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Reliability and Validity of the Turkish Version of the COVID-19 Anxiety Syndrome Scale among Health Professionals

Sağlık Çalışanlarında COVID-19 Anksiyete Sendromu Ölçeği'nin Geçerlik ve Güvenirlik Çalışması

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ABSTRACT

Objective: This study aimed to adapt the COVID-19 Anxiety Syndrome Scale (C-19ASS), used as a reference to take measures against anxiety, worry, perceived threats and stressors, into Turkish and to test its reliability and validity on healthcare workers.

Materials and Methods: The sample of the methodological-descriptive-cross-sectional study consisted of 223 healthcare workers aged 18 years and above. "Sociodemographic Data Collection Form" and "C-19ASS were used to obtain the data. Healthcare workers working in different cities and hospitals answered the questionnaires online using a link.

Results: The scale explained 55.013% of the total variance. In EFA, the factor loadings for the two sub-dimensions were distributed between 0.487-0.909 and 0.580-0.806, respectively. The fit indices in CFA were determined as RMSEA 0.063, GFI 0.956, CFI 0.977, IFI 0.977, TLI 0.968 and NFI 0.952. Cronbach alpha values for the total scale and the two sub-dimensions were 0.891, 0.851 and 0.776, respectively.

Conclusions: These findings support by showing that the Anxiety Syndrome Scale will be useful with mental status assessment and mental health services planning.

Keywords: Anxiety, COVID-19, health professional, reliability, validity

ÖZ

Amaç: Bu çalışmanın amacı kaygı, anksiyete, algılanan tehdit ve stresörlere karşı önlemler almak için kullanılan COVID-19 Anksiyete Sendromu Ölçeği (C-19ASS)"ni Türkçeye uyarlamak ve geçerlilik güvenilirliğini sağlık çalışanlarında test etmektir.

Materyal ve Metot: Metodolojik-tanımlayıcı-kesitsel tipteki çalışmanın örneklemini 18 yaş üstü 223 sağlık çalışanı oluşturdu. Verilerin elde edilmesinde "Sosyodemografik Veri Toplama Formu" ve "C-19ASS kullanıldı. Farklı şehirlerde ve hastanelerde görev yapan sağlık çalışanları anketleri bağlantı linki ile web tabanlı olarak yanıtladı.

Bulgular: Ölçek toplam varyansın %55,013 açıklamıştır. Faktör yükleri iki alt boyut için sırasıyla 0,487-0,909 ve 0,580-0,806 arasında dağılmıştır. CFA'da uyum indeksleri RMSEA 0,063, GFI 0,956, CFI 0,977, IFI 0,977, TLI 0,968 ve NFI 0,952 olarak saptanmıştır. Ölçek toplam ve iki alt boyut için cronbach alfa değerleri sırasıyla 0,891, 0,851 ve 0,776'dır.

Sonuç: Anksiyete Sendromu Ölçeği'nin ruhsal durum değerlendirmesi ve ruh sağlığı hizmetleri planlamalarında yararlı olacağı düşünülmektedir.

Anahtar Kelimeler: Anksiyete, COVID-19, geçerlilik, güvenilirlik, sağlık profesyoneli

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INTRODUCTION

In late 2019, the coronavirus outbreak in Wuhan, China, negatively affected people's lives in many ways. The COVID-19 pandemic became a major global crisis that posed a threat worldwide. The virus caused confusion, uncertainty, unpredictability, and lack of control. Due to similar effects of past outbreaks, radical changes are being discussed.[1,2] The negative socioeconomic impact of quarantine, forced isolation, and temporary confinement is considered a risk factor that negatively affects mental health, especially among low-income families.[3]

In studies mentioning the psychological effects of the pandemic, anxiety levels were found to be high. Limcaco et al. reported that the pandemic increased anxiety in a general population sample between March 17 and April 1.[4] This study involved 1091 participants from 41 countries answering web-based questionnaires in Spanish and English. Emphasizing the link between anxiety and the pandemic, Yin et al. conducted a cross-sectional study (February 2019 –February 2020) with approximately 30,000 adults across seven Chinese provinces, reporting a 15% rise in anxiety during the COVID-19 outbreak, which was higher in places with increased transmission risk.[5] They also surveyed 1210 adults in various Chinese cities, finding severe stress, anxiety, and depression.[5] Odriozola-González et al. conducted a web-based study on 3550 adults in Spain, similarly noting elevated stress, anxiety, and depression. Responses from 18,147 adults in an Italian web-based study confirmed high levels of posttraumatic stress disorder, adjustment and sleep disorders, anxiety, depression, and stress.6,7

It is crucial to identify COVID-19 anxiety syndrome, as related mental problems may lead to ineffective coping.8 The COVID-19 Anxiety Syndrome Scale (C-19ASS) assesses maladaptive coping methods, including avoidance, threat monitoring, anxiety, and control, offering a valid, reliable tool for measuring anxiety, perceived threats, and stressors.9

Healthcare professionals' frontline role during the pandemic exposed them to higher levels of COVID-19-related anxiety, stress, and perceived threats than other groups. They faced increased infection risks for themselves and their families, making the effects of COVID-19 Anxiety Syndrome more pronounced.[10] Measuring and evaluating anxiety in this group is essential for understanding its impact on healthcare systems and for designing targeted interventions.[11]

For the reasons stated above, this study was conducted to determine the validity and reliability of the Turkish version of the C-19ASS.

MATERIALS AND METHODS

Ethics Committee Approval: The approval of Bursa Uludag University – Health Sciences Research and Publication Ethics Committee (Date: 23.02.2022, decision no: 10) was obtained. The study adhered to the ethical guidelines of the Declaration of Helsinki. Informed consent was obtained from participants via email. In order to adapt the C-19ASS into Turkish, permission was obtained by e-mail from Nikčević and Spada, who developed the scale.

Study Design and Participants: This study was a methodical, descriptive, cross-sectional study to adapt to Turkish C-19ASS. The study sample consisted of 223 healthcare workers over the age of 18 years. When determining the number of samples to determine validity and reliability, three rules are mentioned in the literature, namely the 5, 10 and 100 rules.[12] To determine the validity and reliability of the Anxiety Syndrome Scale, consisting of nine items, the sample was determined to be 100 healthcare workers, choosing 10 workers per item. A total of 223 health workers who met the research criteria were included in the sample.

Data Collection: We used the "Sociodemographic Data Collection Form" and the "C-19ASS" developed by researchers to obtain study data. The questionnaires were available online via a link sent to healthcare professionals working in different cities and hospitals. Participants answered the questionnaires online.

Sociodemographic Data Collection Form: This form was developed by researchers and consisted of 13 questions to determine the sociodemographic characteristics of nursing students (grade, age, gender, number of siblings, employment status, income level, education level).

COVID-19 Anxiety Syndrome Scale (C-19ASS): It is a 9-question form developed by Nikčević and Spada and published in 2020[9]. It is reported to be a valid and reliable tool, applied to 426 participants over the age of 18 living in the USA. The scale consists of 9 items, and each item is scored on a five-point Likert scale (1=never, 2=rarely (less than 1 or 2 days), 3=several days, 4=more than 7 days, 5=almost every day). The scale assesses a series of statements by participants on how they cope with the threat of COVID-19 and the extent to which these statements have applied to participants in the last two weeks. Two factors are taken into account in the evaluation of the items on the scale. The first one is the persistence factor of items 2, 4, 6, 7, 8, and 9, and the other is the avoidance factor of items 1, 3, and 5. The Cronbach's alpha coefficient of the 6 items indicating continuity was 0.86, and the Cronbach's alpha coefficient of the 3 items indicating avoidance was 0.77. The scores obtained from the scale varied be-

tween 9 and 45, and the higher the score, the higher the level of anxiety syndrome. There was no reverse scoring in the scale. In the original study, as a result of explanatory factor analysis, it was determined that the scale consisted of two sub-dimensions; it was determined that the factor loadings varied between 0.63-0.85 for the first sub-dimension and between 0.78-0.84 for the second sub-dimension. As a result of the confirmatory factor analysis, it was determined that the fit indices were CFI of 0.99, TLI of 0.99, SRMR of 0.026 and RMSEA of 0.020.

Validity and Reliability Analysis

1. Language Validity: The scale was translated from English to Turkish by two native speakers, merged into a single text, and then back-translated and compared with the original. Revisions were made as necessary.

2. Content Validity: Ten psychiatric nursing experts reviewed the items for language and content using a four-point rating scale. Content validity indices were calculated based on the proportion of experts marking "appropriate" or "needs revision."

3. Implementation Phase: The draft was tested on a group outside the main sample to evaluate clarity and feasibility.

4. Construct Validity: Exploratory and confirmatory factor analyses were performed.

5. Reliability Determination: Cronbach-Alpha reliability coefficient, split-half and item-total score analyses were performed.

Statistical Analysis: Cronbach's alpha and McDonald's omega were used for internal consistency, while Pearson correlation, inter-item correlation, and split-half reliability analyses evaluated item-based total scores. Tukey's additivity analysis assessed scale additivity, and Hotelling's T-square test checked response bias. Exploratory factor analysis (principal axis factoring, Promax rotation) and confirmatory factor analysis (covariance matrix) were conducted. No multicollinearity was found. The significance level was p=0.05, and SPSS 24.0, AMOS 25.0, and JAMOVI 2.2 were used.

RESULTS

A total of 79.4% (n=177) of the participants were female, with mean weekly working hours of 43. 99+12.10 (min=7-max=100), and 74.4% (n=166) were married. Based on the opinions received from ten experts, I-CVI was found to be between 0.98-1.00, and S-CVI was found to be 0.99 (Table 1).

Tablo 1. Characteristics of the participant.

Descriptive characteristics		**M±SD**	**Min–Max**
Age		39.74 ± 9.37	22 – 72
Year of Employment		17.25 ± 9.39	1 – 47
Weekly Working Hours		43.99 ± 12.10	7 – 100
		n (%)	
Gender	Female	177 (79.4)	
	Male	46 (20.6)	
Income	Income less than expenses	58 (26.0)	
	Income equals expenses	118 (52.9)	
	Income is more than expenses	47 (21.1)	
Education Level	High Vocational School	4 (1.8)	
	Associate's degree	22 (9.9)	
	Bachelor degree	102 (45.7)	
	Postgraduate	95 (42.6)	
Family Type	Nuclear family	196 (87.9)	
	Extended family	15 (6.7)	
	Broken family	12 (5.4)	
Marital Status	Married	166 (74.4)	
	Single	57 (25.6)	
Members of a professional association	Yes	120 (53.8)	
	No	103 (46.2)	
Do the emotions of the people around you in the hospital rub off on you?	Yes	93 (41.7)	
	No	26 (11.7)	
	Partial	104 (46.6)	
I-CVI		0.98-1.00	
S-CVI		0.99	

M: Mean; SD: Standard Deviation; I-CVI: Item Content Validity Index; S-CVI: Scale Content Validity Index.

Kaiser-Meyer Olkin (KMO) coefficient was 0.915. Bartlett's test X^2 value was 1002,203 and p=0.000. The EFA found that the scale consisted of two sub-dimensions. The two sub-dimensions accounted for 55.013% of the total variance. The factor loadings of the sub-dimension ranged between 0.487-0.909 and ranged between 0.580-0.806, respectively (Table 2).
The chi-square value of the ten-factor model was 48,753, the degree of freedom was 26 and p=0.000. The ^{2}/SD was 1.875. The fit indices were RMSEA 0.063, GFI 0.956, CFI 0.977, IFI 0.977, TLI 0.968 and NFI 0.952 (Table 3).
The confirmatory factor analysis determined that the factor loadings of the first sub-dimension of the scale ranged between 0.46-0.84, and the factor loadings of the second sub-dimension ranged between 0.59-0.85 (Figure 1).

Table 2. Explanatory Factor Analysis Results (n= 223).

	Factor Loadings	
Items	**1st Sub Dimension**	**2nd Sub-dimension**
I1		0.580
I2	0.609	
I3		0.806
I4	0.487	
I5		0.649
I6	0.652	
I7	0.909	
I8	0.655	
I9	0.710	
Variance Explained (%)	50.971	4.043
Total Variance Explained (%)	55.013	
KMO	0.915	
Bartlett X^2	1002.203	
p	0.000	

I=Item; KMO: Kaiser-Meyer Olkin; X^2: Chi-Square Value.

Table 3. Confirmatory Factor Analysis Model Fit Indices (n= 223).

	X^2	DF	X^2/DF	p	RMSEA	GFI	CFI	IFI	TLI	NFI
Two-Factor Model	48.753	26	1.875	0.000	0.063	0.956	0.977	0.977	0.968	0.952

X^2: Chi-Square Value; DF: Degree of Freedom; GFI: Goodness of Fit Index; CFI: Comparative Fit Index; IFI: Incremental Fit Index; NFI: Normed Fit Index; TLI: Trucker-Lewis Index; RMSEA: Root Mean Square Error of Approximation.

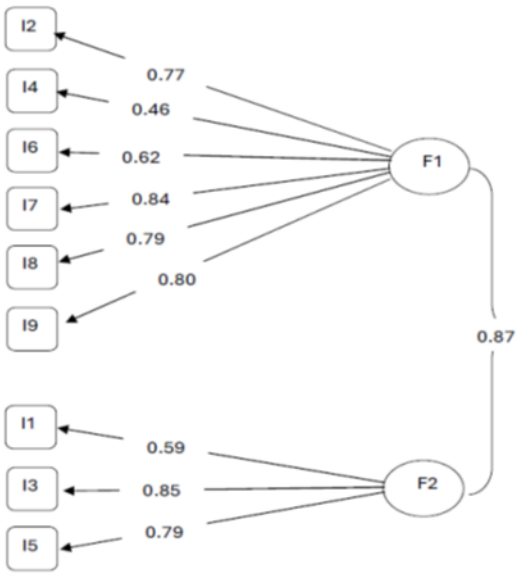

Figure 1. Confirmatory Factor Analysis.

The Cronbach's alpha coefficient for the whole scale and sub-scales were 0.891, 0.851 and 0.776, respectively. McDonald's Omega coefficient of the whole scale and sub-scales were 0.899, 0.865 and 0.792, respectively (Table 4). Other reliability analysis results are given in Table 4.

DISCUSSION AND CONCLUSION

In this study, the opinions of 10 experts were obtained to ensure language and content validity. The I -CVI and S-CVI values of the study were found to be greater than 0.80. The results of the content validity analysis showed that both content and linguistic validity of the scale for the Turkish sample were achieved and that it measured the subject matter as adequately as the original version with respect to the Turkish sample.[9,12-18]

As per the EFA, we found that the scale accounted for more than 50% of the total variance, and the EFA factor loadings were greater than 0.40. In the literature, it should be able to account for at least half of the variance and factor loadings should be above 0.40.[13-17] In order for a scale to have a strong structure. The EFA results from this present study showed that the structure determined by the original scale and the structure in the Turkish sample were similar, and the scale was able to measure anxiety levels towards COVID-19 in the Turkish sample in a similar way to the original scale.[9,13-18]

While the CFA analysis showed that the factor loadings were greater than 0.40, the RMSEA value was below 0.08, and the other fit indices were greater than 0.95. These results showed that EFA and CFA were compatible.[9-15] With EFA and CFA being compatible, this study reported results similar to those of the original scale and confirmed the structure of the original scale with respect to the Turkish sample, proving that the scale can adequately and accurately measure anxiety about COVID-19 for the Turkish sample.[9, 13-17] The validity analysis results showed that the scale can meaningfully and accurately measure the resistance of healthcare workers towards COVID-19 and the fear of avoidance that they may experience in the event of infection or a family member contracting COVID-19 and the fear of infection themselves. Although there is no measurement tool in our country that measures the anxiety of healthcare workers towards COVID-19, there is a

Table 4. Scale Reliability Analysis Results (n=223).

			Split Half Analysis					
	Cronbach's Alpha	**McDonald's Omega**	**First half Cronbach's Alpha**	**Second half Cronbach's Alpha**	**Spearman-Brown**	**Guttman split-half**	**Correlation between the two halves**	**Mean ± Standard Deviation (Min-Max)**
Scale Total	0.891	0.899	0.847	0.730	0.894	0.864	0.808	23.11±8.63 (0-36)
First sub-dimension	0.851	0.865						15.52±5.59 (0-24)
Second sub-dimension	0.776	0.792						7.59±3.63
Cronbach's Alpha When Item Deleted					0.871-0.895			
Corrected Item-Total Score Correlation, *(r)**					0.467-0.756			
Corrected Item-Subscale Total Score correlation, *(r)**					0.407-0.766			
Tukey additivity Test	F				0.453			
	p				0.501			
Hotelling's T-square test	T-square				208.243			
	F				25.210			
	p				0.000			

F: Test of Anova; r= Correlation coefficient.

scale that evaluates the fear of COVID-19 in the general population. The fact that the scale in this study gives similar results to both the original scale and the scale used in the general population shows that the scale is a suitable measurement tool that can be used in our country.

The study also found that Cronbach's alpha and McDonald's omega coefficients of the scale were above 0.70 for both the whole scale and its subdimensions and showed high reliability. The literature emphasizes that high Cronbach's alpha and McDonald's omega coefficients indicate that the items are compatible with each other and measure only the intended structure.[14-18] The results of this study and the high-reliability coefficients showed that the scale could measure the intended concept with respect to the Turkish sample by maintaining its original structure and that the items were compatible with each other.[13-18]

For this study, an additivity analysis was performed, which showed that a total score could be obtained from the scale, and interpretations could be made based on the total score as per the additivity analysis. Since an additivity analysis had not been performed for the original scale, the results could not be compared.[9,13-18]

Response bias is when people fill in the scale items in line with the expectations of society or researchers rather than according to their own opinions. This negatively affects both the reliability and validity of the results.[13-17] We found that all participants filled out the scale based on their own opinions and that there was no response bias.[9, 18] It has been shown that item-total score and sub-dimension total score correlations are high, and the items can measure the same concept.[9,13-18]

Despite all its strengths, the scale has several limitations. First, the study was conducted only with healthcare professionals, and the convenience sampling method was used. These limitations may affect the extent to which the results from the study can be generalized.

In conclusion, the results of this present study revealed that the scale was a valid and reliable measurement tool for the Turkish sample. This study makes a noteworthy contribution to the existing literature by assessing the validity and reliability of the C-19ASS among healthcare workers. The pandemic has led to elevated levels of stress, anxiety, and perceived threat among healthcare professionals, negatively impacting their psychological well-being. This has heightened the demand for reliable assessment tools tailored to this population. Our research addresses this gap by evaluating the applicability of the C-19ASS for healthcare workers, providing empirical evidence of its psychometric properties, and establishing a foundation for future research on anxiety measurement in this high-risk group during pandemics and similar crises. In this regard, our study not only adapts psychological assessment tools for the healthcare sector but also contributes to the development of strategies aimed at safeguarding the mental health of healthcare professionals.

Ethics Committee Approval: This study was approved by the Health Sciences Research and Publication Ethics Committee of Bursa Uludag University (Date: 23.02.2022, decision no: 10).

Conflict of Interest: No conflict of interest was declared by the authors.

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