

## Sağlık Çalışanlarında COVID-19 Sonrası Ağrı Durumu

### Pain Status of Healthcare Workers after COVID-19

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#### ÖZ

**Amaç:** Çalışmanın amacı; COVID-19 sonrası yüksek risk altında olan sağlık çalışanlarında ağrı durumunun araştırılmasıdır. **Yöntem:** Çalışmaya 18-65 yaş arası COVID-19 geçiren ve COVID-19 geçirmeyen toplam 180 sağlık çalışanı katılmıştır. Veriler Şubat-Mayıs 2021 tarihleri arasında toplanmıştır. Veri toplama aşamasında demografik bilgileri ve COVID-19 durumuna ait bilgileri içeren "Ön Değerlendirme Formu" ve "McGill-Melzack Ağrı Anketi (MAÖ)" kullanılmıştır. **Bulgular:** Ağrı anketi ölçek skorlarının COVID-19 geçiren ve geçirmeyen gruplar arasında anlamlı düzeyde farklılaşmadığı bulunmuştur (p=.951). Sağlık teknisyenlerinin puanlarının, hemşirelerin-ebelerin puanlarına göre istatistiksel anlamda düşük olduğu saptanmıştır (p=.022). Ağrı skorlarının cinsiyete göre istatistiksel olarak anlamlı düzeyde farklılık göstermediği bulunmuştur (p=.947). COVID-19 geçirenlerde derin ağrının daha çok sırt (%36.6) ve bel (%34.4) bölgelerinde, yüzeysel ağrının ise boyun (%31,1) bölgesinde tanımlandığı görülmüştür. **Sonuç:** Sonuç olarak; COVID-19 geçiren sağlık çalışanlarında en çok bel ve sırt bölgelerinde ağrı görülmektedir. COVID-19 geçirenlerde cinsiyet açısından ağrı farklılık göstermediği ve sağlık teknisyenlerinin hemşirelere-ebelere göre daha az ağrı yaşadığı gösterilmiştir.

**Anahtar Kelimeler:** COVID-19, Sağlık Çalışanları, Ağrı.

#### ABSTRACT

**Objective:** The aim of the study; it is the investigation of pain status in healthcare workers who are at high risk after COVID-19.

**Methods:** A total of 180 healthcare professionals aged 18-65 years who had COVID-19 and were not COVID-19 participated in the study. Data were collected between February and May 2021. During the data collection phase, the "Preliminary Evaluation Form" and the "McGill- Melzack pain Questionnaire (MPQ)", which includes demographic information and information about the COVID-19 situation, were used.

**Results:** It was found that there was no statistically significant difference between the pain questionnaire scale scores between the groups with and without COVID-19 (p=.951). It was determined that the scores of the health technicians were statistically lower than the scores of the nurses-midwives (p=.022). It was found that pain scores did not differ statistically significantly according to gender (p=.947). It has been observed that deep pain is mostly defined in the upper back (36.6%) and lower back (34.4%) region, and superficial pain is defined in the neck (31.1%) region in those who had COVID-19.

**Conclusion:** As a results; In healthcare workers who have had COVID-19, pain was most common in the waist and back regions. Pain did not differ in terms of gender in those who have COVID-19, however, nurses-midwives experienced more pain than health technicians.

**Key words:** COVID-19, Healthcare Professionals, Pain.

### 1. INTRODUCTION

COVID-19 global pandemic still continues to spread widely (1). Working in healthcare during COVID-19 pandemic poses a great challenge in many respects, such as being at high

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risk of infection, due to direct or indirect daily contact with people infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1). In uncomplicated cases, there may be non-specific symptoms such as cough, fever, nasal congestion, sore throat, muscle pain as well as headache and malaise (2). With the well-known fact that pain status increases in response to stressors, stress associated with the pandemic, may exacerbate pain and reduce functionality in individuals with chronic pain (2). Pandemic-era studies have mainly focused on patients affected by the disease, and very little health research has focused on healthcare workers (HCWs) (2). HCWs are the most essential and most effective workforce risking their lives and fighting on the frontlines against the COVID-19 pandemic (2). Questionnaires from people with post-COVID-19 syndrome observed persistent symptoms such as, widespread myalgia, joint and musculoskeletal pain and fatigue (3). All of these symptoms have been linked to oxidative stress, mitochondrial dysfunction and decreased antioxidants (3). One possible explanation for muscle aches and fatigue is that the virus selectively infects neurons, allowing the virus to attack the host's immune system (3).

It was previously known that healthcare personnels have a high rate of work-related musculoskeletal pain, and that specially upper back, the neck and lower back regions are affected (4). Musculoskeletal complaints may increase due to increased irregular shifts, insufficient rest, workload and psychosocial stress of HCWs during COVID-19 pandemic (4). Recent studies indicates that HCWs in emergency medicine departments are at higher risk of COVID-19 than others, including those in intensive care units (5,6). Nurses appear to be infected and have COVID-19 more often than doctors (6). In COVID-19 patients, both anxiety and muscle pain will reveal severe muscle pain complaints that may cause hemodynamic instability, which delays the patient's recovery, and puts the patient at risk. More, Han et al. found that 44% of COVID-19 patients had muscle pain (7).

In this study, it was aimed to investigate whether there is a difference in terms of musculoskeletal pain between HCWs with and without a history of COVID-19, and the differentiation status according to gender and occupational group.

## **2. MATERIALS AND METHODS**

### **Study Design and Participants**

This study is a descriptive cross-sectional study and the population of the study consists of health workers working in a city hospital and a university hospital. The sample of the study consists of healthcare professionals who are actively working in these hospitals, comply with the inclusion criteria and agree to participate in the study (n=180). The study was conducted in accordance with the Declaration of Helsinki. Ethics Committee Approval was obtained for the study from Süleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee (03/02/2021/72867572-050.01.04-32959). Although participation in the study was on a voluntary basis, health workers were informed about the study in writing before the study. Written informed consent was obtained from all participants before proceeding to the questionnaires.

HCWs between the ages of 18-65 with and without COVID-19 were included in the study; non- HCWs, those younger than 18 years of age and older than 65 years, those who completed the data collection forms incompletely, those with malignancy, dementia,

orthopedic, rheumatological, chronic liver, psychiatric and hematological diseases, those with a history of antipsychotic treatment or antidepressant and those who did not want to participate in the study were excluded.

### **Data Collection**

We collected between February 2021 and May 2021 by sharing the link of the data collection form via e-mail or WhatsApp and the data collection forms transferred to "Google forms".

Demographic and basic characteristics (including age, gender, body weight, body height, education level, marital status, employment status, occupation, watch-keeping status, comorbidities), smoking and alcohol consumption, first symptoms at hospitalization (musculoskeletal and others), the status of being accepted to the intensive care unit, the time elapsed after COVID-19, the status of working in the COVID-19 service, the type of exposure to COVID-19 patients, and the duration of providing care to COVID-19 patients were questioned. Musculoskeletal pain complaints were considered to be associated with COVID-19 infection if they had just started 2 weeks before or 1 month after the diagnosis of COVID-19 infection. Pain localized in the chest was not considered as musculoskeletal system. Pain consisting of myalgia, arthralgia, back pain, or general body aches were considered.

"Preliminary Evaluation Form" and "McGill-Melzack Pain Questionnaire (MPQ)", which were developed in line with the literature, were used to collect the data of the study. It took about 5-10 minutes to respond to the data.

### **McGill-Melzack Pain Questionnaire (MPQ)**

MPQ was used to reassure the subjective and multidimensional nature of the pain experience. It consists of four parts in the first part, there are 2 pictures of the front and the back view of the body to be marked by the patients to indicate which region or regions of their body is/are affected by pain mostly. There are twenty word groups with 2 to 6 descriptive words that describe pain in terms of sensory, perceptual and evaluation. The first 10 groups of words show the sensory dimension, the next 5 the perceptual dimension, the 16th group the evaluation, and the last 4 groups contain lots of directional words to indicate different aspects of pain (mixed). In addition, the relationship of pain with time and what increases and decreases pain are asked. Pain Evaluation is made on a rating scale consisting of words describing the severity of the disease. These descriptors are rated on an intensity scale from 0 to 3 (0= none, 1= Mild, 2=Moderate, 3= Extreme). 5 pain scores are obtained in the scale: sensory index, affective index, evaluation index, miscellaneous index and pain index (8). Only the data of the part where the information that increases and decreases the pain is questioned the relationship of pain with time was not included in our study. These parts were omitted because they contain open-ended questions.

### **Data Analysis**

Statistics were performed using SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, New York). Continuous variables were shown as mean  $\pm$  SD and categorical data as n (%). An independent sample t-test was used to determine the differences between the MPQ subscale scores in groups with and without COVID-19, and to determine the differences in the

MPQ subscale scores according to gender in those who had COVID-19. One-way analysis of variance (ANOVA) was applied to determine the differences in MPQ subscale scores according to occupation in those who had COVID-19. Post-Hoc analysis (LSD) was performed. Pearson Correlation analysis was used for relational analysis. The level of significance in the analyzes was determined as 95% ( $p < 0.05$ ). The power analysis and sampling level of the study were measured by the reference measurements of Wang et al.'s study and it was determined that the 90% power acceptance evaluation study with a type-1 error of 0.05 should be performed with 74 person. The study was completed with 180 people, two groups of 90 people (9).

### 3. RESULTS

Hundred and eighty HCWs with and without a diagnosis of COVID-19 were included in the study, and the findings obtained from the study are as follows.

**Table 1.** General characteristics of study participants (n=180).

		COVID-19	
		Yes (n=90) n(%)	No (n=90) n(%)
<b>Gender</b>	Women	65(72)	62(69)
	Men	25(28)	28(31)
<b>Age (Years )</b>	18-24	20(22)	27(30)
	25-34	47(52)	42(47)
	35-54	23(26)	21(23)
<b>Marital status</b>	Single	46(51)	57(63)
	Married	44(49)	33(37)
<b>Education Level</b>	High school	15(17)	8(9)
	College	11(12)	19(21)
	University	54(60)	47(52)
	Postgraduate	10(11)	16(18)
<b>Level of income</b>	Weak	4(4)	5(5)
	Middle	63(70)	63(70)
	Good	23(26)	22(25)
<b>Tenure at Profession</b>	Less than 1 year	10(11)	15(17)
	1-5 years	38(42)	41(45)
	Over 5 years	42(47)	34(38)
<b>Job</b>	Health technicians	22(24)	20(22)
	Nurses-Midwives	52(58)	50(56)
	Physicians	16(18)	20(22)
<b>Cigarette consumption</b>	Yes	30(33)	38(42)
<b>Alcohol consumption</b>	Yes	3(3)	16(18)
<b>Working at a COVID-19 Clinic</b>	Yes	59(65)	47(52)
<b>Number of days elapsed since COVID-19 (X±SD)</b>	42.15±43.74		

Participants with COVID-19 were in the age range of 25-34 (52%) and 65 (72%) were women. 52 (58%) of those who had COVID-19 consisted of nurses and midwives. 59 (65%) of those who have COVID-19 have worked in COVID-19 clinic. The time passed over COVID-19 was  $42.15 \pm 43.74$  days. The distribution of cases according to occupational groups and years of occupation, smoking and alcohol habits and demographic characteristics are shown in Table 1.

**Table 2.** Comparison of MPQ Scale Scores of People with and Without COVID-19.

MPQ	COVID-19		T*	p
	Yes (n=90)	No (n=90)		
	X±SD	X±SD		
Sensory index	14.25±10.46	14.48±10.46	-.155	.877
Affective index	5.84±5.48	5.61±5.57	.294	.769
Evaluative index	1.12±1.53	1.18±1.53	-.277	.782
Miscellaneous index	3.03±3.54	2.85±3.32	.370	.711
Pain index	43.34±19.92	43.17±19.43	.061	.951

MPQ: McGill- Melzack pain Questionnaire, Independent Sample T test,  $p < 0.05$

According to the analyzes performed, it was determined that there was no statistically significant difference between the groups with and without COVID-19 in the pain questionnaire scale scores ( $p = .951$ ) (Table 2)

**Table 3.** Comparison of MPQ Scale Scores by Occupation.

MPQ	Health technicians	Nurses-Midwives	Physicians	p	(LSD)
	(n=22)	(n=52)	(n=16)		
	X±SD	X±SD	X±SD		
Sensory index	11.22±8.43	17.55±10.39	15.50±9.76	3.107 (.056)	-
Affective index	5.13±4.90	7.23±5.67	5.43±5.46	1.437 (.243)	-
Evaluative index	.59±1.14	1.50±1.62	1.25±1.73	2.682 (.074)	-
Miscellaneous index	1.68±2.49	4.23±3.81	2.87±3.28	4.425 (.015)	1<2
Pain index	36.77±13.80	50.13±21.35	43.31±16.41	3.985 (.022)	1<2

MPQ: McGill- Melzack pain Questionnaire,  $p < 0.05$  Post-Hoc analysis (LSD), People with COVID-19 were analyzed, 1:Health technicians, 2: Nurses-Midwives, 3:Physicians.

When the differences between occupations were examined, it was determined that there was a statistically significant difference between the groups in the miscellaneous index of pain subscales and the pain index ( $p = .015$ ,  $p = .022$ ). As a result of Post-Hoc analysis (LSD), it was determined that the scores of health technicians were statistically lower than the scores of nurses-midwives ( $p = .015$ ,  $p = .022$ ). There was no significant difference in other comparisons (Table 3).

**Table 4.** Comparison of MPQ Scale Scores by Gender.

MPQ	Women (n=65)	Men (N=25)	T	p
	X±SD	X±SD		
Sensory index	15.47±9.97	16.08±10.56	-.253	.801
Affective index	6.35±5.59	6.52±5.33	-.128	.899
Evaluative index	1.16±1.60	1.40±1.50	-.621	.536
Miscellaneous index	3.07±3.47	4.12±3.80	-1.243	.217
Pain index	45.56±19.44	45.88±20.38	-.067	.947

As a result of the analysis, it was determined that pain scores were not statistically significantly different according to gender (p=.947) (Table 4).

**Table 5.** Pain Locations and Characteristics of People with COVID-19.

Pain localization (n=90)	Deep Pain(D) n(%)	Superficial Pain(S) n(%)	D+S n(%)	Total n(%)
Neck	9(10)	28(31.1)	-	37(41.1)
Lower back	31(34.4)	25(27.7)	14(15.5)	69(76.6)
Upper back	33(36.6)	19(21.1)	-	52(57.7)
Knees	9(10)	4(4.4)	1(1.1)	14(15.5)
Abdomen	-	2(2.2)	-	2(2.2)
Head	4(4.4)	1(1.1)	-	5(5.5)
Limbs	6(6.6)	1(1.1)	-	7(7.7)
Hips	3(3.3)	-	-	3(3.3)
Shoulder	14(15.5)	2(2.2)	-	16(17.7)
Other	1(1.1)	5(5.5)	-	6(6.6)

People with COVID-19 were analyzed.

Considering the localizations of pain, it was seen that deep pain was mostly defined in the upper back (36.6%) and lower back (34.4%) regions, and superficial pain was defined in the neck region (31.1%) (Table 5).

#### 4. DISCUSSION

In this study, in which we researched pain status in HCWs with and without a history of COVID-19, no important difference was found between the two groups. There was no difference in pain scores between the genders of those who had COVID-19. However, when we analyze according to occupational groups, miscellaneous pain and total pain index scores of nurses-midwives were higher than health technicians. Looking at other studies, it was stated that hospital nurse and laboratory technician reported COVID-19 much more than doctors (6). These findings likely indicate a higher risk of infection among nurses. In one study, regression analysis of mortality rates by country and occupation revealed that nurses were more frequently

infected with COVID-19 and had a considerably higher risk of death than doctors in France, Spain, Italy and Brazil (10). Currently, there is insufficient data about the long-term complications of COVID-19. Carfi et al. in their study, in an Italian population of 143 patients, a high proportion of people still reported pain 60 days after the first onset of COVID-19 symptoms, the most common types of pain; chest pain (21.7%) and joint pain (27.3%), myalgia and headache (11). In our study, approximately 42 days have passed after COVID-19. Despite this, deep pain has been reported mostly in the lower back and upper back regions due to COVID-19. This suggests that after COVID-19, musculoskeletal pain will occur in the upper back and lower back regions.

Myalgia and headache are the most common in terms of acute pain during the COVID-19 process, occurring in up to 71% of patients (12). However, chest pain, joint pain, and less frequently headache and myalgia persisted for up to 2 months in one-fifth of patients (11). Fatigue and myalgia-arthralgia were examined together in studies and reported with different frequencies. Xu et al. (13) reported the frequency of fatigue and musculoskeletal symptoms to be 4% and 16%, respectively. Mo et al. (14) found the fatigue rate to be 73.2% and the myalgia/arthritis rate to be 61%. Studies conducted in Europe have reported more common musculoskeletal symptoms, eg Lechien et al. (15) analyzed data from 417 COVID-19 patients from 12 European hospitals and reported myalgia in 246 (59%) and arthralgia in 129 (31%) patients. A study conducted in Türkiye revealed that the frequency of myalgia-arthralgia was 63.2% (16). This rate was specially similar to the studies conducted in Europe. In these studies, it is unclear how long these painful conditions last after COVID-19. In our study, we did not report pain rate, but we found that having COVID-19 did not change pain status. In line with the results of our study, it is thought that the reason why the pain situation does not differ between those who have COVID-19 and those who do not may be due to the stress-related pain caused by shift work, long working hours, fear of catching COVID-19 and fear of infecting their loved ones. This situation reveals that in the COVID-19 pandemic, pain will be encountered even when COVID-19 is not exposed, and the negative effects of the pandemic process on HCWs.

Toprak et al. investigated musculoskeletal disorders in working and non-working groups during the COVID-19 pandemic and compared the results with pre-pandemic data. They found that pain was reduced in the neck, back, shoulder, elbow, and hip/thigh regions. They reported that this result may be due to reduced working hours and exposure to work-related physical stress (17). This situation differs in HCWs. It has been reported that HCWs whose responsibilities are to carry, transport or relocate patients, regularly lean the whole body forward and stand for long periods of time are at high risk of Work-related Musculoskeletal Disorder (WMSD) in the neck, lower back and knee regions (18).

When looking at the COVID-19 period, neck and back pain are the most common musculoskeletal complaints, while front-line workers, that is, doctors and nurses, suffer more (19). In our study, when we examined the pain condition in 3 groups as health technicians, nurses-midwives and physicians. It has been determined that nurses-midwives have more pain than health technicians. Low back pain is recognized as a common cause of morbidity in developed countries, especially in various occupational situations such as healthcare workers, physiotherapists, doctors, paramedics, nurses and midwives. One study showed that most of the health workers surveyed had spinal disorders, pain and limitations associated with a reduction

in their quality of life. These complaints were found particularly prominent in nurses and paramedics. The majority of the people perceived pain every day, which was associated with working more than 40 hours per week in various places. It was found that the forced positions taken by most of the respondents (80%) during their working activities for an average of 3.5 hours a day had a great impact on the perception of pain and the level of disability (20). Fibromyalgia, another musculoskeletal condition, showed worse outcomes when evaluated in COVID-19 patients (21). These results reveal the importance of ergonomics training and preventive physiotherapy approaches, especially in order to prevent low back and back pain in nurses.

Short and long-term musculoskeletal system in patients with moderate to violent COVID-19, due to epidemiological data obtained between 2002-2004 when the SARS-CoV-1 epidemic was seen, as well as pathological and genetic similarities between SARS-CoV-1 and SARSCoV-2 complications are predictable (22). In addition, it is stated that corticosteroids used in the treatment process of COVID-19 also have negative effects on muscles and bones, emphasizing the necessity of monitoring these patients (23). Besides, it is thought that studies focusing on the musculoskeletal health of recovering patients may contribute to a clear determination of the long-term results of this disease. All these study results have shown us that HCWs who are already exposed to a high risk of WMSD will not be affected by the covid situation in terms of musculoskeletal pain. Our results supported this prediction.

It has been reported that female patients are emotionally affected more than male patients by the pandemic process (24). In HCWs, this situation did not show a difference between genders in terms of pain. It can be assumed that the reason for this situation is the intense and long-term working conditions in HCWs without gender discrimination.

When the mechanisms that will cause the pain to continue in the next period are examined, the relationship between musculoskeletal system symptoms and inflammation (leukocyte, lymphocyte, CRP, etc.) has not been studied in detail yet. It has been revealed that there is no relationship between inflammatory markers and the presence of myalgia-arthralgia in COVID-19 patients (16). Another view is postulated as a possible underlying mechanism for persistent myalgia and fatigue symptom complex, while a cytokine storm caused by SARS-CoV explains other symptoms such as parainfectious headache and joint pain (25).

Pathomechanisms on the incidence and prevalence of acute and persistent pain symptoms due to coronavirus infections, particularly COVID-19, are lacking. Available information suggests that the pain accompanying COVID-19 may result from viral neurotropic properties, activation of nociceptive sensory neurons by cytokines and chemokines, direct involvement of peripheral nerves and muscles, and autoimmune reactions with the potential to increase and worsen the incidence of chronic pain syndromes (26). In addition, the social and economic consequences of the pandemic may affect the pain situation. Healthcare providers should be more alert to pain during and after COVID-19. Special programs should be established for post-COVID-19 HCWs patients to prevent persistent neuromuscular symptoms, including pain.

## 5. CONCLUSION

As a result; In HCWs who have had COVID-19, pain is most widespread in the lower and upper back regions. Pain does not differ in terms of gender in patients with COVID-19, it has been shown that nurses-midwives experience more pain than health technicians. In the light of the results of our study; it has been observed that HCWs are faced with pain even in the absence of COVID-19 during the COVID-19 process, and in this case, the importance of preventive and therapeutic physiotherapy interventions for the prevention of pain in HCWs during the COVID-19 process has been demonstrated. It is recommended to apply preventive physiotherapy approaches and ergonomic training in HCWs. Prevention of pain should be the primary goal, and physiotherapy and rehabilitation practices are recommended in the presence of pain.

### **Ethical Considerations**

Ethics Committee Approval was obtained for the study from Süleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee (03/02/2021/72867572-050.01.04-32959).

### **Conflict of Interest**

The authors have no conflicts of interest to declare.

### **Limitations of the Study**

This study was carried out limited to the information reported by the person and without access to medical documents. This can be thought of as a limitation. In addition, another limitation was the lack of precise information about the behavior of HCWs in hospitals and the availability of personal protective equipment to explain the observed difference.

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## KAYNAKLAR

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