, and asthma, and Tenforde et al.[29] stated that advanced age and the presence of more than one chronic disease are associated with prolonged Covid-19. However, in this study, contrary to the study of Tenforde et al.[29], it was found that most nurses were female, and the younger age group outnumbered people with existing chronic diseases. In conclusion, the duration of the pandemic and the working conditions of healthcare professionals during the pandemic may have affected their more intense perception of prolonged Covid-19 symptoms.

It is reported that the most common symptoms of prolonged Covid-19 syndrome are fatigue, cough, headache, difficulty in breathing, joint pain, cognitive impairment, depression, skin rashes, gastrointestinal complaints, and dyspnea.[10,29] Petersen et al.[30] stated in their study that in more than half of the participants, at least one symptom persisted an average of 125 days after the beginning of symptoms; The most common prolonged Covid-19 symptoms were found to be fatigue, loss of smell and taste, and joint pain.

This study found that the most common symptoms after Covid-19 pandemic were fatigue, joint pain, inability to smell, cough, myalgia, hair loss, headache, loss of taste, dyspnea, and loss of appetite respectively. Among these symptoms, headache was found to affect the level of fatigue. Similar to the results of other studies, in the study, it is seen that the most common symptom after Covid-19 is fatigue.

Conclusion

As a result of the study, it was determined that the majority of the nurses experienced fatigue after the Covid-19 pandemic. The severity of physical fatigue was higher than mental fatigue, and the headache affected the level of fatigue. In line with these results, considering the negative impact of fatigue on quality of life and daily functionality, it is recommended to conduct periodic physical and mental health screenings for nurses and to provide training on methods such as effective exercise and stress management to help nurses cope with fatigue, and regain optimal health.

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Conflict of Interest

The authors have no conflicts of interest to disclose.

Compliance with Ethical Statement

Ethical permission from Cukurova University Clinical Research Ethics Committee (Number:71/ 2021) to conduct the research and institutional permission from the hospital where the study was conducted were obtained.

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Author Contribution

Idea/concept: YÖ, AT; Design: YÖ, AT, ESA; Consultancy; ESA; Data Collection and/or Processing: YÖ, NA, AT; Analysis and/or Interpretation: YÖ, ESA, AT; Literature review: YÖ, AT, ESA; Writing the article: YÖ, AT, ESA; Critical review: AT, ESA.

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