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COVID-19 Worry and Related Factors: Turkish Adaptation and Psychometric Properties of the COVID-19 Worry Scale

ABSTRACT

Background: This study aimed to evaluate the psychometric properties of the Coronavirus Worry Scale and related factors with COVID-19 worry.

Methods: The data were collected through online survey from 846 participants and final sample was 804 after excluding missing data. The psychometric properties of the Turkish Coronavirus Worry Scale were assessed through exploratory factor analysis, confirmatory factor analysis, internal consistency reliability analysis, and Pearson product moment correlation with other psychological constructs. Finally, the one-way analysis of variance and independent samples *t*-test were utilized for comparing the Coronavirus Worry Scale scores between different socio-demographic and clinical variables. Higher Coronavirus Worry Scale scores suggested higher COVID-19 worry.

Results: Exploratory factor analysis explored the single-factor structure of the Turkish Coronavirus Worry Scale and confirmatory factor analysis confirmed this single-factor structure with good model fits. This scale had good internal consistency reliability (Cronbach's $\alpha = 0.92$, McDonald's $\omega = 0.92$). The Coronavirus Worry Scale scores were significantly positively correlated with the Coronavirus Anxiety Scale ($r = 0.41$, $P < .01$), Fear of COVID-19 Scale ($r = 0.67$, $P < .01$), Obsession with COVID-19 Scale ($r = 0.54$, $P < .01$), and Depression Anxiety Stress Scale-21 ($r = 0.36$, $P < .01$). COVID-19 worry was higher in females, those who had a chronic disease, the loss of first-degree or other relatives or close friends due to COVID-19, or those who had never been vaccinated for COVID-19. Those who obeyed the COVID-19 rules, such as wearing masks and physical distancing had higher Coronavirus Worry Scale scores. Also, those who avoided crowded environments to protect themselves from COVID-19 transmission had higher Coronavirus Worry Scale scores.

Conclusion: These findings show that the Turkish Coronavirus Worry Scale is a valid and reliable instrument for assessing COVID-19 worry.

Keywords: COVID-19 Worry Scale, factor structure, reliability, validity, Turkey

Introduction

The coronavirus (SARS-CoV-2) first reported in China in late 2019 has rapidly spread worldwide, becoming a dramatic and deadly pandemic and a public health emergency within 4 months. Although it has been almost 2 years since the COVID-19 pandemic was declared by the World Health Organization (WHO), the pandemic remains a global challenge. As of November 22, 2021, the total number of COVID-19 cases passed 256 million, and over 5 million deaths had occurred worldwide.[1]

In the early stages of the pandemic, governments took measures to curb the spread of COVID-19, such as a full or partial lockdown or the quarantine of COVID-19 cases; however, these rigorous measures have created a completely different world in which people are

Ömer Faruk Uygur[1]
Hilal Uygur[1]
Dudu Demiröz[2]
Oli Ahmed[3]

[1]*Department of Psychiatry, Dr. Ersin Arslan Training and Research Hospital, Gaziantep, Turkey*
[2]*Department of Psychiatry, Karaman Training and Research Hospital, Karaman, Turkey*
[3]*Department of Psychology, University of Chittagong, Chattogram, Bangladesh*

Corresponding author:
Omer Faruk Uygur
✉ drofuygur@hotmail.com

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lonelier and more stressed. People in quarantine experience more depression, anxiety, stress, anger, and other psychological symptoms.[2,3] Other studies have revealed that the COVID-19 pandemic negatively affects mental health by generating anxiety, depression, boredom, loneliness, stress, fear, and domestic violence.[4-8] Even more concerning, pandemic-related fear was shown to be associated with cases of suicide.[9]

The new normal—the restriction of social life—brought by the pandemic may help end the pandemic, but it could lead to a psychological pandemic. Thus, the broad administration of COVID-19 vaccine is the most effective alternative to normalize life and prevent the pandemic's psychological effects.[10] As of November 22, 2021, in Turkey, close to 120 million COVID-19 vaccines have been administered, and 80.7% of the population over the age of 18 has received 2 doses of the COVID-19 vaccine.[11] Despite advances in COVID-19 vaccines, COVID-19 uncertainty remains. Nations are still following the number of COVID-19 cases and deaths from the health screenings. Moreover, people have been worried about contracting COVID-19 or about what they will experience after contracting it due to the unknown and complex nature of coronavirus variants. They also have the same worries for their first-degree relatives or other relatives and close friends. Worry can be a precursor to stress and depression. Consequently, it negatively affects mental health.[12]

Researchers have developed screening instruments to measure the adverse effects of the recent pandemic on mental health for various populations around the world, and these instruments have been adapted and validated for different countries. Likewise, many researchers are attempting to develop and adapt different mental health screening instruments to assess psychological problems related to the COVID-19 pandemic in Turkey. However, the 7-item COVID-19 Worry Scale (CWS) and the 4-point Likert responses developed in Bangladesh[12] have not been adapted to Turkey. It was developed to specifically assess people's COVID-19 worries about themselves and their loved ones. The CWS has shown solid psychometric properties to assess COVID-19 worry in Bangladesh.[12] For the present study, we first aimed to assess the reliability and validity of the CWS and second to investigate the relationship between sociodemographic (age, gender, education, economic status, etc.) and clinical variables (history of positive COVID-19 history, COVID-19 vaccine status, etc.) with COVID-19 pandemic worry.

MAIN POINTS

- *The exploratory factor analysis explored and confirmatory factor analysis confirmed the single factor structure of the Turkish Coronavirus Worry Scale (CWS).*
- *This scale had excellent internal consistency reliability (Cronbach's $\alpha = 0.92$, McDonald's $\omega = 0.92$).*
- *This scale had scalar level of measurement invariance across sex, COVID-19 history, and COVID-19 vaccination doses.*
- *This scale had moderate to high positive correlation with Coronavirus Anxiety Scale, Fear of COVID-19 Scale (FCV-19), Obsession with COVID-19 Scale, and Depression Anxiety Stress Scale-21.*
- *Females, having a chronic disease, having loss of relatives or friends due to COVID-19, and never been COVID-19 vaccinated had higher CWS scores.*

Methods

Participants

A total of 846 adults participated in the online survey; however, participants with missing data and extreme values were excluded (n = 42), resulting in a final sample of 804 participants from 75 cities in Turkey. The mean age of the total sample was 36.82 years (standard deviation (SD) = 10.53), with a range from 18 to 70 years. The socio-demographic variables of the study are shown in Table 1. Among them, 113 (14.05%) were frontline health professionals with COVID-19, 119 (14.80%) had a chronic illness, and 138 (17.16%) never had a COVID-19 vaccine.

Procedures

Translation of the Coronavirus Worry Scale: After obtaining the necessary permits from the authors of the CWS, we followed the procedures to translate the CWS to Turkish in line with the recommendations in the literature.[13] All authors who have a proficiency in both the Turkish and English languages independently implemented the forward translation. These translations were then compared by the research team, and the most appropriate and understandable items of the Turkish version of the CWS were created. Finally, the scale was back-translated to English by the second co-author, who is bilingual in Turkish and English, and the authors of the CWS checked the back translation and informed us that the back translation is appropriate.

The online survey included the questions about sociodemographic and COVID-19 information, the CWS, the Coronavirus Anxiety Scale (CAS), the Fear of COVID-19 Scale (FCS), the Obsession with COVID-19 Scale (OCS), and the Depression Anxiety Stress Scale (DASS-21). We shared the research link across social media. The data were collected via an online survey from August 15 to September 15, 2021, when widespread COVID-19 vaccination occurred within Turkish society. Participation was anonymous and confidential.

Measures

Socio-Demographic and COVID-19 Information Form: The form contains 2 parts. We asked about participants' age, gender, marital, educational, and economic status, having children, a history of chronic illness, and a history of psychiatric illness in the first part. Secondly, the participants answered questions about the history of positive COVID-19, COVID-19 vaccine status of themselves and their families, a loss due to COVID-19, whether they comply with the rules to protect themselves from COVID-19, and whether they are avoiding crowded places against COVID-19 transmission.

COVID-19 Worry Scale

The CWS is a unidimensional tool with good internal consistency ($\alpha = 0.85$) that can be used to assess participants' worry regarding COVID-19 and concerns about themselves, their families, and their friends being affected by COVID-19.[12] The scale consists of 7 items ranging from 1 (*not at all*) to 4 (*very much*). The overall score ranges from 7 to 28 points, with a score above 22 being considered highly worried. In the initial study, item-total correlations ranged from 0.61 to 0.74, and the factor loadings ranged from 0.70 to 0.83. The scale also has an acceptable infit (ranging from 0.65 to 1.36) and outfit (ranging from 0.58 to 1.25) mean square values of the Rasch model.[12]

Table 1. Socio-Demographic and Clinical Variables for 2 Subsamples and the Total Sample (n = 804)

Characteristics	Subsample A n = 402 n (%)	Subsample B n = 402 n (%)	Total Sample n = 804 n (%)
Age			
18-30 years	112 (27.86)	155 (38.55)	267(33.20)
31-40 years	161 (40.04)	140 (34.82)	301 (37.43)
41-50 years	96 (23.88)	80 (19.90)	176 (21.89)
51-60 years	26 (6.46)	24 (5.97)	50 (6.21)
60 years and above	7 (1.74)	3 (0.74)	10 (1.24)
Gender			
Male	143 (35.57)	131 (32.58)	274 (34.07)
Female	259 (64.42)	271 (67.41)	530 (65.92)
Marital status			
Married	277 (68.90)	236 (58.70)	513 (63.80)
Unmarried	125 (31.09)	166 (41.29)	291 (36.19)
Education			
Primary school	7 (1.74)	13 (3.23)	20 (2.48)
Middle school	9 (2.23)	8 (1.99)	17 (2.11)
High school	33 (8.20)	29 (7.21)	62 (7.71)
University	353 (87.81)	353 (87.81)	705 (87.68)
Living			
With family	353 (87.81)	343 (85.32)	696 (85.56)
Not living with family	49 (12.18)	59 (14.67)	108 (13.43)
Employment			
Working	282 (70.14)	249 (61.94)	531 (66.04)
Unemployed	11 (2.73)	13 (3.23)	24 (2.98)
Student	50 (12.43)	96 (23.88)	146 (18.15)
Other	59 (14.67)	44 (10.94)	104 (12.93)
Monthly income			
0-300 USD	91 (22.63)	140 (34.82)	231 (28.73)
300-600 USD	111 (27.61)	106 (26.36)	217 (26.99)
600-900 USD	92 (22.88)	64 (15.92)	156 (19.40)
9000 USD and above	108 (26.86)	92 (22.88)	200 (24.87)
Having child			
Yes	253 (62.93)	217 (53.98)	470 (58.45)
No	149 (37.06)	185 (46.01)	334 (41.54)
Existence of chronic illness			
Yes	58 (14.42)	61 (15.17)	119 (14.80)
No	344 (85.57)	341 (84.82)	685 (85.19)
Health professionals (HP)			
HP, frontline	64 (15.92)	49 (12.18)	113 (14.05)
HP, secondline	82 (20.39)	68 (16.91)	150 (18.65)
No	256 (63.68)	285 (70.89)	541 (67.28)
History of any psychiatric diagnoses			
Yes	97 (24.12)	94 (23.38)	191 (23.75)
No	305 (75.87)	308 (76.61)	613 (76.24)
Positive COVID-19 diagnoses			
Yes	134 (33.33)	125 (31.09)	259 (32.21)
No	268 (66.66)	277 (68.90)	545 (67.78)
COVID-19 vaccine			
Single dose	35 (8.70)	47 (11.69)	82 (10.19)
≥2 doses	294 (73.13)	290 (72.13)	584 (72.63)
Not vaccinated	73 (18.15)	65 (16.16)	138 (17.16)
Have your first-degree relatives been COVID-19 vaccinated?			
Yes	380 (94.52)	386 (96.01)	766 (95.27)
No	22 (5.47)	16 (3.98)	38 (4.72)
Did your first-degree relative die due to COVID-19?			
Yes	21 (5.22)	23 (5.72)	44 (5.47)
No	381 (94.77)	379 (94.27)	760 (94.52)
Did your close friends or other relatives die due to COVID-19?			
Yes	147 (36.56)	156 (38.80)	303 (37.68)
No	255 (63.43)	246 (61.19)	501 (62.31)
Obey the rules (masks, physical distance etc.)			
Yes	393 (97.76)	390 (97.01)	783 (97.38)
No	9 (2.23)	12 (2.98)	21 (2.61)
Avoiding crowded areas due to COVID-19 transmission			
Yes	296 (73.63)	272 (67.66)	568 (70.64)
No	106 (26.36)	130 (32.33)	236 (29.35)

Similarly, the subsequent replication study showed that the scale had good psychometric scale level properties, such as acceptable ceiling and floor effects, adequate internal consistency ($\alpha = 0.87$), split-half reliability, average variance extracted, and discriminatory power, which was found using Ferguson's delta.[14]

Coronavirus Anxiety Scale

The CAS is a self-report measure developed by Lee as part of the mental health research about the COVID-19 pandemic.[15] The CAS includes a 5-item Likert-type scale and determines how often participants have experienced anxiety related to coronavirus in the last 2 weeks. Each question is scored between 0 and 4 points. The total score is obtained from the sum of the 5 items, and high scores indicate high COVID-19 anxiety. The scale has a highly reliable ($\alpha = 0.92$) consistency, construct, and concurrent validity and was replicated in a later study.[16] The validated Turkish version of the CAS also shows good reliability ($\alpha = 0.80$).[17] In the present study, the scale presented higher reliability indices ($\alpha = 0.87$ and $\omega = 0.83$) for the total sample.

Fear of COVID-19 Scale

The FCS consists of 7 items, single-dimension, and has solid psychometric properties.[18] The scale has potential response options ranging from 1 to 5. The total score between 7 and 35 is reached by summing each item, and higher scores indicate a higher fear of coronavirus. The FCS has a high internal consistency ($\alpha = 0.80$), and the scale test–retest reliability is acceptable ($r = 0.72$). The Turkish version of the FCS has robust psychometric properties.[19] In the present study, the scale presented higher reliability indices ($\alpha = 0.90$ and $\omega = 0.91$) for the total sample.

Obsession with COVID-19 Scale

The OCS is a self-reported 4-item scale that measures persistent thinking regarding COVID-19.[20] Items are scored from 0 (*not at all*) to 4 (*nearly every day over the last 2 weeks*). High OCS scores are strongly associated with coronavirus anxiety ($r = 0.72$-0.81), spiritual crisis ($r = 0.53$-0.64), alcohol/drug coping ($r = 0.42$-0.50), extreme hopelessness ($r = 0.66$-0.70), and thoughts of suicide ($r = 0.45$-0.56).[19] Evren et al[17] demonstrated that the OCS has a single dimension with good

fit indices and an adequate internal consistency ($\alpha = 0.71$) in the Turkish population. In the present study, the scale presented higher reliability indices ($\alpha = 0.84$ and $\omega = 0.85$) for the total sample.

Depression Anxiety Stress Scale-21

It was developed from DASS-42 for implementation in a shorter time. The scale has good fit indices similar to the longer version.[21] Depression Anxiety Stress Scale-21 is widely used in many studies to determine depression, anxiety, and stress levels. Each of the 3 subscales is designed into 7 items with responses ranging from 0 to 3. The scores of each subscale are multiplied by 2, and the total score ranges from 0 to 42 per subscale. Sarıcam et al[22] showed a robust 3-factor structure in the EFA and CFA of the scale in a clinical and non-clinical population. Adequate internal consistency coefficients for each subscales were also identified ($\alpha = 0.87$, $\alpha = 0.85$, and $\alpha = 0.81$). We found that the scale has a good internal consistency reliability $\alpha = 0.92$, $\alpha = 0.87$, $\alpha = 0.92$ and $\omega = 0.92$, $\omega = 0.88$, $\omega = 0.91$ for each sub-scales, respectively, in the total sample.

Ethics

The present study was carried out in accordance with the Declaration of Helsinki and was approved by the ethics committee of the Faculty of Medicine at Karamanoğlu Mehmetbey University (05-2021/02). All participants were informed about the study before online survey.

Statistical Analysis

Descriptive statistics (mean, standard deviation, frequency, and percentages) were estimated for demographic and study variables. We assessed normality by computing skewness and kurtosis statistics of items of the CWS and study variables. We observed that each variable showed a normal distribution.[22] We performed both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to assess the factor structure of the CWS. We randomly split the overall sample into 2 samples of equal size. Subsample A (n = 402) was used for the EFA and subsample B (n = 402) for the CFA. Before running EFA, significance of Bartlett's test of sphericity and Kaiser–Meyer–Olkin measure of sampling adequacy were estimated to determine the suitability of the data for EFA. Next, we run parallel analysis (with reduced correlation matrix) to determine the number of factors. Finally, we ran EFA (estimation method: maximum likelihood) to explore the factor structure. Parallel analysis and EFA were run utilizing the R packages *nFactors* and *psych*. In CFA, the explored factor structure through EFA was tested whether the explored factor structure confirm in another sample or not. In CFA (estimation method: diagonally weighted least squares [DWLS]), the following model fit criteria were utilized to assessed the fit of the factor structure model— $\chi^2/df < 5$, root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR) ≤ 0.10, Comparative Fit Index (CFI) > 0.95, and Tucker–Lewis Fit Index (TLI) > 0.90 were used.[23, 24] Moreover, a series of multigroup CFA was ran to assess the measurement invariance (configural, metric, and scalar) of the scale across sex, COVID-19 history, and COVID-19 vaccination dozes. Non-significant $\Delta\chi^2$ is an indicator of measurement invariance. Besides, we also calculated ΔCFI (≤ 0.01), and ΔRMSEA (≤ 0.01) to assess the measurement invariance of the scale. The R package *lavaan* was used for CFA and multigroup CFA. For assessing reliability of the scale, we assessed internal consistency reliability (Cronbach's alpha and McDonald's omega). The Jamovi 2.2.2 version was used for reliability analyses. In addition, the construct validity of the Turkish CWS in the total sample was examined by estimating the Pearson product-moment correlation coefficients between the mean scores of the CWS, CAS, OCS, FCS, and the DASS-21. Finally, the one-way analysis of variance (ANOVA) and independent samples *t*-test were used to compare the mean scores of CWS. The $\alpha = 0.05$ was utilized in correlation, ANOVA, and *t*-test for statistical significance.

Results

Exploratory Factor Analysis

The significance of Bartlett's test of sphericity ($\chi^2 = 2027.73$, $P < .01$) and the size of the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO = 0.86) revealed that the EFA could run the items of the Turkish CWS. Parallel analysis suggested the single factor structure (reduced Eigen value: 4.39). In EFA, factor loadings ranged between 0.68 and 0.87 (Table 2). The single factor structure with an eigenvalue above 1 explained 67.58% of the total variance. Factor loadings of ± (0.50) and above are considered significant.[23]

Table 2. Descriptive Statistics and Exploratory Factor Analysis for the CWS in Sample A (n = 402)

Items	Mean ± (SD)	Skewness	Kurtosis	Communalities	Factor Loadings
1. How concerned are you about yourself being affected by coronavirus?	2.34 ± (0.76)	0.65	0.09	0.67	0.79
2. How concerned are you about your family members being affected by Coronavirus?	2.69 ± (0.82)	0.34	−0.98	0.73	0.86
3. How concerned are you about your close relatives being affected by coronavirus?	2.44 ± (0.83)	0.56	−0.41	0.74	0.87
4. How concerned are you about your friends being affected by coronavirus?	2.29 ± (0.78)	0.62	0.09	0.67	0.81
5. How concerned are you about getting hospitalized due to coronavirus infection?	2.38 ± (0.87)	0.43	−0.50	0.64	0.73
6. How concerned are you about dying from coronavirus?	2.08 ± (0.89)	0.65	−0.16	0.59	0.68
7. How concerned are you about death of close others from coronavirus?	2.48 ± (0.87)	0.41	−0.64	0.66	0.77
Eigenvalues					4.73
Explained total variance (%)					67.58

CWS, COVID-19 Worry Scale; SD, standard deviation.

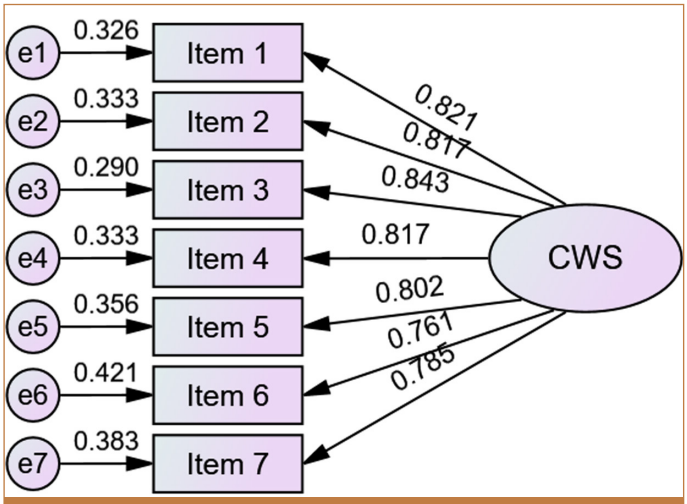

Figure 1. Path diagram for the single factor model of the Turkish version of the COVID-19 Worry Scale.

Confirmatory Factor Analysis

The CFA results showed that the single factor structure model had good model fits (χ^2/df (22.070/14) = 1.57, $P < .07$, RMSEA = 0.03, SRMR = 0.04, CFI = 0.99, TLI = 0.99). The standardized factor loadings of the items ranged from 0.76 to 0.84. The path diagram is shown in the Figure 1.

Measurement Invariance

Measurement invariance results of the Turkish CWS are presented in Table 3. The Turkish CWS has satisfactory configural invariance between sex ($\chi^2 = 55.02$, $df = 28$, CFI = 0.99, RMSEA = 0.04). This scale also has metric ($\Delta\chi^2 = 4.73$, $P = .57$, ΔCFI = 0, ΔRMSEA = −0.006) and scalar ($\Delta\chi^2 = 10.45$, $P = .10$, ΔCFI = 0.001, ΔRMSEA = 0) invariance between sex. Similarly, this scale has strict invariance across COVID-19 history ($\Delta\chi^2 = 8.53$, $P = .20$, ΔCFI = 0, ΔRMSEA = −0.002) and COVID-19 vaccination dozes ($\Delta\chi^2 = 8.45$, $P = .74$, ΔCFI = 0, ΔRMSEA = −0.007). These results suggested that this scale assesses the same construct across sex, COVID-19 history, and COVID-19 vaccination dozes.

Internal Consistency Reliability

We computed the internal consistency reliability of the Turkish CWS using Cronbach's α and McDonald's ω coefficient for 2 subsamples and the total sample. $\alpha \geq 0.70$ and $\omega \geq 0.70$ were considered satisfactory.[25] As shown in Table 4, we found that Turkish CWS Cronbach's α and McDonald's ω ranged from 0.91 to 0.92 for the subsamples and for the total sample, respectively, which showed excellent reliability.

Convergent Validity

We examined the Pearson correlation coefficients of the CWS mean scores with the mean scores of 4 scales (CAS, FCS, OCS, and DASS-21) for the convergent validity of the Turkish CWS. The result showed a statistically significant positive correlation between the CWS and the CAS, FCS, OCS, and DASS-21 (Table 5).

Analysis of the Mean Scores of the Coronavirus Worry Scale between Socio-Demographic and Clinical Variables

The ANOVA showed non-significant difference between age groups, education status, employment, or monthly income with CWS scores. In addition, there was no significant difference between the CWS scores of a frontline health professional (working with COVID-19-positive patients), not a frontline health professional, and not a health professional. Another ANOVA revealed that the CWS scores were higher among never been COVID-19 vaccinated ($P = .03$) and at least two COVID-19 vaccinations.

The independent samples *t*-tests yielded the following results. Females had significantly higher CWS scores ($P = .002$) than males. Those with a chronic disease had significantly higher CWS scores ($P < .001$) than those without a chronic disease. Those with first-degree relative loss associated with COVID-19 ($P = .001$) or those with other relative and friend loss associated with COVID-19 ($P = .003$) had higher CWS scores than those without. Those who obeyed the rules, such as wearing masks and physical distancing ($P < .001$), had higher CWS scores than those who did not obey. Those who avoided crowded environments to protect themselves from COVID-19 transmission ($P < .001$) had higher CWS scores than those who did not. There was no significant relationship between CWS scores and marital status, having children, living with family or not, a history of any psychiatric illness, a history of positive COVID-19 diagnosis, or COVID-19 vaccination status for first-degree relatives. Details about mean scores of the CWS between sociodemographic and clinical variables are shown in Table 6.

Table 3. Measurement Invariance Results of the Turkish CWS

Model	χ^2	*df*	$\Delta\chi^2$	Δ*df*	*P*	CFI	ΔCFI	RMSEA	ΔRMSEA
Sex									
Configural	55.02	28				0.99		0.04	
Metric	59.76	34	4.73	6	.57	0.99	0	0.04	−0.006
Scalar	70.21	40	10.45	6	.10	0.99	0.001	0.04	0
COVID history									
Configural	55.76	28				0.99		0.05	
Metric	66.75	34	10.99	6	.08	0.99	0.001	0.04	−0.001
Scalar	75.28	40	8.53	6	.20	0.99	0	0.04	−0.002
COVID vaccine									
Configural	58.18	42				0.99		0.03	
Metric	66.90	54	8.72	12	.72	0.99	−0.001	0.03	−0.008
Scalar	75.36	66	8.45	12	.74	0.99	0	0.02	−0.007

CWS, COVID-19 Worry Scale; RMSEA, root mean square error of approximation; CFI, Comparative Fit Index.

Table 4. Internal Reliability Coefficients

Reliability Methods	Subsample A (n = 402)	Subsample B (n = 402)	Total Sample (n = 804)
Cronbach's α	0.91	0.92	0.92
McDonald's ω	0.92	0.92	0.92

Discussion

The present study results showed that the Turkish version of CWS had good psychometric properties to assess COVID-19 worry among the Turkish population. Both EFA and CFA lent support to the single factor structure. Two previous studies concluded that the 1-dimensional, 7-item scale has good psychometric properties to assess COVID-19-related worry in the Bangladeshi population. The CFA was not used in previous studies.[12,14] This is one of the strengths of this study compared to previous studies that assessed psychometric properties of this scale. In the present study, this scale had good internal consistency reliability, which is similar to the internal reliability score obtained in the original study.[12] Besides, this scale assesses COVID-19 worry across sex, COVID-19 history, and COVID-19 vaccination dozes. This is another major strength of this study compared to the previous studies.

Worrying about COVID-19 leads to increased symptoms of depression and anxiety.[12] It has been found that a high level of worry about family members contracting COVID-19 leads to higher stress.[26] Worry and stress often predict depression and anxiety and lower mental well-being,[12] and impaired mental health complements negative emotions by significantly predicting future psychological problems, including depression.[27] The current validation findings showed that the total scores of the CWS were significantly positively correlated with the CAS, FCS, OCS, and DASS-21, which is similar to the original investigation.[12] These findings revealed the convergent validity of the scale. After the adaptation analyses of the scale, we performed comparative analyses to investigate whether there were significant differences between the groups. First, we compared the level of coronavirus worry between men and women. Our analysis revealed that women report significantly higher levels of coronavirus-related worry than men. Previous studies have suggested that coronavirus worry is higher in women.[12,14] Men have higher rates of hospitalization and death from COVID-19[28]; however, women have fewer opportunities to receive social support during the crisis, and death anxiety and fear are observed more frequently in women.[29]

Secondly, we examined whether there was a difference in coronavirus worry between age groups. We detected no difference between any age groups. Ahmed et al[12] found that coronavirus worry was higher in the 18-30 age group. The WHO reported that individuals over the age of 50 are at a higher risk of death from coronavirus. Despite the expectation that coronavirus worry will increase with advanced age, ours and other study results suggest that there may be different factors affecting coronavirus worry among age groups.

Thirdly, we evaluated the difference in coronavirus worry between individuals with and without a chronic illness. We found a higher coronavirus worry for those with a chronic illness than those with no chronic illness. COVID-19 mortality rates among patients with chronic disease are much higher,[30] explaining why people with a chronic illness are more worried about coronavirus than those with no chronic illness. The association between chronic illness and coronavirus worry was not investigated in previous CWS studies. We

Table 5. Correlations Between the Scales in the Total Sample (n = 804)

Scales	Mean ± (SD)	CWS	CAS	FCS	OCS	DASS-21
CWS	16.76 ± (5.05)	-	0.41*	0.67*	0.54*	0.36*
CAS	1.76 ± (3.12)		-	0.57*	0.65*	0.51*
FCS	17.62 ± (6.73)			-	0.66*	0.48*
OCS	3.54 ± (3.35)				-	0.58*
DASS-21	29.46 ± (25.15)					-

*$P < .001$.
CWS, Coronavirus Worry Scale; CAS, Coronavirus Anxiety Scale; FCS, Fear of COVID-19 Scale; OCS, Obsession with COVID-19 Scale; DASS-21, Depression, Anxiety and Stress-21.

Table 6. Mean Differences in CWS Scores by Gender, Marital Status, and Other Variables

Groups	Mean ± (SD)	*P*	Cohen Effect Size
Gender			
Male	15.98 ± (5.11)	.002	0.23
Female	17.60 ± (4.85)		
Marital status			
Married	16.89 ± (5.09)	.320	0.07
Unmarried	16.53 ± (5.00)		
Living			
With family	16.90 ± (5.11)	.110	0.16
Not living with family	16.00 ± (4.67)		
Having child			
Yes	16.90 ± (5.15)	.212	0.08
No	16.50 ± (4.91)		
Existence of chronic illness			
Yes	18.35 ± (5.41)	<.001	0.37
No	16.48 (4.94)		
History of any psychiatric diagnoses			
Yes	16.70 (4.8)	.738	0.02
No	16.80 (5.13)		
Positive COVID-19 diagnoses			
Yes	16.80 (5.15)	0.860	0.01
No	16.70 (5.01)		
Have your first-degree relatives been COVID-19 vaccinated?			
Yes	16.80 (5.08)	.140	0.24
No	15.60 (4.44)		
Did your first-degree relative die due to COVID-19?			
Yes	19.22 (4.87)	.001	0.51
No	16.61 (5.03)		
Did your close friends or other relatives die due to COVID-19?			
Yes	17.45 (5.26)	.003	0.21
No	16.34 (4.88)		
Obey the rules (masks, *p*hysical distance etc.)			
Yes	16.87 (5.04)	<.001	0.45
No	12.66 (4.57)		
Avoiding crowded areas due to COVID-19 transmission			
Yes	17.68 (5.00)	<.001	0.65
No	14.51 (4.44)		

CWS, Coronavirus Worry Scale.

found that those with a chronic illness are at a higher risk group for coronavirus worry.

Fourthly, we evaluated whether COVID-19 worry differs between those who are COVID-19 vaccinated and those who are not, those who have lost their relatives or friends due to COVID-19 and those who have not, those who comply and those who do not comply with the measures related to COVID-19, and those who have and do not have protective behaviors. Since the beginning of 2020, vaccines have been produced to solve the COVID-19 pandemic, and billions of dollars have been spent. It was found that the COVID-19 vaccine improves public mental health. Particularly, people are less likely to feel anxious, worried, displeased, and depressed each day in response to a 100% increase in the number of fully vaccinated per 10 million people. They are also 0.27 percentage points less likely to experience daily symptoms of 1 of the 4 abovementioned symptoms.[31] Parallel to this finding, we found that those who received at least 2 COVID-19 vaccines had significantly less coronavirus worry than those who had never been vaccinated against COVID-19. We emphasize that COVID-19 vaccine administration is global for improving mental well-being in the world.

Lastly, the main finding of our study was that COVID-19 worry was significantly higher in those who lost their first-degree relative or other relative or close friend due to COVID-19. Indeed, COVID-19 deaths can be very distressing for those left behind, and grief due to COVID-19 is indeed more severe than grief that results from other forms of loss, such as through natural causes.[32] Accordingly, it is understandable that those grieving due to COVID-19 should have a higher level of worry. Our study also showed that coronavirus worry is higher for those who avoid crowded environments to avoid the transmission of COVID-19 and those who follow the rules regarding COVID-19. The fight-or-flight is a physiological response to an event perceived as a threat and can explain this situation. Those who are more worried about COVID-19 may not enter crowded environments and may follow the rules more to protect themselves from the danger of COVID-19. From this point of view, worry can also be considered a reaction to the danger of COVID-19 with positive results; however, how normal this protective behavior is or how extreme it is in light of these data is unclear. On the contrary, it has been determined that compliance with preventive health behaviors against COVID-19 can reduce depression, anxiety, and stress.[33]

The current study has some limitations that must be mentioned. First, the sampling methods used were convenience and snowball sampling. Participants filled out the scales online. We could not reach the segment of society that does not use the internet. Therefore, it may not be representative of the general population; however, due to the social restriction measures related to COVID-19, it is still the most practical and reliable way to conduct research. Second, we used self-report assessments, which may have resulted in social desirability bias and short-term recall. Also, future research on the adaptation of the CWS in different languages will be important in determining the psychological effects of the pandemic.

Conclusion

The Turkish CWS has excellent internal consistency and adequate fit indices. We have gained a psychometric tool that can be used to measure coronavirus worry in Turkey. Also, we found that the women, those with chronic diseases, those who lost their relatives or friends to COVID-19 had more worried about COVID-19, the COVID-19 vaccine had lessened COVID-19 worry and interestingly, those who followed the rules such as social distancing and masks to avoid being infected with COVID-19, or those who did not go to crowded environments, had higher COVID-19 worry. Thus, we demonstrated which groups might have higher COVID-19 worry, and which groups could be at risk.

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