# The Effect of the Symptoms of Prolonged COVID-19 on Quality of Life

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#### Abstract

This study was conducted to examine the effect of prolonged Covid-19 symptoms on quality of life. The current study involved 153 patients who applied to the COVID-19 follow-up clinic of a public hospital in Istanbul between March 1 and May 11, 2020, and were hospitalized with a positive diagnosis of SARS-CoV-2. These patients were followed up by telephone or face-to-face in the COVID-19 follow-up outpatient clinic four to twelve weeks after recovery and discharge. According to gender, the patients were 43.3% female, 56.7% male, and the mean age was  $48.130\pm13,388$  (Min=23; Max=75), the average number of hospital stays was  $7.856\pm4.614$  (Min=1; Max=32), white cell count, which is one of the inflammatory markers, decreased significantly at the 12th week according to the measurements of the 4th week and 8th week (p<0.05). In prolonged COVID-19, myalgia was the most frequently reported symptom in 64.9%, fatigue in 62.8%, and forgetfulness in 58.7%. Other common symptoms included anxiety (58.8%), sleep disturbance (58.7%), fear (42.3%), and irritability (51.5%), and there was a significant difference as the duration increased (p =0.000) was associated with. When the results of the studies are evaluated, it is seen that the multisystemic and symptom burdens seen in patients with prolonged COVID-19 continue to affect the quality of life. It is further suggested that evidence-based studies be conducted to examine the causes of prolonged COVID-19 effects.

Keywords: COVID-19, Prolonged COVID-19, Life quality, Symptom

#### INTRODUCTION

Prolonged COVID, (Long) COVID, Chronic COVID Syndrome, and Post-acute COVID-19; are terms used for those in their homes who have recovered from COVID-19 but still report that the hold is permanent, or who have had old damages that have remained longer than expected like for more than a month. In a study involving more than four million people in the United States, England, and Sweden, the presence of symptoms exceeding three weeks and extending to 12 weeks from the first onset was used to define the disease in people with 'prolonged COVID-19' [1]. When the studies in the literature were examined, the incidence of persistent symptoms of prolonged COVID-19 was reported to be between 40% and 90% [2]. While symptoms lasting longer than one month were observed in 10% to 20% of patients diagnosed with COVID-19, it was observed that symptoms lasted longer than 12 weeks in 2.3% of patients [3]. SARS-CoV-2 infection is an important cause of morbidity and mortality all over the world. In addition, it maintains its importance in the acute post-infection period with the prolonged COVID-19 clinic that may develop in patients who have recovered from COVID-19. Ongoing symptoms significantly affect the quality of life, return to daily activities, and work. Symptoms lasting more than twelve weeks; resulted in a decrease in quality of life in 57% of patients [4]. Although many risk factors have been shown for the development of prolonged COVID-19 after COVID-19,

its pathogenesis has not been fully elucidated [5]. In one study it was revealed that Patients with myeloid leukemia are more susceptible to be infected by SARS-CoV-2 because there are more ACE2, the receptors for SARS-CoV-2, in their bodies [6]. Also another cross sectional studies showed that Female respondents appeared to have more COVID-19 vaccineassociated symptoms.

Prolonged COVID-19 symptoms affect all systems; fatigue, headache, dyspnea, cognitive impairment, depression, skin rashes, and gastrointestinal complaints [4, 5]. The most commonly reported prolonged COVID-19 symptoms are; fatigue (53.1%), shortness of breath 43.4%, joint pain (27.3%), cough (15.4%), chest pain (22.7%), and worsening of quality of life (44.1%) [5, 7]. Other symptoms of prolonged

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COVID-19 are; difficulty in thinking and concentrating, depression, muscle pain, headache, intermittent fever, and palpitations. Prolonged COVID-19 symptoms, which are more serious but rare, are; reported as myocarditis, pericarditis, lung function abnormalities, acute kidney injury, rash, hair loss, impaired smell and taste, sleep problems, difficulty concentrating, memory problems, depression, anxiety, and mood changes [8].

Prolonged COVID-19 symptoms; It can cause individuals to stay away from their daily routines, change their mood, lead a sedentary life, decrease their physical activity, increase their desire to eat and drink due to increased anxiety and changes in their mood, negatively affect physical health and affect their quality of life [9].

Without a formally accepted definition of post-COVID-19 syndrome, it is difficult to assess how common it is, how long it lasts, who is at risk, what causes it, what is its pathophysiology, and how to treat and prevent it. Detailed studies of prolonged COVID-19 are needed and should explore the causes of prolonged COVID-19 symptoms and ways to alleviate these symptoms. In this study, we aimed to examine the effect of prolonged COVID-19 symptoms on quality of life. How does the paper contribute to the wider global clinical community?

Prolonged COVID-19 is an important public health problem. When the research results are evaluated, it is seen that the multisystemic and symptom burdens seen in patients with prolonged COVID-19 continue to affect the quality of life. The fact that mild or severe illness does not affect prolonged COVID-19 shows the importance of long-term effects of the disease beyond the acute infection burden. For this reason, it is important to know the risk factors for the development of prolonged COVID-19, to detect the patients early, and to provide multidisciplinary rehabilitation in the management of the patients to be followed up with this diagnosis.

# MATERIALS AND METHODS

#### Study Design and Participants

The prospective and cross-sectional study was between 1 March-11 May 2020. The study consisted of 153 patients who applied to the COVID-19 follow-up outpatient clinic of a public hospital operating in the province of Istanbul and were hospitalized with a positive diagnosis of SARS-CoV-2. These patients were followed up by telephone or face-to-face in the COVID-19 follow-up outpatient clinic four to twelve weeks after recovery and discharge. We tried to contact all 153 patients, however, we were only able to complete the interview in 97 (%) and only 15 (%) of these refused to participate in the interview. All included data were recorded as part of routine follow-up. We invited patients who had abnormal blood tests or imaging at discharge to the COVID-19 follow-up outpatient clinic.

#### Data Collection Tools

In this research" Individual Information and Symptom Follow-up forms " and " The Short Form 36 Quality of Life Scale " were used.

Individual Information and Symptom Follow-up Form: This form, which was created by scanning the literature, included questions for each patient to evaluate demographic information, acute COVID-19 application details, and symptom burden in treatment and follow-up. Key symptoms were rated as absent or present. The presence of 3 or more symptoms persisting for more than three months was defined as prolonged COVID.

The Short Form 36 Quality of Life Scale was developed and made available by Rand Corporation to assess the quality of life [10]. The scale was translated into Turkish, and its validity and reliability study was conducted by Kocyigit *et al*. The short form 36 quality of life scale is a self-assessment scale with a generic criterion feature. It consists of 36 items that measure eight dimensions. These dimensions are.

- Physical function; Restriction of physical activities due to health problems, Social function; limitation of social activities for physical and emotional reasons,
- Role physical function; role limitations due to physical health problems,
- Emotional role function; role limitations due to emotional problems,
- Mental health; general mental health in relation to psychological distress and well-being,
- Vitality (energy), Pain, 8. It is the general concept of health

Likert -type scale, except for some health items, and the status of the patients in the last four weeks is taken into account. Subscales evaluate health between 0-100 and the higher the score, the better the quality of life is interpreted.

#### Ethical Aspect of Research

In this study, ethical approval was obtained from the ethics committee of a foundation university (ethics approval no: 22.08.2022-E2022/34). Online consent was obtained from the participants that they were willing to participate in the study. The research was carried out following the Principles of the Declaration of Helsinki.

#### Evaluation of Data

The data obtained in the research is SPSS (Statistical Package for Social Sciences) for Windows 22.0 program. Number, percentage, mean, and standard deviation were used as descriptive statistical methods in the evaluation of the data. Differences between the rates of change of categorical variables in independent groups were analyzed by the McNemar test. Changes between repeated measurements were analyzed by the ANOVA test. Differences between repeated measurements were determined by the supplemental Bonferroni test.

## RESULTS AND DISCUSSION

Findings regarding the descriptive characteristics of the patients are given below.

According to gender, 42 (43.3%) of the patients were female and 55 (56.7%) were male. According to the highest education level of the patients, 11 (11.3%) were literate, 33 (34.0%) had finished primary school, 35 (36.1%) were high school graduates, and 18 (18.6%) were undergraduates. According to marital status, 72 (74.2%) of the patients were married and 55 (56.7%) had chronic diseases. Of the patients, 55 (56.7%) had diabetes, 17 (17.5%) had ischemic heart disease, 21 (21.6%) had asthma, 55 (56.7%) had hypertension, and 21 (21). 21.6% were COPD, 8 (8.2%) chronic renal failure, 26 (26.8%) deep vein thrombosis, and 14 (14.4%) were cancer patients. In addition, 12 (12.4%) used alcohol and 27 (27.8%) were smokers.

It was determined that 42 (43.3%) of the hospitalized patients required oxygen respiratory support, 43 (44.3%) nasal cannula face masks, 4 (4.1%) CPAP (Continuous Positive Airway Pressure), and BPAP (Bilevel Positive Airway Pressure). Of the patients diagnosed as SARS-CoV-2 positive, 81 (83.5%) were distributed to the clinic, and 16 (16.5%) to the intensive care unit. The mean age of the patients was 48,130 $\pm$ 13,388 (Min =23; Max =75), and the mean of "days of hospital stay" was 7,856 $\pm$ 4,614 (Min =1; Max =32) (**Table 1**).

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patients	al information	and character	ristics o
Groups	Frequency (n)	Percent (%)	
	Gender		
Female	42	43.3	
Male	55	56.7	
Educ	cational Status		
Literate	11th	11.3	
Primary education	33	34.0	
High school	35	36.1	
License	18	18.6	
Μ	arital status		
Married	72	74.2	
Single	25	25.8	
Co	omorbidities		
Yes	55	56.7	
No	42	43.3	
	Diabetes		
Yes	55	56.7	
No	42	43.3	
Ischem	ic Heart Disease		
Yes	17	17.5	
No	80	82.5	

I	Asthma			
Yes	21	21.6		
No	76	78.4		
Hyj	pertension			
Yes	55	56.7		
No	42	43.3		
	COPD			
Yes	21	21.6		
No	76	78.4		
Chronic	Renal Failure			
Yes	8	8.2		
No	89	91.8		
Pulmoner	· Tromboemboli			
Yes	26	26.8		
No	71	73.2		
	Cancer			
Yes	14	14.4		
No	83	85.6		
Al	cohol use			
Yes	12	12.4		
No	85	87.6		
S	moking			
Yes	27	27.8		
No	70	72.2		
Oxygen Res	spiratory Suppor	·t		
Yes	42	43.3		
No	55	56.7		
Nasal Can	nula/Face Mask			
Yes	43	44.3		
No	54	55.7		
CP	AP/BPAP			
Yes	4	4.1		
No	93	95.9		
Patier	nt admission			
Clinic	81	83.5		
Intensive care	16	16.5		
	Mean	SD	Min.	Max.
Age	48,130	13,38	23,00	75,00
Length of Hospital	7,856	4,61	1,00	32,00

Patients were followed up for 12 weeks after discharge. White cell count, which is one of the inflammatory markers, decreased significantly in the 12th week according to the measurements of the 4th week and 8th week (p<0.05). The increase in inflammatory markers' white cell count was significant compared to the 4th-week measurement at the 8th week (p<0.05). In addition, there was a significant difference between the sub-dimensions of the SF-36 Quality of Life Scale at the 12<sup>th</sup>-week follow-up of the patients. It was determined that the quality-of-life scores of the patients generally decreased as the follow-up period increased (**Table 2**).



Table 2. Inflammatory Markers and SF-36 Quality of Life Scale																			
	Inflammatory Markers White Cell Count		Inflammatory Markers C	Reactive Protein	Physical	Functionality	Physical Role		Bodily Pain	General	Health	l ife	2	Social	Functionality	Emotional	Role	Mental Health	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
4 weeks	5,99	0.53	83,83	19,21	50,72	29,25	50,51	50,25	38,46 14,88	56,55	4,99	57,11	6,20	51,93	14,80	51,59	49,61	48,12	3,18
8 weeks	6,39	0.88	29,98	22,68	46,90	28,35	48,96	49,06	37,22 16,46	59,34	4,93	57,93	6,988	51,03	15,90	47,73	48,55	47,54	4,03
12 weeks	3,86	1,89	2,54	1,01	46,90	27,12	47,85	35,36	37,24 16,25	58,51	4,69	58,45	5,32	50,00	14,87	44,84	46,57	48,28	4,33
F	127	,74	548	,72	20,	88	6,3	33	10,05	34,9	02	6,5	7	6,1	3	8,4	4	4,5	5
р	0,0	00	0,0	00	0,0	00	0,0	00	0.001	0,00	00	0.0	04	0.0	08	0,0	00	0.01	16
Bonferroni	1,2>3	; 2>1	1,2>3	; 1>2	1>2	2.3	1>2	2.3	1>2,4	1>2.	.3	1<2	2.3	1,2	>3	1,22	>4	2>1	.3

Myalgia was the most frequently reported symptom in 64.9% of patients, fatigue in 62.8%, and forgetfulness in 58.7%, which increased compared to their pre-COVID-19 state. Other common symptoms included anxiety (58.8%), sleep disturbance (58.7%), fear (42.3%), and irritability (51.5%),

with a significant difference with the longer duration (p =0.000). It was also found that the proportion of patients reporting persistent symptoms decreased with longer followup (Table 3).

Symptoms	Wee	ek 4	8. Week		12.	Neek	McNemar
	n	%	n	%	n	%	р
Memory Impairment	5	5.2	37	38.1	40	41.2	0,000 1<2.3
Breathlessness	5	5.2	16	16.5	14	14.4	0.001 1<2.3
Myalgia	48	49.5	63	64.9	63	64.9	0.001 1<2.3
Cough	26	26.8	24	2.8	22	26.8	0.785
Anxiety	46	47.4	46	47.4	58	59.8	0.000 1,2<3
Fatigue	27	27.8	27	27.8	37	38.1	0.000 1,2<3
Cognitive Impairment	12	12.4	12	12.4	12	12.4	1,000
Headache	47	48.5	24	24.7	10	10.3	0.000 1>2>3
Dizziness	12	12.4	4	4.1	4	4.1	0.000 1>2.3
Chest Pain	25	25.8	19	19.6	20	20.6	0.67
Sore Throat	37	38.1	17	17.5	10	10.3	0.001 1>2>3
Sleeping disorder	43	44.3	51	52.6	57	58.7	0.001 1>2>3
Delirium	22	22.7	2	2.1	2	2.1	0.001 1>2.3
Difficulty Walking	11th	11.3	9	9.3	8	8.3	0.654
Balance Disorder	16	16.5	14	14.4	14	14.4	1,000

Cry	22	22.7	27	27.8	25	25.7	1,000
Tiredness	49	50.5	54	55.7	61	62.8	0.000 1>2>3
Fear	21	21.6	36	36.1	41	42.3	0.000 1>2>3
Speech Disorder	4	4.1	4	4.1	4	4.1	1,000
High temperature	19	19.6	10	10.3	7	7.2	0.000 1>2>3
Changes to taste	51	52.6	57	58.7	55	56.7	0.795
İmbalance	4	4.1	4	4.1	4	4.1	1,000
Forgetfulness	30	30.9	49	50.5	57	58.7	0.000 1>2>3
Irritability	46	47.4	50	51.5	50	51.5	0.742

The COVID-19 pandemic has continued to affect all individuals since its first days. In this study, in which the results of Long-COVID-19 patients were evaluated; According to gender, it was found to be common in 43.32% of women and 56.7% of men. When the studies in the literature are evaluated; In the study of Curci *et al.* consisting of 36 patients, we determined that prolonged COVID-19 was observed in 22 male and 10 female patients [11]. In the study of Nalbandian *et al.* 37.1% of women had prolonged COVID-19 symptoms [12]. In the study of Cirulli *et al.* it was reported that it was more common in women with a rate of 64.1% [13]. When the studies examining the effect of Long- COVID-19 on patient outcomes are evaluated, among the risk factors; There were no studies examining the effect of education and marital status.

In our study, 56.7% of the patients had diabetes, 17.5% had ischemic heart disease, 21.6% had asthma, 56.7% had hypertension, 21.6% had COPD, and 8.2% had chronic renal failure, deep vein thrombosis in 26.8%, 14.4% had cancer. In the literature review, it was observed that the presence of chronic disease had a significant effect on the effects of Long-COVID-19 [11-15]. Among the risk factors in our research results; It was seen with the results of the research that cigarette and alcohol consumption were significantly effective in Long- COVID-19 patient outcomes [8, 16]. Among the risk factors in our research, it was observed that the need for COVID-19 patients who prolonged respiratory support, nasal cannula face mask and CPAP/ BIPAP increased and the results of the studies in the literature were in a meaningful way with our research results [8]. In our research results, it was observed that the average age was effective in patients with prolonged COVID-19, and our results were found to be significant in the literature [17, 18]. Inflammatory markers of the patients included in this study; When the result of the 4th week was compared with the 8th week, it was found that the decrease in the 8th-week measurements compared to the 4th week was found to be consistent with the literature [8], but although the decrease in the 12<sup>th</sup>-week measurement was significant, it was not compatible with the literature [8]. It was found that the quality of life of the patients we obtained in our study decreased as

the follow-up was prolonged, which was similar to other studies [5]. As the follow-up period increased in the Long-COVID-19 patients we obtained in our study, myalgia in 64.9%, fatigue in 62.8%, and forgetfulness in 58.7% were consistent with the literature, while other common symptoms were; anxiety (58.8%), sleep disorder (58.7%), fear (42.3%) and irritability (51.5%) and their significant increase as time goes on are consistent with the literature in some studies [12, 19, 20] some studies showed differences [8].

### CONCLUSION

Multisystemic and symptom burdens seen in Long-COVID-19 patients continue to affect the quality of life. However, the reason for this situation has not been clearly stated yet. Therefore, it is recommended to conduct evidence-based studies to examine the causes of Long-COVID-19 effects.

### Relevance to Clinical Practice

This study aims to protect the rights, health, and privacy of the volunteers participating in the research. assurance that data from research is protected and reliable gave. International mutual acceptance of clinical data a single standard was provided to facilitate.

International scientific and ethical research design, conduct, and conduct of research to ensure that monitoring, budgeting, evaluation and reporting, protection of bodily integrity, ensuring the reliability of research data, including the regulations on issues such as preservation and participation in research. The rules to be followed by the parties are explained.

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