The effect of coronavirus disease-2019 (COVID-19) according to gender on health-related quality of life

Betül Çiftçi

Kırklareli University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Kırklareli, Turkey

ABSTRACT

Aim: The purpose of this study was to evaluate the changes in health-related quality of life of hospitalized patients with the diagnosis of coronavirus disease-2019 (COVID-19) according to gender.

Material and Method: The medical records of 77 patients (37 females and 40 males) who were hospitalized for COVID-19 were examined. Sociodemographic features including age, gender, marital status, comorbid diseases, duration of hospitalization, the period after discharge, symptoms of COVID-19 disease were analyzed. Short Form 36 (SF-36) was applied to all patients for evaluating the health-related quality of life pre and post COVID-19.

Results: The median scores of physical function, bodily pain, vitality, social functioning and general health perceptions before COVID-19 were statistically significantly higher than the scores after COVID-19 in both gender. Social functioning and the scores were lower in females than males for pre and post COVID-19 period and the differences were statistically significant.

Conclusions: The findings of this study revealed that health-related quality of life is affected by COVID-19 for both genders, mostly females.

Keywords: Coronavirus, COVID-19, health-related quality of life, quality of life

INTRODUCTION

Coronavirus disease-19 (COVID-19) was first seen in December 2019 in Wuhan, China. After the rapid spread of disease all over the world, it was defined as a pandemic by the World Health Organization on March 11, 2020 (1). Until January 7, 2022, 298.915.721 confirmed cases of COVID-19, and 5.469.303 deaths were detected globally (2). Fever, productive cough, headache, exhaustion, loss of smell, and taste are the most common acute respiratory symptoms in COVID 19 patients. Most of patients have mild diseases, but in some patients the disease can be cause serious illness and result death (3,4). The exact pathophysiological mechanism of COVID-19 is unknown. Many studies are ongoing regarding the treatment and long – term effects of COVID-19 disease (5).

In Turkey, as many countries, various restrictions including closing the schools, staying at home especially over the age of 65, working from home as much as possible have been taken to prevent the spread of disease (6). During the pandemic period, psychological problems such as anxiety, sleep problems, and increased sense of loneliness due to social isolation had been seen in many people (7). As past outbreaks of infectious diseases, COVID- 19 had negative effects on physical, social and psychological functions of individuals and many studies showed that there are deteriorations in health-related quality of life due to COVID-19 (8,9).

There are many studies about COVID-19 and health-related quality of life. However, in the literature studies about health-related quality of life before and after COVID-19 and its relationship with gender are limited. The purpose of this study to investigate the alterations in health-related quality of life in hospitalized patients with the diagnosis of COVID-19 disease according to gender.

MATERIAL AND METHOD

The study was carried out with the permission of Tekirdağ Namık Kemal University Non-interventional Clinical Researches Ethics Committee (Date: 29/06/2021, Decision No: 2021.180.06.10). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Study Design and Setting

In addition, since the study protocol is related with the COVID-19 outbreak, approval was obtained from the Ministry of Health of the Republic of Turkey. The participants were informed about the aim of the study before applying the study, all participants were asked whether they accepted to complete the study and thus all participants have declared voluntary for the study.

Participants

The hospital records were examined and it was determined that there were ninety patients who were hospitalized for COVID-19 disease between April 2021 and November 2021. All patients were planned to be included to study but four patients were died because of COVID-19 in other hospitals or other reasons. Nine patients could not be reached by phone. Remaining seventy-seven patients were enrolled to the study. All patients were contacted by phone and the information about the study was obtained to all patients. All patients were asked ıf they want to accept study.

Sociodemographic features including age, gender, marital status, comorbid diseases, duration of hospitalization, the period after the discharge, symptoms of COVİD-19 were analyzed. Short Form 36 (SF-36) was applied to all patients for evaluation the health-related quality of life pre and post COVID-19. SF-36 has eight sections that include general health (5 items), vitality (4 items), physical functioning (10 items), bodily pain (2 items), physical role functioning (4 items); emotional role functioning (3 items); mental health (5 items); and social functioning (2 items). The total score was obtained the combination of the eight sections. And a higher score is associated to a higher quality of life. The SF-36 was adapted into Turkısh in1999 by Koçyiğit H et al. (10) and the study results suggest it is useful for clinical studies.

Statistical analysis

Continuous variables were declared as mean±standard deviation and median (minimum–maximum), whereas categorical data were numbers and percentages. The Kolmogorov-Smirnov goodness-of-fit test was used to perform normality analyses in the cross-group analysis of continuous variables. The groups with normal distribution of continuous variables were evaluated with the independent samples t-test. Cross-group comparisons of variables not eligible for normal distribution were analyzed with the Mann-Whitney U test. The chi-square test (Fisher's exact test when necessary) was used in the comparison of categorical data. To verify the behavior of the numerical variables within groups the Wilcoxon test was used. The analyses were performed with the Statistical Package for the Social Sciences (SPSS) software program version 22.0 (IBM Corporation, Armonk, NY, USA). The statistical significance level was set at p<0.05.

RESULTS

A total of 77 patients, including 37 females and 40 males, were enrolled in the study. The mean age of the female and male patients were 48.86±16.12 and 45.82±14.44, respectively. The patients were grouped based on gender. The differences between groups were statistically significant (p=0.02). However, there were no statistically significant differences between the two groups in terms of duration of hospitalization, duration after discharge, marital status, comorbidities, smoke (p>0.05). Also there were no statistically significant differences between groups according to the symptoms of COVID-19 including fever, cough and sputum, dry cough, fatigue, wheezing, headache, nasal congestion, nausea and vomiting, tiredness, dyspnea, flank pain, backache, loss of smell, myalgia, sore throat, chest pain and the diagnostic findings of COVID-19 as the PCR test and the findings of thorax CT (p>0.05). Comparisons of the demographic and some clinical features of the patients by groups are presented in **Table 1**.

Comparison of the mean values of SF-36 subscales between females and males and within females and males are shown in **Table 2**. The median scores of physical function, bodily pain, vitality, social functioning mental health scores and general health perceptions in before COVID-19 were statistically significantly higher than the scores after COVID-19 in females (p=0.019, p=0.002, p=0.005, p<0.001, p=0.007, and p=0.012 respectively). Similarly, the median scores of physical function, bodily pain, vitality, social functioning and general health perceptions in before COVID-19 were statistically significantly higher than the scores after COVID-19 in males (p=0.001, p=0.001, p=0.005, p<0.001, and p=0.005 respectively).

When the subscales score of females and males before COVID-19 were compared, there were statistically significant differences between the groups in terms of bodily pain, social functioning and the scores were lower in females than males (p=0.003 and p=0.001 respectively). The bodily pain and social functioning scores of female were lower than the scores of males after COVID-19 disease, the differences were statistically significant (p=0.11 and p<0.001 respectively).

Table 1. Demographic and clinical characteristics of the study group		Females (n=37)	Males (n=40)	P
Age (years)		48.86± 16.12	45.82 ±14.44	0.386*
Duration of hospitalization		5.24±0.46	5.4±0.48	0.959**
Duration after discharge		121.27±11.81	138.5±11.42	0.076**
Marital status	Married	30 (81.1%)	34 (87.5%)	0.53***
	Single	7 (18.9%)	5 (12.5%)	
Comorbidity	No	22 (59.5%)	26 (65%)	0.5***
	Hypertension	6 (16.2%)	3 (7.5%)	
	DM	6 (16.2%)	5 (12.5%)	
	Cardiovascular disease	1 (2.7%)	3 (7.5%)	
	Fibromyalgia	0	1 (2.5%)	
	COPD	1 (2.7%)	0	
	RA	0	1 (2.5%)	
	Cancer	0	1 (2.5%)	
	Hypothyroid	1 (2.7%)	0	
Smoke	Yes	5 (13.5%)	10 (25%)	0.20**
	No	32 (86.5%)	30 (75%)	
Working status	Yes	16 (43.2%)	30 (75%)	0.02**
	No	21 (56.8%)	10 (25%)	
Fever	<37.3	28 (75.7%)	23 (57.5%)	0.14**
	37.3-38.0	9 (24.3%)	15 (37.5%)	
	38.1-39.0	0	2 (5%)	
Cough and sputum	Yes	18 (48.6%)	23 (57.5%)	0.44**
	No	19 (51.4%)	17 (42.5%)	
Dry Cough	Yes	21 (56.8%)	21 (52.5%)	0.71**
	No	16 (43.2%)	19 (47.5%)	
Fatigue	Yes	18 (48.6%)	22 (55%)	0.58**
	No	19 (51.4%)	18 (45%)	
Wheezing	Yes	21 (56.8%)	16 (40%)	0.14**
	No	16 43.2%)	24 (60%)	
Headache	Yes	16 (43.2%)	15 (37.5%)	0.61**
	No	21 (56.8%)	25 (62.5%)	
Nasal congestion	Yes	8 (21.6%)	9 (22.5%)	0.92**
	No	29 (78.4%)	31 (77.5%)	
Nausea and Vomiting	Yes	2 (5.4%)	1 (2.5%)	0.51**
	No	35 (94.6%)	39 (97.5%)	
Tiredness	Yes	33 (89.2%)	30 (75%)	0.10**
	No	4 (10.8%)	10 (25%)	
Dyspnea	Yes	12 (32.4%)	16 (40%)	0.49**
	No	25 (67.6%)	24 (60%)	
Flank pain	Yes	0	1 (2.5%)	0.33**
	No	37 (100%)	39 (97.5%)	
Backache	Yes	29 (78.4%)	35 (87.5%)	0.28**
	No	8 (21.6%)	5 (12.5%)	
Loss of Smell	Yes	8 (21.6%9	9 (22.5%)	0.92**
	No	29 (78.4%)	31 (77.5%)	
Myalgia	Yes	15 (40.5%)	11 (27.5%)	0.23**
	No	22 (59.5%)	29 (72.5%)	
Sore throat	Yes	4 (10.8%)	10 (25%)	0.10**
	No	33 (89.2%)	30 (75%)	
Chest pain	Yes	4 (10.8%)	3 (7.5%)	0.61**
	No	33 (89.2%)	37 (92.5%)	
Thorax CT	Normal	8 (21.6%)	7 (17.5%)	0.87***
	Single lobe	15 (40.5%)	16 (40%)	
	Multiple lobe	14 (37.4%)	17 (42.5%)	
PCR	Positive	22 (59.5%)	24 (60%)	1***
	Negative	15 (40.5%)	16 (40%)	

*T test, ** Mann Whitney u test, *** Chi-square Test (aFisher's exact test), DM, Diabetes Mellitus; COPT, chronic obstructive pulmonary disease; RA, Rheumatoid arthritis; , CT, computerized tomography;PCR, Polymerase chain reaction

Table 2. Comparison of the Short Form 36 subscale scores features among groups

Variables	Females (n=37)			Males (n=40)			Pre COVID-19 Two groups	Post COVID-19 Two groups
	Pre COVID-19	Post COVID-19	p	Pre COVID-19	Post COVID-19	p	p	p
Physical function	90.94±3.11	87.43±2.82	0.019**	96.0±1.60	90.81±2.42	0.001**	0,569*	0,259*
Role-physical	95.54±2.33	93.24±3.16	0.109**	99.37±0.62	97.5±1.74	0,180**	0,136*	0,198*
Bodily pain	83.78±2.20	76.14±2.81	0.002**	92.12±1.82	85.37±2.54	0.001**	0,003*	0,011*
Vitality	73.58±1.52	69.66±2.15	0.005**	76.87±1.33	73.22±1.48	0.005**	0,133*	0,449*
Social functioning	77.9±2.93	63.51±3.62	<0.001**	90.81±2.06	79.87±3.22	<0.001**	0,001*	<0.001*
Role-emotional	97.29±1.99	96.39±2.15	0.317**	100±0.0	100±0.0	1**	0,139*	0,068*
Mental health	75.89±1.29	72.75±1.78	0.007**	76.1±1.29	74.66±1.32	0,071**	0,978*	0,739*
General health perceptions	66.40±2.50	63.02±2.45	0.012**	72.72±2.25	69.47±2.38	0.005**	0,083*	0,069*

*Mann Whitney u
** Wilcoxon signed-rank test

DISCUSSION

The effect of COVID-19 on the health-related quality life at patients hospitalized for COVID-19 and discharged was investigated in this study. The findings of this study may be considered that COVID-19 affects the health-related quality of life especially on physical function, bodily pain, vitality, social functioning, mental health and general health perceptions ın both genders but especially females had lower bodily pain and social functioning scores after COVID-19.

COVID-19 is a respiratory disease that affects not only the lungs but also the kidney, heart, musculoskeletal system, and other systems (11). Studies on the process of the disease and the treatment continue. Studies conducted so far have determined that many risk factors such as obesity, comorbidities such as cardiovascular diseases, diabetes mellitus, immune deficiencies, and age are associated with the severity of the disease and the delayed recovery period after the disease (12). Severe acute lung injury may be important factor associated with delayed recovery period. A study revealed that the degree of acute lung injury is associated with the measures of pulmonary and physical function at 6 months. However, the same study showed that persistent physical and mental ill health and cognitive impairment are not directly related to severity of acute lung injury (13). Also there can be other unknown factors that create differences in patients' recovery period. In the literature, it has been shown that female gender is a risk factor that delays the COVID-19 recovery process and on the other hand male gender is a risk factor to have more severe acute illness (13,14). It is showed with many studies that there is a relationship between COVID-19, autoimmunity, inflammation and preexisting autoantibodies (15). In addition, it is known that many autoimmune diseases, especially in middle aged women (16), ant-cytokine and tissue –

specific autoantibodies and many others have been had a relationship with post COVID-19 syndromes (17,18). Thus the difference of COVID-19 recovery period for genders may be impact of health-related quality of life.

As it is known health –related quality of life is defined as a combination of the patient's physical, mental, emotional and social well-being at the perceptual level (19). Since COVID-19 is a multisystem disease, it affects health-related quality of life. A meta-analysis supported that 58% of the post-COVID-19 patients had poor quality of life (20). Another study that enrolled with 101 COVID-19 patients underwent pulmonary function and SF-36 showed that especially impairment was detected on scores of physical role limitation, physical function and vitality. Also, the study conducted that all domains of health-related quality of life except bodily pain is associated with low lung capacity (21).

Another important issue to be considered is post-acute COVID-19 syndrome may be impact physical and cognitive function, health-related quality of life, and participation in society (22). Many studies explained that post-acute COVID-19 syndrome which is associated with post-traumatic distress syndrome (PTSD) may be the potential reason for poor quality of life (23-27). PTSD after COVID-19 depends on fear, worry, being far away from relatives and also PTSD may be seen at higher incidence in people with comorbidities (28). Also it's known that females are prone to psychological problems such as depression, anxiety and PTSD more than males (29).

The disease itself, as well as the various restrictions taken by the states to prevent the spread of the disease, have also affected the recovery process of patients, especially their mental and physical functions (30). The current study

shows that health-related quality of life subscales scores are statistically significant lower in females than in males in the pre and post COVID-19 period. In addition, it was determined that the distribution within the group in terms of gender was lower in females. Hospitalization with COVID-19 can cause mental problems such as depression and anxiety (31). The social isolation and quarantine process that occurred with the COVİD-19 affected all individuals, especially women. The impact of working from home, childcare, shopping and housework may have been felt more in women and may have caused anxiety and depression (32). Most of the women in the current study are not working. This is an important factor that reduces social functionality. A study with 409 COVID-19 patients supported the current study as males had the scores of quality of life higher than females and also the same study showed that the employed patients had higher quality of life scores than unemployed patients (23).

There are some study limitations to consider: First, the small size of the study group and the inability to deal with COVID 19 risk factors and disease parameters in detail. Second; the effects of social isolation and the restrictions on physical and mental health were not assessed. Lastly, physical activities and exercise habits were not evaluated. Thus, the relationship between physical activities and health-related quality of life could not be reviewed.

CONCLUSION

Health-related quality of life may be affected on average after 4 months in people who had COVID-19 disease and complete the treatment process in the hospital, and especially the female gender carries a greater risk. In this process, where COVID-19 continues with it is new variants, studies with large samples are needed.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Tekirdağ Namık Kemal University Non-interventional Clinical Researches Ethics Committee (Date: 29/06/2021, Decision No: 2021.180.06.10).

Informed Consent: Informed consent was obtained from all participants who participated in this study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The author has no conflicts of interest to declare.

Financial Disclosure: The author declared that this study has received no financial support.

Author Contributions: The author declare that she has all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. T.C. Sağlık Bakanlığı . Covid-19 Genel bilgiler, epidemiyoloji ve tanı. Halk Sağlığı Genel Müdürlüğü. 2020;19 (COVID-19 (SARS-CoV-2 ENFEKSİYONU)): 1–32.

2. WHO. WHO Coronavirus (COVID-19) Dashboard. 2022. Available from: https://covid19.who.int/

3. Xu Z, Shi L, Wang Y, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet Respir Med 2020; 8: 420-2.

4. Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents 2020; 55: 105924.

5. Mutlu P, Mirici A, Gönlügür U, et al. Evaluating the clinical, radiological, microbiological, biochemical parameters and the treatment response in COVID-19 pneumonia. J Health Sci Med 2022; 5: 544-51.

6. TC. İç işleri Bakanlığı. Sokağa çıkma yasağı genelgesi. 2021. Available online: https://www.icisleri.gov.tr/65-yas-ve-ustu-ile-kronik-rahatsizligi-olanlara-sokaga-cikma-yasagi-genelgesi.

7. Szabo A, Ábel K, Boros S. Attitudes toward COVID-19 and stress levels in Hungary: Effects of age, perceived health status, and gender. Psychol Trauma 2020; 12: 572-5.

8. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations [published correction appears in Gen Psychiatr. 2020; 33: e100213corr1].

9. Yezli S, Khan A. COVID-19 social distancing in the Kingdom of Saudi Arabia: Bold measures in the face of political, economic, social and religious challenges. Travel Med Infect Dis 2020; 37: 101692.

10. Koçyigit H, Aydemir O, Olmez N, Memiş A. Reliability and validity of the Turkish version of Short-Form-36 (SF-36). Turkish J Drugs Ther 1999; 12: 102–6.

11. Sanyaolu A, Okorie C, Marinkovic A, et al. Comorbidity and its Impact on Patients with COVID-19. SN Compr Clin Med 2020; 2: 1069-76.

12. Kamal M, Abo Omirah M, Hussein A, Saeed H. Assessment and characterisation of post-COVID-19 manifestations. Int J Clin Pract 2021; 75: 0–2.

13. Evans RA, McAuley H, Harrison EM, et al. Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study. Lancet Respir Med 2021; 9: 1275–87.

14. Vestbo J, Hurd SS, Agusti AG, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. Am J Respir Crit Care Med 2013; 187: 347–65.

15. Knight JS, Caricchio R, Casanova JL, et al. The intersection of COVID-19 and autoimmunity. J Clin Invest 2021; 131: e154886.

16. Walsh SJ, Rau LM. Autoimmune diseases: A leading cause of death among young and middle-aged women in the United States. Am J Public Health 2000; 90: 1463–6.

17. Richter AG, Shields AM, Karim A, et al. Establishing the prevalence of common tissue-specific autoantibodies following severe acute respiratory syndrome coronavirus 2 infection. Clin Exp Immunol 2021; 205: 99–105.

18. Bastard P, Rosen LB, Zhang Q, et al. Autoantibodies against type I IFNs in patients with life-threatening COVID-19. Science 2020; 370: eabd4585.

19. Caballero T, Prior N. Burden of Illness and Quality-of-Life Measures in Angioedema Conditions. Immunol Allergy Clin North Am 2017; 37: 597-616.

20. Malik P, Patel K, Pinto C, et al. Post-acute COVID-19 syndrome (PCS) and health-related quality of life (HRQoL)-A systematic review and meta-analysis. J med virol 2022; 94: 253–62.

21. van der Sar-van der Brugge S, Talman S, Boonman-de Winter L, et al. Pulmonary function and health-related quality of life after COVID-19 pneumonia. Respir Med 2021; 176: 106272.

22. Tabacof L, Tosto-Mancuso J, Wood J, et al. Post-acute COVID-19 syndrome negatively impacts physical function, cognitive function, health-related quality of life, and participation. Am J Phys Med Rehabil 2022; 101: 48-52.

23. Arab-Zozani M, Hashemi F, Safari H, Yousefi M, Ameri H. "Health-related quality of life and its associated factors in COVID-19 patients." Osong Public Health and Research Perspectives 2020; 11: 296-302.

24. Halpin SJ, McIvor C, Whyatt G, et al. Postdischarge symptoms and rehabilitation needs in survivors of COVID-19 infection: A cross-sectional evaluation. J Med Virol 2021; 93: 1013-22.

25. Carfì A, Bernabei R, Landi F. Gemelli against COVID-19 post-acute care study group. persistent symptoms in patients after acute COVID-19. JAMA 2020; 324: 603-05.

26. Valent A, Dudoignon E, Ressaire Q, Depret F, Plaud B. "Three-month quality of life in survivors of ARDS due to COVID-19: A preliminary report from a French academic centre." Anaesth Crit Care Pain Med 2021; 39: 740-41.

27. Moreno-Pérez O, Merino E, Leon-Ramirez JM, et al. Post-acute COVID-19 syndrome. Incidence and risk factors: A Mediterranean cohort study. J Infect 2021; 82: 378-83.

28. Malik P, Patel K, Pinto C, et al. Post-acute COVID-19 syndrome (PCS) and health-related quality of life (HRQoL)-A systematic review and meta-analysis. J Med Virol 2022; 94: 253-62.

29. Pappa S, Giannakoulis VG, Papoutsi E, Katsaounou P. Author reply - Letter to the editor "The challenges of quantifying the psychological burden of COVID-19 on heathcare workers". Brain Behav Immun 2021; 92: 209-10.

30. Tull MT, Edmonds KA, Scamaldo KM, Richmond JR, Rose JP, Gratz KL. Psychological outcomes associated with stay-at-home orders and the perceived impact of COVID-19 on daily life. Psychiatry Res 2020; 289: 113098.

31. Nguyen HC, Nguyen MH, Do BN, et al. People with suspected covid-19 symptoms were more likely depressed and had lower health-related quality of life: The potential benefit of health literacy. J Clin Med 2020; 9: 965.

32. Xiao Y, Becerik-Gerber B, Lucas G, Roll SC. Impacts of working from home during COVID-19 pandemic on physical and mental well-being of office workstation users. J Occup Environ Med 2021; 63: 181–90.