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ABSTRACT

This study was conducted to adapt the COV19-QoL scale to Turkish culture and to examine its psychometric properties in individuals diagnosed with and without COVID-19. A total of 1069 people aged between 18 and 65 years participated in the study. The COV19-QoL$_{TR}$ scale has six items, and it was confirmed to be one-dimensional in the Turkish sample (participants diagnosed with and without COVID-19 and the general population). Participants' perceived quality of life and levels of anxiety and depression were the most affected areas and their physical and mental health levels were the least affected by the pandemic.

The new type of coronavirus (COVID-19) pandemic affecting the world has led to multidimensional effects in societies. The restrictions implemented to reduce or eliminate the risk of transmission of the COVID-19 virus may differ from country to country. The restrictions were initiated in our country as of March 2020 when the first case was observed, and it is emphasized that people should not go out unless it is compulsory and that they should stay at home. During this process, a distance education system was implemented by suspending face-to-face education in preschool, primary education, secondary education, and higher education in our country. Flexible working was introduced for employees, and curfew restrictions were imposed on citizens aged over 65 and under 20 (Tural, 2020). The quarantine measures implemented led to the restriction of people's physical activities. Quarantine leads to a change in mood and to sedentary life by causing people to stay away from their daily routine. Increased time spent at home, listening to and watching pandemic news, increased worries, and increased mood-related changes may lead to undesirable changes in people's quality of life (Tunç et al., 2020).

Quality of life is occasionally difficult to define since it is affected by social, economic, and cultural values (Ma et al., 2020). The World Health Organization (WHO) considers the quality of life as the standard of living perceived by individuals in line with their culture, values, goals, and expectations toward life (The WHOQOL Group, 1996). People who enjoy life, are free from disease, and have active social lives exemplify healthy individuals' quality of life (Barlow et al., 2020). Quality of life maximizes people's functionality, physical and mental well-being, strong family ties, and satisfaction with social relations (Barlow et al., 2020; Garrigues et al., 2020). Based on this information, many factors such as changing living conditions, individuals' isolation and staying in closed areas, and the fear of transmission of the virus to them and their families during the new type of COVID-19 pandemic are considered to negatively affect the quality of life. In one study, it was reported that the infection of a family member with COVID-19 triggered depression and negatively affected the quality of life (Ma et al., 2020). Quality of life is low even in cases of noninfectious diseases (Eren et al., 2008; Gudmundsson et al., 2006; Sainsbury et al., 2013). Similarly, a study conducted with nurses, who are at the forefront of the fight against COVID-19, indicated that nurses caring for COVID-19 patients had high depression scores and low quality of life scores (An et al., 2020).

In the literature, although there are studies examining the effect of the COVID-19 pandemic on the quality of life in different groups in society, questionnaire forms developed by the researchers or other health-related quality of life scales were used in these studies (An et al., 2020; Ma et al., 2020; Ping et al., 2020). A measurement tool was developed by Repišti et al.

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(2020) to evaluate the effect of the COVID-19 on the quality of life. In this study, it was aimed to adapt this scale to Turkish society and to examine its psychometric properties.

Materials and methods

Design and participants

The study was conducted through an online questionnaire between January 11 and 25, 2021. Using the convenience and snowball sampling method, a total of 1,069 people aged between 18 and 65 years from various regions of Turkey participated in the study. Participants were included in the study if they gave consent to voluntarily participate and filled out the form completely. The participants were asked whether they had had a COVID-19 test and whether their test result was positive. Considering that the effect of the pandemic on the quality of life of people with a positive COVID-19 test in the sample and those who were not diagnosed would be different, results were presented separately.

Total sample

While 61.2% of 1,069 individuals who participated in the study were female, 36.5% of them had a bachelor's degree, and their mean age was 34.10 years ($SD = 10.84$). The percentage of those who considered their health as good was 52.4%, while 16.7% and 5.4% of them reported that they had a chronic disease and a mental illness, respectively. While 5.4% of the participants who were health care workers indicated that they did not work with COVID-19 positive patients, 7.1% of them indicated that they worked with them.

Undiagnosed sample

Among the participants in the study, there were a total of 928 people who had tested negative for COVID-19 and were healthy. While 60.6% of these participants were female, 38.1% of them had a bachelor's degree, and their mean age was 33.79 years ($SD = 10.80$). The percentage of those who considered their health as good was 54.4%, while 15.9% and 5.4% of them reported that they had a chronic disease and a mental illness, respectively. While 5.2% of the participants who were health care workers indicated that they did not work with COVID-19 positive patients, 7.2% of them indicated that they worked with them.

Diagnosed sample

A total of 141 people who had tested positive for COVID-19 constituted the diagnosed sample. While 65.2% of these participants were female, 32.6% of them were high school graduates, and their mean age was 36.17 years ($SD = 11.06$). While 39.0% of the participants considered their health as good, 21.3% and 5.7% of them reported that they had a chronic disease and a mental illness, respectively. While 7.1% of the participants who were health care workers indicated that they did not work with COVID-19 positive patients, 6.4% of them indicated that they worked with them.

Instruments

A 13-question personal information form was used to gather characteristics of the participants such as age, gender, education, and the presence of a chronic or mental illness, and about the pandemic such as anxiety about the transmission of COVID-19, and diagnosis for them or their families.

COVID-19 quality of life

The COVID-19–Impact on Quality of Life (COV19-QoL$_{TR}$) scale was developed by Repišti et al. (2020) and has 6 items covering basic quality of life fields related to mental health. The first item includes people's feelings about the overall effect of the current pandemic on their quality of life. The second and third items include individuals' perceptions of mental and physical health deterioration. The fourth and fifth items measure people's levels of anxiety and depression due to the pandemic. The final item is aimed at determining individuals' perceptions of the extent to which their personal security is in danger. All items are of the five-point Likert type ($1 =$ strongly disagree to $5 =$ strongly agree) and evaluate the feelings and thoughts of people in the last seven days. The scale score is calculated by dividing the total score by the number of items. A higher score indicates that the perceived effect of the pandemic on a person's quality of life is higher. Repišti et al. (2020) reported Cronbach's alphas ranging from 0.86 to 0.88.

Procedure

The study was planned in accordance with the principles of the Declaration of Helsinki, and approval was obtained from Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (Date: 09 December 2020, No: KAEK-935). The Ministry of Health General Directorate of Health Services COVID-19 Scientific Research Evaluation Commission gave permission for the research

Table 1. Results of EFA of the COV19-QoL$_{TR}$ scale for all samples.

	Total sample		Undiagnosed sample		Diagnosed sample	
KMO	0.868		0.867		0.798	
$\chi^2(15)$	4,203.902		3,524.273		435.527	
p	<0.001		<0.001		<0.001	
	h^2	F	h^2	F	h^2	F
Item 1: I think my quality of life is lower than before	0.701	0.835	0.701	0.837	0.482	0.694
Item 2: I think my mental health has deteriorated	0.675	0.806	0.675	0.821	0.582	0.763
Item 3: I think my physical health may deteriorate	0.598	0.792	0.598	0.773	0.553	0.744
Item 4: I feel more tense than before	0.718	0.863	0.718	0.847	0.741	0.861
Item 5: I feel more depressed than before	0.742	0.868	0.742	0.861	0.666	0.816
Item 6: I feel that my personal safety is at risk	0.641	0.815	0.641	0.801	0.527	0.726
Eigenvalues	4.136		4.075		3.776	
Explained variance (%)	68.935		67.916		62.926	

h^2: Communalities; F: Factor loadings.

(Document ID: 2020-11-28T15_18_02). Permission to adapt the scale was obtained via e-mail from the researchers who developed the scale.

During the process of translating the scale into Turkish, the English scale was given to two people who have a command of both languages, cultures, and terminologies, and they were asked to write the most appropriate Turkish statements. After all the translations, all of them were brought together and the scale was prepared by selecting the most appropriate Turkish statements. The original and Turkish forms of the scale were presented to nine experts for their opinions. After the nine expert opinions evaluating the scale items according to the Davis (1992) technique, the content validity ratio (CVR) was 0.88 for two items and 1.00 for the other four items. The CVR value is desired to be above 0.80 (Davis, 1992). The Turkish form of the prepared scale was sent to three English linguists who had not seen the previous version of the scale, and they were asked to write the most appropriate English statements. As a result of the feedback received, it was observed that there was no difference with the original versions of the items in English and the Turkish form of the COV19-QoL$_{TR}$ scale was finalized.

Data collection tools were uploaded to Microsoft Forms and distributed online (e.g., e-mail, WhatsApp, Facebook) to reach the largest possible sample under the current pandemic conditions. The participants were informed that they were free to participate in the study or not, and it was explained that the study was conducted on a voluntary basis. The requirement of voluntary informed consent was indicated at the beginning of the questionnaire, and the individuals who agreed to participate in the questionnaire electronically confirmed that they were volunteers, and then, they began to answer the questions. It took an average of five minutes to answer the questionnaires.

Data analysis

In the analysis of the data, AMOS 21.0 was used for confirmatory factor analysis (CFA), and the SPSS 25.0 ready-made software package was used for all other analyses. The confidence interval was set at 95% and the significance level was $p < 0.05$.

Results

Construct validity in all samples was first examined. The Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity were applied to determine the adequacy of the sample size and the suitability of the data for factor analysis as a prerequisite. Using Kaiser's (1974) categories (>0.6 moderate, >0.7 intermediate, >0.8 good, and >0.9 very good), the KMO values were good in the total and undiagnosed sample, and close to good in the diagnosed sample. Researchers typically recommend 10–15 people per item in scale adaptation studies (Alavi et al., 2020; Tabachnick & Fidell 2013; Watson, 2017). With approximately 154 people per item in the undiagnosed sample and 23 people per item in the diagnosed sample. It is observed that the desired condition was achieved in sample determination. In all samples, it was determined that the KMO coefficient varied between 0.798 and 0.868 and that the Bartlett's test result was significant (Table 1). An exploratory factor analysis (EFA) was performed using the principal components analysis (PCA) and varimax rotation (VR) methods to examine the factor structure of the scale. A single structure was observed in the scree
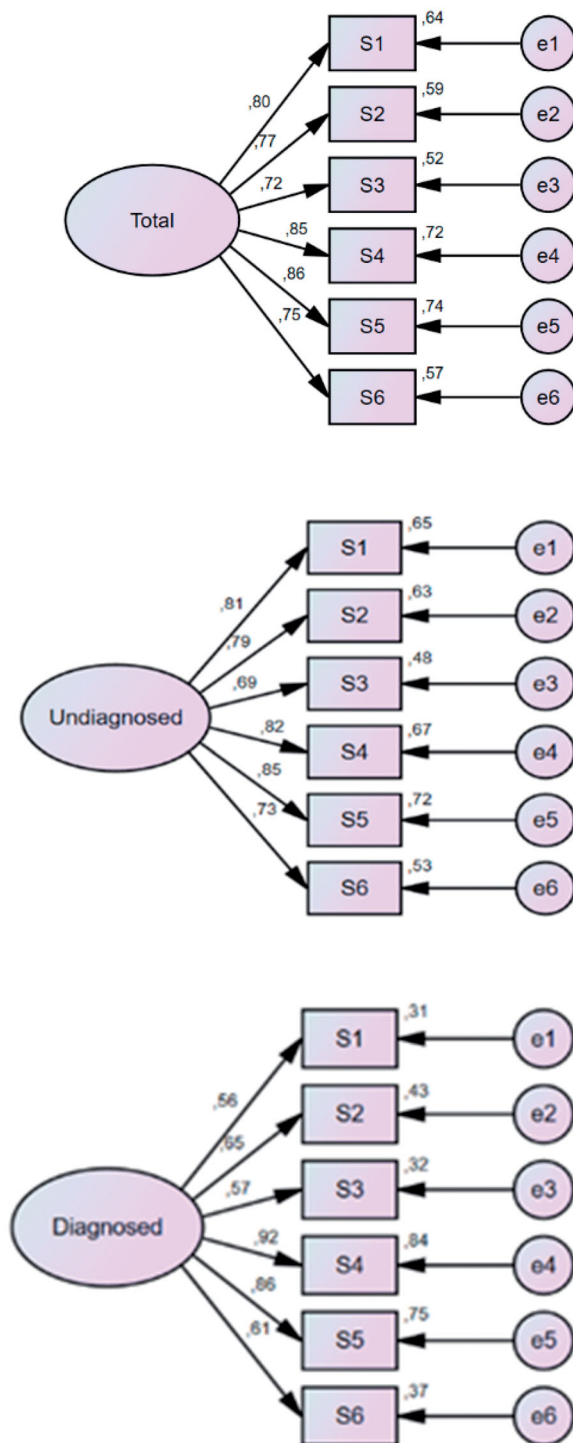
Figure 1. Standardized factor loadings of the scale in all samples.

plots for all three sample groups. The single factor structure obtained by varimax rotation in the total, undiagnosed, and diagnosed samples explained 68.935%, 67.916% and 62.926% of the total variance, respectively.

The uni-dimensionality of the COV19-QoL$_{TR}$ scale was evaluated by the maximum likelihood of the CFA

(Figure 1). Some goodness-of-fit values were used to evaluate the quality of the model predicted in the CFA. The goodness-of-fit index values of the scale in all samples and good and acceptable goodness-of-fit index values are presented in Table 2.

Table 3 shows the corrected item total correlation coefficients were above 0.7 for the total sample and above 0.5 for each of the undiagnosed and diagnosed samples. The highest value belonged to the item "I feel more depressed than before" for the total (0.798) and undiagnosed (0.788) samples and to the item "I feel more tense than before" for the diagnosed sample (0.753). The Cronbach alpha coefficients were 0.91 for the total sample, 0.90 for the undiagnosed sample, and 0.86 for the diagnosed sample. The Spearman-Brown coefficients Guttman coefficients, average variance extracted (AVE), and composite reliability (CR) were acceptable (Table 3).

Table 4 shows that mutual correlations of the items of the COV19-QoL$_{TR}$ scale were found to be moderately to highly, positively, and statistically significant for the three samples. The mean score was 3.36 ($SD = 1.38$) for the total sample and 3.24 ($SD = 1.38$) for the undiagnosed sample, and it was the highest in the item "I think my quality of life is lower than before." The highest score was 4.41 ($SD = 0.97$) for the item "I feel more tense than before," for the diagnosed sample. The lowest score was 2.62 ($SD = 1.28$) and 2.45 ($SD = 1.20$) for the total and undiagnosed sample, respectively, in the item "I think my physical health may deteriorate" and 3.50 ($SD = 1.15$) for the item "I think my mental health has deteriorated" for the diagnosed sample.

When the relationship between some characteristics of the participants and the total scores of the COV19-QoL$_{TR}$ scale was examined, it was determined that the total scores of the COV19-QoL$_{TR}$ scale of the women in the total and undiagnosed sample, participants aged 35 and over, those who were not employed (e.g., housewife, retired, student), those who perceived their health as poor/moderate, those with anxiety about the transmission of COVID-19 to them or their families, those who had tested positive for COVID-19, those who had a family member with COVID-19 positive and lived together with them, and health care workers who worked with COVID-19 patients were significantly higher. No significant difference was found in any of these characteristics among the participants in the diagnosed sample (Table 5).

Table 2. Confirmatory factor goodness-of-fit index results of the COV19-QoL$_{TR}$ scale items in all samples.

Goodness-of-fit indices	Good fit	Acceptable fit	Total sample	Undiagnosed sample	Diagnosed sample
x^2/sd	<2	<5	3.820	3.733	1.909
RMSEA	<0.05	<0.08	0.070	0.076	0.077
RMR	<0.05	<0.08	0.022	0.023	0.051
NFI	>0.95	>0.90	0.996	0.993	0.977
NNFI	>0.97	>0.95	0.997	0.984	0.966
CFI	>0.97	>0.90	0.997	0.995	0.989
GFI	>0.95	>0.90	0.989	0.982	0.973
AGFI	>0.90	>0.85	0.954	0.946	0.888
AIC-Model	Smaller than the AIC value of the comparison model		$51.099 < 4334.317$	$54.128 < 3545.176$	$41.545 < 423.273$
CAIC-Model	Smaller than the CAIC value of the comparison model		$136.908 < 4366.495$	$125.965 < 3575.964$	$102.145 < 445.998$
ECVI	Smaller than the ECVI value of the comparison model		$0.088 < 7.486$	$0.118 < 7.724$	$0.349 < 3.557$

Table 3. Results of internal consistency check of the COV19-QoL$_{TR}$ scale in all samples.

	Total sample			Undiagnosed sample			Diagnosed sample		
	CI-TC	SMC	α if item deleted	CI-TC	SMC	α if item deleted	CI-TC	SMC	α if item deleted
Item 1	0.754	0.597	0.893	0.756	0.608	0.886	0.572	0.370	0.845
Item 2	0.717	0.587	0.898	0.736	0.611	0.889	0.647	0.544	0.832
Item 3	0.703	0.584	0.900	0.679	0.566	0.897	0.636	0.506	0.836
Item 4	0.791	0.655	0.887	0.769	0.613	0.884	0.753	0.752	0.815
Item 5	0.798	0.681	0.886	0.788	0.662	0.881	0.688	0.710	0.826
Item 6	0.729	0.627	0.896	0.709	0.606	0.893	0.605	0.508	0.840
Cronbach's alpha		0.910			0.905			0.856	
Spearman-Brown Coefficient		0.905			0.904			0.814	
Guttman Split-Half Coefficient		0.904			0.904			0.812	
AVE		0.69			0.68			0.59	
CR		0.93			0.93			0.90	

CI-TC: Corrected item-total correlation; SMC: Squared multiple correlation; α: Cronbach's alpha; AVE: Average variance extracted; CR: Composite reliability.

Table 4. Descriptive statistical values and intercorrelations of the COV19-QoL$_{TR}$ scale items in all samples.

	Mean	SD	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6
Total sample								
Item 1	3.36	1.38	–					
Item 2	3.12	1.28	0.690	–				
Item 3	2.62	1.28	0.547	0.530	–			
Item 4	3.26	1.37	0.662	0.610	0.599	–		
Item 5	3.27	1.33	0.676	0.697	0.560	0.757	–	
Item 6	2.77	1.35	0.580	0.490	0.733	0.651	0.614	–
Total COV19-QoL$_{TR}$	3.07	1.11						
Undiagnosed sample								
Item 1	3.24	1.38	–					
Item 2	3.06	1.29	0.715	–				
Item 3	2.45	1.20	0.529	0.510	–			
Item 4	3.09	1.34	0.651	0.617	0.565	–		
Item 5	3.13	1.32	0.679	0.707	0.528	0.728	–	
Item 6	2.60	1.30	0.551	0.500	0.727	0.612	0.592	–
Total COV19-QoL$_{TR}$	2.93	1.08						
Diagnosed sample								
Item 1	4.16	1.09	–					
Item 2	3.50	1.15	0.415	–				
Item 3	3.71	1.24	0.416	0.628	–			
Item 4	4.41	0.97	0.500	0.548	0.451	–		
Item 5	4.19	0.98	0.400	0.594	0.451	0.821	–	
Item 6	3.92	1.10	0.535	0.324	0.512	0.586	0.425	–
Total COV19-QoL$_{TR}$	3.98	0.83						

Note: All correlation coefficients are significant at $p < 0.001$.

Discussion

In this study, we aimed to adapt the COV19-QoL scale in a sample selected from the general population in Turkey (i.e., total sample). Among the people in the selected sample, its psychometric properties were examined in those who had been tested for COVID-19, those with a positive test result (i.e., diagnosed sample), and those who had never had a COVID-19 test and/or those with a negative test result (i.e., undiagnosed sample). Furthermore, these results constitute the first study to report associations between

Table 5. Distribution of the COV19-QoL$_{TR}$ scale with all sample participants' descriptive characteristics.

	Total sample		Undiagnosed sample		Diagnosed sample	
	Mean (SD)	Test/p	Mean (SD)	Test/p	Mean (SD)	Test/p
Gender						
Female	3.20 (1.07)	5.017[1]	3.07 (1.05)	4.897[1]	4.03 (0.76)	0.827[1]
Male	2.86 (1.13)	<0.001***	2.71 (1.08)	<0.001***	3.90 (0.96)	0.410
Age						
34 and below	2.93 (1.13)	−4.105[1]	2.82 (1.12)	−3.816[1]	3.90 (0.78)	−1.139[1]
35 and above	3.22 (1.08)	<0.001***	3.06 (1.01)	0.002**	4.06 (0.88)	0.257
Employment status						
Working in the public sector	3.11 (1.08)	6.633[2]	2.94 (1.06)	5.324[2]	3.92 (0.80)	0.438[2]
Working in the private sector	2.89 (1.16)	<0.001***	2.74 (1.10)	0.001**	4.12 (0.96)	0.726
Self-employed	2.88 (1.09)	d > b,c	2.77 (1.05)	d > b,c	3.82 (0.99)	
Unemployed	3.22 (1.07)		3.07 (1.06)		3.99 (0.78)	
Evaluation of health						
Poor/Moderate	3.25 (1.09)	5.173[1]	3.09 (1.07)	4.295[1]	4.02 (0.84)	0.620[1]
Good	2.90 (1.09)	<0.001***	2.79 (1.06)	<0.001***	3.93 (0.83)	0.536
Anxiety about COVID-19						
Yes	3.14 (1.07)	6.904[1]	3.01 (1.04)	7.118[1]	3.97 (0.84)	−0.910[1]
No	2.35 (1.23)	<0.001***	2.18 (1.13)	<0.001***	4.25 (0.57)	0.365
Having COVID-19 test						
No	2.95 (1.06)	62.442[2]				
Yes, negative	2.84 (1.14)	<0.001***				
Yes, positive	3.98 (0.83)	c > a,b				
Family member with positive COVID-19 test						
No	3.03 (1.08)	3.911[2]	2.99 (1.08)	3.219[2]	4.07 (0.87)	0.495[2]
Yes, not living together	2.87 (1.10)	0.020*	2.75 (1.10)	0.040*	3.91 (0.72)	0.611
Yes, living together	3.15 (1.02)	c > b	2.90 (1.02)	a > b	3.93 (0.84)	
Being a health care worker						
No	3.03 (1.10)	4.156[2]	2.89 (1.06)	4.214[2]	3.96 (0.84)	0.333[2]
Yes, not working with COVID-19 positive patients	3.24 (1.14)	0.016*	3.06 (1.12)	0.015*	4.10 (0.81)	0.717
Yes, working with COVID-19 positive patients	3.37 (1.14)	c > a	3.27 (1.14)	c > a	4.16 (0.81)	

SD: Standard deviation, [1]Independent samples t-test, [2]One-way ANOVA, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
Bold letters "a, b, c, d" determine the difference between the variables.

COVID-19 and quality of life among people from different samples in our country. In general, the results indicated that the COV19-QoL$_{TR}$ scale had a single factor structure, and good content validity and reliability values.

The single factor structure across the three samples aligns with uni-dimensional structure of the original COV19-QoL (Repišti et al., 2020). The explained variance values and factor loadings showed that the scale had a strong construct validity (Orcan, 2018). The one-dimensionality of the six-item scale in the Turkish sample was confirmed by CFA, with AIC-Model, CAIC-Model, and ECVI values within the criteria specified in the literature (Barrett, 2007; Kline, 2015; Perry et al., 2015; Schermelleh-Engel et al., 2003). Additionally, the internal consistency analyses were more than sufficient (Davenport et al., 2015; Hair et al., 2020; Polit & Beck, 2012; Shieh & Wu, 2016; Whitley & Kite, 2013) for the undiagnosed, diagnosed, and total samples.

Therefore, regardless of the population of the participants, it can be said that the COV19-QoL$_{TR}$ scale had a similar structure and that the content validity and reliability values were good. Furthermore, the values in this study were found to be higher than the values reported by Repišti et al. (2020), who developed the scale.

In the study, significant differences were found between the variables of gender, age, employment status, perception of health, anxiety about the transmission of COVID-19, being tested positive for COVID-19, and being a health care worker and working with COVID-19 patients, and the total scores of the COV19-QoL$_{TR}$ scale. This result indicates that the Turkish version of the COV19-QoL scale is a valid and reliable measurement tool that can be used in studies to be conducted with various groups in society and that can reveal the differences between sub-variables. That these differences were between the total and undiagnosed sample and that there was no significant difference in the diagnosed sample suggests that contraction of COVID-19 negatively affected everyone's quality of life, regardless of the characteristics of people. This finding might also be influenced by Turkey being 9th out of 224 countries for COVID-19 cases reported and 18th of 204 countries for deaths due to COVID-19 (WHO, 2021).

The COV19-QoL$_{TR}$ scale is short, easy to use, and has acceptable validity/reliability values and can be applied to all individuals in the population. However, the study has some limitations. Online sampling strategies that are necessary during the pandemic meant that individuals without internet access were not included. Self-section bias means that individuals who

were more sensitive to the effects of the pandemic may have preferred not to answer the questionnaire. The diagnosed sample comprised individuals who had tested positive for COVID-19 based on their own statements. Because COVID-19 might be asymptomatic, persons may have been infected and included in the undiagnosed sample.

The results showed that the necessary conditions were achieved in the adaptation of the COV19-QoL$_{TR}$ scale to Turkish, and that it had strong reliability, validity, and psychometric properties. The COV19-QoL$_{TR}$ scale can be used to investigate the effects of the pandemic on the quality of life of people. The fact that the sample consisted of individuals with and without COVID-19 diagnosis revealed its difference from the original study. It can be used to monitor the changes in the quality of life of individuals with and without COVID-19 diagnosis during and after the pandemic.

Authors' contributions

Conceptualization, Methodology, Software, Formal analysis, Resources, Writing—Original Draft, Visualization. DA: Software, Formal analysis, Resources, Data curation, Writing—Review and Editing, Visualization, Supervision.

Ethical approval

This study was performed in line with the principles of the Declaration of Helsinki. Ethics committee approval was received for this study from the Akdeniz University Medical Faculty Clinical Research Ethics Committee (Date: 09 December 2020, No: KAEK-935).

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Disclosure statement

The authors declare that they have no conflict of interest.

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