Psychometric properties of the Spanish version of the Fear of COVID-19 Scale (FCV-19S)

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Research Article

Abstract

Globally, mental health impairments have been described based on the fear of the infection generated by the COVID-19 pandemic. The aim of this study is to test the psychometric properties of the Spanish validation the Fear of COVID-19 Scale (FCV-19S), which has been recently developed to measure fear quantitatively. Participants were recruited through an Internet-based survey. 1077 subjects were included. To establish construct validity, an exploratory factor analysis was performed using the KMO test, which was adequate, and the Bartlett sphericity test, which was significant ($p < .0001$). The CFI, NFI, GFI, TLI and RMSEA indices were used to evaluate the model and showed good adjustment. Cronbach's alpha showed valid internal consistency ($\alpha = 0.86$). This validation is supported by significant correlation ($p < .001$) with the HADS scale for anxiety and depression and with the Fear Questionnaire scale for specific phobia. In conclusion, the Spanish version of the FCV-19S is a 7-item scale with two dimensions, psychological symptoms (items 1, 2, 4, and 5) and physiological symptoms (items 3, 6, and 7) with robust psychometric properties.

Introduction

Since the end of 2019, the world is facing a new threat to public health that consists of a new respiratory disease caused by a new coronavirus (Corman et al., 2020). The World Health Organization (WHO) named the new infection as COVID–19 (Wu et al., 2020). Moreover, due to its incredibly high transmission rates and the interconnectedness of the world, the disease rapidly spread to become a pandemic that is taking a great toll on humanity. The mental health of the communities is one of the main areas that this pandemic is undoubtedly affecting (Torales et al., 2020). Different governments have taken unprecedented measures in order to safeguard the health of their citizens, measures that have meant a decrease in social contact and the isolation, even involuntary, of large sectors of the population (Usher et al., 2020). It has been observed that these measures led to an increase of fear (Ornell et al., 2020), anxiety (Peteet, 2020), depressive symptoms (Stein, 2020), hopelessness (Shaw, 2020) and adjustment disorders. These circumstances have already been described in countries where the situation has overwhelmed the health system (Kang et al., 2020; Mantica et al., 2020; Mowbray, 2020; Sindhu & Gupta, 2020), as well as in those areas where disease outbreaks were contained (Ho et al., 2020). The related increase of psychopathological disorders (Mamun & Griffiths, 2020; Troyer et al., 2020) also added to the pressure on health systems in terms of resources and rapid strategies to be adopted for coping the outbreak of COVID–19.

For these reasons, it is key to have a tool that allows measuring the level at which fear of COVID–19 can affect individuals. The Fear of Covid–19 Scale (FCV–19S), aims to determine these variables (Ahorsu et al., 2020). The objective of this study was to translate the FCV–19S to Spanish and validate it in the Paraguayan population.

Methodology

Participants

Participants were recruited through an Internet survey published on social networks and on the official social media accounts of the School of Medical Sciences of the National University of Asunción. All participants whose scores at the HADS (Hospital Anxiety and Depression Scale) and The Fear Questionnaire (Marks & Mathews, 1979) were greater than zero were included. The survey was open from March 19 to March 21, 2020 and 1245 subjects responded voluntarily: 1077 subjects, scoring >0, were considered.

Measures

- Socio-demographics Parameters: information about socio-demographic factors of participants (e.g., age, gender, residence area) were collected.
- Hospital Anxiety and Depression Scale: The HADS - Spanish version (Herrero et al., 2003) is a 14-item scale comprising seven items related to anxiety and seven items related to depression. Items are answered on a 4-point response format with a total score ranging from 0 to 21 for each of the two subscales. Cronbach´s alphas for the scale were 0.835 for the total scale, 0.722 for the anxiety, and 0.721 for depression subscales.
- The Fear Questionnaire: Four scores are obtained from the Fear Questionnaire (Marks & Mathews, 1979): level of avoidance caused by specific target phobia identified in writing (question 1, score range 0–8). A total phobia score indicating the extent of avoidance for 15 common phobias (questions 2–16, score range 0- 120). This score is made up of 3 separate phobia subscores, each including five items and having a score range of 0–40 (agoraphobia items 5, 6, 8, 12, 15; blood-injury phobia items 2, 4, 10, 13, 16; and social phobia items 3, 7, 9, 11, 14). A rating of associated anxiety and depression obtained from five common non- phobic symptoms found in phobic individuals (questions 18–22, score range 0- 40). A global phobia rating reflecting distress and avoidance (final scale on the questionnaire, score range 0–8).
- Fear of COVID–19 Scale: The FCV–19S (Ahorsu et al., 2020) is a seven-item scale assessing the fear of COVID–19. The seven items are rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree) with scores ranging from 7 to 35.

Translation process and validation

These steps were followed to guarantee the validity of the translation: the original questionnaire in English (v1) was translated into Spanish by the researchers (v2). Then, the translated Spanish version (v2) was carried out back into English by a bilingual expert (v3). Finally, the authors of the original version compared the English version (v3) with the original version (v1), sentence by sentence, to determine if they were equivalent in meaning. Subsequently, changes were made according to suggestions of the

original authors and the Spanish version was employed in a pilot test with a sample of 15 people, after which, the final Spanish version was obtained (see Annex 1).

Statistical Analysis

To establish validity of the construct, the pertinence of conducting an exploratory factor analysis was initially analyzed using the Kaiser-Meyer-Olkin (KMO) sample adequacy tests and the Bartlett's sphericity test. The sample was randomly divided into two subsamples, in which exploratory factor analysis was performed with the SPSS version 23 statistical software and confirmatory factor analysis with the JASP 0.11.1 statistical program, respectively. The extraction method was principal axis factoring and varimax rotation with Kaiser normalization.

Chi square test was performed, and the following fit indices were used to assess the model: CFI, NFI, GFI, TLI, and RMSEA. For the validity of model, CFI, NFI, GFI and TLI values had to be at least 0.90 and RMSEA value below 0.05 (Herrero, 2010). Reliability was measured with Cronbach's alpha (a value of ≥0.70 was considered acceptable). For construct validity, correlation tests were used between the scores of the different scales.

Ethical considerations

The study was approved by the Ethics Committee of the National University of Caaguazú, School of Medical Sciences (Paraguay). Data were treated with confidentiality, equality, and justice, respecting the Helsinki principles. Participants who required a feedback from the survey were invited to write down their email address and received information or specific helpful suggestions.

Results

1077 subjects were included, 68.71% were women ($n = 740$), 30.73% men ($n = 331$) and 0.56% preferred not to mention their own sex ($n = 6$). The mean age was 30.95±10.07 years. 40.76% was from the Central department (the area near the capital city), 30.73% from Asunción (the capital city) and 28.51% from the other parts of the country. The mean score for the FCV−19S was 15.84±5.53. Table 1 shows statistics performed on the Spanish version of the FCV−19S.

Table 1. Statistics on the items of the Spanish version of the FCV-19S

	Corrected item – total correlation	Mean	SD	Skewness	Kurtosis
Item 1	0.64	2.8	1.14	0.20	-0.85
Item 2	0.66	2.6	1.22	0.25	-1.09
Item 3	0.51	1.7	0.73	1.26	2.64
Item 4	0.67	2.5	1.24	0.52	-0.84
Item 5	0.67	2.6	1.22	0.30	-1.02
Item 6	0.61	1.8	0.88	1.15	1.35
Item 7	0.65	1.9	0.99	1.13	0.77

Kaiser-Meyer-Olkin (KMO) test was adequate (KMO = 0.85) and sphericity tested significantly ($p < 0,0001$). These results confirmed that the sample was adequate for a factorial analysis. Secondly, the sample was randomly divided into two subsamples (subsample 1, n = 517; subsample 2, n = 560), in order to perform exploratory and confirmatory factorial analysis.

Factorial Analysis

Only the first two factors had raw eigenvalues greater than the parallel random values, thus two factors were retained. Before extraction, these factors explained 71.86% of total variance. After extraction, the two first factors explained 61.09% of total variance. All the items have factorial weights associated to only one of the factors (Table 2).

Table 2. Results from the exploratory factor analysis with varimax rotation on the Spanish version of the Fear of COVID-19 Scale

Items	Factor 1	Factor 2	Communality
Item 1	0.847		0.558
Item 2	0.696		0.487
Item 3		0.691	0.415
Item 4	0.681		0.533
Item 5	0.639		0.474

Item 6	0.797	0.541
Item 7	0.710	0.535

Note: pattern matrix shows values greater than 0.4

The items 1, 2, 4 and 5 corresponded to factor 1 ("Psychological symptoms") and the items 3, 6 and 7 corresponded to factor 2 ("Physiological symptoms"). Factor 1 explained 32.94% as well as factor 2 explained 28.15% of variance. Eigenvalue of the first factor was 3.918 and 1.112 for the second one.

Since the items were distributed in a non-normal way (see skewness and kurtosis on Table 1), parallel analysis/diagonal weighted least squares method (DWLS) was used. The two- factors model, as found in the exploratory factorial analysis performed on subsample 1 (n = 517), was assessed with confirmatory factorial analysis in subsample 2 (n = 560). The model adjustment was valid, according to all fit indices (S-B χ2 = 19.872, df = 13, p = 0.098; RMSEA = 0.031; CFI = 0.996, NFI = 0.989, GFI = 0.996, TLI = 0.994).

Validity, internal consistency and correlation between factors

Cronbach's alpha showed a valid internal consistency (α = 0.86), and could not be improved by removing any item, as found for both factors: psychological symptoms (α = 0.84) and physiological symptoms (α = 0.819). Correlation between FCV–19S total score and the scores of each factor were significant (factor 1: r = 0.948, p<0.001; and factor 2: r = 0.721, p<0.001). Mean scores and standard deviations were 10.46 (SD = 3.96) and 5.38 (SD = 2.24) for factor 1 and 2, respectively.

Concurrent validity was supported by the HADS for anxiety and depression and the FQ for specific phobia as indicated by the significant positive correlation with both scales (p<.001). FCV–19S positively correlated with the HADS (r = 0.330) and FQ (r = 0.262).

Discussion

This research reports on the psychometric properties of the Spanish version of the FCV- 19S, testing a sample of 1077 people. This sample included more participants than those involved in the English version scale (Ahorsu et al., 2020), as well as versions in Hebrew (Tzur Bitan et al., 2020), Italian (Soraci et al., 2020), Arabic (Alyami et al., 2020), Russian (Reznik et al., 2020) and Indian (Doshi et al., 2020). However, our sample was smaller than the validation-sample for the Turkish version (Satici et al., 2020), the Greek version (Tsipropoulou et al., 2020) and the Bangla version (Sakib et al., 2020).

The descriptive statistics of the scale show good levels of corrected item - total correlation ranging from (0.51 to 0.67), the sample was adequate to perform a factor analysis when the assumptions were fulfilled, so it was randomly divided into two sub-samples.

In the first subsample (n = 517) factorial loads and eigenvalues were studied to discover the structure of the scale, two well-differentiated factors were found, with large factorial loads in only one of the factors and with eigenvalues greater than 1 and with good level of explained variance, since this model explains 61.09% of the total variance. The items that were grouped in the first factor are those containing words such as: afraid, uncomfortable, nervous and anxiety, so this factor was called "psychological symptoms". The items grouped in the second factor describe words like: clammy, sleep and heart roots, so this factor has been called "physiological symptoms".

This two-factors model was confirmed using subsample 2 (n = 560) and according to which all the adjustment indices have been correct, indicating that the scale has two well- defined factors. This has also been found in the validation of the scale in Hebrew (Bitan et al., 2020). It is important to mention that the original authors of the scale stated that more studies are necessary to confirm the single-factor structure of the scale (Ahorsu et al., 2020).

Similarly, for the Italian version (Soraci et al., 2020), authors also stated the importance of carrying out more research with a larger sample size to confirm the structure of the scale, since they report that they found covariance between items 1 and 5, which in our sample remains at factor 1. This difference found is not a contrary to what has already been published, but, in our study, it was possible to carry out an exploratory analysis first and then a confirmatory analysis, both with quite optimal sample sizes compared to the publications mentioned above.

Although the Turkish version also reports a single factor and has a good sample size, its authors directly carried out a confirmatory factor analysis, like others researchers did (Sakib et al., 2020; Satici et al., 2020; Tsipropoulou et al., 2020). This could explain why the Turkish version authors did not find two factors, since they directly performed the confirmatory analysis of the original one-dimensional model (Ahorsu et al., 2020). This has also been highlighted by the authors of the original scale (Pakpour et al., 2020).

Regarding the internal consistency of the full scale and the factors, adequate Cronbach's alpha values were obtained, the first being similar to the other adaptations and to the original scale (Ahorsu et al., 2020; Satici et al., 2020; Soraci et al., 2020). Construct validity was performed by comparing the scores of the FCV−19S with the scores obtained in the HDAS and the FQ, where both scales correlated positively, but weakly. The explanation for this might be that the scores in specific phobia, anxiety and depression were low in our sample, taking into account that at the time of data collection, the country was managing COVID−19 sufficiently well. This was also noted in the Russian validation of the scale (Reznik et al., 2020).

Limitations of this study included that sample was obtained in a non-probabilistic way and from the general population, which means that was not selected on the base of a specific diagnosis, and scale

sensitivity and specificity were not studied. Also, the two- factor model should be studied in other samples with adequate sample sizes to described scale structure properly.

In conclusion, the Spanish version of the FCV–19S is a 7-item scale with two dimensions, psychological symptoms (items 1, 2, 4, and 5) and physiological symptoms (items 3, 6, and 7) with robust psychometric properties.

Declarations

Authors Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Iván Barrios, Carlos Rios-González, Marcelo O'Higgins, Israel González, and Noelia Ruiz Díaz. The first draft of the manuscript was written by Julio Torales, Antonio Ventriglio, João Mauricio Castaldelli-Maia, and Oscar García. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Disclosure of interest

To the best of our knowledge, no conflict of interest, financial or other, exists. We have no conflicts of interest to disclose

Ethical considerations

The study was approved by the Ethics Committee of the National University of Caaguazú, School of Medical Sciences (Paraguay). Data were treated with confidentiality, equality, and justice, respecting the Helsinki principles. Participants who required feedback from the survey were invited to write down their email address and received information or specific helpful suggestions.All participants were informed of the research objectives and were explicitly asked to give their consent. The first question in the online survey asked for consent, if they marked "no" the questions were not shown.

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Supplementary Files

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- Data.csv
- Annex1.docx