

# COVID-19 PANDEMİSİ SÜRECİNDE HEMİPLEJİ HASTALARINDA FONKSİYONELLİK, DEPRESYON VE YAŞAM KALİTESİNİN DEĞERLENDİRİLMESİ

## EVALUATION OF FUNCTIONALITY, DEPRESSION AND QUALITY OF LIFE IN HEMIPLEGIC PATIENTS DURING COVID-19 PANDEMIC

Merve Akdeniz LEBLEBİCİER, Dilan Bulut ÖZKAYA, Fatima YAMAN

Kütahya Sağlık Bilimleri Üniversitesi Tıp Fakültesi, Fiziksel Tıp ve Rehabilitasyon Ana Bilim Dalı

### ÖZET

**AMAÇ:** Bu çalışmada amaç, iskemik veya hemorajik inmeyle ilişkili hemipleji tanısı ile takipli hastalarda COVID-19 pandemisi sırasında fonksiyonellik, duygu-durum ve yaşam kalitesindeki değişiklikleri araştırmaktır.

**GEREÇ VE YÖNTEM:** COVID-19 pandemi döneminden önce inmeyle ilişkili hemipleji tanısı ile 30 seans rehabilitasyon tedavisi alan 83 hasta (ortalama yaş 62.0±6.43 yıl) çalışmaya dahil edildi. Katılımcıların yaş, cinsiyet, vücut kitle indeksi (VKİ), inme süresi, inme tipi, etkilenen taraf ve eğitim düzeyi ile ilgili veriler kaydedildi. Tüm değerlendirmeler COVID-19 pandemisinden önce yapıldı ve pandeminin başlamasından sonraki ilk yılda tekrarlandı. Hastaların fonksiyonel durumları Fonksiyonel Bağımsızlık Ölçütü (FIM) ile, depresyon düzeyleri Beck Depresyon Envanteri (BDI) kullanılarak, yaşam kaliteleri İnmeyle Özgü Yaşam Kalitesi Ölçeği (SS-QOL) ile değerlendirildi.

**BULGULAR:** COVID-19 öncesi ve pandeminin 1. yılında değerlendirilen hastaların FIM toplam puanlarında istatistiksel olarak anlamlı fark saptandı (91.32±15.94 ve 87.15±15.60, p<0.001). COVID-19 öncesi ve pandeminin 1. yılında hastaların FIM öz bakım skorları sırasıyla 27.45±6.62 ve 25.27±7.08, FIM sfinkter kontrol skorları sırasıyla 10.10±2.56 ve 9.39±2.87, FIM transfer puanları sırasıyla 14.67±3.36 ve 13.61±3.54, FIM sosyal algı puanları sırasıyla 18.40±1.86 ve 17.67±1.93 olarak saptandı (p<0.001). BDI skoru pandemi öncesi 10.06±3.18 ve pandeminin 1. yılında 13.66±3.04, SS-QOL skorları pandemi öncesi 136.48±29.63 ve birinci yıl değerlendirmesinde 133.63±29.63 idi. (p<0.001).

**SONUÇ:** COVID-19 pandemisi kronik hemiplejili hastalarda hem takip hem de rehabilitasyon tedavisinde gecikmeler nedeniyle olmuştur. Rehabilitasyon tedavisinden yoksun kalma ve sosyal izolasyon hastaların fonksiyonelliğini, yaşam kalitesini ve duygu durumunu etkilenmiştir.

**ANAHTAR KELİMELER:** COVID-19 virüs, Hemipleji, Depresyon, Yaşam kalitesi.

### ABSTRACT

**OBJECTIVE:** The aim of this study was to investigate the changes of the functionality, mood and life quality of patients diagnosed with hemiplegia due to an ischemic or hemorrhagic stroke during the COVID-19 pandemic.

**MATERIAL AND METHODS:** A total of 83 patients (mean age, 62.0±6.43 years) diagnosed with hemiplegia due to stroke, who received 30 sessions of rehabilitation therapy, before the COVID-19 pandemic, were included in this study. Data regarding the participants' age, gender, body mass index (BMI), duration of stroke, stroke type, affected side, and education level were recorded. All the assessments were undertaken before the COVID-19 pandemic and repeated at the first year after the beginning of the pandemic. The functional status of the patients was evaluated with the Functional Independence Measure (FIM). The depression levels of the participants were evaluated using the Beck Depression Inventory (BDI). The life quality of the participants was evaluated using the Stroke-Specific Quality of Life Scale (SS-QOL).

**RESULTS:** There were significant differences in the FIM total scores of the patients evaluated before and during COVID-19 (91.32±15.94 and 87.15±15.60, respectively, p<0.001). When the FIM domain scores were evaluated before COVID-19 and at the first-year control during COVID-19, the FIM self-care scores were 27.45±6.62 and 25.27±7.08, respectively, the FIM sphincter control scores were 10.10±2.56 and 9.39±2.87, respectively, the FIM transfers scores were 14.67±3.36 and 13.61±3.54, respectively, the FIM social cognition scores were 18.40±1.86 and 17.67±1.93 respectively (p<0.001). The BDI score was 10.06±3.18 before the pandemic and 13.66±3.04 at the first year of the pandemic, the SS-QOL scores was 136.48±29.63 before the pandemic and 133.63±29.63 at the first year evaluation (p<0.001).

**CONCLUSIONS:** The COVID-19 pandemic has caused delays in both follow-up and rehabilitation therapy in patients with chronic hemiplegia. The functionality, life quality and mood of the patients have been affected due to the lack of therapy and social isolation.

**KEYWORDS:** COVID-19 virus, hemiplegia, depression, quality of life.

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**Yazışma Adresi / Correspondence:** Dr. Öğr. Üyesi Merve Akdeniz LEBLEBİCİER

Kütahya Sağlık Bilimleri Üniversitesi Tıp Fakültesi, Fiziksel Tıp ve Rehabilitasyon Ana Bilim Dalı

**E-mail:** merve1985akdeniz@hotmail.com

**Orcid No (Sırasıyla):** 0000-0002-6147-300X, 0000-0002-5161-4710, 0000-0002-6137-0166

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## INTRODUCTION

A new coronavirus called SARS-CoV-2 appeared in December, 2019 in Wuhan, People's Republic of China. The disease caused by this virus, coronavirus disease 2019 (COVID-19), was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020. In many countries of the world, including Turkey, temporary curfews and physical distancing rules have been applied (1, 2). These new rules have affected individuals' participation in daily activities, such as community mobility and access to education, employment and healthcare (3).

WHO has expressed its concern about the psychosocial impacts of the pandemic on individuals and their mental health. During the pandemic, new measures such as quarantine and isolation have affected people's daily lives, habits and routines. These measures have led to an increase in loneliness, anxiety, depression, insomnia, or suicidal behavior (4).

The first case of COVID-19 in Turkey was detected on March 11, 2020. In order to prepare for the increasing number of COVID-19 cases, patients hospitalized due to other reasons were gradually discharged. Elective operations were postponed to reduce intensive care units. The Turkish Society of Physical Medicine and Rehabilitation published a consensus to reduce the infection rate in outpatient clinics, rehabilitation units, and inpatient rehabilitation services. In this guideline, it was recommended to postpone the doctor appointments of elderly patients and those with comorbidities posing a high risk of mortality due to COVID-19 (5).

Stroke is a common, serious and disabling health-care problem throughout the world (6). It is defined as the impairment of brain functions, which causes sudden and rapidly developing clinical symptoms lasting more than 24 hours or death. Stroke is an important health problem, which causes physical and psychological problems and can affect the patients' functionality, quality of life, participation in society. For this reason, the health changes of stroke patients are evaluated with functional and social as recommended in the International Classification of Functioning, Disability and Health (ICF) of the World Health Organization. It is important to determine and measure the

effectiveness of rehabilitation by focusing on the patient's physical structure, activities and participation. The rehabilitation program includes all efforts to maximize the physical, mental, social and professional accessibility of stroke patients (7 - 9). Stroke management, including early rehabilitation is crucial. Stroke rehabilitation and follow-up of stroke patients reduce the risk of death, accelerate hospital discharge, and reduce the burden on the health system (10, 11). However, the COVID-19 pandemic has severely limited access to rehabilitation for the patients with stroke-related hemiplegia.

Currently, many inpatients have been discharged from the hospital earlier than they should have been. However, it is important to continue inpatient or outpatient rehabilitation processes in order to reduce the long-term negative effects of the disease and achieve neuroplasticity (11 - 13).

The mood and functionality of hemiplegic patients, who could not have been included in the rehabilitation process for various reasons, such as new restrictions brought by the pandemic and limited access to healthcare services, may have been affected. The aim of this study was to reveal functionality, mood changes and quality of life in hemiplegic patients who could not have received rehabilitation therapy due to the pandemic conditions.

## MATERIAL AND METHODS

This retrospective study was conducted between January 2020 and January 2021. A total of 83 patients diagnosed with hemiplegia due to stroke, who received 30 sessions of rehabilitation therapy just before the COVID-19 pandemic, were evaluated in the study. Patients whose Brunnstrom lower extremity stage were between 3 and 5 who were ambulated with an assistive device and over 18 years of age and had been diagnosed with hemiplegia at least six months earlier were included in the study. Patients who received rehabilitation therapy during the pandemic, those who had COVID-19 pneumonia, those with cognitive impairment and those with recurrent cerebrovascular disease were excluded from the study. Patients received 30 sessions of conventional physiotherapy for 6 weeks, 60 minutes per day, 5 days of the week. The exercise program included upper and lower extremity range of motion, stret-

ching, strengthening exercises, occupational therapy and neural facilitation techniques in accordance with the functional levels of the patients. The basis of strengthening exercises is to strengthen, balance and stabilize the muscles on the affected side of the upper and lower extremities. In resistance exercises, exercises were performed with different colors of theraband according to the muscle strength of the patient. Data regarding the participants' age, gender, body mass index (BMI), duration of stroke, stroke type, affected side, and education level were recorded. All the assessments had been undertaken before the COVID-19 pandemic and were undertaken at the first year of the pandemic. The functional status of the patients was evaluated with Functional Independence Measure (FIM), which uses a scoring based on a seven-point scale (1: total assistance, 7: complete independence) in the categories of self-care, sphincter control, transfers, locomotion, communication and social cognition. In FIM, 13 items evaluate motor functions and five evaluate cognitive functions (14). The validity and reliability studies of the Turkish version of the scale were undertaken by Kucukdeveci et al. (15), who found it suitable to use in Turkish society. The depression levels of the participants were evaluated using the Beck Depression Inventory (BDI), which consists of 21 questions. Each question has a set of at least four possible responses (0-3), ranging in intensity. According to the total scores obtained, 0-9 is considered as normal, 10-19 is considered as mild depression, 20-30 is considered as moderate depression, and 31-63 is considered as severe depression. The validity and reliability of the Turkish version of BDI were proven by Hisli et al (16). The life quality levels of the participants were evaluated using the The Stroke-Specific Quality of Life Scale (SS-QOL), which consists of 49 questions in 12 different categories. Each item is evaluated with a 5-point Likert scale. The validity and reliability of the Turkish version of SS-QOL were proven by Hakverdioglu Yont G. et al (17).

The G.Power3.1 program was used to calculate the power, which was calculated using the baseline value of the FIM Total measurement of  $91.32 \pm 15.94$  and the values of  $87.15 \pm 15.60$  at the 1st year control of the pandemic, with

an effect size of 0.26 and a significance level of 0.05 (95% confidence level). In the FIM Total measurement, the power value of the study was found to be 0.83 when 83 sample size and Wilcoxon Paired Two Sample Test were used to examine the differences between before pandemic and the first year of the pandemic.

#### Ethical Committee

Approval for the study was granted by the Clinical Research Ethics Committee of the Kutahya Health Science University (date/number: 11.11.2021/2021-15/29).

#### Statistical Analysis

The Statistical Package for the Social Sciences (SPSS, IBM, Armonk, NY, USA), version 24.0 was used for statistical analyses. Continuous variables were given as mean  $\pm$  standard deviation values, and categorical variables as numbers (percentages). Frequency tables and descriptive statistics were used to interpret the findings. The conformity of the variables to the normal distribution was examined by visual (histogram and probability graphs) and analytical (Shapiro-Wilk test) methods. The paired-samples t-test was used for normal distributed data, and the Wilcoxon test for the non-normally distributed data. The significance value was accepted as  $p < 0.05$ .

## RESULTS

This study was completed with the participation of 83 hemiplegic patients, 43 female (51.8%) and 40 male (48.2%). **Table 1** presents the age, gender, body mass index, stroke duration, the cause of hemiplegia and education levels of the participants. There were significant differences in the FIM total scores, FIM self-care scores, FIM sphincter control scores, FIM transfers scores, FIM locomotion scores and the FIM social cognition of the patients evaluated before and at the first-year control during COVID-19 ( $p < 0.001$ ,  $p < 0.001$ ,  $p < 0.001$ ,  $p = 0.001$ ,  $p < 0.001$ , respectively) (**Table 2**). There was no statistically significant difference in the FIM communication scores of the patients evaluated before and at the first-year control during COVID-19. There were significant differences in the BDI and SS-QOL scores of the patients evaluated before and at the first-year control during COVID-19

( $p < 0.001$ ,  $p < 0.001$ , respectively) (Table 3).

**Table 1:** Demographic characteristics of the group

	(Mean $\pm$ SD) (n=83)	Min-Max (n=83)
Age (years)	62.6 $\pm$ 4.3	37-75
BMI (kg/m <sup>2</sup> )	27.38 $\pm$ 3.99	20.10-39.30
Chronicity (months)	47.57 $\pm$ 31.57	12-132
	n (n=83)	% (n=83)
<b>Type of stroke</b>		
Ischemic	76	91.6
Hemorrhagic	7	8.4
<b>Affected side</b>		
Right	46	55.4
Left	37	44.6
<b>Gender</b>		
Female	43	51.8
Male	40	48.2
<b>Education</b>		
Illiterate	12	14.5
Literate	5	6.0
Primary school	52	62.7
High school	5	6.0
University	9	10.8

SD: Standard deviation, Min: Minimum, Max: Maximum

**Table 2:** Changes in outcomes from the baseline to the first-year follow-up evaluation

	Mean $\pm$ SD (n=83)	Min-Max (n=83)	z	p
			-6.540	<0.001
FIM self-care, baseline	27.45 $\pm$ 6.62	28 (15-37)		
FIM self-care, first year	25.27 $\pm$ 7.08	26 (11-36)		
FIM sphincter control baseline	10.10 $\pm$ 2.56	11 (4-12)	-4.452	<0.001
FIM sphincter control, first year	9.39 $\pm$ 2.87	10 (3-12)		
FIM transfers, baseline	14.67 $\pm$ 3.36	16 (6-18)	-5.114	<0.001
FIM transfers, first year	13.61 $\pm$ 3.54	15 (6-18)		
FIM locomotion, baseline	10.33 $\pm$ 3.09	12 (3-12)	-3.217	0.001
FIM locomotion, first year	10.15 $\pm$ 3.27	12 (2-12)		
FIM communication, baseline	12.36 $\pm$ 1.21	12 (10-14)	0	1.000
FIM communication, first year	12.36 $\pm$ 1.21	12 (10-14)		
FIM social cognition, baseline	18.40 $\pm$ 1.86	18 (15-21)	-5.115	<0.001
FIM social cognition, first year	17.67 $\pm$ 1.93	18 (15-21)		
FIM total, baseline	91.32 $\pm$ 15.94	94 (51-113)	-6.728	<0.001
FIM total, first year	87.15 $\pm$ 15.60	90 (51-109)		

FIM: Functional Independence Measure, z: Wilcoxon test, \* $p < 0.05$

**Table 3:** Changes in outcomes from the baseline to the first-year follow-up evaluation

	Mean $\pm$ SD (n=83)	Min-Max (n=83)	z	p
BDI, baseline	10.08 $\pm$ 3.06	10 (5-16)	-6.663	<0.001
BDI, first year	13.66 $\pm$ 3.04	14 (6-19)		
SS-QOL, baseline	136.48 $\pm$ 29.63	130 (95-206)		
SS-QOL, first year	133.63 $\pm$ 29.63	126 (93-207)	-7.896	<0.001

BDI: Beck Depression Inventory, SS-QOL: Stroke-Specific Quality of Life Scale, z: Wilcoxon test, \* $p < 0.05$

## DISCUSSION

The COVID-19 has affected the lifestyles and moods of both healthy people and patients across the world, including Turkey. The interruption of standard care, increasing information about COVID-19, fear of quarantine and social isolation have affected the mental and physical health of individuals (18). In our study, it was determined that the mood, functionality and life quality of the patients with chronic hemiplegia were also affected by the pandemic conditions. As in all chronic patients, access to rehabilitation was restricted in patients with hemiplegia due to emergence of COVID-19, and the subsequent declaration of the pandemic (19). Patients began to be discharged from the hospital earlier

than expected (20). Significant decreases were observed in the rates of the diagnosis of acute stroke, and hospitalization rates were reduced by almost half compared to the previous year (21). This may be attributed to the decrease in hospital admissions due to fear of COVID-19 although patients have stroke related symptoms.

In our study, the functionality of the patients with chronic hemiplegia who received neurological rehabilitation therapy was found decreased, which may result from the delay in both inpatient and outpatient treatments for a year. Another factor affecting this patient group may be their social isolation during the pandemic. Patients spent most of their time at home and avoided hospital visits although they needed rehabilitation therapy. This may have affected their functionality and increased their depression scores. In a study, 134 chronic stroke patients were evaluated during the COVID-19 pandemic, their access to rehabilitation and other previous health problems they experienced were questioned. It was determined that 72.7% of 134 patients received rehabilitation treatment before the pandemic, only 3% received rehabilitation treatment during the pandemic. As a result, it was concluded that the rehabilitation processes of stroke patients were adversely affected during the COVID-19 pandemic (22).

In another study evaluating the life quality, depression and anxiety status of patients with chronic spinal cord injury during the COVID-19 (between June 2020 and November 2020) an increase was found in depression scores during the pandemic, similar to our study. However, the most important difference from our study is that the authors did not state whether the patient group received treatment. Unlike our study, no significant difference was found in the quality of life scale scores (23). In our study, a statistically significant difference was found in quality of life (stroke-specific) scales during the pandemic compared to before pandemic. This may be because the quality of life scale used in the assessment in the previous study was not specific to the disease. The Evaluation of the stroke-specific quality of life scale is the superiority of our study, we think that the evaluation with the disease-specific quality of life during the pandemic will be more objective. In another study, in which 344 stroke patients were evalua-

ted before and during the COVID-19 pandemic, the patients were evaluated with 36-item Short Form Health Survey (SF-36), the Activities of Daily Living (ADL) scale, and the Questionnaire about the Process of Recovery (QPR). A significant difference was detected in the SF-36 (physical and mental component scores) of the patients evaluated before and during COVID-19. This was thought to be related to the improvements in patients' personal recovery experience and the treatments received. Unlike this study, our study included patients who did not receive any treatment during the pandemic, so the pandemic period may have had a negative impact on the life quality of these patients (24).

The restriction of patients' access to treatment during the pandemic has revealed the need for telerehabilitation, which can be carried out through video-conferencing, sensor and virtual reality technologies. It has been suggested that telerehabilitation services provided without in-person contact can actually strengthen the communication among the patient, caregiver and healthcare personnel, in addition to reducing the spread of the pandemic. It has also been emphasized that telerehabilitation can be an alternative option for individuals who have to stay at home for various reasons (25, 26). It can be thought that telerehabilitation applications may be even more important during the COVID-19. The common feature of the patients included in our study is that their treatment processes had been completed in the form of a 30-session neurological rehabilitation program just before the pandemic started. Patients who had a history of recurrent cerebrovascular disease, another systemic disease or COVID-19 was excluded from the study. The patient group was small because of, this reason, patients who received rehabilitation during the pandemic were excluded from the evaluation.

The other limitations of the study are its retrospective nature and absence of a control group. Restrictions applied during the COVID-19 pandemic have caused delays in the treatment and follow-up of patients with chronic diseases. In our study, we determined that rehabilitation

restriction in patients with chronic hemiplegia affected not only their functional status but also their emotional state and quality of life.

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