



Reliability and Validity of the COVID -19 Anxiety scale in a Sample of Greek Medical Doctors

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Abstract

Background: During recent COVID-19 pandemic, health professionals were faced with a tremendous workload and had to make difficult decisions. As in similar pandemics in the past, health professionals had reported anxiety, low mood and increased stress, resulting in psychological distress.

Aim: This study aimed to examine the validity and the reliability of a new measurement tool, the COVID-19 anxiety questionnaire in the Greek medical doctors. The tool aimed to assess distress in doctors who worked in hospital during COVID-19 pandemic.

Methods: The Perceived Stress Scale (PSS), the Depression Anxiety Stress scale (DASS) were used together with the COVID-19 anxiety scale. Also, certain sociodemographic characteristics were assessed. Exploratory Factor Analysis (EFA) was used to identify possible factors from C-19 Anxiety scale. Cronbach's a and Spearman's rho were also used.

Results: The sample consisted of 179 Greek medical doctors (87.2% males) with mean age 50.73 years. The results of EFA results indicated only one factor for the COVID-19 Anxiety scale (2 questions were excluded from the final factor due to small loadings) which explained the 65.38% of total variance. Cronbach's a was 0.967 and COVID-19 anxiety scale was positively correlated with PSS-14 ($p < 0.001$) and the 2 subscales of DASS-21 (Stress and Depression) ($p < 0.001$ for both subscales), while it was negatively correlated with DASS-Anxiety ($p < 0.05$).

Conclusion: The findings of this study showed that the Greek version of C-19 Anxiety questionnaire has good psychometric properties and can be safely used in future studies.

Keywords: COVID-19 pandemic; Greek medical doctors; Anxiety; Depression; Stress

Introduction

During the COVID-19 pandemic, various emotional changes occurred in the population. These changes can be described as normal such as stress, anxiety and the result of depression [1]. In similar pandemics in the past, health professionals had reported anxiety, low mood and increased stress [2-4], resulting in psychological distress after one year of observation and post-traumatic stress symptoms, within a few days of the onset of the cause [3,4].

Psychological disorders of the health professionals can negatively affect many important factors, such as the clinical and medical care of patients. These disorders are due to the great pressure that the health workers are subjected and as a result they develop burn out syndrome [5]. As in the SARS era, health workers experienced burnout leading to reduced performance and several resignations [6].

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Due to the unknown treatment of COVID-19 and the lack of resources, the medical and paramedical staff were faced with moral dilemmas and tough decisions that could have caused them psychological disorders and even psychological trauma [7]. This was reflected in the refusal of social contact where they avoid contact with family members or friends, for fear of exposing them to the virus. Furthermore, medical doctors are a professional group that undoubtedly take an active part in the COVID-19 pandemic by exposing themselves to the virus, neglecting their personal and social lives, in the effort to fight the pandemic.

Based on the above, it seems important to have a greater picture of the levels of anxiety in this professional field. However, even though there are several tools that measure anxiety, there are no validated tools exclusively for the anxiety of COVID-19 in the medical staff, especially in resident doctors who are already overloaded with multiple responsibilities.

COVID-19 Anxiety scale is a modified version of the DSM 5 - Severity measure for a specific phobia - adult scale that was first validated in the general population of Germany (8) and focuses specifically on the symptoms of anxiety regarding exposure to COVID-19 virus. However, no other research is found in specific professions.

In this context, the aim of this study was to validate the instrument COVID-19 Anxiety scale, in a sample of medical doctors in Greece as well as to examine its relation to perceived stress, symptoms of stress, anxiety and depression.

Methods

The study took place in a Public General Hospital of Athens, between February 2021 and May 2021. Prior to the initiation of the study, protocol implementation and recruitment of participants, ethical approval was obtained from the Scientific and Ethics Committee of the hospital (protocol n. 4717/08-03-2021). The Greek surgical company also took an active part, where with its approval, the questionnaires were sent to all its members all over Greece. Before completion of the questionnaires, participants were fully informed about the purposes of the study and signed informed consent. Inclusion criteria were the ability to read and write Greek as well as working as resident doctor in a Greek hospital during the pandemic period.

The COVID-19 anxiety questionnaire

The COVID-19 anxiety questionnaire [8] was created to assess a specific anxiety regarding to COVID-19 in a general population. It is a slight modified version of the DSM-5 – Severity Measure for Specific Phobia – Adult (SP-D). This measurement tool consists of 10 questions that are scored on a Likert scale with values from 0 (not at all) to 4 (too much). High scores reflect high concern. To our knowledge the COVID-19 anxiety questionnaire has not been validated in any other language furthermore to health workers population. Permission was obtained by the authors.

Other measurements

Social, demographic related variables included gender, age, residency (city/province), marital status (married/single/divorced), presence of children (yes/no), position of employment (public/private sector), hospital reference (COVID/non-COVID), professional experience in years and satisfaction from family income (Not at all/A little/Merely/Very satisfied/Very much satisfied).

Perceived stress scale (PSS-14)

The perceived stress of the individuals in the sample was measured using the Perceived Stress Scale (PSS). The PSS is a 14-question self-report tool that assesses subjective perceived stress levels. Each of the questions is scored on a 5-point Likert scale (from 0= never to 4= very often). The cancellation time concerns the last 1 month. After reversing the scores of 7 items the total score is calculated from the sum of the individual values of the questionnaire. Higher values mean more stress. Good psychometric properties of this measure have been recorded within the Greek population [9].

DASS-21

DASS-21 is a 21-question tool that assesses levels of depression, anxiety and stress. Each of the questions is scored on a 4-point Likert scale (from 0= never to 4= very often). Three subscales rise from 7 different items (DASS_STRESS, DASS_ANXIETY, DASS_DEPRESSION) [10].

Translation

After receiving the authors' permission, the COVID-19 anxiety instrument was translated backward-forward, according to the World Health Organization's guidelines for the adaptation of instruments. A pre-test of the translated questionnaire was then held to identify the presence of unclear expressions.

Statistical analysis

Descriptive analyses were used to calculate the means, medians, Standard Deviations (SD), interquartile range and absolute and relative frequencies (%). Exploratory Factor Analysis (EFA) was used to identify possible factors from C-19 Anxiety scale.

Kaiser-Meyer-Olkin (KMO) test and Barlett's Sphericity Test were used in order to assess the adequacy of the sample. Cronbach's α value was calculated to examine internal consistency. For group comparison, the non-parametric Mann Whitney u and Kruskal Wallis tests were used, due to the skewed distribution of the quantitative variables. Spearman's rho correlation coefficient was used to evaluate correlation between scale variables. The level of significance was 0.05. Statistical analyses were performed using the SPSS for WINDOWS (version 25.0.0) statistical software (SPSS Inc., Chicago, IL).

Results

Table 1 presents the main characteristics of our sample. The analysis was performed in 179 participants (males =87.2%, females =12.8%) with a mean age of 51 years, most of whom were residents of Athens (72.1%) while the rest (27.9%) lived in the provinces of Greece. As for their family status the majority was married (82.7%) with children (80.4%). In the question regarding the sector of employment most of them answered the public sector (74.9%) while 68.2% was employed in covid reference hospital. Finally, participants were asked to rate their satisfaction over family monthly income, where the majority (65.4%) answered "merely satisfied".

The results of the EFA are presented in Table 2, where 2 items were excluded (item 4 and 10) due to their small loadings. KMO value was 0.903 and the significance of Bartlett's test of sphericity was $p < 0.001$. Cronbach's alpha indicates satisfactory reliability ($\alpha = 0.967$). All item-total correlations were > 0.314 .

Table 3 presents the results of the correlation analysis among C-19 Anxiety scale, PSS-14 and DASS-21 subscales. The results show that the C-19 Anxiety scale is positively correlated with PSS-14 ($r = 0.816$,

Table 1: Samples' Sociodemographic characteristics and study's measurements.

Sociodemographic characteristics		Scales and subscales scores	
		N (%)	Median (IQR) Mean (SD)
Gender	- Males	156 (87.2)	PSS Score 35.00 (11.50) 30.24 (8.66)
	- Females	23(12.8)	
Age	- Median (IQR)	51 (11.00)	Depression score 14.00 (8.00) 12.25 (6.54)
	- Mean (SD)	50.73 (7.92)	
Residency	- Athens	129 (72.1)	Anxiety score 0.00 (4.00) 2.61 (4.39)
	- Out of Athens	50 (27.9)	
Marital status	- Married	148 (82.7)	Stress score 24.00 (10.00) 20.99 (10.67)
	- Single	20 (11.2)	
	- Divorced	11 (6.1)	
Parity	- Yes	144 (80.4)	
	- No	35 (19.6)	
Work sector	- Private	45 (25.1)	
	- Public	134 (74.9)	
Work Experience in years	- 1-5 years	5 (2.8)	
	- 6-10 years	4 (2.2)	
	- 11-15 years	31 (17.3)	
	- >15 years	139 (77.7)	
Covid-reference hospital	- Yes	122 (68.2)	
	- No	57 (31.8)	
Income Satisfaction N (%)	- Not at all	6 (3.4)	
	- A little	18 (10.1)	
	- Merely	117 (65.4)	
	- Very satisfied	34 (19.0)	
	- Very much satisfied	4 (2.2)	

SD: Standard Deviation; IQR: Interquartile Range; PSS: Perceived Stress Scale

$p < 0.01$) and the 2 subscales of DASS-21 (Stress and Depression) ($r = 0.699$ and $r = 0.568$ respectively and $p < 0.01$) while it is negatively correlated with DASS-Anxiety ($r = -0.148$, $p < 0.05$).

Table 4 shows associations between COVID-19 anxiety scale and various participants sociodemographic characteristics. Specifically, statistically significant differences were observed between marital status and COVID-19 anxiety scale. Married participants reported higher levels of COVID-19 anxiety compared to unmarried or divorced participants ($p = 0.004$). Moreover, those who were in a COVID-reference hospital scored higher in the COVID-19 anxiety scale compared to those who were not ($p = 0.001$). Finally, those who reported that they were not at all satisfied from their income reported lower levels of COVID-19 anxiety compared to those who reported that they were merely satisfied and very satisfied from their income ($p = 0.001$).

Discussion

The current study was the first attempt to validate the COVID-19 anxiety scale in the Greek health workers population. The results have shown that the C-19 Anxiety scale was positively correlated with PSS-14 and the 2 subscales of DASS-21 (Stress and Depression). This suggests that medical doctors have devoted themselves exclusively to the pandemic and its effects, becoming even more stressed with their workload (burn out) which led them to experience depressive symptoms as a result of their lack of knowledge to deal with the pandemic, the many deaths, and the generalized crisis that existed prior to pandemic throughout the planet [11,12]. The initial hypothesis of the study that stress would be correlated with COVID-19 pandemic was verified. On the contrary, C-19 Anxiety

Table 2: Rotated factor loadings of the Exploratory Factor Analysis (EFA), item-total correlation Cronbach's alpha coefficient and descriptive of the C-19 Anxiety scale.

Item	Factor Loadings	Item-total correlation
C19-A.1	0.957	0.940
C19-A.2	0.953	0.939
C19-A.3	0.954	0.937
C19-A.5	0.944	0.924
C19-A.6	0.961	0.947
C19-A.7	0.955	0.938
C19-A.8	0.964	0.952
C19-A.9	0.362	0.314
Eigenvalues	6.538	
% of Variances	65.381	
Range	0-32	
Mean (SD)	17.16 (10.83)	
Cronbach's α	0.967	

Table 3: Correlations (Spearman's rho) of COVID-19 Anxiety questionnaire with PSS and DASS-21 subscales.

	C-19 A	PSS-14	DASS-Stress	DASS-Depression	DASS-Anxiety
C-19 A scale					
<i>Pearson's rho</i>	1.00	0.816**	0.699**	0.568**	-0.148*

**correlation is significant at the 0.01 level (2-tailed)

*correlation is significant at the 0.05 level (2-tailed)

questionnaire was negatively correlation to DASS-Anxiety subscale. This may indicate that the anxiety subscale of DASS-21 could not capture such a specific concern towards COVID-19 virus exposure, which strengthens the purpose of this study. Married participants reported higher levels of COVID-19 anxiety compared to unmarried or divorced participants. This happens because doctors who handled COVID-19 patients were under the threat of quarantine in case they got infected. There were several times when, due to possible suspicion of infection, they were forbidden to return home to their family in order not to spread the infection. This situation, with the increase in workload, caused an increase in stress [13]. In addition, those who were in a covid-reference hospital scored higher in the COVID-19 anxiety scale compared to those who were not, this is explained, because those who worked in a hospital exclusively for COVID patients, lived in extreme conditions, with a very large and increasing workload, with continuous deaths, and rapid deterioration of the clinical picture in theoretically stable patients. These stressors increased their phobia about covid.

In conclusion, the Greek version of the COVID-19 anxiety questionnaire demonstrated good psychometric properties and it could be safely used in future studies. However, this study has several limitations; the scale has not been translated and validated in any other languages, and it has only been used in the general population [8]. In addition, sample size was only representative for all the medical field as it was limited to resident doctors. Future studies could broaden the sample by recruiting paramedical staff, as well.

Conclusion

The findings of this study showed that the Greek version of C-19 Anxiety questionnaire has good psychometric properties and can be safely used in future studies.

Table 4: Association between COVID-19 anxiety scale and participants characteristics.

Study measurements	Categories	COVID-19 anxiety scale
Gender Median (IQR) Mean (SD)	Males	23.00 (22.00) 17.52 (10.80)
	Females	19.00 (22.00) 14.74 (10.96)
	p-value	0.266
Residency Median (IQR) Mean (SD)	Athens	23.00 (21.00) 17.54 (10.70)
	Out of Athens	21.00 (22.25) 16.17 (11.22)
	p-value	0.368
Marital status Median (IQR) Mean (SD)	Married*,^	23.00 (18.00) 18.38 (10.41)
	Single*	7.50 (23.00) 11.90 (10.92)
	Divorced^	1.00 (22.00) 10.36 (11.87)
	p-value	0.004
Parity Median (IQR) Mean (SD)	Yes	22.50 (23.00) 17.20 (10.93)
	No	22.00 (21.00) 16.97 (10.60)
	p-value	0.832
Work sector Median (IQR) Mean (SD)	Private	23.00 (23.50) 16.38 (11.40)
	Public	22.00 (21.00) 17.42 (10.67)
	p-value	0.445
Work Experience in years Median (IQR) Mean (SD)	1-5 years	22.00 (21.00) 17.60 (11.61)
	6-10 years	2.00 (16.50) 6.50 (10.38)
	11-15 years	11.00 (22.00) 14.06 (10.94)
	>15 years	23.00 (18.00) 18.14 (10.61)
	p-value	0.165
Covid-reference hospital Median (IQR) Mean (SD)	Yes	23.00 (11.75) 19.23 (9.85)
	No	8.00 (24.00) 12.74 (11.58)
	p-value	0.001
Income Satisfaction Median (IQR) Mean (SD)	Not at all*,^	1.00 (3.25) 1.50 (1.76)
	A little	15.00 (24.00) 13.28 (12.15)
	Merely*	22.00 (20.50) 17.91 (10.43)
	Very satisfied^	24.00 (4.00) 20.68 (9.41)
	Very much satisfied	5.00 (13.50) 6.50 (7.19)
	p-value	0.001

Mann Whitney U, Kruskal Wallis

SD: Standard Deviation; IQR: Interquartile Range, p<0.05

*,^ shows between which categories exist the significant differences

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