Psychometric properties of the Persian COVID-19 phobia scale

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Abstract

Context: The COVID-19 pandemic had consequences such as fear and anxiety in humans.

Aims: The present study aimed to adapt the COVID-19 Phobia Scale (C19P-S) into Persian and test the psychometric properties of the adapted scale.

Settings and Design: This study was conducted in Iran during December 2020.

Materials and Methods: The C19P-S was used to obtain data from 600 Iranian individuals aged 16–65 years.

Statistical Analysis Used: Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to evaluate the construct validity. The average variance extracted and construct reliability were used to assess the convergent validity and the maximum shared squared variance and average shared squared variance were used to assess discriminant validity. Cronbach's alpha was used to evaluate the internal consistency.

Results: The results of EFA indicated that Kaiser–Meyer–Olkin value (0.831) approved sampling adequacy. The communality of Psy6 and factor loading of Soc5 were lower than 0.4; therefore, they were removed. The cumulative variance explained with 4 factors and 18 items was 69%. The results of the CFA indicated that the measurement model fits the data well (Goodness of Fit Index = 0.891, Tucker–Lewis Index = 0.901, Comparative Fit Index = 0.920, Incremental Fit Index (IFI) = 0.922, Root Mean Square Error of Approximation = 0.065, and χ^2/df = 1.807), suggesting construct validity. Further, the results confirmed the convergent and discriminant validity. Cronbach's alpha coefficients of the four dimensions ranged between 0.760 and 0.878, suggesting that the Persian C19P-S is a reliable scale.

Conclusions: Persian C19P-S with 4 dimensions and 18 items is reliable and valid in measuring the COVID-19 phobia among the Iranian general population.

Keywords: Psychometrics, COVID-19, Phobia, Scales

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INTRODUCTION

One of the most important emerging infectious diseases in the world is COVID-19, which was appeared in late 2019 by a virus called severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[1] The viral pandemic can affect people in many aspects, including psychological, social, political, and economic.[2] Various studies have shown that pandemic diseases have caused depression, anxiety, fear of death, and posttraumatic stress disorder.[3-5] One of the countries affected heavily by coronavirus was Iran.[6]

Ambiguity and the risks of this disease may lead to phobic reactions. The researchers claimed that various emotional concerns such as psychological problems, perceived sensitivity to the disease, and disproportionate anxiety during the pandemic may manifest themselves as chronophobia. Because phobia is defined as a disproportionate fear response to a subject or state of anxiety or fear stimulus, researchers used the term chronophobia to refer excessive fear caused by the COVID-19.[7] Thus, "corona phobia" can be categorized as a specific type of panic in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V).[8] Individuals provide disproportionate cognitive, emotional, or behavioral responses to objects associated with COVID-19 that can impair physiological and psychological functions.[9] The disease also affects all areas of life since its risk factors are numerous, unique, and diverse compared to other epidemics. Thus, fear may go beyond getting sick and trigger other fears, such as economic and social problems.[10]

Given that the American Psychiatric Association recommended the development of assessment tools that conform to the DSM-V criteria for specific phobia disorders, Arpaci *et al*. developed the COVID-19 Phobia Scale (C19P-S). The C19P-S is a five-point Likert scale that has four dimensions and 20 items, to measure the somatic, psychological, social, and economic effects of the COVID-19. The psychological dimension contains items related to the excessive fear and anxiety due to a potential infection with COVID-19. The somatic dimension includes items associated with the physical symptoms due to the COVID-19. Economic dimension includes items related to hoarding behavior due to the breakdown of supply chain during the pandemic. The social dimension includes items related to experiences of social phobia due to the COVID-19. They performed an initial test on the psychometric properties and confirmed the reliability and validity of the scale.[9] Based on the above mentioned, the present study investigated the psychometric properties of the Persian C19P-S.

MATERIALS AND METHODS

This cross-sectional and methodological study was conducted in four steps after approval by the ethics committee(Ethical code: IR.MAZUMS.REC.1400.8871) in Iran. First, we translated the C19P-S from English to Persian and tested face and content validity. In step 2, participants whose ages ranged from 16 to 65 years completed the C19P-S. Then, we measured the structural validity of the scale by using exploratory and confirmatory factor analysis (CFA). We also assessed the convergent and discriminant validity of the scale. In the final step, we evaluated the internal reliability of the scale.

Step 1: Translation and face and content validation of the COVID-19 Phobia Scale

This step consists of two phases including forward-backward translation to Persian language along with face and content validation. We translated the items conceptually and cross-culturally by one translator, who was a specialist in psychology and nursing. It was then translated into English by another translator. Finally, the English version of the scale was sent to the developers of the original C19P-S and approved by them.

The expert panel consisted of 10 nursing and psychology faculty members of Mazandaran University of Medical Sciences and evaluated the content and face validity of the scale. For qualitative face validity, they assessed the Persian translation to identify problems, grammatical errors, and ambiguities. The impact score for each item was calculated to assess the quantitative face validity. The content validity ratio was used for assessing the content validity. The cut point for impact score and Content Validity Ratio (CVR) were higher than 1.5 and 0.62, respectively. The final version of the Persian C19P-S was approved by the expert panel.

Step 2: Data collection

The questionnaire consisted of two parts: (1) questions about demographic characteristics such as age, sex, educational attainment, marital status, COVID-19 diagnosis, international travel, and contact with travelers, COVID-19-positive contact, and relative/friend dead from COVID-19 and (2) the five-point Likert C19P-S that has 20 items. Adequate sample size for conducting the exploratory and CFA is 10 samples per item.[11] However, a total of 600 respondents (18–65 years old) voluntarily completed the C19P-S during December 2020.

Step 3: Assessing structural, convergent, and discriminant validity

The exploratory factor analysis (EFA) was performed to explore the factor structure of the scale using 300

respondents. We used the eigenvalue ≥ 1 as an index to identify the latent factors. Explained variance for each factor and scale was measured. Sampling adequacy was measured by using the Kaiser–Meyer–Olkin (KMO ≥ 0.80).[12]

The CFA was employed using 300 respondents to assess the goodness of fit of the extracted structure by using the following indices, "Comparative Fit Index" (CFI ≥ 0.90), "Tucker–Lewis Index" (TLI ≥ 0.90), "Root Mean Square Error of Approximation" (RMSEA ≤ 0.06), "Chi-square/Degree of Freedom" (CMIN/DF ≤ 3), and "Goodness of Fit Index" (GFI ≥ 0.90).[13]

The "average variance extracted" (AVE ≥ 0.50) and "construct reliability" (CR ≥ 0.70) were used to assess the convergent validity. The "maximum shared squared variance" (MSV $\leq$ AVE) and "average shared squared variance" (ASV $\leq$ AVE) were used to assess discriminant validity.[13]

Step 4: Assessing internal reliability

The Cronbach's alpha coefficients ($\alpha \geq 0.70$) were measured to evaluate the internal reliability of the scale.[14,15] All of the statistical analyses were conducted by using IBM SPSS and Amos (ver. 20).

RESULTS

The face and content validity of the Persian C19P-S was approved based on the impact score and CVR results, and there were no cross-cultural and conceptual problems. Based on the Lawshe table, the CVR scores for each item were higher than the acceptable level (0.78–1). Six hundred participants (response rate: 80.16%) with informed consent completed the scale [Table 1].

The KMO value (0.831) approved sampling adequacy [Table 2]. The communality (except for Psy6 = 0.196) and factor loading of each item (except for Soc5 = 0.210) were higher than 0.4; therefore, Psy6 and Soc5 were removed. The cumulative variance explained with four factors was 69%.

The CFA confirmed the goodness of fit of the extracted structure by the EFA. The CFI = 0.920, TLI = 0.901, IFI = 0.922, GFI = 0.891, RMSEA = 0.065, and χ^2/df value were on the favorable threshold (χ^2/df = 1.807, df = 124, $P \leq 0.001$). Factor loading of each item was higher than 0.4 and all retained [Figure 1].

Cronbach's alpha internal reliability coefficient of the scale (α =0.910) was optimal; therefore, the internal consistency was confirmed. The discriminant and

Table 1: Characteristics of the participants

	Frequency (%)
Marital status	
Married	412 (68.7)
Single	181 (30.2)
Other	7 (0.01)
Educational attainment	
Uneducated	44 (7.3)
High school	203 (33.8)
Undergraduate	314 (52.3)
MSc/PhD	39 (6.5)
Chronic disease	
Yes	69 (11.5)
No	531 (88.5)
COVID-19 diagnosis	
Yes	110 (18.3)
No	490 (81.7)
Internal travel	
Yes	377 (62.8)
No	223 (37.2)
International travel	
Yes	20 (3.3)
No	580 (96.7)
Contact with travelers	
Yes	234 (39)
No	366 (61)
COVID-19-positive contact	
Yes	303 (50.5)
No	297 (49.5)
Relative/friend dead from COVID-19	
Yes	213 (35.5)
No	387 (64.5)

convergent validity values for each factor were in the acceptable thresholds [Table 3].

DISCUSSION AND CONCLUSION

This study investigated the psychometric properties of the C19P-S in the Iranian sample. The C19P-S was developed by Arpaci *et al.*; it has a four-factor structure and 20 items. The scale aims to measure psychological, economic, somatic, and social effects of the COVID-19 pandemic. Psychological dimension contains six items related to the excessive fear and anxiety due to a potential infection of the COVID-19. Somatic dimension includes five items associated with the physical symptoms due to the COVID-19. Economic dimension includes four items associated with hoarding behaviors due to the breakdown of supply chain during the pandemic. Social dimension includes five items related to the experiences of social phobia as a consequence of the COVID-19.[9]

In the present study, the EFA results extracted four factors that were similar to the original scale developed by Arpaci *et al*. However, factor loadings of the fifth and sixth items were less than the threshold value of 0.40; therefore, these items were eliminated. The rest of the items were explained 69% of the total variance. In the study, the highest variance was explained by the psychosomatic factor (R^2 = 18.2).
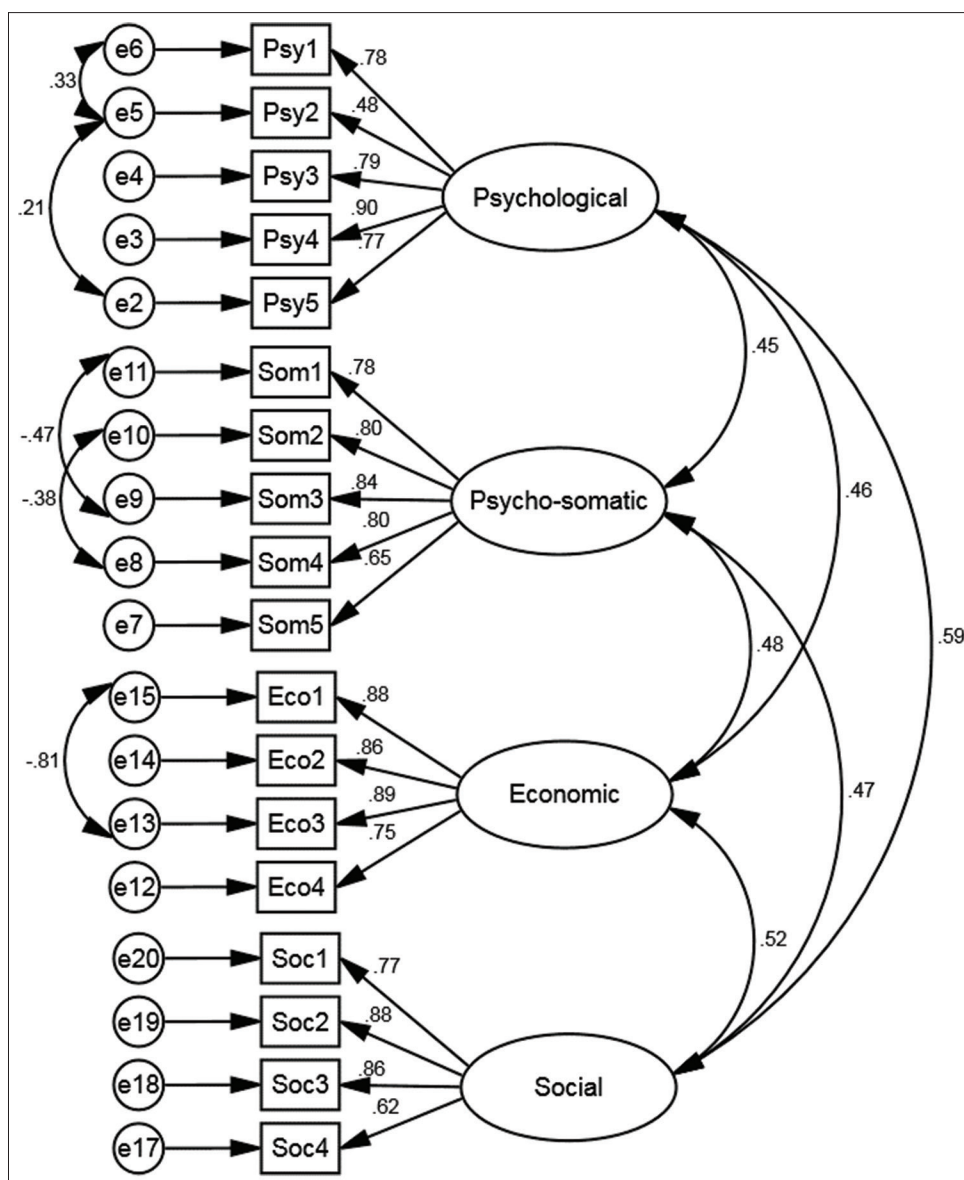
Figure 1: The measurement model

Whereas, the highest variance was explained by the psychological factor (16.97%) in the original study. In the present study, the psychological factor explained 17.8% of the total variance.

Studies have reported that psychological symptoms such as fear, anxiety, and phobia were prevalent during the pandemic as well as in the previous epidemics, including H1N1, MERS, SARS, Zika, and Ebola.[2,16] Prior findings showed that long-term quarantine and misinformation about coronavirus as well as posttraumatic stress disorder, confusion, and anger have negative psychological effects.[17] Gibbons *et al*. found that health professionals' accurate information about the pandemic can be useful in preventing the psychological effects of the COVID-19.[18]

During the quarantine of the COVID-19 pandemic, daily activities such as eating, sleeping, exercising, and social activities were restricted.[16] Mohammed Hussien *et al*. revealed that the most common determinants for the COVID-19 phobia were related to the psychological factors. They also emphasized the role of psychosomatic factors, which are associated with the complications of biological and psychosocial factors, in explaining the COVID-19 phobia.[19] Likewise, prior studies have shown that stressful life events such as COVID-19 pandemic can be closely related to gastrointestinal symptoms and chronic pain.[20,21]

The COVID-19 pandemic has disrupted the economic and social situation all around the world, and therefore, mental health of people was seriously affected.[22] Previous findings showed that the negative effects of the COVID-19 were

Table 2: Descriptive statistics, factor loading, and communality of items and variance explained by factors

Factors	Items	Mean (SD)	Skewness	Kurtosis	Communality	Factor loading	Explained variance	α	α if item deleted
Psychological	Psy 1	22.3 (5.8)	−0.7	−0.69	0.664	0.719	17.757	0.834	0.791
	Psy 2				0.415	0.624			0.832
	Psy 3				0.655	0.744			0.790
	Psy 4				0.763	0.790			0.770
	Psy 5				0.699	0.765			0.784
	Psy 6				0.196	0.399			0.858
Psychosomatic	Som 1	10.1 (4.1)	0.7	0.13	0.635	0.757	18.225	0.878	0.859
	Som 2				0.684	0.771			0.855
	Som 3				0.783	0.868			0.833
	Som 4				0.672	0.786			0.850
	Som 5				0.694	0.732			0.861
Economic	Eco 1	10.4 (4.9)	0.43	−0.93	0.731	0.777	16.732	0.871	0.838
	Eco 2				0.818	0.875			0.804
	Eco 3				0.735	0.806			0.838
	Eco 4				0.668	0.685			0.859
Social	Soc 1	17.6 (5)	−0.58	−0.44	0.598	0.643	10.793	0.760	0.706
	Soc 2				0.730	0.825			0.719
	Soc 3				0.631	0.713			0.716
	Soc 4				0.497	0.414			0.715
	Soc 5				0.435	0.210			0.726

SD: Standard deviation

Table 3: Convergent and discriminant validity values

	CR	AVE	MSV	ASV	Economic	Psychological	Psychosomatic	Social
Economic	0.911	0.720	0.271	0.238	0.848			
Psychological	0.867	0.574	0.353	0.255	0.460	0.758		
Psychosomatic	0.884	0.605	0.231	0.216	0.481	0.448	0.778	
Social	0.867	0.624	0.353	0.280	0.521	0.594	0.465	0.790

CR: Construct reliability, AVE: Average variance extracted, MSV: Maximum shared squared variance, ASV: Average shared squared variance

not limited to the psychological but also economic and social.[23] They also showed that women have more economic concerns than men, while men have more psychosomatic health concerns. Supporting this, a recent study has reported that COVID-19 could indirectly lead to an increase in unemployment and rising inflation all over the world.[24]

Social relationships refer to the relationships that exist between friends, family members, and co-workers. The quality of social relationships depends on the impact of the stresses on individuals.[25] During the pandemic, fundamental changes have been observed in social relations. People have been reported to feel unwell and lonely due to social distance.[24] Social isolation reduced quality of life while increasing psychosocial problems.[26] Prior studies have shown that the COVID-19 pandemic has led to excessive fear in the community; people try to maintain their social distance in the streets and public places to not transmit the virus to their families.[27] Naser (2021) argued that the pandemic has profound negative impacts on the social communication. For example, 76% of the participants reported that they have contacted only their family members during the pandemic.[28]

The internal reliability coefficient was found as 0.91 in the study, indicating good reliability. This result was consistent with the original study ($\alpha = 0.93$)[9] and the study conducted in South Korea ($\alpha = 0.95$).[29] The high reliability means that the items in the scale have an internal correlation and measure a unit concept.[9] It is important to note that this tool has already been validated in Turkey, South Korea, and the United States.[9,17,29] These studies were designed to provide a valid tool for early detection and intervention for the COVID-19 phobia.[30]

In the current study, the structural validity was evaluated using a CFA and the results revealed that the adapted scale is a valid tool that can be used in Iranian society for assessing the COVID-19 phobia. Community managers and policymakers can use this scale, especially during the pandemic, to assess individuals' phobia of COVID-19 and ultimately lead to improving the mental health in the community.

The present study has some limitations. The design of the study was cross-sectional, and the sample size was limited. Similarly, for the Italian version,[31] the authors emphasized the importance of conducting more studies with a larger sample from different cultures to examine the factor structure of the scale. Further, only 110 (18.3%) participants were infected by the COVID-19, and none of them were having a phobia-related diagnosis. Future research should, therefore, include those individuals diagnosed with a social phobia, hoarding disorder, or specific phobia.

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