

# The impact of the COVID-19 pandemic on the quality of life of the elderly population

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**Ethics Committee Approval**

The study was approved first by the Ministry of Health, then by the Istinye University Clinical Research Ethics Committee (2/2020.K-068).

All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

**Conflict of Interest**

No conflict of interest was declared by the authors.

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**Abstract**

**Background/Aim:** The elderly population were most exposed to lockdowns worldwide. Lockdown causes many disorders in people's daily routines, and the elderly suffer the most from these disorders. Our aim is to investigate the impact of the COVID-19 epidemic, which we do not know how long will last, on the psychological status and quality of life (QOL) of the elderly population.

**Methods:** A total of 226 male and female volunteers over the age of 65 years and with a score above 21 in the Minimental test were included in this cross-sectional study. QOL scale SF-36 and Geriatrics Depression Scale were performed to the participants.

**Results:** One hundred and twenty-five (55.3%) of the participants were male, 101 (44.7%) were female, and the mean age was 69.2 (4.4) years. A significant decrease was observed in all SF-36 QOL subscale scores during the pandemic compared to before ( $P<0.001$ ). Compared to those not diagnosed with COVID-19, physical functioning, role limitations due to emotional problems and physical health, general health, and pain scores were decreased significantly among those diagnosed with COVID-19 ( $P<0.05$  for all). In 67 of the 226 cases (29.6%), deterioration was observed in their health status in terms of depression during the pandemic compared to before ( $P<0.001$ ).

**Conclusion:** The pandemic should not be dealt with medical treatment only, but precautions should be taken to increase the QOL. For this, the factors that determine the QOL are important. Telemedicine should be widely used in the elderly, social and physical activity should be increased, and videoconferences should be made.

**Keywords:** COVID-19, Depression, Elderly, Geriatrics, Health-related quality of life, Lockdown, Physical activity

## Introduction

Chronologically, aging starts from at 65 years. World Health Organization (WHO) defines those aged 65 years and over as elderly [1]. The world population was 7.5 billion in 2019, while the elderly population was 700 million. Accordingly, 9.3% of the world population was formed by the elderly [2].

Aging is one of the most important reasons for decreased quality of life (QOL) because of its biological, chronological, psychological, and social aspects and is an inevitable process. The higher chronic disease prevalence and disability in the elderly than other age groups and consequently, social activity restrictions decrease the quality of life [3]. Not quality of life but biomedical results have traditionally been the primary endpoints in medical and health studies. Nevertheless, QOL has become a fundamental concept in the preceding decades and the aim in health and medicine studies. Recently, attention to QOL has increased, and more studies have been performed on this matter [4].

According to the WHO definition, quality of life means an individual's understanding of his or her situation in life concerning the value and cultural systems of his or her living environment regarding the expectations, goals, concerns, and goals [5]. The Health-Related Quality of Life (HRQOL) measures the effects of diseases, disorders, or disabilities on an individual's wellbeing and indicates how a person functions in social, mental, and physical health domains and how it affects the person's wellbeing. Understanding QOL is essential for enhancing patient care, symptom relief, and recovery. Issues that arise with the self-reported QOL of patients might cause changes and treatment progress or indicate that some treatments provide a limited advantage. Also, QOL identifies various disorders affecting patients, and this information could be utilized to understand and predict the problems that diseases can cause to patients. Also, long-term survivors and treated patients may experience persistent issues after a long time following the end of treatment. These issues can go unnoticed without a QOL assessment. Decision-making is another use for QOL because it is a treatment success indicator. Consequently, it has prognostic significance and appears to require routine evaluation of QOL in clinical studies [4].

Studies on HRQOL consist of various dimensions such as basic quality of life, wellbeing, social and psychological factors, physical function, satisfaction from life, and health status awareness. In the section on physical function, issues such as the effects of chronic diseases and their treatment methods on daily physical functions are discussed. The section on social functioning also deals with the social aspects affected by the disease, such as communication with relatives and family members and mental states such as depression, anxiety, or anger [3].

WHO named Coronavirus Disease 2019 briefly as COVID-19.

When the epidemic in Wuhan reached a global dimension, WHO declared a pandemic on Mar 11, 2020 [6]. The people most affected by the disease in the pandemic were those over the age of 65 years with serious chronic diseases. The increase in mortality due to COVID-19, directly related to old age,

hospitalization and mortality rates in the geriatric age group, have shown that this age group is at high risk [7]. For this reason, all over the world, emphasis has been placed on protective measures for the elderly and a lockdown has been imposed at certain hours to protect people over 65 years of age from COVID-19.

The most important consequences of the COVID-19 pandemic for the elderly who stay at home for too long are the psychological and physical effects [8]. According to studies, the physical results of the isolation include sarcopenia, increased risk of falling, fragility, diabetes mellitus, hypertension, and increased risk of cardiovascular disease [9]. The psychological consequences of isolation are anxiety, depression, dementia, impaired cognitive functions, mental disorientation, increased suicide attempt and post-traumatic stress disorder [10].

It is important to know how much the QOL and psychological state of the elderly population are affected during the period of staying at home, in terms of precautions to be taken during the pandemic period, which we do not know how long will last [11]. This study aimed to investigate the COVID-19 pandemic impact on the quality of life of the elderly population.

## Materials and methods

The study was approved first by the Ministry of Health and then by the Istinye University Clinical Research Ethics Committee (2/2020.K-068). According to the power analysis performed before the research, it needed to include at least 226 cases (85% power and 5% error level). The effect size of 0.20 was decided in line with clinical predictions. Sample size calculations were performed with the G\* Power 3.0.10. (Franz Foul, Universität Kiel, Kiel, Germany) package program.

A total of 226 male and female patients with a Mini Mental Test (MMT) score of 21 and above, in accordance with the WHO definition, were included in our study. Exclusion criteria were having an MMT score of under 21 and not volunteering [12]. In October 2020 the two doctors who conducted the study first conducted MMT on the participants. Participants with a score of 21 and above were made to fill in the questionnaires twice, taking into account the pre-pandemic (February, March 2020) and current (October, November 2020) situations in Turkey, using the Short Form 36 (SF-36) and Geriatric Depression Scale (GDS), which have been proven valid and reliable in the Turkish population [13,14].

The questionnaire consisted of 9 sub-scales: Role limitation due to physical health (PH), role limitation due to emotional problems (EP), Physical Function (PF), Emotional Wellbeing (EW), Social Function (SF), General Health (GH), Fatigue (F), Pain (P) and Health Changes (HC). The higher the score of these sub-scales, the better the quality of life, and conversely, the lower the score, the lower the respondent's quality of life. For more accurate results, respondents were accompanied by a physician when answering the questionnaire.

GDS, which was used to measure depression in respondents, had 30 questions, 20 of which indicated depression if answered positive, and the rest were depressive if answered negative. GDS is a self-estimated scale, and answers were responded with yes and no. To make it more acceptable for patients, the questions were all formatted to fit in one page. 0-10

points indicated no depression, 11-13 points indicated possibly in depression, 14 and above points indicated depression.

The demographic data of the patients, their current weight (October, November 2020) and that before the pandemic (February, March 2020), exercise habits, antidepressant use history, the presence of chronic disease, whether the person was diagnosed with COVID-19, whether the person remained in quarantine, whether any of their relatives died due to COVID-19, whether there was anyone going to work every day at home were also recorded.

**Statistical analysis**

The Kolmogorov-Smirnov test was used to test the normality of the distribution of continuous variables, and the Levene test was used to test the homogeneity of variances. Categorical variables were shown in numbers (n) and percentage (%) while continuous variables were given as mean (SD) or median (min-max). While the difference in status of depression between before and during COVID-19 pandemic was investigated with the McNemar-Bowker test, Wilcoxon Sign Rank test was used to compare SF-36 QOL subscale scores.

Parametric test assumptions for continuous variables were evaluated by Kruskal-Wallis or Mann-Whitney U tests based on the number of independent groups. After identifying the variables with statistically significant P-values through the Kruskal-Wallis test, the Dunn-Bonferroni test was used to detect the differences between the groups. Categorical data were evaluated with Pearson's  $\chi^2$  or continuity corrected  $\chi^2$  test, where applicable. Spearman's rank-order correlation test was used for the association degree between continuous variables. Multiple logistic regression analysis via the Backward LR procedure was conducted to get the best predictor(s) which effect the deterioration in depression. Variables with univariable test values of less than 0.25 were selected for the multivariate model along with other variables of clinical significance. For each independent variable, 95% confidence intervals and odds ratios were calculated. Multiple linear regression analysis was used to determine the best predictor(s) affecting the SF-36 QOL subscale scores depending on the COVID-19 pandemic. Variables with univariable test values of less than 0.10 were selected for the multivariate model along with other variables of clinical significance. For each independent variable, 95% confidence intervals and coefficient of regression were calculated. Because of non-normal distribution, logarithmic transformation was used for each component of SF-36 QOL scale in regression analysis. IBM SPSS Statistics version 17.0 software (IBM Corporation, Armonk, NY, USA) was used for data analysis. A P-value of less than 0.05 was considered significant.

**Results**

Table 1 contains the descriptive statistics regarding the demographic and clinical characteristics of the study participants.

Table 2 includes the frequency distribution of the cases regarding the depression status of the cases before and during the pandemic. In 67 (29.6%) of 226 cases included in the study, deterioration was observed in their health status in terms of depression during the pandemic than before (P<0.001). No change was observed in the depression levels of the remaining cases (except one).

Table 1: Demographic and clinical characteristics of cases

	n=226
Age (years)	69.2 (4.4)
Range of age (years)	65-85
Gender	
Male	125 (55.3%)
Female	101 (44.7%)
Living place	
At home	182 (80.5%)
Other	44 (19.5%)
Level of education	
Primary school	74 (32.7%)
High school	86 (38.1%)
University	66 (29.2%)
Marital status	
Single	37 (16.4%)
Married	189 (83.6%)
Number of children	3 (0-6)
Comorbidity	167 (73.9%)
Body weight before the pandemic (kg)	76.7 (11.3)
Current body weight (kg)	77.9 (12.0)
Smoking habit	45 (19.9%)
Alcohol consumption	53 (23.5%)
Physical examination	
No	146 (64.6%)
Not doing due to the pandemic	30 (13.3%)
Regularly doing	50 (22.1%)
Antidepressant usage	53 (23.5%)
Vitamin supplement	110 (48.7%)
Being diagnosed with COVID-19	21 (9.3%)
Exposure to lockdown	72 (31.9%)
Losing an acquaintance due to COVID-19	52 (23.0%)
Number of family member	3 (1-6)
Having someone at home going to work regularly	120 (53.1%)
Mini mental test	25 (21-30)

Table 2: Frequency distribution of cases in terms of depression status before and during the pandemic

		Before the COVID-19 pandemic			Total
		No depression	Possibly in depression	In depression	
During the COVID-19 pandemic	No depression	123 (54.4%)	1 (0.4%)	0 (0.0%)	124 (54.8%)
	Possibly in depression	27 (11.9%)	19 (8.5%)	0 (0.0%)	46 (20.4%)
	In depression	23 (10.2%)	17 (7.5%)	16 (7.1%)	56 (24.8%)
	Total	173 (76.5%)	37 (16.4%)	16 (7.1%)	226 (100.0%)

Compared to the group whose depression level did not change, the rate of women, those with a low education level, those who were in quarantine, those who lost their relatives due to COVID-19, and the absence of anyone who went to work regularly at home was significantly higher in the group whose health condition deteriorated in terms of depression (P<0.05 for all).

The multivariate logistic regression analysis results showed that the most effective factors in predicting the deterioration in health status in terms of depression during the pandemic than before were the absence of anyone who went to work regularly at home (OR = 3.868, 95% CI: 1.941-7.709, P<0.001), loss of relatives due to COVID-19 (OR = 3.863, 95% CI: 1.846-8.082, P<0.001), being in quarantine (OR = 2.438, 95% CI: 1.241-4.789, P=0.010) and being a female (OR = 1.904, 95% CI: 1.017-3.564, P=0.044). (Table 3).

Table 3: Determining the best predictor(s) which affect the change in depression status depending on the COVID-19 pandemic – the results of Backward LR logistic regression analysis

	OR	95% CI	P-value
Female factor	1.904	1.017-3.564	0.044
Exposure to lockdown	2.438	1.241-4.789	0.010
Losing an acquaintance	3.863	1.846-8.082	<0.001
Not being able to go to work	3.868	1.941-7.709	<0.001

OR: Odds ratio, CI: Confidence interval

Table 4 shows the comparisons between the SF-36 QOL subscale scores of the cases before and during the pandemic. A statistically significant decrease was observed in all SF-36 QOL subscale scores during the pandemic than before (P<0.001).

A significant correlation was seen between the amount of change during the pandemic period in the PF, EP, F, and P components of the SF-36 QOL scale and age compared to before

the pandemic ( $P<0.05$  for all). However, it these correlation levels were very weak. As the population living at home increased, PH, EP, EW and HC scores significantly decreased during the pandemic compared to before ( $P<0.05$  for all).

Table 4: The comparisons between before and during the COVID-19 pandemic in terms of SF-36 quality of life subscale scores

		Mean	SD	Median	Min	Max	P-value †
PF	Before pandemic	70.20	27.86	80.00	0.00	100.00	<0.001
	During pandemic	66.57	29.41	80.00	0.00	100.00	
PH	Before pandemic	71.57	35.15	75.00	0.00	100.00	<0.001
	During pandemic	51.77	36.09	50.00	0.00	100.00	
EP	Before pandemic	69.10	37.98	100.00	0.00	100.00	<0.001
	During pandemic	44.54	39.54	33.30	0.00	100.00	
F	Before pandemic	56.39	18.92	55.00	5.00	100.00	<0.001
	During pandemic	50.58	20.40	50.00	0.00	100.00	
EW	Before pandemic	64.38	17.05	61.25	12.50	100.00	<0.001
	During pandemic	60.23	18.97	60.00	8.00	92.00	
SF	Before pandemic	70.38	27.47	62.50	0.00	100.00	<0.001
	During pandemic	50.88	28.55	50.00	0.00	100.00	
P	Before pandemic	66.48	22.29	67.50	12.50	100.00	<0.001
	During pandemic	57.98	24.23	57.50	0.00	100.00	
GH	Before pandemic	58.83	18.75	55.00	15.00	95.00	<0.001
	During pandemic	53.59	18.71	55.00	10.00	95.00	
HC	Before pandemic	43.68	17.47	50.00	0.00	75.00	<0.001
	During pandemic	35.82	17.05	25.00	0.00	75.00	

† Wilcoxon Sign Rank test

The amount of change in the SF-36 QOL scale components (except the SF subscales) between women and men during the pandemic period was similar ( $P>0.05$  for all). On the other hand, social functional subscale scores of women were significantly lower than those of men ( $P=0.022$ )

Significant differences were seen in changes in the subjects' PH, EP, F and GH sub-dimension scores according to their education levels ( $P<0.05$  for all). Compared to college graduates, primary school graduates' PH scores decreased more during the pandemic than before ( $P=0.034$ ). Compared to high school graduates, the EP and GH scores of primary school graduates also decreased more during the pandemic than before ( $P=0.002$  and  $P=0.009$ ). In addition, compared to high school graduates, EP and F scores of college graduates decreased more during the pandemic than before ( $P=0.032$  and  $P=0.051$ ).

The EP, F, SF and HC scores of those who did not have a chronic disease were significantly higher during the pandemic than those with chronic disease ( $P<0.05$  for all).

Compared to those who were not diagnosed with COVID-19, the PF, PH, EP, P and GH scores of those diagnosed with COVID-19 decreased significantly more during the pandemic than before ( $P<0.05$  for all).

Compared to those who were not in quarantine, the PF, PH, EP, F, P and GH scores of those who remained in quarantine were significantly higher during the pandemic than before ( $P<0.05$  for all).

PH and EP scores of those who lost their relatives due to COVID-19 during the pandemic period were significantly lower than those who did not lose any relatives due to COVID-19 ( $P=0.008$ ).

The results of multivariate linear regression analysis showed that being diagnosed with COVID-19 was an independent risk factor for the decrease in the PF sub-dimension scores of the SF-36 QOL scale during the pandemic than before ( $B = -0.510$ , 95% CI:  $-0.777 - -0.244$ ,  $P<0.001$ ). The most determinant factors on the decrease in PH subscale scores were having a low education level ( $B = -0.261$ , 95% CI:  $-0.451 - -0.071$ ,  $P=0.007$ ), losing any relatives due to COVID-19 ( $B = -0.487$ , 95% CI:  $-0.849 - -0.126$ ,  $P=0.008$ ) and being diagnosed with COVID-19 ( $B = -0.626$ , 95% CI:  $-1.220 - -0.032$ ,  $P=0.039$ ).

Being diagnosed with COVID-19 ( $B = -1.131$ , 95% CI:  $-1.925 - -0.336$ ,  $P=0.005$ ) and the number of people living at home ( $B = -0.232$ , 95% CI:  $-0.434$ ) were independent markers for the decrease in EP sub-dimension scores ( $B= -0.029$ ,  $P=0.025$ ). Not having chronic disease ( $B = 0.460$ , 95% CI:  $0.247 - 0.673$ ,  $P<0.001$ ) and being diagnosed with COVID-19 ( $B = -0.432$ , 95% CI:  $-0.743 - -0.121$ ,  $P= 0.007$ ) was effective. In terms of the decrease in the P sub-dimension scores, being diagnosed with COVID-19 was an independent risk factor ( $B = -0.539$ , 95% CI:  $-0.791 - -0.288$ ,  $P<0.001$ ). The most determinant factor on the decrease in HC subscale scores was the number of people living at home ( $B = -0.141$ , 95% CI:  $-0.210 - -0.073$ ,  $P<0.001$ ) (Table 5).

Table 5: Determining the best predictor(s) which effect on the changes in SF-36 quality of life subscale scores depending on the COVID-19 pandemic – the results of Multiple linear regression analyses

	B	LL	UL	P-value
PF				
Age	-0.014	-0.029	0.002	0.087
Being diagnosed with COVID-19	-0.510	-0.777	-0.244	<0.001
Exposure to lockdown	0.0004	-0.164	0.165	0.997
PH				
Level of education	0.261	0.071	0.451	0.007
Being diagnosed with COVID-19	-0.626	-1.220	-0.032	0.039
Exposure to lockdown	0.309	-0.058	0.677	0.099
Losing an acquaintance	-0.487	-0.849	-0.126	0.008
Number of family members	-0.082	-0.196	0.033	0.162
EP				
Age	-0.012	-0.066	0.043	0.670
Level of education	0.054	-0.230	0.337	0.710
Comorbidity	0.324	-0.194	0.842	0.219
Being diagnosed with COVID-19	-1.131	-1.925	-0.336	0.005
Losing an acquaintance	-0.171	-0.705	0.363	0.529
Number of family members	-0.232	-0.434	-0.029	0.025
Having someone at home going to work regularly	-0.099	-0.640	0.443	0.719
SF				
Female factor	0.046	-0.143	0.235	0.632
Comorbidity	0.460	0.247	0.673	<0.001
Being diagnosed with COVID-19	-0.432	-0.743	-0.121	0.007
P				
Age	0.010	-0.004	0.025	0.167
Being diagnosed with COVID-19	-0.539	-0.791	-0.288	<0.001
Exposure to lockdown	-0.013	-0.168	0.142	0.871
HC				
Comorbidity	0.043	-0.129	0.216	0.619
Number of family members	-0.141	-0.210	-0.073	<0.001
Having someone at home going to work regularly	0.010	-0.172	0.192	0.913

B: Coefficient of regression, LL: Lower limit of 95% confidence interval for B, UL: Upper limit of 95% confidence interval for B

## Discussion

Since the COVID-19 infection progressed very rapidly and pandemic decisions were made quickly, pre-pandemic scale evaluation could not be performed in our study, and the answers to the pre- and post-pandemic evaluations of the elderly were requested in the same interview. However, our study is valuable because it detects the effects of COVID-19 infection and pandemic on the quality of life of elderly people. In addition, the Short Form-36 used in this study is among the recommended scales in terms of reliability, validity, and sensitivity to change, and is recommended when a comprehensive assessment of HRQOL is required [15, 16]. One of the most important results of our study was that a significant decrease was observed in all SF-36 quality of life subscale scores during the pandemic than before. The reason may be that the health status of elderly people is mostly affected by the ability to continue daily life activities and routines. Unfortunately, physical and social isolation prevented many of the elderly's daily activities.

Fifty (22.1%) of our participants continued their exercises regularly despite the pandemic. Thirty (13.3%) people stated that they could not exercise due to the pandemic. Suzuki et

al. assessed the impact of public health constraints on physical activity, subjective wellbeing, and health related QOL of the elderly in 165 patients in Japan. Of them, 47.3% of the participants became less active, 23.0% became more active, and 29.7% maintained physical activity levels. Subjective wellbeing and lower mental component health related QOL scores were related to an increased risk of decreased physical activity [17]. Another study in Finland examined active aging, variations of life-space mobility and QOL scores of 809 patients (75, 80, and 85-year age group) 2 years ago, and these scores were re-examined during the pandemic period. All scores were significantly lower during COVID-19 social distancing. The more physically active the elderly people are and the greater the mobility of their living space, the higher their quality of life [18]. Our results support these results.

In a multi-center study in which 928 people between the ages of 60 and 85 years were included, the relationship between health literacy and suspected COVID-19 symptoms (S-COVID-19-S) was examined. Health literacy-related factors in the study groups were age, gender, social status, ability to afford treatment costs, and education. As health literacy increased, there was an increase in healthy eating, and physical activity, and a decrease in depression rates [19]. In our study, significant differences were observed in terms of changes in PH, EP, F and GH sub-dimension scores of the subjects according to their education levels. To reduce the damage caused to the elderly in the pandemic, the use of health literacy interventions and healthy behavior training can effectively improve the mental state of the elderly.

In a study including 120 older people published in 2009, psychological factors measured by GDS and sociodemographic factors including leisure activities, income, and marital status are reported to affect QOL.

As assessed by the Geriatric Depression Scale, psychological factors and sociodemographic characteristics, such as marital status, income, and leisure activities impacted QOL. In our study, we saw that depression that increased during the pandemic period negatively affected the quality of life. The same study concluded that in the analysis models in active elderly, functional status had no impact on the QOL variable. This result can be explained by the absence of a pandemic and prohibitions in those years [20].

In 2020, a study from Spain investigated the Relationship between QOL and Sociodemographic, Physical, and Mental Health Variables in people over 65 years of age. The factors affecting the QOL were the abundance of financial difficulties, the presence of a psychological disorder, psychological and physical symptoms, while a positive factor was having a job [21].

A study about the variations of depressive indications following therapy with exercising showed that combining exercise with antidepressant medications can positively improve the symptoms of depression. The results showed that compared to other standard treatments for depression, this method could show its positive results in early 4-week periods and long 12-week periods. [22].

A 2017 study examined the relationship between physical weakness, physical activity, and depression in older

women. This study showed that the risk factors associated with depression in participants with low levels of physical activity were low levels of education, diabetes, and a high risk of metabolic syndrome. The results also showed that because life expectancy and longevity are higher in women, especially after menopause, men should pay more attention to physical activity and lifestyle changes in older women to prevent a decrease in their quality of life [23]. In our study, the female gender was one of the most effective factors in predicting the deterioration of health status in terms of depression during the pandemic.

### Limitations

The primary limitation of our study is that the scales before the pandemic were completed during the pandemic period, as it was not predicted before.

### Conclusion

We found that the COVID-19 pandemic negatively affected the quality of life in the elderly. With the COVID-19 pandemic, the decrease in sharing with the elderly living at home decreases the quality of life and affects their mood. It is not clear how long COVID-19 pandemic and social-physical isolation will last. Therefore, enough physical activity should be encouraged for the elderly population to be less affected by this situation. Regular behavioral therapy over the phone or online, and video calls with family members and peers can help improve depression. According to our results, in behavioral therapy, priority can be given to female gender, those who lost their relatives due to COVID-19, those who remain in quarantine due to COVID-19 and the elderly population receiving COVID-19 treatment. To reduce mental issues during the pandemic, it is recommended to use health literacy interventions and teach proper health behaviors. Telemedicine should be made more available, especially in this risky group.

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