

Impact of Prolonged COVID-19 Symptoms on Patient Quality of Life

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Abstract

This study aimed to assess how lingering symptoms of COVID-19 affect the overall quality of life of affected individuals. The study included 153 participants who were admitted to a public hospital in Istanbul with a confirmed SARS-CoV-2 diagnosis between March 1 and May 11, 2020. These individuals were monitored through either phone or in-person consultations at the COVID-19 follow-up outpatient clinic for 4 to 12 weeks after their discharge. The cohort consisted of 43.3% females and 56.7% males, with an average age of 48.1 ± 13.4 years (ranging from 23 to 75 years). The average number of hospital admissions was 7.9 ± 4.6 (ranging from 1 to 32). The white blood cell count, a known inflammatory marker, significantly decreased by the 12th week in comparison to the 4th and 8th weeks ($P < 0.05$). The most prevalent prolonged symptoms were myalgia, reported by 64.9% of patients, followed by fatigue at 62.8%, and forgetfulness at 58.7%. Other common symptoms included anxiety (58.8%), sleep disturbances (58.7%), fear (42.3%), and irritability (51.5%), with a significant association with symptom duration ($P = 0.000$). The findings suggest that the multifaceted nature of prolonged COVID-19 symptoms continues to impact patients' quality of life. Further research is needed to explore the root causes of these long-term symptoms.

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

Introduction

The terms Prolonged COVID, Long COVID, Chronic COVID Syndrome, and Post-acute COVID-19 are used to describe individuals who, despite having recovered from the acute phase of COVID-19, continue to experience persistent symptoms that last beyond one month. In a study conducted across the United States, England, and Sweden involving more than four million individuals, the definition of prolonged COVID-19 was based on symptoms that lasted from three to twelve weeks following the onset of the virus [1]. Research indicates that anywhere between 40% and 90% of those who experience prolonged COVID-19 symptoms report lasting effects [2]. While 10% to 20% of patients with

COVID-19 have symptoms extending beyond one month, only 2.3% of patients experience symptoms beyond twelve weeks [3]. The global impact of SARS-CoV-2 remains significant, not only due to the acute infection but also due to the persistent effects of prolonged COVID-19, which affect patients even after recovery. These ongoing symptoms can severely disrupt the quality of life, impair the ability to perform daily tasks and hinder the return to work. For 57% of patients, symptoms persisting for more than twelve weeks result in a noticeable decline in their quality of life [4]. Despite various identified risk factors, the underlying mechanisms of prolonged COVID-19 remain unclear [5]. One study found that individuals with myeloid leukemia may be more susceptible to SARS-CoV-2 infection due to an increased number of ACE2 receptors in their bodies [6]. Additionally, some research has suggested that women may experience more symptoms related to the COVID-19 vaccine.

The persistent symptoms of prolonged COVID-19 can affect many different systems within the body, including fatigue, headaches, difficulty breathing, cognitive

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decline, depression, skin rashes, and digestive problems [4, 5]. The most common symptoms of prolonged COVID-19 include fatigue (53.1%), breathlessness (43.4%), joint pain (27.3%), cough (15.4%), chest pain (22.7%), and reduced quality of life (44.1%) [5, 7]. Other frequently reported symptoms are trouble concentrating, muscle pain, intermittent fever, and heart palpitations. More severe but less common symptoms include myocarditis, pericarditis, lung abnormalities, kidney issues, rashes, hair loss, loss of smell and taste, sleep disturbances, and mood alterations [8].

Prolonged COVID-19 symptoms can cause individuals to withdraw from their usual routines, lead to mood changes, reduce physical activity, and foster unhealthy eating habits driven by anxiety. These shifts can worsen physical health and further diminish the quality of life [9]. The lack of an established definition for post-COVID-19 syndrome makes it difficult to measure its prevalence, duration, contributing factors, causes, and how to treat or prevent it. In-depth research is required to understand the origins of prolonged COVID-19 and find methods to ease these persistent symptoms.

The primary goal of this study is to assess the impact of prolonged COVID-19 on quality of life. The findings contribute to the wider global clinical community by shedding light on the ongoing challenges faced by individuals with prolonged COVID-19. It highlights the importance of recognizing the long-term effects of COVID-19, regardless of the initial severity, and the necessity of early identification of risk factors, as well as multidisciplinary rehabilitation strategies to support patients suffering from prolonged COVID-19.

Materials and Methods

Study design and participants

This study was a prospective and cross-sectional investigation carried out between March 1 and May 11, 2020. It included 153 individuals who visited the COVID-19 follow-up outpatient clinic at a public hospital in Istanbul after being hospitalized with a confirmed diagnosis of SARS-CoV-2. These participants were monitored through phone calls or in-person visits 4 to 12 weeks post-discharge. Although efforts were made to contact all 153 patients, 97 individuals completed the interview, while 15 opted out. The data collected during the follow-up process were integrated into routine patient monitoring. Patients with abnormal blood tests or

imaging findings were also invited to return for additional follow-up evaluations.

Data collection instruments

This study utilized two primary tools for data collection: the “individual information and symptom follow-up forms” and the “short form 36 quality of life scale.”

Individual information and symptom follow-up form: Developed through an extensive review of existing literature, this form was designed to gather demographic data, details regarding the acute phase of COVID-19 treatment, and the symptom burden experienced by patients during both treatment and follow-up periods. Symptoms were categorized as either present or absent. If a patient exhibited three or more symptoms that lasted beyond three months, this was classified as prolonged COVID-19.

The short form 36 quality of life scale, created by Rand Corporation, is a tool for assessing an individual’s quality of life [10]. This scale was adapted to Turkish, and its reliability and validity were confirmed through a study conducted by Kocyigit *et al.* It is a self-administered assessment designed to evaluate eight core aspects of health through 36 questions. The dimensions covered include:

- *Physical functioning:* The degree to which physical activities are hindered by health issues.
- *Social functioning:* The impact of physical or emotional problems on social participation.
- *Role limitations because of physical health:* Restrictions in roles and activities caused by physical health conditions.
- *Emotional role limitations:* Restrictions in daily roles due to emotional difficulties.
- *Mental health:* The overall state of mental health, focusing on emotional distress and psychological well-being.
- *Vitality (energy), pain, and overall health:* general health perception.

The scale applies a Likert-type format, except for some specific health items, and reflects the individual’s condition over the preceding four weeks. Scores from 0 to 100 are used for each subscale, with higher scores indicating better quality of life.

Ethical considerations

The ethical approval for this study was granted by the ethics committee of a foundation university (approval number: 22.08.2022-E2022/34). Participants provided their consent online to confirm their willingness to participate in the research. The research followed the ethical standards outlined in the Declaration of Helsinki.

Data analysis

The collected data were analyzed using SPSS version 22.0 (Statistical Package for the Social Sciences). Descriptive statistical techniques such as frequency counts, percentages, mean, and standard deviation were used for data evaluation. The McNemar test was applied to compare changes in categorical variables across independent groups, while ANOVA was used to evaluate differences in repeated measurements. The Bonferroni correction was used for post-hoc analyses of significant changes.

Results and Discussion

The following summarizes the descriptive characteristics of the study participants:

In terms of gender, 42 patients (43.3%) were female, and 55 (56.7%) were male. The educational background of participants was as follows: 11 (11.3%) were literate, 33 (34.0%) had completed primary school, 35 (36.1%) had finished high school, and 18 (18.6%) were university graduates. As for marital status, 72 (74.2%) were married. Concerning chronic conditions, 55 (56.7%) had diabetes, 17 (17.5%) had ischemic heart disease, 21 (21.6%) had asthma, 55 (56.7%) had hypertension, 21 (21.6%) had COPD, 8 (8.2%) had chronic renal failure, 26 (26.8%) had deep vein thrombosis, and 14 (14.4%) were diagnosed with cancer. Furthermore, 12 (12.4%) consumed alcohol, and 27 (27.8%) were smokers.

In terms of hospitalization, 42 (43.3%) of the patients needed oxygen support, 43 (44.3%) required nasal cannulas or face masks, 4 (4.1%) were treated with CPAP (Continuous Positive Airway Pressure), and 2 (2.1%) used BPAP (Bilevel Positive Airway Pressure). Among the SARS-CoV-2-positive patients, 81 (83.5%) were admitted to the general ward, while 16 (16.5%) were transferred to the intensive care unit. The average age of the participants was 48.1 ± 13.4 years, with a range from 23 to 75 years. The mean duration of hospital stay was 7.9 ± 4.6 days, with a range from 1 to 32 days (**Table 1**).

Table 1. General information and characteristics of patients

Groups	Frequency (n)	Percent (%)
Gender		
Female	42	43.3
Male	55	56.7
Educational status		
Literate	11th	11.3
Primary education	33	34.0
High school	35	36.1
License	18	18.6
Marital status		
Married	72	74.2
Single	25	25.8
Comorbidities		
Yes	55	56.7
No	42	43.3
Diabetes		
Yes	55	56.7
No	42	43.3
Ischemic heart disease		
Yes	17	17.5
No	80	82.5
Asthma		
Yes	21	21.6
No	76	78.4
Hypertension		
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
Alcohol use		
Yes	12	12.4

No	85	87.6
Smoking		
Yes	27	27.8
No	70	72.2
Oxygen respiratory support		
Yes	42	43.3
No	55	56.7
Nasal cannula/face mask		
Yes	43	44.3
No	54	55.7
CPAP/BPAP		
Yes	4	4.1
No	93	95.9
Patient 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

The patients were monitored for 12 weeks following their discharge. A notable reduction in white blood cell count, an indicator of inflammation, was observed in the 12th week compared to the 4th and 8th weeks ($P < 0.05$). Furthermore, a significant rise in white blood cell count was recorded between the 4th and 8th week measurements ($P < 0.05$). Additionally, a marked difference was found in the sub-dimensions of the SF-36 quality of life scale during the 12th-week follow-up. Overall, the quality of life scores for patients tended to decline as the follow-up period progressed (**Table 2**).

Table 2. Inflammatory markers and SF-36 quality of life scale

	Inflammatory marker's white cell count		Inflammatory markers C reactive protein		Physical functionality		Physical role		Bodily pain		General health		Life		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	6.98	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		6.33		10.05		34.92		6.57		6.13		8.44		4.55	
p	0.000		0.000		0.000		0.000		0.001		0.000		0.004		0.008		0.000		0.016	
Bonferroni	1.2 > 3; 2 > 1		1.2 > 3; 1 > 2		1 > 2.3		1 > 2.3		1 > 2.4		1 > 2.3		1 < 2.3		1.2 > 3		1.2 > 4		2 > 1.3	

The most commonly reported symptoms were myalgia, experienced by 64.9% of patients, followed by fatigue at

62.8%, and forgetfulness at 58.7%, all of which were more prevalent than before contracting COVID-19.

Other frequently noted symptoms included anxiety (58.8%), sleep disturbances (58.7%), fear (42.3%), and irritability (51.5%), with these symptoms showing a significant increase over time ($P = 0.000$). Additionally, the percentage of patients reporting ongoing symptoms declined as the follow-up period extended (**Table 3**).

Table 3. Symptom follow-up form

Symptoms	Week 4		8. Week		12. Week		McNemar p
	N	%	N	%	N	%	
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 impacted individuals globally since its onset. In this study, which assessed the outcomes of Long-COVID-19 patients, it was found that

43.3% of women and 56.7% of men experienced prolonged symptoms. When compared to other studies, Curci *et al.* research on 36 patients revealed that

prolonged COVID-19 was seen in 22 males and 10 females [11]. Nalbandian *et al.* found that 37.1% of women suffered from prolonged symptoms [12], while Cirulli *et al.* reported a higher prevalence among women at 64.1% [13]. Risk factors for Long-COVID-19 have been explored in various studies, though no research has directly examined the effects of education and marital status on patient outcomes.

In our study, 56.7% of 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. Additionally, 26.8% had deep vein thrombosis, and 14.4% had cancer. The literature suggests that chronic diseases significantly affect Long-COVID-19 outcomes [11-15]. Our findings also revealed that cigarette and alcohol use were notably influential in Long-COVID-19 patient outcomes [8, 16]. We observed that patients requiring respiratory support, such as nasal cannula masks and CPAP/BIPAP, had a greater incidence of prolonged COVID-19 symptoms, which aligns with other studies [8]. Furthermore, our study found that age was a significant factor in Long-COVID-19 outcomes, consistent with existing research [17, 18]. Inflammatory markers in our study showed a decrease from the 4th to the 8th week, which matched previous findings [8]. However, while the decrease in inflammatory markers in the 12th week was statistically significant, it did not align with other studies [8]. Regarding quality of life, we observed a decline as the follow-up period lengthened, which mirrored results from other research [5]. As follow-up extended in our study, symptoms such as myalgia (64.9%), fatigue (62.8%), and forgetfulness (58.7%) were consistent with existing literature, while anxiety (58.8%), sleep disturbances (58.7%), fear (42.3%), and irritability (51.5%) also showed significant increases over time, which were in agreement with some studies [12, 19, 20], though other research reported differing findings [8].

Conclusion

The ongoing multisystemic effects of Long-COVID-19 continue to affect patients' quality of life, although the exact causes remain unknown. Therefore, further research grounded in evidence is essential to better understand the underlying mechanisms of Long-COVID-19.

Relevance to clinical practice

This research places a strong emphasis on safeguarding the rights, health, and confidentiality of the participants. It ensures that the data collected is protected and trustworthy, contributing to the global standardization of clinical data for international acceptance. The research complies with international scientific and ethical standards, overseeing all aspects of the study, including monitoring, budgeting, assessment, and reporting. It also ensures the preservation of participants' bodily integrity and the reliability of research data, while adhering to regulations regarding participation and data handling. The responsibilities of all involved parties are clearly outlined.

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