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FATIGUE IN POST COVID PERIOD AND STRATEGIES FOR COPING WITH FATIGUE: A PILOT STUDY

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■ Abstract

The aim of this study is to compare fatigue and musculoskeletal injuries in young adults who have not had Covid-19 and have had mild Covid-19 before. Another aim of the study is to propose some suggestions to manage the fatigue symptom that occurs in the post Covid period. The research was carried out on students and academic staff working and studying at the Faculty of Health Sciences of Karamanoğlu Mehmetbey University between February 8, 2021 and April 23, 2021. A total of 94 volunteers, aged 20–65 years, who had never had Covid-19 before (40 people) and who had returned from positive to negative for Covid (54 people), participated in the study. The clinical and demographic data of the individuals were recorded by meeting face to face (individual). Fatigue severity was measured with the Fatigue Severity Scale; musculoskeletal system symptoms were evaluated with Arthritis Research Uk Musculoskeletal Health Questionnaire (MSK-HQ). In the study, it was reported that individuals who had Covid-19 had a higher level of fatigue than those who did not ($p<0.05$). In terms of musculoskeletal injury, there was no difference between individuals who had Covid-19 and those who did not. To cope with the symptoms of fatigue seen in the post-Covid-19 period, it is recommended to gradually increase the physical activity levels of individuals by following the symptoms of shortness of breath and palpitation. Conservative treatment methods are also among the suggestions given to relax the muscles and reduce pain.

Keywords: Covid-19, Fatigue, Symptom, Health management, Musculoskeletal system.

Covid Sonrası Dönemde Yorgunluk ve Yorgunlukla Başa Çıkma Stratejileri: Bir Pilot Çalışma

■ Özet

Bu çalışmanın amacı, daha önce Covid-19 geçirmemiş ve hafif düzeyde Covid-19 geçirmiş olan genç erişkinlerde yorgunluk ve kas-iskelet yaralanmalarını karşılaştırmaktır. Çalışmanın bir diğer amacı da Covid-19 sonrası dönemde ortaya çıkan yorgunluk semptomunu yönetmek için önerilerde bulunmaktır. Araştırma, Karamanoğlu Mehmetbey Üniversitesi Sağlık Bilimleri Fakültesi'nde 8 Şubat 2021 ile 23 Nisan 2021 tarihleri arasında görev yapan ve öğrenim gören öğrenciler ve öğretim elemanları üzerinde gerçekleştirilmiştir. Çalışmaya 20-65 yaşları arasında, daha önce hiç Covid-19 geçirmemiş (40 kişi) ve pozitiften negatife dönen (54 kişi) toplam 94 gönüllü birey katıldı. Bireylerin klinik ve demografik verileri yüzyüze (bireysel) görüşülerek kaydedildi. Yorgunluk şiddeti, Yorgunluk Şiddet Ölçeği ile ölçüldü; kas-iskelet sistemi semptomları Kas-İskelet Sistemi Sağlık Sorgulaması (KİS-SS) ile değerlendirildi. Çalışmada, Covid-19 olan bireylerin, olmayanlara göre daha yüksek yorgunluk düzeyine sahip olduğu bulundu ($p<0,05$). Kas-iskelet sistemi yaralanmaları açısından ise Covid-19 olan ve olmayanlar arasında fark bulunmadı. Covid-19 sonrası dönemde görülen yorgunluk semptomu

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ile başa çıkabilmek için; nefes darlığı ve çarpıntı belirtileri takip edilerek, bireylerin fiziksel aktivite düzeylerinin kademeli olarak artırılması önerilmektedir. Konservatif tedavi yöntemleri ise kasları gevşetmek ve ağrıyı azaltmak için verilen diğer öneriler arasında yer almaktadır.

Anahtar Kelimeler: Covid-19, Yorgunluk, Belirti, Sağlık yönetimi, Kas-iskelet sistemi.

INTRODUCTION

The clinical picture of COVID-19 (Coronavirus Disease) differs from person to person. Passing the disease at home with mild symptoms in 10 days or less with a good prognosis is defined as mild Covid-19. Severe Covid 19 is defined as to spend the disease process in the hospital and to have serious diseases such as pneumonia, pulmonary edema, acute respiratory distress syndrome, and multiple organ failure (Wu et al., 2020: 336). It has been reported in the literature that fatigue, sleep disturbance, anxiety, and depression symptoms persist for the first 6 months in 30% of patients diagnosed with Covid-19 (Fernández-de-Las-Peñas et al., 2021, Mahase, 2020: m2815, Sandler et al., 2021: ofab440). Prolonged Covid-19 is when one or more symptoms persist for 3 weeks or more, or new symptoms begin to appear, even though the Covid-19 tests are negative, and the patient has clinically recovered. The most commonly reported prolonged symptoms include fatigue, headache, dyspnoea, cognitive impairment, depression, cough, myalgia, palpitations, headache, skin rashes, and gastrointestinal complaints. It is reported that as the severity and duration of the disease increase in Covid-19, the risk of prolonged Covid-19 also increases (Sandler et al., 2021: ofab440). Although the sequelae after Covid-19 vary from patient to patient, it has been reported that organ damage in the lungs, heart, brain, and kidneys continues in the post-Covid period even in patients with only mild symptoms (Raveendran et al., 2021: 870). Depending on the severity of the viral infection after Covid-19, fatigue may occur due to the effects on the cardiopulmonary system and the circulatory system, as well as a decrease in power output due to musculoskeletal system problems, the feeling of psychological exhaustion, or lack of motivation. Fatigue in Covid-19 is a multifaceted symptom that should be evaluated from a psychological, physiological, and biomechanical point of view. Although it is a well-known fact that elderly individuals who have had severe Covid-19 for a long time have fatigue symptoms, there are fewer studies on how young adults who have had mild and short-term Covid-19 are affected by fatigue symptoms (Fernández-de-Las-Peñas et al., 2021, Gaber, 2021: 36-39). The aim of this study is to compare fatigue and musculoskeletal injuries in young adults who have not had Covid-19 and have had mild Covid-19 before, and to make recommendations for managing fatigue in Covid 19. The hypotheses developed for the purpose of the research are stated as follows:

H1: Individuals who have had Covid have more fatigue symptoms than individuals who have not had Covid-19.

H2: The musculoskeletal health status of individuals who have had Covid-19 is worse than that of those who have not had Covid-19.

1. METHOD

1.1. Sample

The research was carried out a total of 94 students and academic staff working and studying at the Faculty of Health Sciences of Karamanoglu Mehmetbey University between February 8, 2021 and

April 23, 2021. The data were obtained through face-to-face interviews, each evaluation lasted between 20-30 minutes. Necessary permissions for the study were obtained from the local ethical committee of the university on 08.03.2022. All participants included in the study were informed about the study and a voluntary consent form was signed.

These are all of the criteria for inclusion and exclusion for the study:

- Participants that were between the ages of 18–55 and volunteered to participate in the study were recruited into the study.
- Participants who have had Covid-19, it must have changed from positive to negative and at least three weeks have passed since the illness were recruited Covid-19.
- Participants who have not had Covid-19, not been diagnosed with Covid-19, and not experienced symptoms of Covid-19
- Participants are having a serious psychiatric illness that may prevent the individual from understanding and completing the question were excluded the study.
- Participants who gave incomplete answers to the questions in the questionnaire were excluded from the study.

1.2. Data Collection Tools

The sociodemographic information of all individuals participating in the study was evaluated using the form prepared by the researchers. The fatigue severity of the participants with the fatigue severity scale, musculoskeletal system problems were evaluated with the musculoskeletal system health questionnaire.

Sociodemographic form: It is a form applied to the participants and developed by researchers who question age, gender, current weight, height, history of COVID-19, symptoms complained of, duration of illness, status of alcohol consumption, smoking, physical activity level, and additional systemic diseases. Fatigue severity scale: It consists of nine items measuring the severity of fatigue. Each item is scored from 1 to 7. The total score is calculated by taking an arithmetic mean. The total score range of the scale is 9–63. A score of 36 or higher indicates severe fatigue. The average score of 4 or less than indicates severe fatigue. Fatigue severity scale was developed by Krupp et al (Krupp et al., 1989: 1121-1123). The Turkish validity and reliability of the scale was conducted by Can et al in 2010 (Gencay-Can and Can, 2012: 29).

Musculoskeletal Health Questionnaire (MSK-HQ): It is an outcome measure that evaluates different musculoskeletal diseases. It consists of a total of 14 questions evaluating many parameters such as pain, sleep, fatigue, activities of daily living, physical activities, psychosocial status, and the general effect of the disease. The total score ranges from 0 to 56, with 0 points indicating the worst health status and 56 points indicating the best health status. This scale developed by Hill et al (Hill et

al., 2016: e012331). The Turkish validity and reliability of this questionnaire was conducted by Akkubak et al (Akkubak, 2017: 48).

1.3. Statistical Analysis

Kolmogorov-Smirnov and Shapiro-Wilk normality tests were performed to evaluate the suitability of the data for normal distribution. A histogram of the distribution of the data is plotted. It was observed that the data was not normally distributed. The Mann-Whitney U test was used to determine the difference or equality of the mean between two independent groups that were not normally distributed.

2. RESULTS

At first, a total of 101 individuals participated in the study. Seven participants who gave incomplete answers to the questions in questionnaire were excluded from study. Finally, a total of 94 individuals, 62 female and 32 males included the study. The subjects were at an average age of 27.13 years old; weights were 68.51 and heights were 168.54. The age of individuals who do not have Covid-19 are higher than those who have Covid-19 (see Table 1).

Table 1. Sociodemographic Data.

	All Participants	Participants who have had Covid 19	Participants who have not had Covid 19	<i>p</i>
	Mean ± SD (Min-Max)	Mean ± SD (Min-Max)	Mean ± SD (Min-Max)	
Age (years)	27.13±7.45 (20-51)	25.20±5.67 (20-40)	29.75±8.75 (20-51)	0.012
Height (cm)	168.54±9.02 (150-191)	169.25±8.66 (153-191)	167.57±9.52 (150-185)	0.378
Weight (kg)	65.96±16.11 (40-128)	66.42±14.83 (42-121)	65.32±17.88 (40-128)	0.372

SD: Standart Deviation, Min: Minimum, Max: Maximum, cm: centimeter, kg: kilogram, Mann-Whitney U test *p**<0.05.

Almost all of the individuals who were involved in our study with Covid-19 spent the disease process at home. Individuals who have had Covid do not have additional systemic diseases and also, most of the individuals included in the study consist of sedander individuals. other individual characteristics are shown in Table 2.

Table 2. Individuals' Characteristics.

		Participants who have had Covid 19 (n=54)	Participants who have not had Covid 19 (n=40)
Gender	Female	33 (61.1%)	29 (72.5%)
	Male	21 (38.9%)	11 (27.5%)
Disease Prognosis	At home	52	
	Hospital	2	
Disease Duration	less than 10 days	49	
	10 days or above	5	
Systemic Diseases	yes	0	4
	no	54	36
Alcohol Use	yes	10	2
	no	44	38
Smoking	yes	4	12
	no	50	28
Physical Activity Level	none	42	29
	3 days or more per week	12	11

n: Number

The severity of fatigue of individuals who have had covid is higher than those who have not had Covid-19. There is no difference between the groups in terms of musculoskeletal system problems. (see Table 3.)

Table 3. Comparison of Fatigue Severity and Musculoskeletal System Problems.

	Participants who have had Covid 19 (n=54)	Participants who have not had Covid 19 (n=40)	Z	p
	Mean±SD (Min-Max)	Mean±SD (Min-Max)		
Fatigue Severity Scale	31.70±12.31 (15-48)	24.30±10.00 (15-42)	-2.865	0.004
Musculoskeletal System Questionnaire	45.09±7.79 (29-56)	45.40±10.06 (19-56)	-0.774	0.439

SD: Standart Deviation, Min: Minimum, Max: Maximum, cm: centimeter, kg: kilogram, Mann-Whitney U test $p^* < 0.05$.

3. DISCUSSION

In present study, fatigue symptom, which is one of the most common symptoms in prolonged Covid-19 and musculoskeletal symptoms which is the less common were examined. This study claims that fatigue symptom persists for a long time in Covid-19 patients and that Covid-19 can affect skeletal muscle. According to result of study, while the H1 hypothesis is valid, the H2 hypothesis was not supported. Although severity of fatigue is higher in individuals who have had Covid-19 compared

to individuals who have not had Covid-19, there was found no differences between groups related musculoskeletal symptoms. Studies in the literature also support this result but most of the studies in the literature are on hospitalized patients. It is known that patients with a long disease duration and a history of hospitalization in intensive care have to cope with more symptoms in the post-Covid period (Maccarone et al., 2021: 2241-2243). The individuals examined in this study consist of individuals who survived the disease with mild symptoms. With this aspect, it will be a study that will contribute to the literature. Similar to our study, according to the findings obtained from the study of CIBIK et al., anxiety and depression in individuals with Covid-19 infection and fatigue levels were found to be higher than those who did not (Çıbık et al., 2022: 36). In previous study, it is argued that depression and stress factors trigger fatigue in individuals with Covid-19. According to a review study conducted in 2022, it is reported that the symptom of fatigue decreases within 4-7 weeks after Covid-19. To find the underlying problem of fatigue; It is reported that depression, anxiety and post-traumatic stress disorder should be evaluated after evaluating respiratory, cardiac and neurological findings. In addition, tests such as complete blood count, kidney, liver and thyroid function, C-reactive protein, blood sugar, ferritin tests should be performed (Sandler et al., 2021: ofab440). Although the pathophysiology of post-Covid-19 fatigue syndrome is not yet clarified, overexpression of Interleukin 6 (IL-6) would be linked to persistent inflammation and fatigue (Gaber, 2021: 36-39). In the literature, there are many studies reporting that symptoms such as myalgia, back pain, general muscle weakness, and fatigue are seen in Covid-19, especially in the acute period after the disease (Agergaard et al., 2021: 1978, Ali and Kunugi, 2021: 372, Fernández-de-Las-Peñas et al., 2021). In these studies, unlike in present study, musculoskeletal problems were observed in individuals who had Covid-19, and these problems were associated with post-Covid-19 fatigue (Agergaard et al., 2021: 1978, Raveendran et al., 2021: 870). In addition, according to the previous studies, the length of hospital stay and the presence of additional systemic diseases increase the incidence of musculoskeletal problems in the post-Covid period (Fernández-de-Las-Peñas et al., 2021). In our study, individuals who had the disease with fewer symptoms were examined. The individuals in the population of our study consist of academic students and staff. It is very important for these individuals, who are in working conditions that require intense mental performance, to cope with the symptoms of fatigue after Covid-19 (Örk Özel et al., 2021: 269-291).

4. RECOMMENDATIONS FOR COPING WITH POST-COVID-19 FATIGUE

Fatigue and musculoskeletal problems in Covid-19 include loss of muscle mass due to physical inactivity as well as deterioration in aerobic capacity due to house confinement (Agergaard et al., 2021: 1978, Gaber, 2021: 36-39). Management strategies for post-Covid-19 treatment will vary greatly depending on the sequelae and symptomatic state. Strategies should be developed for each patient's needs and symptoms. Conditions and maintenance teams should provide regular follow-up. Even simple physical activities such as getting out of bed, getting dressed, preparing meals, and taking

a shower can be tiring for some patients (Çıbık et al., 2022: 36). They may also have decreased motivation to work. In a study motivation was evaluated by a questionnaire including the coronavirus anxiety scale and the motivation scale (Örk Özel et al., 2021: 269-291). The results of the study was coronavirus may cause fatigue in students and academic staff due to loss of motivation. In present study, no motivation-specific evaluation was made.

Covid-19 activates leukocytes by releasing various cytokines, including Interleukin-6 in the lungs. In particular, systemic elevations of IL-6 can impair muscle metabolic homeostasis and exacerbate muscle wasting (Ferrandi et al., 2020: 864-867). Excessive interleukin 6 (IL-6) secretion during the disease may be associated with persistent inflammation and fatigue (Perrin et al., 2020: 110055). Soaking in mineral-rich waters and mud baths has been shown to be effective in reducing proinflammatory cytokines, including IL6 levels (Maccarone et al., 2021: 2241-2243). Also spa treatments can stimulate the release of anti-inflammatory cytokines, It can restore the imbalance in the immune system (Masiero et al., 2020: 1433-1434). Also, spa interventions could also act on the physical symptoms associated to chronic fatigue, such as musculoskeletal (Yancey and Thomas, 2012: 741-746). Fatigue is also associated with neurological symptoms such as unrefreshing sleep, impaired memory, lack of concentration, and headaches. Patients can also benefit from spa treatment in the treatment of these symptoms associated with fatigue . But in the thermal environment take care of comorbidities, such as advanced age, obesity, and rheumatic diseases which may play a role in the cardiopulmonary system complications

In the post-Covid-19 period, although the pain is usually of muscle origin, joint pain may also occur. Mostly, underlying bed musculoskeletal disorders are triggered by Covid-19. For this reason, it is important to identify the target source of pain and treat it. The pattern of pain may vary, so simple analgesics can be used if needed. Sleep hygiene is another important issue. Sleeping pills should be avoided. Care should be taken to ensure that the sleeping environment is quiet, dark, and clean. Long working hours and perfectionist personality traits can lead to the progression of anxiety and sleep problems. Support should be sought to cope with anxiety and depression. Cognitive behavioral therapy is the first line of treatment for anxiety and depression. It should be considered that the intense working conditions, measures such as quarantine, social distance and isolation, and the lack of adequate opportunities for rest may have contributed to the increase in the level of fatigue.

Aerobic exercise and strength training can contribute to improve muscles function and to reduce muscular pain in post-Covid-19 subjects (Masiero et al., 2020: 1433-1434). Physical inactivity during quarantine and illness may also cause a decrease in the excitability of motor neurons, triggering post-COVID-19 fatigue. The level of physical activity and physical fitness should be individual and determined according to the individual's initial level. Also, the level of physical activity should be increased within the safe range by self-monitoring (pulse monitor, oximetry) or by professional follow-up of the patient. Other symptoms such as rapid heartbeat and shortness of breath during

physical activity should also be considered. As peripheral muscles strengthening exercise in upper extremities put more stress on the cardiopulmonary system, calisthenic exercises, mostly involving large muscle groups of the lower extremities, should be preferred. In the literature, studies on aerobic exercise training in Covid-19 suggest walking or cycling 2 or 3 days a week, lasting 20–60 minutes, at 60–80% of the maximum heart rate (Alawna et al., 2020: 13049-13055). In one study, intermittent running was recommended at 70% of maximum oxygen consumption (Lira et al., 2017: 856).

CONCLUSION

Although there was no difference between those with and without Covid-19 in terms of musculoskeletal injuries, it was observed that individuals with Covid-19 had a higher level of fatigue than those without. It is recommended to gradually increase the physical activity levels of individuals by following the symptoms of shortness of breath and palpitation. Conservative treatment methods (e.g., massage, spa treatment) are also among the recommendations given to relax the muscles and reduce pain.

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