Development and Initial Validation of the Coronavirus Pandemic Anxiety Scale

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ABSTRACT

Aims This paper aimed to report the development and validation of the Coronavirus Pandemic Anxiety Scale, for assessing COVID-19-related anxiety.

Instrument & Methods This is a methodological and psychometric study, we developed a 7-Item Generalized anxiety disorder of COVID-19 scale to measure symptoms of anxiety related to the COVID-19 pandemic to help identify people who might need mental health services. In developing the generalized anxiety disorder of COVID-19 scale items, we considered a previous theory and research on anxiety symptoms and symptoms reported in Iran. The scale was validated in the Razavi Khorasan (N=500).

Findings The CVR in this study for the total scale was 0.81 indicating a satisfactory result. Also, the CVI for the scale was 0.78, and the scale had good content validity. Confirmatory factor analysis showed a good fit for the seven-factor model. generalized anxiety disorder of covid-19 scale showed good internal consistency.

Conclusion The results support the viability of generalized anxiety disorder on the COVID-19 scale as a tool to identify individuals experiencing COVID-19-related anxiety.

Keywords COVID-19; Coronavirus; Pandemic; Anxiety; Mental Health

CITATION LINKS

[1] Characteristics of and important lessons from ... [2] COVID-19 vaccination coverage in low-income areas: outcomes ... [3] Community behavioral and perceived responses in ... [4] A first course in structural equation ... [5] Coronavirus Pandemic Anxiety Scale (CPAS-11): development ... [6] Mental Health and the Covid-19 ... [7] Health effects of overweight and obesity in 195 countries ... [8] Coronavirus Anxiety Scale: A brief ... [9] Mass hysteria ... [10] Online mental health services ... [11] Unprecedented disruption of lives and ... [12] The relationship between self-efficacy, self-care behavior ... [13] Psychiatry of ... [14] A longitudinal study on the mental health of general population ... [15] Prevalence of anxiety in the COVID-19 ... [16] Effectiveness of combined intervention ... [17] Iranian mental health during the ... [18] A brief measure for assessing generalized ... [19] Psychometric theory ... [20] Designing and psychometric evaluation of stretching ... [21] Psychometric measure continuous variables ... [22] A first course in structural equation ... [23] Latent variable models: an introduction to factor, path, and ... [24] Psychometric Properties of the Iranian Version of the ... [25] Sex and age differences in clinically significant symptoms of depression and ... [26] Fear of the coronavirus (COVID-19): Predictors in an ...

Introduction

The COVID-19 is now a known virus disease fatality rate ranging from 2.5% to 3% [1]. The emergence of the coronavirus 2019 pandemic (COVID-19) [2, 3], with its rapid transmission rate and relatively high mortality. The studies showed as the pandemic seems to sustain and lead to long exposure to social isolation and undesirable economic effects, researchers and clinical specialists have expressed concern about the potential negative effects of COVID-19 on the mental health of the general public [4]. So that the World Health Organization (WHO) drew attention to the mental health impact of the global outbreak of coronavirus (COVID-19), which is still spreading in many parts of the world [5].

Previous research on natural and man-made disasters has shown that emotional distress and other psychological symptoms permeate affected populations, and this pattern applies to populations affected by the COVID-19 epidemic [5-7]. Furthermore, the research showed mass tragedies, especially those that include infectious diseases often trigger the intensification of fear and anxiety, which is known as a widespread disorder in the behavior and mental well-being of many people [8-10]. The outbreak of the COVID-19 pandemic is having a strong impact on individuals and it is a very stressful period [11, 12] and according to the authors, factors such as quarantine, inadequate information, fears of infection, stigma, or financial loss were relevant to higher negative psychological impact [6, 13, 14]. Recent studies produced evidence supporting these concerns [15]. For example, Gao *et al.* showed that 0.9% were suffering from severe anxiety. Furthermore, Anxiety is one of the issues that people face in an epidemic situation. Meanwhile, generalized anxiety disorder (GAD) is characterized specifically by extreme and persistent, which is uncontrollable and pervasive, and the resulting anxiety focuses on all events of daily life [16]. The study [17] by title Iranian mental health during the COVID-19 epidemic suggested one of the most stressful situations is the unpredictability of the situation doubt about when to control the disease and the seriousness of the risk. Also, previous study epidemics and pandemics show that anxiety is an important stimulus behavior [7].

According to the importance of anxiety in shaping behavior during a viral epidemic and anxiety can lead to long-term mental health problems, mental health professionals, public health decision-makers, and other stakeholders in the long-term COVID-19 epidemic must have access to data on the prevalence of anxiety and other adverse psychological reactions to epidemics in communities [5].

In this study, we developed and validated a mental health tool to assess COVID-19-related anxiety. The scale development process considered current knowledge about anxiety symptoms as well as symptoms identified in Iran. Although our trend is largely based on the Iran experience, we believe that the items on the scale should be appropriate to different countries that also experience widespread virus quarantine, forced social isolation, and physical distancing. This paper aimed to report the development and validation of the Coronavirus Pandemic Anxiety Scale (GAD-19S), for assessing the COVID-19 related anxiety.

Instrument and Methods

This is a methodological and psychometric study. A total of 500 individuals participated in the online survey in the Razavi Khorasan Province from 19 March 2020 to 13 April 2020. Participants were asked to report their age, gender, education, occupational status, and history of anxiety. In addition to regarding demographics, current anxiety is measured by generalized anxiety disorder of COVID-19 (GAD-19S). A self-report measure aimed at assessing anxiety of COVID-19. The scale consists of seven items about emotional anxiety reactions to the pandemic.

Candidate Items Selection a systematic search for existing anxiety scales was conducted using several search engines. Google Scholar, Microsoft Academic, Psychiatry.org using the keywords anxiety scale, anxiety instrument, and anxiety measure. Generalized anxiety disorder (GAD) questionnaire selected. Then, a committee of three researcher's evaluated items of GAD intending to develop a scale that more closely reflects the symptoms associated with anxieties during the current COVID-19 outbreak in Iran. The seven-item scale is used to assess symptoms of generalized anxiety disorder [18], as indicated in the DSM-5. Participants were also to think about how often they experienced the symptoms in the past two weeks. The generalized anxiety disorder questionnaire measures the severity of symptoms of generalized anxiety disorder over the past two weeks. Participants are requested on a four-item Likert-type scale ranging from 0 (never) to 3 (nearly every day). The total score was from 0 to 21, with a higher sum score indicating higher anxiety of COVID-19 and with increasing scores indicating 17 more severe functional impairments as a result of anxiety. The provisional scale then was held in focus groups with ten participant's similar population research. They stated their opinions about the words and phrases in each item, and clear to understand, and misunderstanding of the questions. In general, there were no major problems in reading and understanding the items, however, a few words were changed. Content Validity was assessed by an expert panel (5 specialists in health education professionals and 5 psychologists) and calculated Content Validity Ratio (CVR) and the Content Validity Index (CVI). An online survey proceeded

and participants were recruited through social media sites and were asked whether they were still home quarantined. The survey was live online for exactly 24 days. All the recorded responses to the online survey were found to be valid and all participants gave their informed consent, so no data from any participants were excluded from the analysis. As can be seen, the majority of the participants were women, 74.2% (N=371) and 65.4% (N=327). The majority of the sample was either below 30 years of age or in the 18-27 age group. The mean age of participants was 31.9±11.91 years. About 68.6% of the sample had higher education. The confirmatory factor analysis was done. Internal consistency was estimated by computing a Cronbach's Alpha coefficient. The alpha values of 0.70 were considered satisfactory [19]. In the current study, the GAD-19S scale showed good internal consistency, with a Cronbach's alpha of 0.80.

The study was developed and conducted during the COVID-19 pandemic outbreak in Iran (19 Feb 2020 to 13 March 2020). An online survey was circulated on different online lists and social media platforms. The sample is consistent with the residents of the province in the Razavi Khorasan Province that were randomly surveyed.

The data were analyzed using the Lisrel software (V.8), and the descriptive statistical procedure for demography characterizes the participatory and self-reported generalized anxiety disorder scale during the epidemic COVID-19. The confirmatory factor analysis (CFA) was conducted to investigate the domains of GAD. Maximum likelihood estimation was used to estimate the model and good fitness indicators (GFI) were used to evaluate the fit of the model. In order to assess sampling adequacy to perform, the Kaiser-Meyer-Olkin measure (KMO) and Bartlett test were calculated [20, 21]. The calculated KMO was 0.80 so it shows an adequate sample size. Bartlett's test of the sphericity was significant (p<0.001). KMO index show adequate sample size and satisfactory factor analysis. Therefore, the factor finding was justifiable. The indicators used in CFA were: The Comparative Fit Index (CFI), Normed Fit Index (NFI), Root Mean Squared Error of Approximation (RMSEA), and Goodness of Fit Index (GFI). Indicators CFI, GFI, and NFI greater than 0.9 indicate a good fit of the model, and index RMSEA> 0.1 indicates a poor fit of the model [22, 23]. Reliability analysis was then followed using Cronbach's alpha analysis.

Findings

A total of 500 responders participate in the study. Most of the participants were women, 74.2% (N=371) and 65.4% (N=327) were married and 68.6% (N=343) had a university education. As can be seen, the majority of the sample was either below

30 years of age or in the 18-27 age group. The mean age of participants was 31.9±11.91 years. About 68.6% of the sample had higher education. Twenty-six percent (26.4%) reported that they had respiratory symptoms in the last 14 days, and Twenty percent (20%) of the sample reported that they had a travel history in the last month. Seventy-eight percent (78%) reported that they had severe anxiety. The results are shown in Table 1.

Table 1) Demographic characteristics of the study sample (n=500)

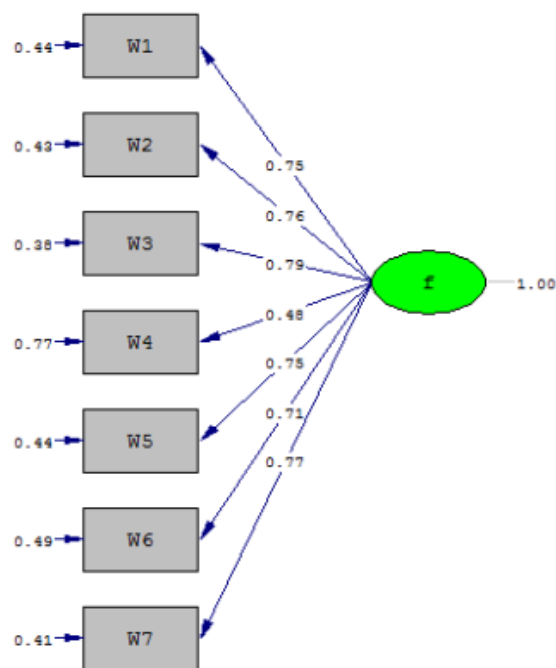| Characteristics	Number	Percent
Sex		
Male	129	25.8
Female	371	74.2
Age (years)		
18-27	213	42.6
28-37	144	28.8
38-47	84	16.8
48-57	42	8.4
58 or above	17	3.4
Educational level		
Elementary and lower	35	7
Middle school	18	3.6
High school and diploma	104	20.8
Graduate	343	68.6
Employment status		
Employee	188	43.6
Employer	14	2.8
Housekeeper	218	43.6
Retired	12	2.4
Unemployed	68	13.6

The CVR in this study for the total scale was 0.81 indicating a satisfactory result. Also, the CVI for the scale was 0.78 recommended the scale had good content validity.

The structural validity of GAD-19S was determined by Confirmatory Factor Analysis (CFA) using the statistic software Lisrel software (V.8), The results of factor loadings and item-total correlations Generalized Anxiety Disorder of the COVID-19 measure are shown in Table 2.
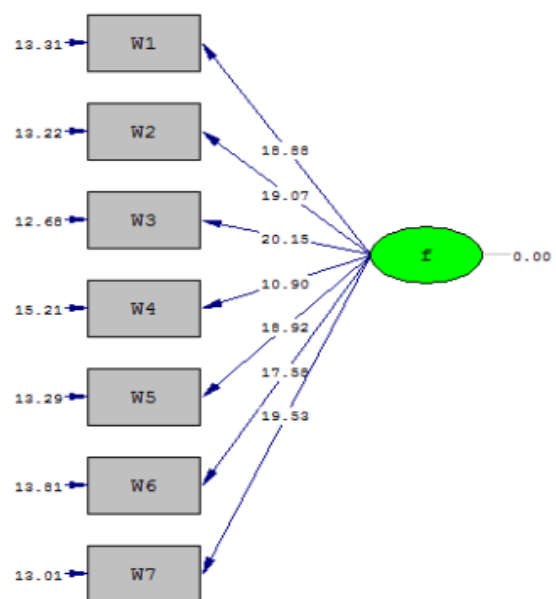
Table 2) Factor loadings and item-total correlations generalized anxiety disorder of the COVID-19 measure

Items	Factor	Loading	t statistic
1. I feel anxious and nervous	0.44	0.75	18.88
2. I Can't control my anxiety.	0.43	0.76	19.07
3. I'm too worried about different things in life.	0.38	0.79	20.15
4. It is difficult for me to stay calm.	0.77	0.48	10.90
5. I'm so restless I can't sit comfortably.	0.44	0.75	18.92
6. I easily get angry and irritable.	0.49	0.71	17.56
7. I feel afraid if something bad may happen.	0.41	0.77	19.53

Further, the findings of the standard operating loads on the factor structure of the Persian version of GAD and T-statistics on the factor structure of the Persian version of GAD were presented. Based on the results, the model was confirmed (Figures 1 & 2; Table 3).

a newly developed scale designed to evaluate different aspects of anxiety disorder of the COVID-19 pandemic, in the population of Iran. The total scale showed good internal consistency. The results of a study by Mohammadpour *et al.* [24] internal consistency were found to be 91.5 which was more reported compared to our study.

Overall, the findings indicated satisfactory psychometric properties for the GAD-19S. The CVI and the CVR indicated that content validity of the GAD-19S scale was advisable. Furthermore, the results of the CFA showed a good structure for the GAD-19S scale.

The results showed in our study the structures of generalized anxiety disorder are 7 items and the fourth item is the weakest item and the second item is the strongest so that in our study other items are better indexed.

The results of the current study provide further support for the validity and reliability of the GAD-19S, demonstrating strong psychometric properties among Iran's population.

Exploring the association between generalized anxiety disorder of COVID-19 and different demographic and pandemic-related factors, our analyses suggested that women show increased anxiety compared to men. These findings correspond with recent studies [4, 22] which show the same trend. The higher rates of anxiety among women, can be related to gender differences in sensitivity to stress, because females are more vulnerable to stress and also have an increased risk of mental disorders [23]. Karin Hammarberg *et al.* [25] in considering depression and anxiety among people in Australia suggested women were more likely than men to have clinically significant symptoms of anxiety(21.8% (95%CI 21.0 to 22.6) vs 14.2% (95%CI 13.0 to 15.4), p<0.001) which is consistent with the results of the present study. In the study by Mertens *et al.* [26] 439 participants from 28 countries in the world, personal relevance, such as health risk for loved ones were found to predict fear of COVID-19. It may be suggested that personal increased risk or personal loss, can influence an individual's perceived coping potential threat, and when the personal risk is perceived to be high, the coping ability may be reduced and thus affecting the overall levels of fear of such a potential exploratory path should be subjected to additional research.

Although the study has several strengths, such as the large sample of the general population in Iran, several limitations should also be noted. First, surveying with self-report measures entails potential bias, given that the responses may be affected by factors such as social preferences. Future studies should aim to use other measures that would enable more in-depth analysis. Second, although the sample evaluated in the present study was large, convenience sampling may be limited in its ability to research all sections of the population). Finally, the

Figure 1) Standard operating loads on the factor structure of the Persian version CGAD

Figure 2) T-statistics in the factor structure of the Persian version of CGAD

Table 3) Results of fitness in the confirmatory factor analysis model (N=500)

Fitness indicators	Sub-scales
RMSEA	0.1
NFI	0.95
GFI	0.93
CFI	0.95
$\chi 2/(df)$	3.51
p-value	0.001

Discussion

The GAD-19S was developed and initially validated on a sample of adults. In this study, we aimed to assess the psychometric properties of the GAD-19S,

fact that a large percentage of the sample contains female participants might affect the generality of our results. Despite these limitations, our findings provide support for the efficiency of the version of the GAD-19S, as well as highlight its potential in clinical and research settings.

Conclusion

The results support the viability of GAD-19S as a tool to identify individuals experiencing COVID-19-related anxiety.

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