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RESEARCH ARTICLE / ARAŞTIRMA YAZISI

Reliability and Validity of Turkish Version of the COVID-19 Stressors Scale

COVID-19 Stresörler Ölçeği'nin Türkçe Geçerlilik ve Güvenirlik Çalışması

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Abstract:

The aim of this study was to produce a Turkish version of the COVID-19 Stressors Scale and to assess it for reliability and validity. The scale is designed to evaluate stressors related to the COVID-19 pandemic and their levels. The sample of the methodological-descriptive-cross-sectional study was comprised of adults who were over the age of 18, could read and write, and had no objections against participating in the study. The study included 259 participants. "Sociodemographic Data Form" and "COVID-19 Stressors Scale" created by the researchers based on the literature were used for data collection. The Cronbach's alpha coefficient of the entire scale was 0.908. The results of the content validity analysis showed that the scale provided both content and language validity for the Turkish sample and measured the subject matter as adequately as its original version. The present study determined that the scale was valid and reliable for use with mental status assessment and mental health services planning.

Keywords: COVID-19, Stressors, Scale, Mental health, Validity, Reliability.

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Öz:

Bu araştırmanın amacı, COVID-19 Stresörlerini Belirleme Ölçeği'ni Türkçeye uyarlamak ve geçerlilik güvenilirliğini test etmektir. Ölçek COVID-19 pandemisiyle ilişkili stresörleri ve stresörlerin düzeylerini değerlendirmeyi amaçlamaktadır. Metodolojik-tanımlayıcı-kesitsel tipteki çalışmanın örneklemini 18 yaş üstü olan, okuma ve yazma bilen, çalışmaya katılmayı kabul eden yetişkinler oluşturdu. Araştırmaya 259 katılımcı dâhil edildi. Veri toplamada araştırmacılar tarafından literatüre dayalı olarak oluşturulan "Sosyodemografik Veri Toplama Formu" ve "COVID-19 Stresörlerini Belirleme Ölçeği" kullanıldı. Ölçeğin tamamının Cronbach alfa kat sayısı 0.908 olarak belirlendi. Kapsam geçerlilik analizi sonuçları, ölçeğin Türk örneklemi için hem içerik hem de dil geçerliliğini sağladığını ve konuyu Türk örnekleminde de orijinal yapı kadar yeterli olarak ölçtüğünü gösterdi. Geçerlilik güvenirliği yapılan ölçeğin bireylerin mevcut ruhsal durumunun/sorunlarının hangi alanlarda daha fazla strese neden olduğunu ve stres düzeyini belirlemede alana katkı sağlayacağı düşünülmektedir.
Anahtar Kelimeler: COVID-19, Stresörler, Ruh sağlığı, Geçerlilik, Güvenirlik.

Introduction

The World Health Organization (WHO) declared a global pandemic on 11 March 2020, as COVID-19, first detected in Wuhan, China in December 2019, began to spread rapidly around the world (WHO, 2020). The fact that the virus could not be fully defined, and that different kinds of information about its infectiousness, effects and symptoms were disseminated, made the process even more complicated. In this confusion and uncertainty, the rapidly increasing number of cases and increasing deaths created an air of panic all over the world (Zhang et al., 2020a). In addition to creating physical problems, the COVID-19 outbreak, which was experienced for the first time and which spread widely, caused anxiety, fear, stress and anger in all people. These emotional effects caused psychological problems over time (Huang et al., 2020). Various studies were conducted on stressors causing mental problems, which can be traced back to COVID-19. Stressors including fears of infection with COVID-19 caused disruptions with work and education life, daily activities, and routines. The fear of being infected or transmitting the virus to others caused increasing mental problems, particularly among those feeling severe fear or anxiety (Zhang et al., 2020b).

Restrictions, quarantines, isolations etc. that came with the pandemic tend to aggravate psychological problems (Sporthy et al., 2020). Individuals in social isolation and quarantine may experience stress because they are deprived of social relationships and activities. In this process, the likelihood of psychological problems, such as high levels of anxiety, panic, depression and anger, increases as a result of false or incomplete information provided by social media and mass media (Brooks et al., 2020; Mohindra et. al., 2020). Horesh and Brown (2020) argue that the COVID-19 pandemic was the kind of traumatic stress that leads to worsening psychiatric problems for a number of individuals while causing an onset of new disorders in healthy individuals. Since the beginning of the pandemic, many studies have revealed negative effects associated with the COVID-19 pandemic. The frequency and level of feelings of anxiety coupled with depression symptoms were compared to the previous year. Large-sample studies conducted in the United States and the United Kingdom in May 2020, found that mental health had deteriorated and anxiety and depression had increased compared to 2019 (Twenge & Joiner, 2020). A cross-sectional study conducted in Germany, which reported similar findings, stated that in addition to the increase in anxiety and depression symptoms, negative affects persisted even after lockdowns (Bräscher et al., 2023). A study conducted by Wang et al. (2020) with 1210 adults living across various cities in China, revealed that the stress, anxiety and depression levels of the participants were severe. Odriozola-González et al. (2022) conducted a web-based study on 3550 adults in Spain and similarly found that participants had high levels of stress, anxiety and depression. The responses of 18,147 adults in Italy, obtained through a similar web-based study, also proved that post-traumatic stress disorder, adjustment and sleep disorders, anxiety, depression, and stress symptoms were at high levels (Rossi et al., 2020). Similar to other countries, studies conducted in our country revealed high levels of anxiety, depression and other negative effects (Özdin & Bayrak, 2020; Demir et al., 2021).

With the COVID-19 pandemic, the pathogenic effects of stress can worsen over time and its effects can last for weeks or even months. With the pandemic, the deteriorating economy, increasing unemployment and anxiety about the future caused the effects of stress to be accentuated even more. The negative socioeconomic impact of quarantines, mandatory isolations and temporary closures on individuals is considered a risk factor that negatively affects mental health, especially among low-income families (Pellecchia et al., 2015). In this context, it is very important to identify stressors in order to detect or diagnose early on mental disorders that may occur due to the pandemic (Galea, 2020).

Scales developed to identify stressors specific to an event and situation usually examine a single situation and are therefore fall short of measuring other stressors that play a role. Various studies were conducted to determine COVID-19-related distress. One of these studies was the COVID-19-specific "Fear Scale" developed by Ahorsu et al. (2020) and this scale was a one-dimensional measurement tool as it focused only on the general concept of fear. The "Coronavirus Anxiety Scale (CAS)" developed by Lee et al. (2020) was broader and multidimensional, and it is stated to be a valid and reliable scale that also evaluates COVID-19 diagnoses, history of anxiety, fear, and functional impairment. The "Perceived Coronavirus Scale", which measures the perception of threat and anxiety related to COVID-19, assesses individuals' coronavirus perceptions, experiences, and reactions to government practices. In terms of the studies

conducted in our country, they measured the levels of reactions such as depression, anxiety, fear, and stress against the virus in order to evaluate the impact of the pandemic on the psychological health of individuals. These scales were namely the COVID-19 Perception Scale (Geniş et al., 2020), Multidimensional COVID-19 Scale (Batıgün & Ertürk, 2020), Scale for Assessing Perceptions and Attitudes Towards COVID-19 Pandemic (Artan et al., 2020). They tend to fall short of evaluating the stress caused by the COVID-19 pandemic since they are not exclusively concerned with stress response. Therefore, as a result of the literature review, we found that there was no measurement tool in our country, which could evaluate the stressors related to the COVID-19 pandemic and the level of stress caused by these stressors. Since the stress caused by lifelong crises such as pandemics also affects the physical and mental health of individuals, studies on stress areas and stress levels related to COVID-19 are gaining importance.

This study aims to test the validity and reliability of the COVID-19 Stressors Scale developed by Park et al. in 2020 to adapt it to Turkish. We believe the insights to be gained from this study may help researchers evaluate in which areas the current mental state/problems of individuals cause more stress.

Method

This study is a methodological-descriptive-cross-sectional study planned to adapt the COVID-19 Stressors Scale to Turkish and test its reliability and validity.

Sample/Participants

The study was conducted with adults who were over 18 years of age, could read and write, and had no objections against taking part in the study. The study included 259 participants. To examine the scale's functionality, we used 20 volunteering independent individuals. When determining the sample size in determining validity and reliability, the literature mentions three rules: the rule of 5, the rule of 10 and the rule of 100. It is stated that researchers should have at least five people for each item to be able to carry out factor analysis. When there are no problems in terms of achieving the sample numbers, the recommended number of people should is 10 for each item (Tavşancıl, 2010). To evaluate the reliability and validity of the twenty-three item Anxiety Syndrome Scale, the sample consisted 230 participants, with 10 health workers chosen for each item. A total of 259 participants met the research criteria and they were included in the sample.
The "Sociodemographic Data Form" and the "COVID-19 Stressors Scale" developed by the researchers were used to obtain the study data.

Sociodemographic Data Form

The sociodemographic data form consisted of 12 questions. Through this form, participants were asked about their gender, age, marital status, family type, occupation, education, income, whether they had COVID-19, and if so, whether they had been hospitalized.

COVID-19 Stressors Scale

The COVID-19 Stressors Scale was developed by Park et al. (2021) and consists of 23 items aiming to psychometrically assess crisis-related stressors. The scale aimed to assess the stressors and levels of stressors associated with the COVID-19 pandemic. The validity and reliability test included 437 participants over the age of 18. The scale consisted of 23 stressors conceptually grouped into (1) infection-related stressors, (2) daily activity stressors, and (3) finance/resource-related stressors. Firstly, each item had a yes/no binary option. When participants checked "yes" for each item, the next question assessed the level of stress caused by the event using a Likert-type rating scale from 1 to 5 ("not at all stressful" to "extremely stressful"). Thus, the scale provided an assessment of exposure to the stressor.[21] Binary ratings were coded as 0/1 and multiplied by each other to determine the stress level. The scores of those who answered "yes" to the item were in the range of 1-5. Participants who chose the "no" option received 0 points from the relevant item. A score of 0 indicated that the participant did not experience the event or situation and therefore did not experience stress. Participants with a score of 5 meant that they experienced the event and therefore had a high level of stress. The Cronbach's alpha coefficient ($\alpha = .96$) obtained as a result of the analysis showed that the internal consistency of the scale was quite high. The scale is considered a valid and reliable instrument for participants over the age of 18 living in the United States. Studies have also indicated that the scale is a valid and reliable tool for identifying COVID-19 stressors (Park et. al., 2021).

Data Analysis

Language Validity

To ensure language validity, two native-speaker Turkish linguists translated the scale independently translated from English to Turkish. The then researchers developed the text in Turkish by assessing the most suitable translation of each item. Two translators fluent in Turkish and English then translated the Turkish version of the scale back into English and this translation was compared to the original form. Statements that were inappropriate were revised.

Content Validity

The draft scale was examined by 10 experts in psychiatric nursing to check for content validity. They were asked assess the items both for the language used and the content. The experts evaluated the scale items using a four-point system: (a) appropriate, (b) the item needs to be slightly revised, (c) the item needs to be extensively revised, (d) the item is inappropriate. The number of experts marking options (a) and (b) was divided by the total number of experts and the content validity indices were thereby calculated for each item and the total scale.
Implementation Phase: The developed draft scale was applied to people who were not included in the sample for pilot application and the comprehensibility and application process were evaluated.

Construct Validity

Exploratory and confirmatory factor analysis was employed to test construct validity.

Reliability Determination

Cronbach's-Alpha reliability coefficient, split-half and item-total score analyses were conducted.
Individuals who agreed to take part in the study were informed about the purpose and nature of the research and provided their consent. The researcher distributed the questionnaire forms to the participants and asked them to answer the questions, explaining that all of the data would be used for a scientific study and that the answers would not be shared with third parties in any way.
In the analysis of the data, Cronbach's alpha and McDonald's Omega were used to determine the internal

consistency of the scale and its sub-dimensions, and Pearson correlation analysis, inter-item correlation and bisection analysis were used for item total score analysis of the scale and sub-dimensions. Response bias in the scale was evaluated using Hotelling's T-squared test. Exploratory factor analysis was employed to assess the item-factor relationship. Principal axis factoring was used as the estimation method and promax rotation technique was used as the rotation technique in the exploratory factor analysis. Eigenvalue was accepted as 1 in factor determination. The factor loading coefficient was determined as 0.32 in deciding in which sub-dimension the item would be included. Whether the items and sub-dimensions explained the original structure of the scale was evaluated by confirmatory factor analysis. Before the confirmatory factor analysis, multicollinearity analysis was performed and it was determined that there was no multicollinearity between the items. Correlation matrix was used for exploratory factor analysis and covariance matrix for confirmatory factor analysis. In the evaluation of the data, the margin of error (error) was p=0.05. SPSS 24.0, AMOS 24.0 and JAMOVI 2.2 programs were used for statistical analysis.

Ethical principles

For the research, the necessary permission was obtained by applying online to the Scientific Research Platform of the Ministry of Health of the Republic of Turkey since the study covers the COVID-19 pandemic. Permission was obtained via e-mail from Park et al. (2021) who developed the scale, to adapt the COVID-19 Stressors Scale to Turkish. Then, approval was obtained from the Health Sciences Research Department and Publication Ethics Committee (2022-02 / Decision No: 9). In addition, the name, purpose and confidentiality principles of the research were explained to the participants, who were informed that the data obtained would be reported without specifying their names and that their names would be kept confidential.

Results

68% (n=176) of the participants were female, mean age was 36.03±12.03 (min=19-max=79), 39% (n=101) were self-employed and 23.6% (n=61) were civil servants, 59.5% (n=154) were married, 91. 1% (n=236) had a nuclear family, 60.2% were university graduates, 62.5% (n=162) had income equal to their expenses and 45.9% (n=119) had COVID-19 (Table 1).

***Table 1**. Distribution of Socio-Demographic Characteristics of Participants (n=259)*

Variables	**Min-Max**	**Average**
Age	19-79	36.03
	n	**%**
Gender		
Female	176	68.0
Male	83	32.0
Marital Status		
Married	154	59.5
Single	105	40.5
Family Type		
Nuclear Family	236	91.1
Extended Family	16	6.2
Fragmented Family	7	2.7
Education Status		
Primary School	10	3.9
Secondary School	11	4.2
High School	31	12.0
Associate degree	36	13.9
Undergraduate degree	156	60.2
Graduate degree	15	5.8
Occupation		
Unemployed	39	15.1
Officer	61	23.6
Worker	44	17.0
Retired	14	5.3
Other	101	39.0
Income Status		
Income Higher than Expenses	48	18.6
Income Equivalent to Expenses	162	62.5
Income Lower than Expenses	49	18.9
Previous COVID-19 Infections		
Yes	119	45.9
No	140	54.1
Hospitalization due to COVID-19		
Yes		
No.	9	3.5
	250	96.5

Kaiser-Meyer Olkin (KMO) coefficient was 0.885, Bartlett's test X^2 value was 2389.080 and p=0.000. EFA determined that the scale consisted of four sub-dimensions. The sub-dimensions of the scale accounted for 30.926%, 6.748%, 4.453% and 2.890% of the total variance, respectively. The four sub-dimensions accounted for 45.017% of the total variance. The factor loadings of the sub-dimensions of the scale ranged between 0.371-0.864, 0.310-0.750, 0.453-0.662 and 0.247-0.522, respectively (Table 2).

***Table 2**. Explanatory Factor Analysis Results (n= 259)*

Items	**Factor Loadings**			
	1st Sub Dimension	**2nd Sub-dimension**	**3rd Sub-dimension**	**4th Sub-dimension**
I1		0.709		
I2		0.692		
I3		0.717		
I4		0.750		
I5	0.522			
I6				0.522
I7				0.455
I8	0.339			
I9	0.501			
I10			0.662	
I11			0.453	
I12	0.481			
I13		0.310		
I14	0.864			
I15	0.782			
I16	0.824			
I17	0.516			
I18				
I19			0.606	
I20			0.636	
I21	0.518			
I22	0.371			
I23				0.247
Variance Accounted for (%)	30.926	6.748	4.453	2.890
Total Variance Accounted For (%)	45,017 %			
KMO	0.885			
Bartlett X^2(p)	2389.080 (p<0.001)			

I=Item

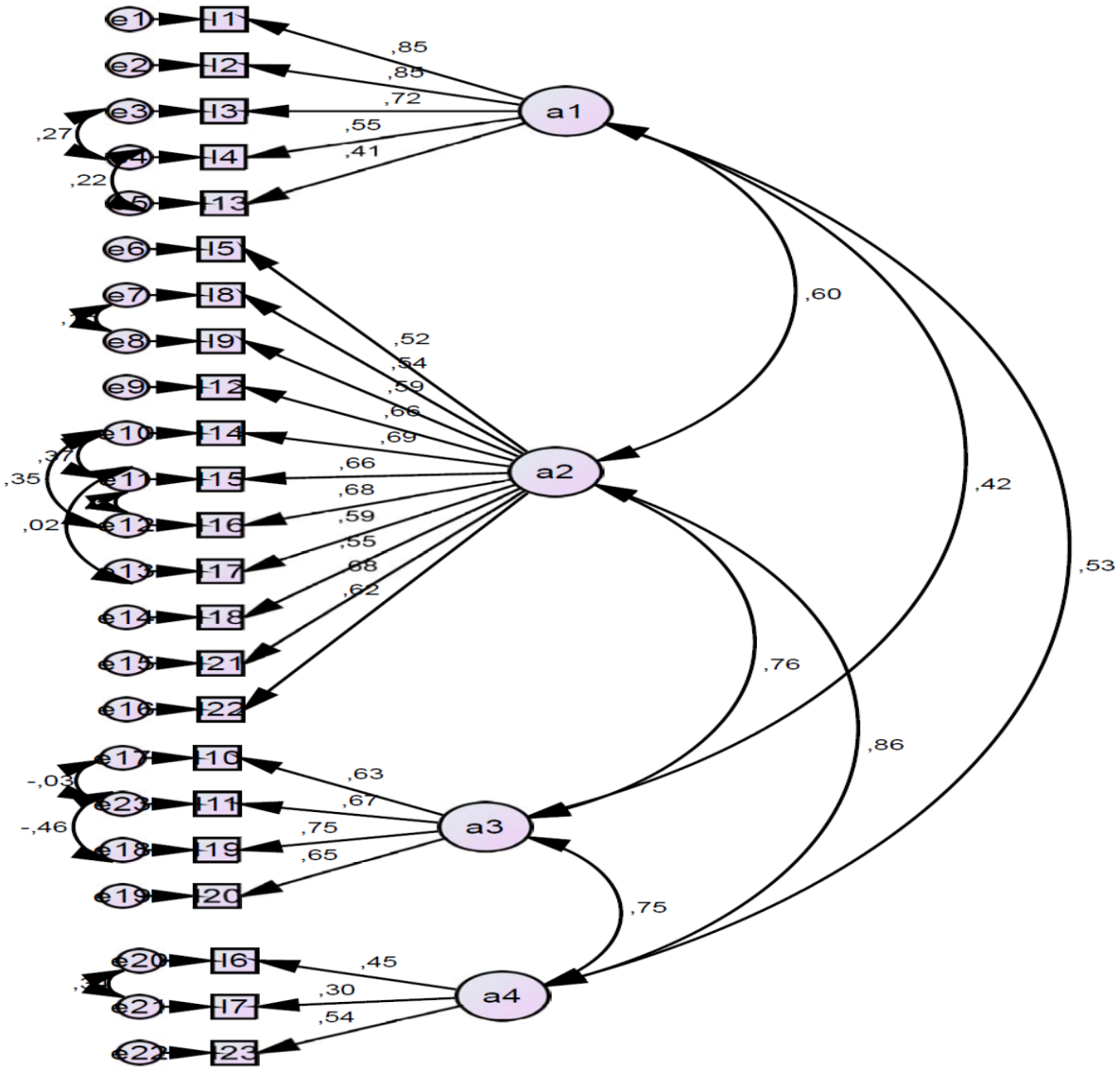
The calculated chi-square value of the four-factor model was 433.766, the degree of freedom was 214 and p=0.000. X^2/SD was 2.027. The fit indices were RMSEA 0.066, CFI 0.903, IFI 0.905, TLI 0.885 and NFI 0.828 (Table 3).

Table 3. *Confirmatory Factor Analysis Model Fit Indices (n= 259)*

	X^2	SD	X^2/SD	RMSEA	CFI	IFI	TLI	NFI
Four-Factor Model	433.776	214	2,027	0.066	0.903	0.905	0.885	0.828

CFA determined that the factor loadings of the sub-dimensions of the scale ranged between 0.41-0.85, 0.52-0.69, 0.63-0.75 and 0.30-0.54, respectively (Figure 1).

Figure 1. *Confirmatory Factor Analysis*



The Cronbach's alpha coefficient for the whole scale was 0.908. The Cronbach's alpha coefficients for the sub-dimensions of the scale were 0.819, 0.877, 0.737 and 0.538, respectively. As per the split-half analysis, the Cronbach's alpha value of the first half was 0.801 and that of the second half was 0.829. The correlation between the two halves was 0.858. Spearman-Brown coefficient was 0.923 and Guttman split-half coefficient was 0.921. The McDonald's Omega coefficient of the scale was 0.899, that of the first sub-dimension was 0.865 and that of the second sub-dimension was 0.792. The inter-item correlation coefficients of the scale ranged between 0.022 and 0.729. Hotelling's T-square test was performed to determine whether there was response bias in the scale and Hotelling's T-squared value was 384.638, F=16.060 and p=0.000. As per the analysis, there was no response bias in the scale (Table 4).

Table 4. *Scale Reliability Analysis Results (n=259)*

			Analysis of Division by Two Halves (Split Half)					
	Cronbach's Alfa	**McDonald's Omega**	**First half Cronbach's Alfa**	**Second half Cronbach's Alfa**	**Spearman-Brown**	**Guttman split-half**	**Correlation between the two halves**	**Mean ± Standard Deviation (Min-Max)**
Scale Total	0.908	0.899	0.801	0.829	0.923	0.921	0.858	49.63±24.70 (0-111)
First sub-dimension	0.819	0.865						11.19±7.05 (0-25)
Second sub-dimension	0.877	0.792						26.43±13.83 (0-55)
Third sub-dimension	0.737	0.740						7.18±5.67 (0-20)
Fourth sub-dimension	0.538	0.570						4.69±3.96 (0-15)

The correlations of the scale items with the scale total score ranged between 0.285-0.656. The correlations of the scale items with the sub-dimension total score ranged between 0.265-0.695. There was no item that significantly increased Cronbach's alpha when removed from the scale (Table 5).

Table 5. *Cronbach's Alpha, Item Scale Total Score and Subscale Total Score Adjusted Correlations when the item was deleted (n=259)*

Items	**Cronbach's Alpha When Item Deleted**	**Corrected Item-Total Score Correlation *(r)****	**Corrected Item-Subscale Total Score correlation *(r)****
I1	,904	,553	,695
I2	,904	,566	,693
I3	,904	,532	,675
I4	,907	,397	,610
I5	,906	,473	0.496
I6	,906	,443	0.399
I7	,909	,285	0.403
I8	,905	,517	0.495
I9	,904	,526	0.571
I10	,905	,490	0.558
I11	,904	,539	0.459
I12	,903	,595	0.596
I13	,906	,469	0.407
I14	,902	,656	0.695
I15	,902	,646	0.670
I16	,902	,630	0.693
I17	,904	,543	0.557
I18	,905	,519	0.487
I19	,905	,516	0.525
I20	,905	,508	0.577
I21	,903	,605	0.616
I22	,904	,554	0.548
I23	,906	,441	0.265

Significant at***** p<.001, I=It

Discussion

This section contains a discussion on the validity and reliability results of the COVID-19 Stressors Scale for the Turkish sample. The content validity rates were higher than 0.80 for both the items and the scale in the present study, demonstrating that the scale had achieved content validity for use in a Turkish setting (DeVellis, 2016; Özdamar, 2016; Karagöz, 2016; Seçer, 2018; Tambling et al., 2021).

As per EFA, four dimensions were obtained that differed from the original scale. While 23 items were grouped into three sub-dimensions in the original scale, there were more dimensions in the Turkish sample with some items included in different dimensions. As per EFA, the scale accounted for nearly half of the total variance and the factor loadings of all items were above 0.32, except 23 items. These results showed that the new construct had good validity for the Turkish sample (DeVellis, 2016; Özdamar, 2016; Karagöz, 2016; Kartal & Bardakçı, 2018; Seçer, 2018; Tambling et al., 2021). In order to decide whether to remove 23 items from the scale, both total item and item subscale total correlations were examined and the change in Cronbach's alpha was examined when 23 items were removed, and as per these evaluations, it was decided to keep the item in the scale because there was no significant change with respect to validity and reliability results and the item contained a feature (Kartal & Bardakçı, 2018; Seçer, 2018; Tambling et al., 2021).

CFA was used to test the structure obtained as per EFA. As per CFA analysis, it was determined that all factor loadings were greater than 0.30, the RMSEA value was less than 0.08, and all other fit indices were greater than =.90. These results proved that the four-factor structure was sufficient to measure the stressors associated with COVID-19 and that the scale items were interrelated and could accurately measure the subject matter (Jonhson & Christensen, 2014; Karagöz, 2016; Kartal & Bardakçı, 2018; Seçer, 2018; Özdamar, 2016). These findings showed that the scale had good validity for the Turkish sample. Because no CFA was performed on the original scale, it was not possible to compare these results with those from the original scale (Karagöz, 2016; Kartal & Bardakçı, 2018; Seçer, 2018; Tambling et al., 2021).

As per reliability analyses, both alpha and Omega coefficients were greater than 0.90 for the total scale and greater than 0.70 for the sub-dimensions, except for the last sub-dimension. With two-half analyses, both the alpha value of both halves and the correlation between the two halves were greater than 0.80. The Spearman Brown and Guttmann Half coefficients were determined to be near to one. Except for one sub-dimension, the items were compatible with each other with respect to the whole scale and the sub-dimensions, measured similar constructs, and showed consistency with measurements. These results demonstrated the scale's high level of reliability for the Turkish sample (Seçer, 2018; Tambling et al., 2021). The fact that the alpha value in the last sub-dimension was on the borderline was thought to be due to both the low number of items in this sub-dimension and the culturally different characteristics of the items. In the original scale, the alpha value for the total scale and its sub-dimensions was relatively high in the original scale, and the results in the present study were similar. However, since a split-half analysis was not performed for the original scale, it was not possible to compare the results of the scale (Tambling et al., 2021).

With respect to this present study, both item total and sub-dimension total correlations and inter-item correlations greater than 0.20 supported the reliability of the results. In the original scale, item total correlations showed similarities to the results of present study. These results demonstrated the scale's high level of reliability (Kartal & Bardakçı, 2018).

One of the things that would negatively affect the results of the scale was response bias. The analysis showed that there was no response bias in the scale and that the respondents filled out the scale to reflect their own opinions and in a way that would not cause bias. These results suggested that the respondent factor, which would negatively affect both the validity and reliability of the scale, was managed (Tambling et al., 2021).

Conclusion

The present study determined that the scale was valid and reliable for use with a Turkish sample and is a valid and reliable tool for evaluating the mental states of Turkish individuals and the problems they face in the current moment. Establishing the validity and reliability of this scale will make a contribution to the field in terms of assessing the areas in which the current mental state and problems of individuals lead to greater stress, as well as the level of that stress. Studies should be conducted on both clinical and healthy using the scale and further studies should be planned with the aim of making intercultural comparisons.

Limitations

Despite all its strengths, the scale has several limitations. These are: the study was conducted with 259 adults and the random sampling method was used. It is recommended to conduct studies with greater number of adults on both healthy and clinical samples using the scale and to plan further studies in which intercultural comparisons are made. Another limitation of the study is that a similar test was not selected as a criterion. It was requested to use a parallel form for criterion validity, but since there was no similar scale that directly measured this issue in our country, an equivalent scale could not be used for criterion validity in the study. For this reason, reliability results of the equivalent scale could not be given. This can be stated as a limitation of this study. These limitations may affect the extent to which the results from the study can be generalized.

Declarations

Ethical Approval and Consent to Participate

Approval was received from Health Sciences Research Department and Publication Ethics Committee of Bursa Uludağ University for the implementation of the research (Decision No: 9, Date: 23.02.2022).

Consent for Publication
Not applicable.

Availability of Data and Materials
Competing Interests
The authors declare that they have no competing interests.

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Not applicable.

Author Contributions
BA carried out the proposal of the main idea of the research, BA and AB contributed to the collection of data, analysis. MB carried out revision of the article content. All authors have read and approved the final article.

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