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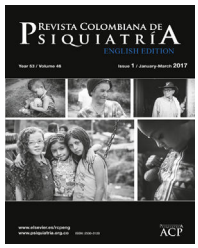

Original article

GAD-7 Generalised Anxiety Disorder scale in Colombian medical professionals during the COVID-19 pandemic: Construct validity and reliability

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ABSTRACT

Introduction: The detection of anxiety symptoms among health workers who care for patients infected with COVID-19 is a current priority. Fast and valid instruments are required for this population group. The objective is to establish the construct validity and reliability of the Generalised Anxiety Disorder (GAD-7) scale in Colombian doctors during the COVID-19 lockdown.

Methods: E-health study, in which cross-sectional data were collected online (n = 1030) from 610 COVID doctors and 420 non-COVID doctors, during the Colombian lockdown, between 20 April and 10 August 2020. Each subject was contacted, and they confirmed their participation, identity and professional role.

Results: A single factor factorial structure was found, made up of the 7 items of the instrument, which managed to explain 70% of the variance. The goodness of fit indices (RMSEA = 0.080; CFI = 0.995; SRMR = 0.053; $p < 0.001$) showed an "acceptable" unidimensionality and adequate factor loadings in each item of the GAD-7, >0.070. Finally, the internal consistency of the instrument was good, with a Cronbach's alpha of 0.920 (95%IC, 8.80–9.71).

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Conclusions: The GAD-7 is an instrument that presents adequate indicators of validity and reliability. It is an excellent tool that is reliable and easy and fast to use for the detection of generalised anxiety symptoms in medical personnel caring (or not) for patients infected with COVID-19.

Escala de ansiedad generalizada GAD-7 en profesionales médicos colombianos durante pandemia de COVID-19: validez de constructo y confiabilidad

Palabras clave:
GAD-7
Ansiedad
Psicometría
COVID-19
Personal sanitario

R E S U M E N

Introducción: La detección de síntomas de ansiedad entre el personal sanitario que atiende a pacientes contagiados de COVID-19 es una prioridad actual. Se requieren instrumentos rápidos y válidos para esta población. El objetivo es establecer la validez de constructo y la confiabilidad de la Escala de Ansiedad Generalizada (GAD-7) en médicos colombianos durante la cuarentena por la COVID-19.

Métodos: Estudio eSalud, en el que se recopilaron datos transversales en línea (n = 1.030) de 610 médicos de COVID y 420 no de COVID durante la cuarentena colombiana, entre el 20 de abril y el 10 de agosto de 2020. Se contactó con cada sujeto, que confirmó participación, identidad y función profesional.

Resultados: Se encontró una estructura factorial de 1 solo factor, conformado por los 7 ítems del instrumento, que logró explicar el 70% de la varianza. Los índices de bondad de ajuste (RMSEA = 0,080; CFI = 0,995; SRMR = 0,053; p < 0,001) mostraron una unidimensionalidad «aceptable» y adecuadas cargas factoriales en cada ítem del GAD-7, >0,07. Por último, la consistencia interna del instrumento fue buena, con alfa de Cronbach = 0,920 (IC95%, 8,80–9,71).

Conclusiones: El GAD-7 es un instrumento que presenta indicadores adecuados de validez y confiabilidad. Es un excelente instrumento, confiable, fácil y rápido de usar para la detección de los síntomas de ansiedad generalizada en personal médico, atienda o no a pacientes contagiados de COVID-19.

Introduction

Generalised anxiety is a mental disorder in which a person is often worried or anxious about one or more situations, and finds it difficult to control their symptoms.[1] Although the aetiology is unknown, it is usually caused by significant exposure to a stressful event or the accumulation of stressful situations. A later psychological reaction characterises it once the stressor has ceased and is usually accompanied by depression.[2]

Recent evidence reports a significant increase worldwide in the burden of generalised anxiety, among other mental disorders, among medical staff in direct contact with patients with COVID-19.[3–5] The first descriptions were of Chinese healthcare workers, with a prevalence of anxiety of 44.7%. Healthcare staff who have had direct contact with patients with COVID-19 have experienced symptoms of anxiety and greater psychological distress than other healthcare professionals and are twice as likely to suffer from anxiety and depression.[5–7] The effects of the pandemic on the mental health of these healthcare professionals can be significant, so it is necessary to have brief and useful instruments which enable cases to be detected quickly, taking into account the therapeutic options and the need to improve the mental health of the medical staff.[8,9]

The availability of brief, easy-to-use instruments capable of detecting psychological disturbances in the current pandemic has become relevant,[10,11] due to the advantages they offer in different healthcare settings, where workloads are high and time is scarce. The Generalised Anxiety Scale (GAD-7) was originally developed in English as a brief screening tool capable of detecting anxiety.[12] This original study reported adequate reliability (0.92) and validity (0.83) values. Since then, its psychometric properties have been examined in various countries.[13–15]

There are no data published in Colombia on the psychometric properties of GAD-7, except for one study that used it to analyse psychosocial factors associated with symptoms of generalised anxiety disorder in general practitioners during the COVID-19 pandemic.[16] Therefore, in this study, the construct validity and reliability of the GAD-7 scale were analysed in Colombian medical professionals during the COVID-19 pandemic, with the premise that healthcare workers have a quick

Table 1 – Descriptives of GAD-7.

Items	Mean	Standard deviation	Kurtosis	Asymmetry	Confidence interval	
					Lower limit	Upper limit
1	1.28	0.890	−0.550	0.380	1.230	1.350
2	1.04	0.870	−0.470	0.500	0.970	1.110
3	1.39	0.880	−0.660	0.200	1.320	1.460
4	1.45	0.930	−0.820	0.180	1.380	1.520
5	1.04	0.880	−0.430	0.530	0.970	1.110
6	1.40	0.900	−0.730	0.200	1.330	1.470
7	1.33	0.960	−0.870	0.250	1.260	1.410

and reliable instrument to help improve the identification of generalised anxiety.

Methods

The eSalud[15] cross-sectional study included 1030 Colombian doctors during the COVID-19 pandemic, evaluated in the second half of 2020 using an online questionnaire.

Participants

Medical staff were recruited through social media, advertisements and institutional emails. Of the total population, 610 cared for patients with COVID-19 and 420 did not provide clinical services to these patients. There were 629 women (61%), 377 men (36.6%) and 24 of another gender (2.4%); the mean age was 37.18 ± 8.24 years. We included 428 specialist doctors (41.6%), 168 residents (16.3%), 296 general practitioners (28.7%) and 138 interns (13.4%); 61.7% (636) reported working in private clinics and 38.3% (394) in public hospitals. They all completed a Google form which contained informed consent. They did not receive financial compensation for their participation but simply a report of results and a guide of clinical guidelines for dealing with anxiety. The instrument's online assessment took two minutes.

Instrument

The GAD-7 is a 7-item self-administered instrument widely used to assess generalised anxiety disorder in the previous two weeks, according to the DSM-5.[1] Each item is scored on a 4-point Likert scale to indicate the frequency of symptoms, ranging from 0 (not at all) to 3 (almost every day). The GAD-7 total score can range from 0 to 21, with a score ≥10 indicates generalised anxiety disorder. The original study reported adequate sensitivity (0.92) and specificity (0.83) values.[17] Since then, good psychometric properties of the instrument have been reported worldwide[18,19] and it is widely used in different mental health contexts.[20,21] We used the version of the GAD-7 adapted for Peru,[22] with the appropriate language adaptations for the Colombian population.

Statistical analysis

A construct validity analysis was carried out through an exploratory factor analysis (EFA), following the KMO and sphericity criteria according to the nonorthogonal oblimin method. For the confirmatory factor analysis (CFA), we used the weighted least squares method adjusted to the mean and variance (WLSMV). For the goodness-of-fit criteria, the following criteria were used: coefficient of root mean square error of approximation of population values, with an adequate value of fit (RMSEA), general fit index (GFI) and the standardised root mean square residual (SRMR). Reliability was then analysed using Cronbach's alpha coefficient and the item-total correlation based on the final items of the instrument. The R program version 1.3.1056 was used.

Formal aspects

The authors affirm that all procedures contributing to this work complied with the ethical standards of the relevant national and institutional committees on human experimentation and the 1975 Declaration of Helsinki, as revised in 2008. Informed consent was obtained online from all study subjects. Once the evaluation was completed, each subject was contacted by email to confirm participation in the study and deliver the results report along with a document with psychological and clinical guidelines. The study was approved by the ethics committee of the Universidad de La Costa (Minute No. 86-2020). Research project code INV.140-02-004-15.

Results

Table 1 shows the descriptive mean ± standard deviation, kurtosis and skewness and the confidence intervals based on the mean of the items that make up the GAD-7 scale.

Exploratory factor analysis

The EFA showed values which allowed a factor analysis (KMO = 0.930; Bartlett <0.001). The nonorthogonal analysis with the oblimin method determined a factorial structure of one single factor comprised of the seven scale items, which explained 73% of the variance. Table 2 shows the factor loading and communality of GAD-7.

Confirmatory factor analysis

To report the unidimensional nature of the GAD-7, the CFA was carried out taking into account the goodness of fit

Table 2 – Factor loadings and communality of the GAD-7 scale.

	Factor 1	Communality
Over the last two weeks, have you felt nervous, anxious, or on edge?	0.86	0.74
Over the last two weeks, have you been unable to stop or control worrying?	0.84	0.69
Over the last two weeks, have you been worrying too much about different things?	0.88	0.76
Over the last two weeks, have you had trouble relaxing?	0.92	0.83
Over the last two weeks, have you been so restless that it is hard to sit still?	0.84	0.72
Over the last two weeks, have you been becoming easily annoyed or irritable?	0.76	0.67
Over the last two weeks, have you feared something awful might happen?	0.78	0.71

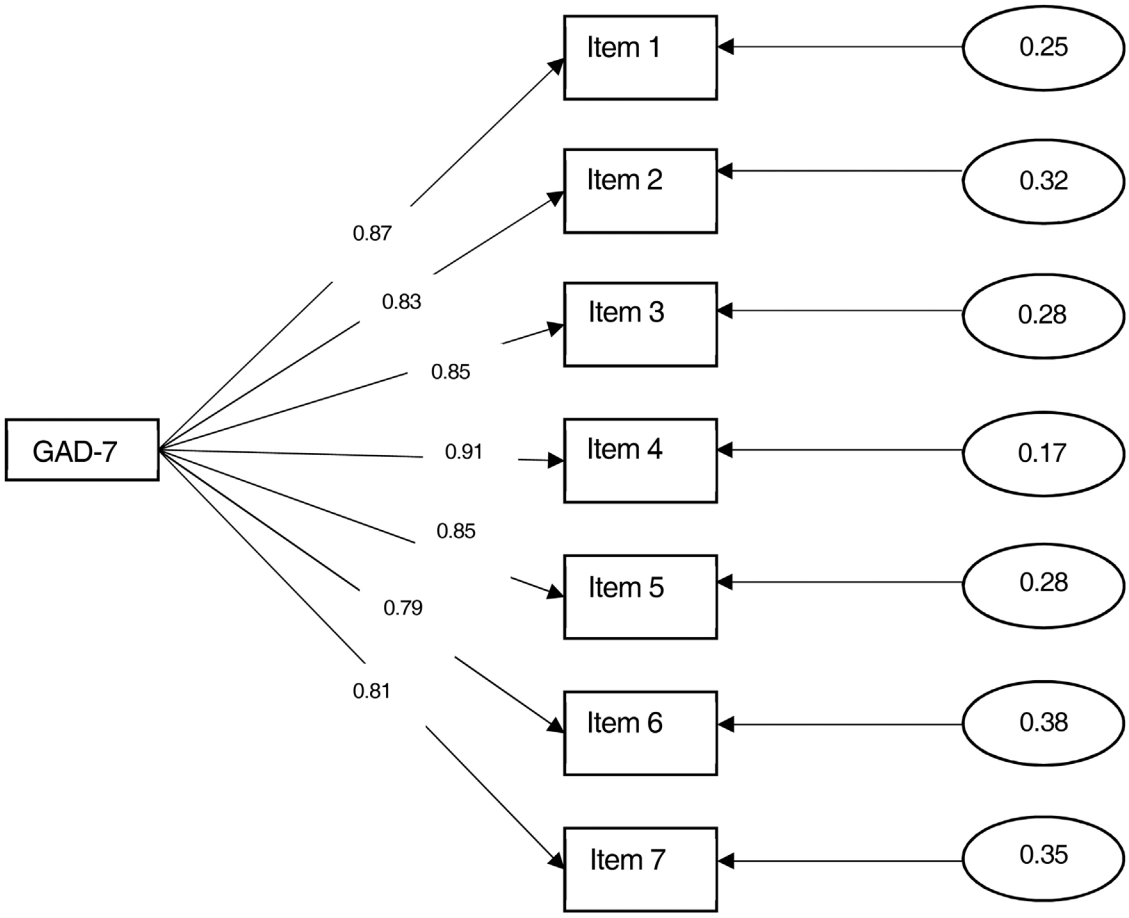

Fig. 1 – One-dimensional structure of the GAD-7 scale (RMSEA = 0.080; CFI = 0.995; SRMR = 0.053; p < 0.001).

indices (RMSEA = 0.080; CFI = 0.995; SRMR = 0.053; p < 0.001) and showed "acceptable" unidimensionality. Fig. 1 shows the factor structure for the seven items of the GAD-7, where all factor loadings were >0.07.

Reliability analysis

Considering the EFA and CFA models, we analysed internal consistency, estimated using Cronbach's alpha. The internal consistency of the GAD-7 was good ($\alpha = 0.920$; confidence interval, 8.80–9.71). Table 3 shows that the alpha value does not increase even if some of the final items of the instrument are eliminated. The item-total correlations range from 0.674 to 0.732, above the minimum level of 0.300.

Discussion

In our study, we wanted to analyse the psychometric properties of the GAD-7 to identify generalised anxiety in Colombian doctors during the COVID-19 quarantine. Preliminary findings revealed that the seven items of the GAD-7 comprise one single factor: the generalised anxiety construct. Furthermore, each item that make up the scale has adequate factor weights and no item presented communalities <0.40 (range, 0.67–0.83). This has been reported in previous studies,[20,21,23] demonstrating the usefulness and saturation of each of the items on the scale to constitute the theoretical construct and identify anxiety quickly and reliably with an instrument of few items. The results produced by the instrument are also consistent with the findings in other questionnaires that evaluate anxiety.[24]

Table 3 – Descriptive statistics and internal consistency of GAD-7.

	Mean	Standard deviation	Item/total correlation	Deleting the item, α
Over the last two weeks, have you felt nervous, anxious, or on edge?	1.33	0.890	0.732*	0.905
Over the last two weeks, have you been unable to stop or control worrying?	1.08	0.872	0.674*	0.912
Over the last two weeks, have you been worrying too much about different things?	1.44	0.878	0.701*	0.909
Over the last two weeks, have you had trouble relaxing?	1.49	0.924	0.777*	0.900
Over the last two weeks, have you been so restless that it is hard to sit still?	1.07	0.890	0.709*	0.908
Over the last two weeks, have you been becoming easily annoyed or irritable?	1.46	0.893	0.668*	0.914
Over the last two weeks, have you feared something awful might happen?	1.39	0.959	0.694*	0.911
Total GAD-7	9.26	5.190		

* $p < 0.01$.

Regarding internal consistency values, the GAD-7 reports high reliability (0.920), which makes it an excellent candidate for identifying generalised anxiety in healthcare workers without the need to reduce or eliminate items from the instrument. There are currently few scales that meet these conditions: quick administration; not requiring item deletion; and high Cronbach's alpha values.[25] The DASS-21[26] is one of the most widely used scales to measure generalised anxiety, easy to answer and with adequate psychometric properties,[18,19,21] but as it measures other constructs such as stress and depression, completing it requires more time, it is somewhat counterproductive in the contexts of work pressure and current viral contingencies.

Although our findings show adequate psychometric values which validate and generate confidence in applying the GAD-7 to Colombian healthcare professionals, the research is not free of limitations. The sampling was not probabilistic, which impacts the generalisation of the findings. The use of the Internet limits the opportunity to participate in a significant number of medical professionals who work in geographic regions with little coverage. However, e-health platforms and technological supports have proven useful for the current pandemic context.[27] Finally, it is necessary to carry out criterion validity studies with clinical samples and analyse the instrument in various contexts to more safely extrapolate the results of the instrument to the general population and provide greater evidence in favour of the instrument.

With these limitations in mind, it can be concluded that the psychometric properties obtained demonstrate that the GAD-7 reflects adequate validity and reliability indicators. We conclude that the GAD-7 is an excellent, reliable and easy-to-use instrument for detecting symptoms of generalised anxiety in medical staff, whether or not they are looking after patients with COVID-19. In an upcoming international multicentre study, where the health, anxiety, stress and depression situation of Latin American healthcare workers will be analysed, we hope that the GAD-7 will help anticipate the mental health climate of physicians as global trends due to COVID-19 continue to evolve.

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Conflicts of interest

The author has no conflicts of interest to declare.

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