

Psychological Trauma: Theory, Research, Practice, and Policy

Gender Implications of the Fear of COVID-19 Scale in the Spanish Population: A Validation Study

David Sánchez-Teruel, María Auxiliadora Robles-Bello, Mariela Lara-Cabrera, and Nieves Valencia-Naranjo
Online First Publication, June 28, 2021. <http://dx.doi.org/10.1037/tra0001062>

CITATION

Sánchez-Teruel, D., Robles-Bello, M. A., Lara-Cabrera, M., & Valencia-Naranjo, N. (2021, June 28). Gender Implications of the Fear of COVID-19 Scale in the Spanish Population: A Validation Study. *Psychological Trauma: Theory, Research, Practice, and Policy*. Advance online publication. <http://dx.doi.org/10.1037/tra0001062>

Gender Implications of the Fear of COVID-19 Scale in the Spanish Population: A Validation Study

David Sánchez-Teruel¹, María Auxiliadora Robles-Bello², Mariela Lara-Cabrera^{3, 4, 5}, and Nieves Valencia-Naranjo²

¹ Department of Psychology, University of Cordoba

² Department of Psychology, University of Jaen

³ Department of Research and Development, Division of Mental Health, St Olav's University Hospital

⁴ Department of Mental Health, Norwegian University of Science and Technology (NTNU)

⁵ Tiller Community Mental Health Centre, Division of Psychiatry, St. Olav's University Hospital

Objective: The aim of this study was to determine the psychometric properties of the Fear of COVID-19 Scale (FCV-19S) for the general Spanish population. **Method:** A cross-sectional investigation was carried out in several stages. Participants ($N = 699$) between the ages of 18 and 73 ($M = 27.79$; $SD = 12.68$) completed both the FCV-19S and the Hospital, Anxiety, and Depression Scale (HADS). We performed descriptive, exploratory factorial ($n = 349$), confirmatory ($n = 350$), and scale reliability analyses. **Results:** The results confirmed the factor structure of the original scale as well as the scale's goodness-of-fit indices and good internal consistency ($\alpha = .91$, $\omega = .98$). The correlations between the Spanish FCV-19S and the HADS support the scale's validity, especially for the subdimension of anxiety. **Conclusions:** The Spanish version of the FCV-19S appears to be a valid measure for the assessment of fear in an adult population. The present study moves research forward by providing a confirmatory analysis of the gender variable's influence on the factor analysis. The FCV-19S-Spanish provides a valid brief measure to evaluate fear of being infected by the SARS-CoV-2 virus. The results also revealed that fear was higher among women than among men, which is important as it suggests that more attention needs to be paid to assessing and treating women's fear. Assessing and treating fear represents an important step for the prevention of future mental health problems.

Clinical Impact Statement

COVID-19 is a threat to global public health, and its relatively high rate of morbidity highlights the importance of fear of contagion research. Therefore, it is more pressing than ever that we have access to appropriate measurement tools to evaluate fear of contagion. The results of the present study provide preliminary support for the validity of the Fear of COVID-19 Scale for a Spanish sample. Our results also highlight an unfortunate gender-related disparity. This research demonstrates that the scale is a reliable, valid measure that is highly recommended for the measurement of fear of contagion during the COVID-19 pandemic.

Keywords: anxiety, COVID-19, depression, fear, gender

SARS-CoV-2 (COVID-19) has become a threat to global public health (Mahase, 2020; World Health Organization [WHO], 2020) due to its high infection rate, lack of a vaccine, increased number of deaths worldwide, as well as the mass quarantines that have

been put in place to contain its spread (Chen et al., 2020; Lu et al., 2020; Rothan & Byrareddy, 2020; WHO, 2020). The outbreak of this disease has generated a high level of distress in the general population, which manifests as moderate-to-severe symptoms of

David Sánchez-Teruel contributed equally to writing—review and editing. María Auxiliadora Robles-Bello contributed equally to writing—review and editing. Mariela Lara-Cabrera contributed equally to writing—review and editing. Nieves Valencia Naranjo contributed equally to writing—review and editing.

All procedures performed involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments

or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

The authors declare that there are no conflicts of interest. This research has not received specific support from public sector agencies, the commercial sector, or nonprofit organizations.

Correspondence concerning this article should be addressed to María Auxiliadora Robles-Bello, Department of Psychology, University of Jaén, Paraje Las Lagunillas, 23071 Jaén, Spain. Email: marobles@ujaen.es

depression and anxiety (C. Wang et al., 2020). Furthermore, fear of potential contact with people who may be infected (Lin, 2020) has been reported to heighten the stigma and discrimination faced by those who are infected (Pappas et al., 2009). The literature has also revealed an increased risk of mental disorders (Y. Wang et al., 2020; Yao et al., 2020) and suicide in vulnerable populations (Gunnell et al., 2020). Studies suggest that fear of contagion can also amplify the severity of COVID-19 infections due to an increased risk of psychological problems like distress, anxiety (Centers for Disease Control and Prevention, 2020), and posttraumatic stress, which can lead to emotional burnout and depersonalization (Luceño-Moreno et al., 2020). Increased anxiety and the risk of posttraumatic stress in COVID-19 patients can amplify a downstream cascade of psychosocial problems that can prompt patients to seek preventive actions that are based more on myths than on health recommendations (Smithsonian Science Education Center, 2020).

Recent studies suggest that fear might also be associated with worries about risk of infection from asymptomatic carriers and concerns about touching others due to fear of transmission (Shigemura et al., 2020). Although it is fairly normal to experience a fear reaction to infectious diseases, COVID-19's higher rates of morbidity and mortality highlight the importance of research on fear of contagion and fear-related behaviors, especially in the context of vulnerable populations (Brooks et al., 2020) and individuals who have experienced mental disorders (Holmes et al., 2020; Mamun & Griffiths, 2020). Fear is a psychological emotion that modulates important aspects of human beings such as self-efficacy and coping, but it can also influence responsible or irresponsible behavior in the face of infection, so its measurement is essential, especially in some specific population groups such as young people, the elderly, or health professionals. However, without a specific instrument to assess fear, it is difficult to propose appropriate health promotion actions. Evidence of the importance is the large number of adaptations made to different languages of various scales to measure the attitudes and psychological impact of the COVID-19 (Cortez et al., 2020). However, attempts to assess the psychosocial factors of the fear of contagion are hampered by the scarcity of validated fear-measurement instruments (Ahorsu et al., 2020).

A newly developed scale, the Fear of COVID-19 Scale (FCV-19S), has been proposed as a valid self-report measure to assess fear of COVID-19 (Ahorsu et al., 2020). Since the scale's development, researchers have carried out several validation studies that have revealed that the scale has good psychometric properties in multiple languages, including English (Harper et al., 2020); Persian (Ahorsu et al., 2020); Bangla (Sakib et al., 2020); Italian (Soraci et al., 2020); Hebrew (Bitan et al., 2020); Arabic (Alyami et al., 2020); Russian (Reznik et al., 2020); and Turkish (Satici et al., 2020). Good results have also been found among U.S. college students (Perz et al., 2020) and Spanish university students (Martínez-Lorca et al., 2020); however, no measures have, as of yet, been adapted to the Spanish population.

In addition to investigations of the factor structure of the FCV-19S, several analyses have supported its convergent and construct validity by using the Hospital, Anxiety and Depression Scale (HADS) and the Depression and Anxiety Stress Scale (DASS-21) for comparison. Recent studies have also supported the scale's reliability, showing high internal consistency. Other studies,

however, have reported some psychometric inconsistencies. In the original study, gender and age did not appear to affect the fear response pattern in the FCV-19S (Ahorsu et al., 2020). However, other studies that are based on logistic regression seem to show that gender is a variable of tremendous interest that modulates anxiety and depression levels (Curran et al., 2020). The Russian and Hebrew versions of the scale showed a bidimensional structure, rather than a unidimensional factor structure, underlying the proposed factor structure. As Ransing et al. (2020) pointed out in their recent review, although translated versions of FCV-19S are available in several languages, these have not yet been validated; for instance, there is currently no validation study of a Spanish version of the scale. As of May 21, 2020, Spain had the fifth highest number of infections and deaths from COVID-19 worldwide (WHO, 2020), and the second highest numbers in Europe. As no measures have, as of yet, been adapted to the Spanish population, a psychometric translation and adaptation of the FCV-19S is timely and of particular interest, especially since extreme fear has been found to be positively related to anxious or depressive symptomatology (Li et al., 2020; Zhang et al., 2020). Hence, the objective of this study was to assess, through descriptive and factorial analyses, the psychometric properties of the FCV-19S in the general Spanish population subject to mandatory confinement (i.e., no possibility of leaving home except for work—only if it is not possible to do it online—doctor or pharmacy visits, or buying food; teaching, at all levels of education, was also moved online) due to COVID-19. It is important to establish a psychometrically robust scale for the Spanish-speaking population and to further advance research evidence with regard to the FCV-19S's factor structure. This study also assesses how gender might affect the factor structure and whether there is a correlation with depression and anxiety.

Method

Participants and Study Design

The sample consisted of 699 people who responded to a battery of online questionnaires that included the FCV-19S-Spanish, the HADS (Zigmond & Snaith, 1983), and general background information. The inclusion criteria were as follows: (a) aged 18 years or older, (b) complete all of the questionnaires, and (c) be of Spanish nationality or living in Spain. The criteria for exclusion were: (a) being under 18 years old, (b) not completing one or more of the questionnaires, (c) having lived outside of Spain for more than 6 months to a year, and (d) not signing the informed consent form. The total sample comprised 402 women (57.51%) and 297 men (42.49%) between the ages of 18 and 73 ($M = 27.79$; $SD = 12.68$). For 414 (59.23%) of the participants, a family member performed an essential service or worked as a health worker. We randomly divided the total sample into two subsamples (n_1 and n_2) for factorial analysis (Goretzko et al., 2019; Muñiz & Fonseca-Pedrero, 2019) using a simple randomization method at <https://www.graphpad.com/quickcalcs/index.cfm>; $n_1 = 349$, including 199 women (57.02%) and 150 men (42.98%); and $n_2 = 350$, including 201 women (57.59%) and 149 men (42.41%). All other sociodemographic data is described in Table 1.

Table 1
Description of Participants' Sociodemographic Data of the Sample

Sociodemographic data	<i>N</i> (%)	<i>n</i> ₁ (%)	<i>n</i> ₂ (%)
Age			
18–28	426 (60.94)	211 (49.53)	215 (50.47)
29–39	132 (18.89)	67 (50.75)	65 (49.25)
40–49	124 (17.74)	63 (50.80)	61 (49.20)
over 50	17 (2.43)	8 (47.06)	9 (52.94)
Do you work or study?			
Study	255 (36.48)	128 (50.20)	127 (49.80)
Work	359 (51.36)	178 (49.58)	181 (50.42)
Study and work	49 (7.01)	25 (51.02)	24 (48.98)
Retired	14 (2.00)	8 (57.14)	6 (42.86)
Nothing	22 (3.15)	10 (45.45)	12 (54.55)
Relationship with essential services workers			
Yes	414 (59.23)	208 (50.24)	206 (49.76)
No	285 (40.77)	141 (49.47)	144 (50.53)
Presence of COVID-19 infection			
Yes	19 (2.02)	11 (57.89)	8 (42.11)
No	680 (97.28)	338 (49.70)	342 (50.30)
Total	699 (100)	349 (100)	350 (100)

Data Collection and Instruments

Sociodemographic Data Sheet

We gathered sociodemographic data from the participants through questionnaires. The data gathered included the participants' gender, age and activity; whether they have cohabited with someone who is or has been infected with COVID-19; and whether they live with essential service workers or health professionals.

Fear of COVID-19 Scale

Ahorsu et al.'s (2020) FCV-19S was used to measure fear of COVID-19 infection. Each of the scale's seven items (e.g., "It makes me uncomfortable to think about coronavirus-19") has a 5-point Likert response scale, with ratings from 1—*strongly disagree* up to 5—*strongly agree*; total scores range between 7 and 35 points. A higher score indicates a greater fear of COVID-19 infection. The researchers developed the FCV-19S using a sample of 717 Iranian participants. They used both the classical test theory and the item response theory—the Rasch (1960) model, in particular—in which different indices are analyzed to show how the measurement of fear can be represented in a single dimension (i.e., people and items); differential item functioning, and the invariance of the measure with respect to gender and age have both been analyzed (Wu et al., 2017). This scale, in its original version, showed satisfactory psychometric properties, having both unidimensional factor structure and high internal consistency (with a Cronbach's alpha of .82).

Zigmond and Snaith's Hospital Anxiety and Depression Scale

We used the Spanish adaptation of the HADS (Zigmond & Snaith, 1983), which consists of 14 items that correspond to two subscales, one for anxiety and one for depression. Each contains

seven items on a Likert 0–3 response scale. An example of an item from the anxiety scale is "I feel tense and nervous," while "I feel slow and awkward" is an example of an item from the depression scale. This scale evaluates symptoms of anxiety and depression in patients and in the general population. Values of between 7 and 13 indicate the possible or probable presence of a mood disorder, while scores greater than 14–15 indicate severe disorder (the range spans between 0 and 21) for both the anxiety and depression subscales. In order to analyze the prevalence of symptoms in this study, we have categorized the variables as follows: <6.99 no disorder, 7–13.99 possible or probable disorder, >14 severe disorder (Luceño-Moreno et al., 2020). The higher the score, the greater the prevalence of symptoms of anxiety and depression. In its Spanish adaptation, the scale has shown adequate psychometric properties, with confirmed validity of two factors and an internal consistency of .77 for the anxiety subscale and .71 for the depression subscale (Herrero et al., 2003; Terol et al., 2007). In this study, the alpha for the total scale was .86 and we found it to be acceptable for both subscales ($\alpha_A = .89$; $\alpha_D = .83$).

Translation of the Scale

We translated the original version of the FCV-19S (Ahorsu et al., 2020) to Spanish through a standardized translation process (Gjersing et al., 2010). The first author of this article compared the Spanish translation to the original English version (Ahorsu et al., 2020) based on the rules set out by the International Test Commission (Hambleton, 2005). An additional bilingual translator—who worked with the first translator to reach an agreement, especially on items that posed greater semantic and grammatical difficulties—supported the translation and revision to Spanish. A Doctor of Psychology and bilingual (English–Spanish) translator then used a reverse translation methodology to perform a back translation (Gudmundsson, 2009). We used this last version of the Spanish FCV-19S scale in this research.

Procedure

We collected the necessary data between April 22, 2020 and May 21, 2020. The online survey was posted at <https://forms.gle/kAU1sr84uTHCfMu8>, and we used snowball sampling to disseminate the survey. We initiated contact with potential participants through social networks and requested that they, in addition to completing the survey, share it with their own contacts in other groups. Prior to completing the online questionnaire, participants read information about the study. If they gave voluntary consent to participate, they had to click on the "Agree" button that explained that they voluntarily agreed to participate. Electronic consent was required for participants to gain access to the survey. Organic Law 3/2018; of 5 December, on the protection of personal data and the guarantee of digital rights, was respected at all times.

Ethical Approvals

The ethics committees of the University of Jaén and the University of XX approved the project (identification number ABR.20/4.PRY). The study followed the principles enshrined in the Helsinki Declaration (Goodyear et al., 2007).

Data Analysis

Missing data represented less than 3% of the responses, and we used a multiple imputation method (SPSS) to account for the missing values (Graham, 2012). We carried out the analysis in several stages. First, we used FACTOR software (Lorenzo-Seva & Ferrando, 2006) to calculate the internal consistency, item analysis, and exploratory factor analysis (EFA). This software is suitable for ordinal data exploration and allows the calculation of the proportion of shared variance explained by each of the extracted factors (Baglin, 2014). We performed the factor extraction procedure selected for the EFA using minimum range factor analysis (Timmerman & Lorenzo-Seva, 2011) and parallel analysis (PA) with polychoric correlations (Garrido et al., 2013) with optimal implementation (Timmerman & Lorenzo-Seva, 2011) to evaluate the potential dimensionality of the ordinal-level data.

Second, we used an oblique rotation to obtain maximum parsimony in the interpretation of the factorial solution—specifically, we employed the direct oblique rotation method with a delta value equal to 0 (Jennrich, 1979). Subsequently, we applied a PA (Horn, 1965) using O'Connor's (2000) SPSS macro. One hundred random selected cases were used for the PA, using the same number of variables and observations as the actual dataset. For a factor to be maintained, the actual value from the actual dataset had to exceed 95% of the eigenvalues from the random array for the same factor (Glorfeld, 1995).

Third, we performed a confirmatory factor analysis (CFA) using SPSS Amos software on the second subsample. To evaluate the structure obtained from the above analysis, we used unweighted least squares (ULS) with bootstrap procedures (Rodríguez-Ayán & Ruiz-Díaz, 2008). We used the χ^2/df index, the root mean

square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean residual (RMR; similar to the RMSR for factor 10.3), the adjusted goodness-of-fit index (AGFI) and the gamma index (GFI) as adjustment rates. The goodness-of-fit model is considered satisfactory if the TLI and CFI are at .95 and the RMSEA approaches .06 (Kline, 2015).

Results

Descriptive Statistics, Item Analysis and Exploratory Factor Analysis for the n_1 Subsample

The results of the descriptive item analysis and Kolmogorov–Smirnov test reported univariate normality, revealing little variability in this sample that contained 349 participants. In addition, we observed high internal consistency values ($\alpha = .91$, $\omega = .98$), with the minimum reported score being 8, and the maximum, 24 (see Table 2). The Kaiser–Meyer–Olkin (KMO) measurement of the sampling adequacy index (KMO = .92), Bartlett's Sphericity test ($\chi^2 = 5654.219$; $p < .001$), and the correlation matrix determinant (.005) demonstrated the adequacy of the data for factor analysis (Lloret-Segura et al., 2014). The FACTOR software we used in our analysis compares the mean or 95th percentile of the percentage of the common variance explained by the factor for randomly interchangeable data with the observed explained common variance of the sample (Baglin, 2014). If the observed percentage of a factor exceeds the random percentage, the factor is retained. This occurred on one occasion for the FCV-19S-Spanish. Therefore, the data showed one-dimensionality through the EFA, which

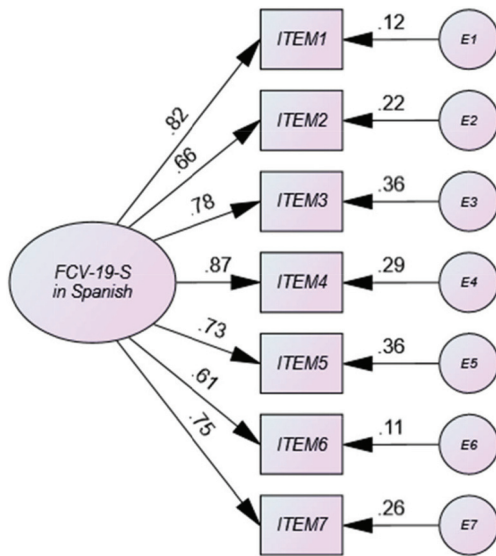
Table 2
Descriptive Statistics, Item Analysis, and EFA for the FCV-19S-Spanish

Original	Spanish	<i>M</i> (<i>SD</i>)	<i>K-S</i>	<i>r</i> item-total	α if item deleted	Dimensions	h^2
Item 1. I am most afraid of COVID-19	<i>Tengo mucho miedo a infectarme por SARS-CoV-2</i>	4.8 (1.12)	.90**	.77	.55	.63	.58
Item 2. It makes me uncomfortable to think about COVID-19	<i>Me incomoda pensar en la COVID-19</i>	3.6 (1.79)	.81**	.59	.68	.61	.43
Item 3. My hands become clammy when I think about COVID-19	<i>Me sudan las manos cuando pienso en la COVID-19</i>	3.59 (1.22)	.80**	.42	.61	.58	.38
Item 4. I am afraid of losing my life because of coronavirus-19	<i>Tengo miedo de perder la vida por SARS-CoV-2</i>	4.82(.91)	.86**	.61	.78	.79	.39
Item 5. When watching news and stories about COVID-19 on social media, I become nervous or anxious	<i>Cuando veo noticias e historias sobre la COVID-19 en las redes sociales, me pongo nervioso o ansioso</i>	3.11 (1.25)	.89**	.75	.63	.71	.48
Item 6. I cannot sleep because I'm worrying about getting COVID-19	<i>No puedo dormir porque me preocupa estar infectado por SARS-CoV-2</i>	2.06 (1.35)	.80**	.72	.69	.59	.53
Item 7. My heart races or palpitates when I think about getting COVID-19	<i>Mi corazón se acelera o palpita cuando pienso en contraer el SARS-CoV-2</i>	3.8 (1.45)	.87**	.69	.66	.66	.83
Total		29.34 (9.65)	.87**				
Eigenvalue						5.68	
% variance						88.10	

Note. *M* = mean; *SD* = standard deviation; *K-S* = Kolmogorov-Smirnov test; ns = not significant; h^2 = commonalities; total dimensions: % variance = variance explained.

** $p < .01$.

Figure 1
Path Diagram for the Spanish FCV-19S



Note. See the online article for the color version of this figure.

explains 88.10% of the variance, as shown in Table 2. All items loaded above .50. The item analysis revealed an adequate average variability for each item, and the correlation between the item's total and the alpha showed appropriate correlations for all items (>.50), with the exception of item 3 ($r_{it} = .42$).

Confirmatory Factor Analysis for the n_2 Subsample

CFA was conducted for the sample of 350 participants, with a normality in the distribution of the items (Mardia's test = 2.81; Mardia, 1970). Figure 1 shows a path diagram of the Spanish version of the FCV-19S, for which most of the items yielded excellent values and standardized weight values (coefficients of β) and showed appropriate values, except for Item 2 (.66) and Item 6 (.61). To explore the importance of gender, three different models were tested. Table 3 demonstrates that Model 3 (total) was the best fit for this study.

The results displayed in Table 3 showed that the Spanish version of the FCV-19S produced very good fit indices for this total sample (Model 3). However, we did find differences between Model 1 (men) and Model 2 (women) for some of the goodness-of-fit indices. Specifically, Model 1 showed differences between the CFI and TLI indices and a score of .05 for the RMR, while Model 2 (women) showed an

adequate and significant χ^2/df ; all other indices were also excellent, with an RMSEA value of <.06 (95% confidence interval [CI]), adequate scores for CFI and TLI, and GFI and AGFI values of >.85, with high agreement between the assessed goodness-of-fit indices. These results revealed strong acceptability and goodness-of-fit for Model 2. However, Model 3 (total sample), with its adequate and significant difference χ^2/df and excellent values in the rest of the goodness-of-fit indexes, is the model that best fits our sample.

Finally, the results referring to the Spanish version of the FCV-19S present a high internal consistency (alpha and omega), where $\alpha = .91$ and $\omega = .98$ in the total sample; the minimum score for this sample is 8 and the maximum score is 24. Furthermore, the data for the relationship between fear and levels of anxiety and depression show that there is a high positive correlation with the total HADS score ($r = .88$). We have also found an adequate positive correlation with the depression subdimension of HADS ($r_d = .71$) and a higher positive correlation with the anxiety subdimension ($r_a = .86$), which is very close to the correlation with the total score for the HADS.

Discussion

Spain is one of the countries that has been most seriously affected by COVID-19 (WHO, 2020), and it has suffered severe consequences from the pandemic (Mahase, 2020; Ministerio de Sanidad, Consumo y Bienestar Social, 2020). To date, however, no instruments to measure fear of infection have been adapted for the Spanish adult population. This study was the first to adapt the FCV-19S to the general population and examine its psychometric properties. We used a sample that was subject to mandatory confinement at home due to COVID-19, as this group was representative the experience of the Spanish population as a whole at the time. The present study also aimed to examine how gender affects the factorial structure of the scale and whether there is a correlation with depression and anxiety.

The results suggest that the Spanish version of the FCV-19S (FCV-19S-S) has adequate psychometric properties to measure the level of fear of COVID-19 infection, including high internal consistency and high convergent validity. The factorial analysis shows a one-dimensional structure of the FCV-19S-S, which explains 88.10% of the variance in the Spanish sample. Our findings with regard to the factorial structure are in contrast to two previous studies conducted among Hebrew and Russian populations (Bitan et al., 2020). However, our results are in line with the original version, which have been tested with an Iranian population (Ahorsu et al., 2020), and with the recent adaptations for Bangladeshis (Sakib et al., 2020), Italian populations (Soraci et al., 2020), U.S. college students (Perz et al., 2020), and Spanish university

Table 3
Goodness-of-Fit Indices for the Spanish FCV-19S for the n_2 Subsample

Model	χ^2	df	χ^2/df	p	RMSEA [95% CI]	CFI	TLI	RMR	GFI	AGFI
Model 1	128.12	58	2.21	.00	.06 [.01, .08]	.97	.89	.05	.79	.81
Model 2	126.45	58	2.18	.00	.04 [.01, .05]	.97	.96	.04	.87	.89
Model 3	120.12	58	2.07	.00	.02 [.01, .03]	.99	.98	.03	.90	.91

Note. Model 1 = confirmatory factor analysis for the Spanish version of the FCV-19S for men; Model 2 = confirmatory factor analysis of the Spanish version of the FCV-19S for women; Model 3 = confirmatory factor analysis of the Spanish version of the FCV-19S for both sexes; χ^2 = chi-square; df = degrees of freedom, χ^2/df = chi-square goodness-of-fit index; p = significance level; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; RMR = root mean residual; GFI = gamma index; AGFI = adjusted goodness-of-fit index.

students (Martínez-Lorca et al., 2020). Taken together, the findings support the FCV-19S-S as a psychometrically robust scale.

Previous studies have revealed some discrepancies regarding gender. While the original study found that gender and age did not appear to affect the fear response pattern in the FCV-19S (Ahorsu et al., 2020), Curran et al. (2020) found that gender modulated both anxiety and depression levels. As a secondary aim, we wanted to explore how gender affected the scale's factorial structure. Confirmatory factorial analysis in a second sample in this study suggested that the FCV-19S-S has a greater capacity for explaining fear of infection in women (Model 2) than in men (Model 1). This discrepancy in the goodness-of-fit could suggest that there are differences in fear according to gender in this sample of the Spanish population. This is in line with other studies developed in China (C. Wang et al., 2020; Y. Wang et al., 2020) and with studies of the adaptations of the FCV-19S to different languages, including the Turkish and Israeli adaptations (Bitan et al., 2020; Sakib et al., 2020). Previous research has shown that the COVID-19 pandemic has generated a high level of distress in the general population (Y. Wang et al., 2020). In the same vein, previous validation studies have found correlations between FCV-19S scores and psychological distress. Our results support the findings of these previous studies (Ahorsu et al., 2020; Bitan et al., 2020), having found a high correlation with the anxiety and depression scales of the HADS.

On the other hand, previous research has suggested that the relationship among anxiety, depression, and gender might be more complex and that age may also be a factor, as symptoms of anxiety were found to be more common in women in the early stages of life and their incidence was found to decrease progressively with advanced age (Curran et al., 2020). Other studies have suggested that gender may be a factor in the response of individuals to the traumatic and stressful situation posed by COVID-19, as women reported greater fear, perceived personal risk, fear of dying, and fear of infection than men (Sloan et al., 2020). This finding can be explained by the different roles traditionally assigned to each of the sexes. In Spain, although men and women may care for each other, the proportion of women who fulfill the role of caregiver is usually higher than that of men. Women also represent the vast majority of caregivers for those who have been infected with COVID-19 (Luceño-Moreno et al., 2020). Concern about direct contagion by loved ones might increase women's anxiety responses. This is in line with the findings of Sloan et al.'s (2020) study, which found that fear and concerns have a greater impact on women with mental health conditions than on men with those conditions. Although the consideration of these factors falls outside of the main scope of this study, it is worth noting that other factors that may explain gender differences could be related to biological stress response or sociodemographic factors like age. Although a limitation in this study, these possible explanations are important to consider when planning interventions to address fear, and they warrant future research.

Previous research has also suggested that direct contact with people infected with COVID-19 (e.g., health workers and the general population; Robles-Bello et al., 2020) and cohabitation with people more likely to be exposed to the virus (e.g., essential service workers) might be related to higher levels of anxiety (C. Wang et al., 2020) due to the fear that contagion could spread among those who are cohabiting. Those who fear contagion perceive direct (or

indirect) contact with the virus as dangerous or threatening. However, the two situations can be viewed as offering different degrees of control—that is, contact with a patient can be perceived as a threatening and uncontrollable situation, while a greater degree of control can be implemented by introducing preventive measures that limit exposure to the virus in the safe home environment.

The perception of lack of control has traditionally been linked to depressive states (Jeronimus, 2020)—an emotional alteration that may be more likely in men (Liang et al., 2020), with results that may prove more lethal (Mamun & Griffiths, 2020). Assessing fear through the FCV-19S-S can help mental health professionals monitor and prevent psychological maladjustment in the general population (Centers for Disease Control & Prevention, 2020); as well as in groups that may be more psychologically vulnerable (Yao et al., 2020). The consequences in the latter population can be particularly devastating, leading to increases in attempted or completed suicides (Gunnell et al., 2020). The adaptation of the FCV-19S to Spanish could be of vital importance for detecting those who are at risk among vulnerable populations, especially in the context of the devastating impact of COVID-19 in Spain and in the Spanish-speaking countries of Latin America. Fear of COVID-19 often presents a traumatic and stressful experience that is associated with depression and anxiety, and having a validated monitoring measure could have practical implications for clinicians. Identifying levels of fear early on might facilitate interventions for the treatment of disorders such as anxiety and depression, and using such a short questionnaire in the general population could facilitate screening and allow the development and targeting of strategies to enhance control of fear (Usher et al., 2020). The potential use of the FCV-19S-S as a screening or monitoring measure should be investigated further; more research is needed to determine whether the scale is clinically useful as a screening tool.

Although the current study has several methodological strengths, its major limitations are related to its lack of analysis to assess the scale's test-retest reliability and the methodology applied for data collection, which was exclusively online. Additionally, as the population was subject to mandatory confinement at home, this might limit the generalizability of the results to a general nonconfined population. Notwithstanding these limitations, it is important to point out that the scales were easy to administer and the online survey was accessible to participants who were in quarantine settings. Another limitation is the lack of a diagnostic tool that can objectively assess depression and anxiety. Nevertheless, the use of the HADS provides support for the validity of the FCV-19S-S, especially considering our finding that the FCV-19S-S correlated with depression, and especially with anxiety. Finally, other important variables, such as age and its impact on fear were not analyzed in depth. Future studies should analyze this variable with bigger samples to further understand whether age can explain the invariance and impact of fear.

In conclusion, the Spanish version of the FCV-19S appears to be a valid self-report measure for the assessment of fear in the adult population. The present study moves research forward by supporting the proposed factor structure and providing a confirmatory analysis of the influence of the gender variable (women). Given the scale's factor validity, high internal consistency and adequate correlation with the HADS, the FCV-19S-S can be recommended for use to assess fear in future research studies.

References

- Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). Fear of COVID-19 Scale: Development and initial validation. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00270-8>
- Alyami, M., Henning, M., Krägeloh, C. U., & Alyami, H. (2020). Psychometric evaluation of the Arabic version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00316-x>
- Baglin, J. (2014). Improving your exploratory factor analysis for ordinal data: A demonstration using FACTOR *Practical Assessment, Research & Evaluation*, 19, Article 5. <https://doi.org/10.7275/dsep-4220>
- Bitan, D. T., Grossman-Giron, A., Bloch, Y., Mayer, Y., Shiffman, N., & Mendlovic, S. (2020). Fear of COVID-19 scale: Psychometric characteristics, reliability and validity in the Israeli population. *Psychiatry Research*, 289, 113100. <https://doi.org/10.1016/j.psychres.2020.113100>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Centers for Disease Control and Prevention. (2020). *Coronavirus disease 2019 (COVID-19): Manage anxiety & stress*. <https://www.cdc.gov/coronavirus/2019-ncov/prepare/managing-stress-anxiety.html>
- Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., Han, Y., Qiu, Y., Wang, J., Liu, Y., Wei, Y., Xia, J., Yu, T., Zhang, X., & Zhang, L. (2020). Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *The Lancet*, 395(10223), 507–513. [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
- Curran, E., Rosato, M., Ferry, F., & Leavey, G. (2020). Prevalence and factors associated with anxiety and depression in older adults: Gender differences in psychosocial indicators. *Journal of Affective Disorders*, 267, 114–122. <https://doi.org/10.1016/j.jad.2020.02.018>
- Cortez, P. A., Joseph, S. J., Das, N., Bhandari, S. S., & Shoib, S. (2020). Tools to measure the psychological impact of the COVID-19 pandemic: What do we have in the platter? *Asian Journal of Psychiatry*, 53, 102371. <https://doi.org/10.1016/j.ajp.2020.102371>
- Garrido, L. E., Abad, F. J., & Ponsoda, V. (2013). A new look at Horn's parallel analysis with ordinal variables. *Psychological Methods*, 18(4), 454–474. <https://doi.org/10.1037/a0030005>
- Gjersing, L., Caplehorn, J. R., & Clausen, T. (2010). Cross-cultural adaptation of research instruments: Language, setting, time and statistical considerations. *BMC Medical Research Methodology*, 10(13), 13. <https://doi.org/10.1186/1471-2288-10-13>
- Glorfeld, L. W. (1995). An improvement on Horn's parallel analysis methodology for selecting the correct number of factors to retain. *Educational and Psychological Measurement*, 5(3), 377–393. <https://doi.org/10.1177/0013164495055003002>
- Goodyear, M. D., Krleza-Jeric, K., & Lemmens, T. (2007). The Declaration of Helsinki. *BMJ*, 335(7621), 624–625. <https://doi.org/10.1136/bmj.39339.610000.BE>
- Goretzko, D., Huong, T. T., & Bühner, M. (2019). Exploratory factor analysis: Current use, methodological developments and recommendations for good practice. *Current Psychology*, 19, 1–7. <https://doi.org/10.1007/s12144-019-00300-2>
- Graham, J. W. (2012). *Analysis and design*. Springer.
- Gudmundsson, E. (2009). Guidelines for translating and adapting psychological instruments. *Nordic Psychology*, 61(2), 29–45. <https://doi.org/10.1027/1901-2276.61.2.29>
- Gunnell, D., Appleby, L., Arensman, E., Hawton, K., John, A., Kapur, N., Khan, M., O'Connor, R. C., & Pirkis, J. (2020). Suicide risk and prevention during the COVID-19 pandemic. *The Lancet Psychiatry*, 7(6), 468–471. [https://doi.org/10.1016/S2215-0366\(20\)30171-1](https://doi.org/10.1016/S2215-0366(20)30171-1)
- Hambleton, R. K. (2005). Issues, designs and technical guidelines for adapting tests into multiple languages and cultures. In R. K. Hambleton, P. F. Merenda, & C. D. Spielberger (Eds.), *Adapting psychological and educational tests for cross-cultural assessment* (pp. 3–38). Erlbaum.
- Harper, C. A., Satchell, L. P., Fido, D., & Litzman, R. D. (2020). Functional fear predicts public health compliance in the COVID-19 pandemic. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00281-5>
- Herrero, M. J., Blanch, J., Peri, J. M., De Pablo, J., Pintor, L., & Bulbena, A. (2003). A validation study of the hospital anxiety and depression scale (HADS) in a Spanish population. *General Hospital Psychiatry*, 25(4), 277–283. [https://doi.org/10.1016/S0163-8343\(03\)00043-4](https://doi.org/10.1016/S0163-8343(03)00043-4)
- Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A. K., Shafran, R., Sweeney, A., . . . Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7(6), 547–560. [https://doi.org/10.1016/S2215-0366\(20\)30168-1](https://doi.org/10.1016/S2215-0366(20)30168-1)
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2), 179–185. <https://doi.org/10.1007/BF02289447>
- Jennrich, R. I. (1979). Admissible values of γ in direct oblimin rotation. *Psychometrika*, 44(2), 173–177. <https://doi.org/10.1007/BF02293969>
- Jeronimus, B. F. (2020). *Personality and the coronavirus Covid-19 pandemic*. University of Groningen Press.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Press.
- Li, W., Yang, Y., Liu, Z.-H., Zhao, Y.-J., Zhang, Q., Zhang, L., Cheung, T., & Xiang, Y.-T. (2020). Progression of mental health services during the COVID-19 outbreak in China. *International Journal of Biological Sciences*, 16(10), 1732–1738. <https://doi.org/10.7150/ijbs.45120>
- Liang, L., Ren, H., Cao, R., Hu, Y., Qin, Z., Li, C., & Mei, S. (2020). The effect of COVID-19 on youth mental health. *Psychiatric Quarterly*, 91(3), 841–852. <https://doi.org/10.1007/s1126-020-09744-3>
- Lin, C. Y. (2020). Social reaction toward the 2019 novel coronavirus (COVID-19). *Social Health and Behavior*, 3(1), 1–2. https://doi.org/10.4103/SHB.SHB_11_20
- Lloret-Segura, S., Ferreres-Traver, A., Hernández-Baeza, A., & Tomás-Marco, I. (2014). El análisis factorial exploratorio de los ítems: una guía práctica, revisada y actualizada [Exploratory item factor analysis: A practical guide revised and updated]. *Anales de Psicología/Annals of Psychology*, 30(3), 1151–1169. <https://doi.org/10.6018/analesps.30.3.199361>
- Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavior Research Methods*, 38(1), 88–91. <https://doi.org/10.3758/bf03192753>
- Lu, R., Zhao, X., Li, J., Niu, P., Yang, B., Wu, H., Wang, W., Song, H., Huang, B., Zhu, N., Bi, Y., Ma, X., Zhan, F., Wang, L., Hu, T., Zhou, H., Hu, Z., Zhou, W., Zhao, L., . . . Tan, W. (2020). Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *The Lancet*, 395(10224), 565–574. [https://doi.org/10.1016/S0140-6736\(20\)30251-8](https://doi.org/10.1016/S0140-6736(20)30251-8)
- Luceño-Moreno, L., Talavera-Velasco, B., García-Albuérne, Y., & Martín-García, J. (2020). Symptoms of posttraumatic stress, anxiety, depression, levels of resilience and burnout in Spanish health personnel during the COVID-19 pandemic. *Environmental Research and Public Health*, 17(15), 5514. <https://doi.org/10.3390/ijerph17155514>
- Mahase, E. (2020). China coronavirus: WHO declares international emergency as death toll exceeds 200 *BMJ*. <https://doi.org/10.1136/bmj.m408>
- Mamun, M. A., & Griffiths, M. D. (2020). First COVID-19 suicide case in Bangladesh due to fear of COVID-19 and xenophobia: Possible suicide prevention strategies. *Asian Journal of Psychiatry*, 51, 102073. <https://doi.org/10.1016/j.ajp.2020.102073>
- Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika*, 57(3), 519–530. <https://doi.org/10.1093/biomet/57.3.519>

- Martínez-Lorca, M., Martínez-Lorca, A., Criado-Álvarez, J. J., Armesilla, M. D. C., & Latorre, J. M. (2020). The fear of COVID-19 scale: Validation in Spanish university students. *Psychiatry Research*, *293*, 113350. <https://doi.org/10.1016/j.psychres.2020.113350>
- Ministerio de Sanidad, Consumo y Bienestar Social. (2020). *Situación de COVID-19 en España* [Situation of COVID-19 in Spain]. <https://cneocovid.isciii.es/covid19/>
- Muñiz, J., & Fonseca-Pedrero, E. (2019). Ten steps for test development. *Psicothema*, *31*(1), 7–16. <https://doi.org/10.7334/psicothema2018.291>
- O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers*, *32*(3), 396–402. <https://doi.org/10.3758/BF03200807>
- Pappas, G., Kiriakou, I. J., Giannakis, P., & Falagas, M. E. (2009). Psychosocial consequences of infectious diseases. *Clinical Microbiology and Infection*, *15*(8), 743–747. <https://doi.org/10.1111/j.1469-0691.2009.02947.x>
- Perz, C. A., Lang, B. A., & Harrington, R. (2020). Validation of the Fear of COVID-19 Scale in a U.S. college sample. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00356-3>
- Ransing, R., Ramalho, R., Orsolini, L., Adiukwu, F., Gonzalez-Diaz, J. M., Larnaout, A., Pinto da Costa, M., Grandinetti, P., Bytyçi, D. G., Shalhafan, M., Patil, I., Nofal, M., Pereira-Sanchez, V., & Kilic, O. (2020). Can COVID-19 related mental health issues be measured? assessment options for mental health professionals. *Brain, Behavior, and Immunity*. Advance online publication. <https://doi.org/10.1016/j.bbi.2020.05.049>
- Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests*. Danish Institute for Educational Research
- Reznik, A., Gritsenko, V., Konstantinov, V., Khamenka, N., & Isralowitz, R. (2020). COVID-19 fear in Eastern Europe: Validation of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00283-3>
- Rodríguez-Ayán, M. N., & Ruiz-Díaz, M. A. (2008). Atenuación de la asimetría y de la curtosis de las puntuaciones observadas mediante transformaciones de variables: Incidencia sobre la estructura factorial [Attenuation of the asymmetry and kurtosis of the observed scores through transformations of variables: Incidence on the factorial structure]. *Psicológica: Revista de Metodología y Psicología Experimental*, *29*(2), 205–227.
- Rothan, H. A., & Byrareddy, S. N. (2020). The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*, *109*, 102433. <https://doi.org/10.1016/j.jaut.2020.102433>
- Sakib, N., Bhuiyan, A., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A. H., Sarker, M. A., Mohiuddin, M. S., Rayhan, I., Hossain, M., Hossain, M. T., Hossain, D., Muhit, M., Islam, S., Griffiths, M. D., Pakpour, A. H., & Mamun, M. A. (2020). Psychometric Validation of the Bangla Fear of COVID-19 Scale: Confirmatory Factor Analysis and Rasch Analysis. *International Journal of Mental Health and Addiction*, 1–12. Advance online publication. <https://doi.org/10.1007/s11469-020-00289-x>
- Satici, B., Saricali, M., Satici, S. A., & Griffiths, M. D. (2020). Intolerance of uncertainty and mental wellbeing: Serial mediation by rumination and Fear of COVID-19. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00305-0>
- Robles-Bello, M. A., Sánchez-Teruel, D., & Valencia Naranjo, N. (2020). Variables protecting mental health in the Spanish population affected by the COVID-19 pandemic. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-020-01132-1>
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and Clinical Neurosciences*, *74*(4), 281–282. <https://doi.org/10.1111/pcn.12988>
- Sloan, M. M., Haner, M., Graham, A., Cullen, F. T., Pickett, J. T., & Jonson, C. L. (2020). *Pandemic emotions: The extent, correlates and mental health consequences of personal and altruistic fear of COVID-19* (Working paper). University of South Florida.
- Smithsonian Science Education Center. (2020). *Covid-19! How can I protect myself and others?* Retrieved from <https://ssec.si.edu/covid-19>
- Soraci, P., Ferrari, A., Abbiati, F. A., Del Fante, E., De Pace, R., Urso, A., & Griffiths, M. D. (2020). Validation and psychometric evaluation of the Italian version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*. Advance online publication. <https://doi.org/10.1007/s11469-020-00277-1>
- Terol, M. C., López-Roig, S., Rodríguez-Marín, J., Martín-Aragón, M., Pastor, M. A., & Reig, M. T. (2007). Propiedades psicométricas de la escala Hospitalaria de Ansiedad y Depresión (HADS) en población Española [Psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in the Spanish population]. *Ansiedad y Estrés*, *13*, 163–176.
- Timmerman, M. E., & Lorenzo-Seva, U. (2011). Dimensionality assessment of ordered polytomous items with parallel analysis. *Psychological Methods*, *16*(2), 209–220. <https://doi.org/10.1037/a0023353>
- Usher, K., Bhullar, N., & Jackson, D. (2020). Life in the pandemic: Social isolation and mental health. *Journal of Clinical Nursing*, *29*(15-16), 2756–2757. <https://doi.org/10.1111/jocn.15290>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, *17*(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- Wang, Y., Di, Y., Ye, J., & Wei, W. (2020). Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology Health and Medicine*. Advance online publication. <https://doi.org/10.1080/13548506.2020.1746817>
- World Health Organization (WHO). (2020). *Rolling updates on coronavirus disease (COVID-19)*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>
- Wu, T. Y., Lin, C. Y., Årestedt, K., Griffiths, M. D., Broström, A., & Pakpour, A. H. (2017). Psychometric validation of the Persian nine-item Internet Gaming Disorder Scale–Short Form: Does gender and hours spent online gaming affect the interpretations of item descriptions? *Journal of Behavioral Addictions*, *6*(2), 256–263. <https://doi.org/10.1556/2006.6.2017.025>
- Yao, H., Chen, J. H., & Xu, Y. F. (2020). Patients with mental health disorders in the COVID-19 epidemic. *The Lancet Psychiatry*, *7*(4), e21. [https://doi.org/10.1016/S2215-0366\(20\)30090-0](https://doi.org/10.1016/S2215-0366(20)30090-0)
- Zhang, J., Wu, W., Zhao, X., & Zhang, W. (2020). Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: A model of West China Hospital. *Precision Clinical Medicine*, *3*(1), 3–8. <https://doi.org/10.1093/pcmedi/pbaa006>
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, *67*(6), 361–370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>

Received August 19, 2020

Revision received March 3, 2021

Accepted March 21, 2021 ■