

Validity and Reliability Study of the Fear of COVID-19 Scale in Nursing Students

Gürkan ÖZDEN¹, Seher ÇEVİK AKTURA²,

¹Research Assistant, İnönü University Faculty of Nursing, Department of Internal Medicine Nursing, Malatya, Turkey.
orcid.org/0000-0002-2775-3163

Research Assistant, İnönü University Faculty of Nursing, Department of Fundamental of Nursing, Malatya, Turkey.
orcid.org/0000-0001-7299-1788

Correspondence to Gürkan ÖZDEN, RN, E-mail: gurkan.ozden@yandex.com, Telephone: +90 422 341-0220, Fax +90 422 341-0219

ABSTRACT

Aim: To test the Turkish validity and reliability of the fear of COVID-19 scale.

Methods: The study was done as a validity and reliability study. This study was conducted with 1281 students who were studied in a nursing faculty of a university in Turkey between May and June 2020. Cronbach Alpha and item-total correlation were used for internal consistency, reliability and in-class correlation coefficients for scale validity, and Bartlett test and Kaiser-Meyer-Olkin (KMO) were used for scale validity.

Results: It was found that KMO test was significant at 0.89, Bartlett's test was significant on the level of p: .001 and Cronbach alpha internal consistency reliability coefficient is 0.91. the scale covered sole factor and accounted for 61.43% of the total variance.

Conclusion: As a result of this research, Fear of COVID-19 Scale was found to be a reliable and valid measurement tool.

Keywords: COVID-19, Fear, Pandemics

INTRODUCTION

One of the global difficulties of today's world is the COVID-19 pandemic. The novel coronavirus which has spread around the entire world in a short time is characterized by fever, weakness, dry cough, muscle pain and shortness of breath that emerge within 2-14 days.¹ By 27 April 2020, it had spread to 213 countries, infected 2,810,325 individuals and led to the deaths of 193,825 people. The first case in Turkey was reported on 10 March 2020, this number reached 112,261 cases by 27 April, and 2,900 deaths were recorded.² Its high infection rate and relatively high mortality rate naturally have led to concerns in people. Lin (2020) reported that people experience fears of contacting individuals carrying the COVID-19 virus. Fear is a defense mechanism that is fundamental for survival and emerges as a response to potentially threatening events. In comparison to other conditions, contagious diseases characteristically lead to fear. Fear is closely associated with the epidemic's environment, spreading rate, morbidity and mortality.³ High levels of fear may lead people to experience difficulties in the fight against an epidemic. In order to understand the psychological and psychiatric reflections of an epidemic, the emotions of fear and anger should be taken into consideration. When fear is chronic or disproportionate, it becomes harmful and may become a key component in development of various psychiatric disorders.⁴ In epidemic management, in addition to preventing contagions and focusing on treatment and vaccination, the fears experienced by individuals should also be assessed.⁵

There is a need for a measurement instrument to be able to assess the fears experienced by individuals regarding the COVID-19 pandemic. When there is a suitable measurement instrument, individuals who experience fear may be accurately and rapidly identified, and they may be helped with appropriate coping methods, treatment and care practices. While there is no

measurement instrument in Turkey which assesses fear of COVID-19, Ahorsu et al. (2020) developed a fear of COVID-19 scale in Iranian individuals.⁶ The purpose of this study is to test the Turkish validity and reliability of the fear of COVID-19 scale developed by Ahorsu et al. in nursing students.

METHODS

Research Type: This study was conducted methodologically to adapt the "Fear of COVID-19 Scale" into Turkish and determine its validity and reliability.

Location and time of the study: The data were collected between May and June 2020.

Population and sample of the study: The population of the study consisted of the students of the faculty of nursing at a university located in Eastern Turkey. The faculty had approximately 1400 students. No sample selection was carried out in the study, the entire population was aimed, and the study was concluded with 1281 students.

Data Collection Tools: A questionnaire and Fear of COVID-19 Scale were used for data collection in the study.

Questionnaire: The 9-item questionnaire prepared by the researchers questioned information such as some sociodemographic characteristics, emotions experienced during the pandemic and stressors.

Fear of COVID-19 Scale: The scale developed by Ahorsu et al. in 2020 is a single-factor, 5-point Likert-type scale. The scale consists of 7 items that conduct some psychometric measurements of fear of COVID-19. While the minimum possible score in the scale is 7, the maximum is 35. The scale's Cronbach's alpha coefficient was reported as 0.82.⁶

Validity and reliability of the Fear of COVID-19 Scale: The validity and reliability analysis of the Fear of COVID-19 Scale was carried out in suitability with expert opinions and the relevant literature.⁷⁻⁹

Linguistic validity: In the translation process of the Fear of COVID-19 Scale, the scale was firstly translated from English to Turkish by the researchers. Afterwards, the form was translated back to English by an expert linguist. This translation was compared to the original English scale that was examined by the researchers, and the final Turkish version of the scale which was made suitable and comprehensible was prepared.

Internal consistency: For internal consistency testing of the scale, item-total score correlations, Cronbach's alpha coefficient and factor analysis were used. Item-total score correlations show whether or not each item of the scale contributes to the general internal consistency. The Cronbach's alpha coefficient is a measure of internal consistency and the homogeneity of the items in a scale. As the Cronbach's alpha reliability coefficient increases, the items in the scale are considered more consistent and homogenous in measuring the same property.^{10,11} In the literature, a correlation coefficient of smaller than 0.25 was proposed for item selection, and it was reported that a Cronbach's alpha coefficient of 0.70 or above would indicate sufficient reliability.^{12,13}

Data Collection: Data collection tools were delivered to the students via e-mail, and the answers were received via e-mail.

Data analysis: In the analysis of the data collected in the study, the Cronbach's α reliability coefficient that shows the homogeneity of items for internal consistency, Pearson's Product-Moment Correlation for determining correlations between variables, factor analysis, Kaiser-Meyer-Olkin test and Bartlett's test in measuring whether or not a previously defined limited construct could be validated as a model were utilized. Finally, the study used regression analysis in determining the effects between variables, as well as frequency and percentage distributions and t-test to determine other relationships.

Ethical principles of the study: Before starting the study, ethical approval was obtained from the Health Sciences Scientific Research and Publication Ethics Board of İnönü University (Decision No: 2020/812), and permission was received from the Dean's Office of the Faculty of Nursing at İnönü University.

RESULTS

In the study, it was found that 64.9% of the nursing students were female, 32.3% were at the ages of 20-21, during the pandemic, 49.3% lived in towns, 37.4% lived with their families, and 74.98% did not know someone who was diagnosed with the disease. The emotion felt most intensely by the participants was anger (27.7%), while the most frequently encountered stressor was concerns about education (44.1%).

Content Validity: The translated scale, consisting of 7 items, was examined by using an expert panel for relevance and phrasing of the items. For each item, the experts would suggest possible upgrades in phrasing. Subsequent revision of the Turkish version of the scale was made and discussed again by means of the panel members until settlement on content was reached.

Table 1: Descriptive information of the participants

Characteristics	Frequency	%age
Female	840	64.9
Male	455	35.1
Age group		
18-19	325	25.1
20-21	418	32.3
22-23	316	24.4
24 or older	236	18.2
Place of living		
City center	257	19.8
Town	639	49.3
Village	399	30.8
Does the family have regular income?		
Yes	532	41.1
No	763	58.9
Who have you been living with after the COVID-19 pandemic?		
Alone	183	14.1
Family	484	37.4
Friends	389	30.0
Relatives	239	18.5
*What is the most intense emotion have you been having due to the COVID-19 pandemic?		
Fear	558	25.9
Worry	583	27.1
Anger	597	27.7
Loneliness	414	19.2
Is there someone you know who was diagnosed with COVID-19?		
Yes	324	25.02
No	971	74.98
*Which stressors have you been exposed to due to the COVID-19 pandemic?		
Concerns about economic conditions	240	9.7
Concerns about education	1092	44.1
Concerns about daily life	729	29.4
Concerns about social support	416	16.8

*Multiple options could be selected

Construct Validity: Kaiser-Meyer-Olkin sample adequacy measurement (KMO= 0.89, $p < 0.001$) was made before the factor analysis, and it was decided that the sample size was suitable for factor analysis. Additionally, Bartlett's sphericity test was significant ($p=0.001$). For applying factor analysis, the KMO value has to be statistically significant. Eigenvalues of higher than 1 were considered to determine the number of factors.

The factor analysis results showing the homogeneity of the scale and item-total score correlations are shown in Table 2. The item-total correlation coefficients varied in the range of 0.49 to 0.79. The item-total correlations of the scale items were observed to be sufficient. As a result of the analyses, 1 factor that had an eigenvalue of higher than 1 and explained 61.43% of the total variance was found, while the Cronbach's alpha reliability coefficient was calculated as 0.91. This Cronbach's alpha value showed a very good internal consistency (Table 2)

Reliability: In the analyses of the study, the data collection instruments answered by 1295 students were utilized. The Cronbach's alpha reliability coefficient of the Fear of COVID-19 Scale was found as 0.91 (Table 2).

Stability: After the students included in the study filled out the Fear of COVID-19 Scale, 2 weeks later, the scale was applied again to 30 students. By measuring test-retest reliability, it was determined that the scale had a stability of 0.76.

Table 2. Fear of COVID-19 Scale, Item-Total Score Correlation Coefficients, Factor Loads, α Coefficients and Explained Variance

Fear of Covid-19 Scale	Factor loading	Item-total correlation
I am most afraid of coronavirus-19	0.71	0.63*
It makes me uncomfortable to think about coronavirus-19	0.70	0.49*
My hands become clammy when I think about coronavirus-19	0.69	0.51*
I am afraid of losing my life because of coronavirus-19	0.73	0.75*
When watching news and stories about coronavirus-19 on social media, I become nervous or anxious	0.81	0.79*
I cannot sleep because I'm worrying about getting coronavirus-19	0.62	0.68*
My heart races or palpitates when I think about getting coronavirus-19	0.71	0.74*
Cronbach's Alpha		0.88
Eigenvalue		3.71
Total Variance Explained (%)		61.43

*P<0.001

DISCUSSION

This study revealed that the Fear of COVID-19 Scale is a valid and reliable instrument for assessing COVID-19 concerns and fears. Validity refers to whether or not an assessment instrument accurately measures what is needed to be measured. When an instrument is valid, it actually reflects the concepts that is needed to be measured.¹⁴ Adaptation of a measurement instrument to another culture is influenced by cultural characteristics and the nature of language, and some changes may be necessary. This inevitable change originates from conceptualization and expression differences. Examining scale items carefully to minimize the differences, making the necessary transformations for the scale to have meaning in the target language and standardizing individuals using this language based on norms constitute the foundation of adapting a scale to a new culture.¹⁵ In our study, it was determined that the expressions of the translated Fear of COVID-19 Scale and the expressions of the original scale were equivalent. In determining the suitability of the scale translated into Turkish in terms of content validity, the Content Validity Index (CVI) was utilized.^{16,17}

Another measure in testing validity is the construct validity. Factor analysis is conducted to determine construct validity. However, before conducting a factor analysis, whether or not this analysis can be conducted on the scale items is determined by Kaiser-Meyer-Olkin (KMO) and Bartlett's tests which indicate the suitability of the sample size for factor analysis.¹⁸ In this study, the result of the KMO test was found as 0.89. All test results of the KMO and Bartlett's test of sphericity were significant on the level of $p < 0.001$. In the light of these results, the data were found to be adequate and suitable for factor analysis.

Reliability indicates that the measurement instrument collects the data accurately and is repeatable. In other words, it is the stability between independent measurements of the same variable.¹⁹ For item analysis that determines the relationship of items constituting the assessment instrument with the entire instrument and is used frequently in item selection, the correlation coefficient is calculated.²⁰ A high correlation coefficient for each item included in the scale indicates that the item in question is effective and sufficient in measuring the targeted behavior. If an element has a low correlation with the total scale score, the element in question is concluded to be measuring a different quality than those measured by the other elements of the scale. On the other hand, a high

correlation among the items of the scale shows that the scale is one-dimensional, the items measure the same quality, and the scores that are obtained can be added together.²¹ In our study, the item-total correlation coefficients varied in the range of 0.49-0.79. In the original form of the scale, these coefficients were in the range of 0.47-0.56.⁶

To determine the factorial structure of the scale, principal component analysis was used, and varimax rotation was applied. As a result of the analyses, 1 factor with an eigenvalue of higher than 1 which explained 61.43% of the total variance was found. When an eigenvalue (the sum of the squares of factor loads) is higher than 1, the variables are clustered into one factor, because the explanatory power of the factor is greater than all variables under it.²² It is known that higher variance ratios indicate a better factorial structure, and a variance explanation rate of higher than 60% is acceptable.²³ Considering the obtained that, the Fear of COVID-19 Scale had internal consistency.

Another indicator of internal consistency is the Cronbach's alpha reliability coefficient. This coefficient is an indicator of the homogeneity of all items included in a scale. In our study, the Cronbach's alpha coefficient was 0.88. Considering the literature, it is known that Cronbach's alpha coefficients of higher than 0.70 are acceptable.²⁴⁻²⁷ A high Cronbach's alpha coefficient shows that the scale items are consistent with each other and consist of items that examine the same property, or all elements act together.²⁸ The Cronbach's alpha coefficient is typically in the range of 0-1, but it may also take negative values when the elements are not positively correlated with each other.²⁹ The Cronbach's alpha coefficient of the original form of the scale was 0.82.⁶ In the light of our findings, it may be stated that the reliability and internal consistency of the Fear of COVID-19 Scale were high.

One of the analyses that are used to test reliability is test-retest analysis. Test-retest measures the stability through time. For test-retest analyses, the group needs to consist of at least 30 individuals, and the time between two tests should not be short enough to allow the participants to remember their responses to the first test or long enough to allow significant changes in the participants in terms of the characteristics measured in the scale.³⁰ The test-retest results of our study were on an acceptable level for the Fear of COVID-19 Scale ($r=0.76$). The original form of the scale was similarly a single-factor scale.⁶

CONCLUSION

Formation of fear and worry in a large part of people is inevitable after the COVID-19 pandemic that has influenced the entire world. There is a need for a measurement instrument to measure these feelings of people. Our study reveals that the Fear of COVID-19 Scale is a valid and reliable measurement instrument for a Turkish population. It is recommended to apply the scale not only in different regions of Turkey but also with different samples.

The limitations of the research

This study has some limitations. The study was carried out only in a nursing faculty. The results obtained in our study are valid only for these groups and can only be generalized to these groups.

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