Anxiety and fear related to coronavirus disease 2019 assessment in the Spanish population: A cross-sectional study

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Abstract

Background: The coronavirus disease 2019 pandemic has affected millions of people worldwide, compromising the responsiveness of governments and states and thus generating anxiety and fear at the population level.
Objective: To assess the level of anxiety and fear of coronavirus disease 2019 in a Spanish adult population group.
Methods: A descriptive cross-sectional study, using the anxiety and fear of COVID-19 assessment scale (AMICO, for its acronym in Spanish). The sample was composed of 1038 subjects. Univariate

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and bivariate statistical analyses were performed, after analysis of normality in the data distribution. Categorical regression analyses were also executed.

Findings: The total sample size was 1036 subjects, 56.3% was made up of females, with a mean age of 48.11 years (SD = 15.13). The mean score obtained on the AMICO scale was 5.54 points (SD = 1.83), with a score range between 1.22 and 10. Bivariate analysis only demonstrated statistically significant differences in the mean score of the scale and the variables: sex, marital status, work area and academic level. The executed categorical regression analysis revealed an R^2 value of 0.75 and a significance of $p = 0.00$.

Conclusions: The results obtained show that the Spanish population presents moderate anxiety levels to coronavirus disease 2019. Women, married, with primary and/or secondary education level, and working in the public transport, services and/or hospitality sectors are more likely to have high levels of fear and anxiety.

Application to Practice: These results could be used for therapeutic and preventive psychological interventions, and also to plan new research under sex perspective and observing the socio-economic environment.

Background

Throughout history, the Spanish population has had to deal with different pandemics and epidemics such as the Black Plague (1347–1382) or the Spanish Influenza (1918–1920), which had an important impact on the historical future of societies.[1] As with its predecessors, the current coronavirus disease 2019 (COVID-19) pandemic in which we are immersed is causing thousands of deaths and major repercussions in the economic, social and public health levels in all affected countries.[2,3]

COVID-19 has come into our lives, affecting a considerable number of people in all parts of the world, regardless of race, economics or culture, compromising global health and policy response capacity and leading to an increase in mental health problems in European, Asian and American populations.[4–7] This disease caused by severe acute respiratory syndrome coronavirus 2 virus infection was first detected at the end of 2019 in Wuhan, Hubei Province of the People's Republic of China, and has caused the World Health Organization (WHO) to declare a global pandemic status, given the rapid spread of the virus and the high volume of deaths that have occurred in a very short time.[8–10]

In Spain, the central government declared the state of alarm on 13 March 2020 through 'Royal Decree 463/2020 of March 14, for the management of the health crisis situation caused by COVID-19' (BOE No. 67,2020) and since then, the population is facing new challenges arising from the public health measures, established with the intention of reducing the number of contagions, until the onset of the definitive cure of the disease.[11]

This situation has forced national and regional authorities to adopt important restriction measures on the normal activity of society, measures including the fulfilment of social distancing, the acquisition of new hygiene habits, and a reduction in interterritorial mobility.[12] Several studies have found that these interventions have caused alterations in people's lives at the human, family, and social levels,[13] thus impairing people's mental health and

enhancing underlying problems such as anxiety, depression or use of harmful substances.[14–17] Examples of this are the results obtained by Wang et al.[18] who show that, in the population of Poland, there are significantly higher levels of anxiety, depression and stress in comparison with the population of China, due to the fact that, in the latter country, the use of the mask is more widespread among the inhabitants, as same as social distancing.[19]

In addition to referencing the implications that health measures have on the mental health of the population, research such as the one by Félix-Castro,[20] which sets out the importance of taking into account the term contagion, should be mentioned since it influences the appearance of fear or anxiety in individuals who may experience the disease. Contextualising the above related to the current COVID-19 pandemic, it could be assumed that fear of contracting the disease enhances the population's sensitivity levels to anxiety disorders, which involves mental health problems,[21] not only in healthy people, but also in psychiatric patients, or people who have suffered from COVID-19.[22]

In this sense, and given the alarming epidemiological data on contagion figures, hospital occupation, deaths and psychological well-being among other factors that could be associated with COVID-19, investigating the level of anxiety and fear of COVID-19 in the population is considered necessary.[23,24] Thus, the objective of this research is to evaluate the level of anxiety and fear of COVID-19 in a group of Spanish adult population.

Methods

Design

Descriptive cross-sectional study, based on questionnaires.

Instrument

The anxiety and fear of COVID-19 (AMICO) assessment scale was designed and validated in previous studies.[21] Exploratory factor analysis extracted a dimensional matrix of 16 items and two factors (anxiety and fear) explaining 64.8% of the variance (KMO test $= 0.94$; Barlett test $p = 0.001$). Responses to the items range from 1 point (the lowest self-reported level) to 10 points (the highest self-reported level) for each item (Table 1). The total score of the scale is obtained by calculating the average score with the self-reported responses, and the value ranges from 1 to 10 points.

The reliability study offered a Cronbach's α value of 0.92.[21] The confirmatory factorial analysis (CFA) for the study of construct validity offered the following values: normed fit index (NFI) $= 0.968$; Tucker-Lewis index (TLI) $= 0.964$; comparative fit index (CFI) $= 0.974$; root mean square error of approximation (RMSEA) $= 0.06$; and standarized root mean-square (SRMR) $= 0.037$.[25]

The AMICO scale response options range from 1 to 10 points, where 1 fully disagrees, and 10 fully agrees. For this study, the Google Forms© tool was used for the design and creation of the online questionnaire.

Participants

Spain's adult population amounts to 38,000,000 subjects.[26] The calculation of the required sample size was 385 subjects, considering a 95% confidence level, a

Table 1. Anxiety and fear of COVID-19 assessment (AMICO) scale items.

1.   I am very afraid of COVID-19
2.   I feel uneasiness when thinking about COVID-19
3.   I am very concerned about getting COVID-19
4.   The COVID-19 disease may cause death, and this worries me
5.   COVID-19 is unpredictable
6.   My hands sweat when I think about COVID-19
7.   I am afraid of dying due to COVID-19
8.   I feel nervous or anxious when watching news or stories about COVID-19 in social networks and other media
9.   I caṅt sleep because I am worried about getting COVID-19
10. My pulse races when I think about getting COVID-19
11. Contradictory information about coronavirus in social networks and the media makes me feel anxious
12. I have negative ideas when I hear or read any news related to the disease
13. I am afraid a relative or friend may get COVID-19
14. I am worried about how long the pandemic will last
15. When someone coughs near me, or too close to me, I am afraid of getting infected
16. I am worried about being close to or assisting a person that has or may have COVID-19
17. I feel sad or downcast when I think about the disease and the possibility of getting infected
18. I feel anxious about going out, or considering going out, to fulfil my daily responsibilities (work, family etc.)

heterogeneity of 50% and a margin of error of 5%. However, data from 1038 subjects were finally collected, increasing statistical power from 84% to 90.5%.

A non-probabilistic snowball sampling was carried out. To this end, the research team carried out a process of identification and selection of different official groups of professionals and the general population, such as associations, labour unions, specific groups and other cultural groups. An email was sent to all of them with the presentation of the study and a request to disseminate it among all its members, guaranteeing the confidentiality of the data, and the link to the Google Forms© questionnaire. In addition, the need for all subjects to give their consent to participate in the study, once they accessed the link, and before they could continue with the completion of the survey, as well as stating that they were over 18 years of age, was described exhaustively. On the other hand, the same text and link to the questionnaire was also disseminated through the official social networks of the participating universities, and personal social networks of each researcher in the group (Facebook, WhatsApp, LinkedIn, Twitter and Instagram).

At the end of the survey, the participant was asked to forward the link to the survey to other people over 18 years of age and a resident in Spain with whom he/she might have contact, thus developing snowball sampling.

Variables

The online questionnaire contained sociodemographic variables (sex, age, province of residence, marital status, employment status, work area, level of studies, issues related to COVID-19 contacts and contagions, and self-perception of health status) and the scale variable (16 items on the AMICO scale).

Data analysis

Univariate and bivariate statistical analyses were performed through the SPSS Statistics programme v.2627. For the bivariate study, normality in the distribution of data was analysed using the Kolmogorov-Smirnov test, and a significance of 0.001 was obtained, showing the lack of normality. Contrast tests were therefore carried out, such as the Mann-Whitney U and the Kruskal-Wallis tests. Kendall's tau-b was used to study the correlation between quantitative variables.

To establish the relationship between the level of anxiety and fear (total score of the AMICO scale) with the other variables, the categorical regression analysis (CATREG) was executed since these variables are qualitative in nature.[27] The CATREG analysis includes characteristic aspects of classical regression analysis: coefficient of determination (R^2), variance analysis in regression and significance of parameters.[28] For the calculation, the optimal scaling option was selected in the SPSS software©.

Ethical aspects

This study is part of the IMPACTCOVID-19 project, which aims to assess the impact of the COVID-19 pandemic on the emotional well-being and psychological adjustment of the general population in Spain, which obtained due permission from the Research and Ethics Committee of the Regional Government of Andalusia to be implemented (Ref. PI 036/20). The study also complies with the Helsinki Declaration of Ethical Principles in Human Research Guidelines[29] and with the state regulations for biomedical research.[30]

All subjects in the sample confirmed their voluntary and confidential participation in the study through a specific box, in which they had to check the option 'I agree to participate'. Otherwise, the application did not allow access to the questionnaire. Written informed consent was obtained from the patient(s) for their anonymised information to be published in this article.

Findings

Descriptive analysis

The total sample consisted of 1036 subjects, over 18 years old, and residing in Spain. Of this sample, 56.3% were women with a mean age of 48.11 years (SD = 15.13). Likewise, 54.82% were married, 29.53% single and 15.65% covered other civilian states (divorced, separated, widowed, cohabitating as a couple). In addition, 55.5% of the sample was working, 15.2% were unemployed and 29.4% were in retirement or engaged in household chores. With regard to work areas: 28% worked in the health sector, 18.9% in administrative work, 15.19% in the services sector, 12.5% in education, 8.1% in industry, 7.6% in trade and/or hospitality, 6.3% did not currently work and 1.92% worked in the public transport sector.

Of the 52 provinces of Spain, the highest response rates were obtained from Huelva (27.9%), Seville (18.2%) and Madrid (9.9%). Other provinces such as the Balearic Islands, Barcelona, Malaga and Murcia had participation percentages between 4% and 7%. Valencia, Biscay, Cordoba and Melilla also obtained percentages of less than 3%.

The remaining 41 provinces had participation percentages of less than 1%, noting that all provinces collected data from at least two subjects.

With respect to the COVID-19 diagnostic variable, 94.9% of the sample had not been infected at the time of data collection, and 85% had not required isolation from having narrow contact with any case. In addition, self-perceived health status, in a range of 0–10 points, obtained 7.86 points (SD = 1.4). Regarding the academic level, 40.7% of the sample had completed undergraduate studies, 19.3% postgraduate studies, 31.7% higher secondary studies and/or vocational training and 8.3% had completed primary and/or secondary studies (see Table 2).

Table 2. Description of the sample profile.

	Total sample (n = 1038)	AMICO mean score	Contrast hypothesis*
Sex			$p = 0.00^{a}$
Female	583 (56.3%)	5.3	
Male	453 (43.7%)	5.00	
Age			$Tau = 0.08^{b}$
Mean (SD)	48.11 (15.13%)		
Marital status			
Married	567 (54.82%)	5.55	$p = 0.02^{c}$
Single	306 (29.53%)	5.10	
Other	163 (16.65%)	4.15	
Work area			$p = 0.03^{c}$
Health	298 (28%)	5.18	
Administration	197 (18.9%)	5.42	
Services	163 (15.1%)	5.9	
Education	130 (12.5%)	5.48	
Industry	85 (8.1%)	5.04	
Commerce/hospitality	79 (7.6%)	5.6	
Public transport	20 (1.92%)	6.65	
Unemployed	66 (6.35%)	5.11	
Academic level			$p = 0.0o^{c}$
Postgraduate	421 (40.7%)	4.84	
Graduate	200 (19.3)	5.33	
Higher Sec./Voc. training	329 (31.7%)	5.66	
Primary and/or secondary	86 (8.3%)	6.00	
COVID-19 diagnosis			$p = 0.08^{a}$
No	983 (94,9%)	5.43	
Yes	53 (5.1%)	5.00	
Isolation by contact			$p = 0.46^{a}$
No	881 (85%)	5.4	
Yes	155 (15%)	5.3	
Self-perceived health status mean (SD)	7.86 (1.4)		$Tau = -0.1^{b}$

COVID-19: coronavirus disease 2019; AMICO: anxiety and fear of COVID-19 assessment.
[a]Mann-Whitney *U*.
[b]Kendall's tau-*b*.
[c]Analysis of variance (ANOVA).
*Non-parametric contrast statistics.

The mean score on the AMICO scale obtained was 5.54 points (SD = 1.83), with a score range of 1.22 – 10.

Bivariate analysis only demonstrated statistically significant differences in the mean score of the scale and the sex, marital status, work area and academic level variables (see Table 1). Thus, the group of women had higher levels of anxiety and fear ($\bar{x}$ = 5.3 points) than men ($\bar{x}$ = 5 points). In addition, married persons also had higher levels of anxiety and fear ($\bar{x}$ = 5.55), followed by people living together as a couple or divorced or widowed ($\bar{x}$ = 5.10); subjects in the sample who were single had the lowest levels of anxiety and fear ($\bar{x}$ = 4.15). On the other hand, subjects with primary and/or secondary studies had the highest levels of anxiety and fear ($\bar{x}$ = 6 points), followed by people with higher secondary studies or vocational training ($\bar{x}$ = 5.66). Subjects in the sample with undergraduate ($\bar{x}$ = 5.33) and postgraduate ($\bar{x}$ = 4.84) studies had the lowest levels of anxiety and fear. In relation to work areas, sample subjects working in the public transport sector ($\bar{x}$ = 6.65), services ($\bar{x}$ = 5.9), and commerce and/or hospitality ($\bar{x}$ = 5.6) had higher scores on the AMICO scale. In contrast, the industry sector ($\bar{x}$ = 5.04), unemployed subjects ($\bar{x}$ = 5.11), and the health sector ($\bar{x}$ = 5.18) showed the lowest mean scores. The administration and education sectors scored a mean of 5.4 points, with a confidence level of 95% (see Table 1).

The study of the correlation between quantitative variables did not achieve statistically significant results; namely, there is neither a correlation between the AMICO score and self-perceived health status nor with age.

The categorical regression analysis was performed, with the total mean score of the AMICO questionnaire as a dependent variable and all other variables. Depending on the groups of each variable tested, $n - 1$ dummy variables were created, coding with values of 1 or 0, in which any value of each variable acts as a reference for the rest. This eliminates any possible collinearity that might exist.[31] The regression equations for each dummy variable, created from the variables sex, marital status, work area, and academic level, obtained p-values < 0.001. These variables were thus shown to be significant and should be considered in the final categorical regression model. However, the variables COVID-19 diagnosis and Isolation by contact, whose regression equations for their dummy variables were not significant, were also considered of interest for the final model, because of their relevance to the current COVID-19 epidemic.[14–17]

Table 3. Adjustment of the model and significance of the regression model.

Regression model adjustment				
$R^2 = 0.752$	Fisher $F = 7.39$	$p = 0.001$		
Regression and significance coefficients				
	Coefficient	Freedom degrees	Fisher F	p-Value
Sex	0.81	2	18.47	0.001
Marital status	0.08	1	5.81	0.01
Work area	0.08	1	4.22	0.01
Academic level	0.1	1	14.28	0.001
COVID-19 diagnosis	0.04	2	0.82	0.44
Isolation by contact	0.01	1	0.24	0.62

The most optimal final regression model revealed an R^2 value of 0.752 and a significance level of $p = 0.001$ (see Table 3). In addition, the individual significance of the sex, marital status, work area, and academic level variables obtained values of $p < 0.05$. However, the COVID-19 diagnostic and isolation by contact variables were not significant in the tested model, with a value of $p > 0.05$.

Discussion

Given the recent onset of the disease and the uncertainty in which we currently live, there is multiple research that continuously describes and updates information on the nature, spread extent or impact of the disease on the health of different populations, in all corners of the world.[32–35] However, when it comes to the study of mental health in relation to the pandemic, it is difficult to find research that is exclusively focused on the general population,[9,36] being more common to professionals in the health sector.[37–39] That is why it is of particular interest to identify the population groups most vulnerable to mental disorders in order to protect the health of people.

Overall, the results of this study indicated that the Spanish population had moderate levels of anxiety. Works conducted on the general population at the beginning of the pandemic such as the one by Wang et al.,[40] which intended to establish the prevalence of psychiatric symptoms and identify risk factors and protectors in relation to the initial psychological impact of the COVID-19 outbreak in China, showed a psychological impact considered moderate to severe. The same was reflected in other similar works such as that by Ozamiz-Etxebarria et al.,[9] carried out in the general Spanish population residing in the Basque Autonomous Community, where the psychological impact acquired moderate to high values, but considering these levels lower than those obtained in the aforementioned research carried out by Wang et al.[41]

In this line, it is worth mentioning another research, which compares the impact of COVID-19 on physical and mental health in the Chinese and Spanish populations. The results show that physical symptoms produced by COVID-19 were associated with adverse mental health in both China and Spain. Also, in relation to mental health, Spanish participants reported higher levels of stress and depression, while Chinese participants reported higher levels of psychological impact.[40]

These results could have been limited and affected by the moment in which each study was carried out and the amount of information on the pandemic available at the time since, as Igartua et al.[42] mentioned, possessing scientific and reliable information decreases the degree of anxiety and fear of COVID-19, leading to the adoption of preventive measures such as the acquisition of appropriate habits and lifestyles, which preserve the physical and mental health of populations.

As for the study of anxiety and sex, most of the revised work coincides with the findings of the present study, as they show that the female population has significantly more anxiety regarding COVID-19.[36,43] To some extent, it could be stated that being male or female can be a condition when it comes to psychiatric disorders that alter mental health.[44] In the same line, it may be relevant to bear in mind that women are assuming more and more complex social roles, which could lead to this increase in anxiety since

assuming these new roles usually does not imply the disuse of the classics, such as acting as caregivers of people who may be infected with COVID-19.[45]

In relation to the levels of anxiety that participants present when studying the work area variable, the results have shown that the subjects with the highest levels of anxiety were those who worked in the public transport sector, as well as in the services, commerce and hospitality sectors. Health workers, the unemployed and industrial workers had lower anxiety values. In line with the above, the WHO, over the pandemic period, has published documents updating the strategy against COVID-19.[46] They state that, in a very short period of time, there has been some socio-economic disturbance that, among other factors, could be arising from government restrictions and the implementation of pandemic containment measures, which are causing a cooling of the economy, thus producing instability and declining income in many families,[47] situations that would be identified as risk factors for anxiety during the pandemic.[12]

Contrary to the data in the study at hand, there are data in the literature which show a greater sensitivity to mental health disturbances as sequelae of the pandemic among young people, so students are more sensitive and age could be considered a protective factor. Also, based on these data, it seems that the level of training could also be considered a protective factor since the studied population showed lower anxiety values for participants with a higher academic level.[48, 49] This is consistent with research conducted in China that aimed to study the main symptoms, knowledge, concerns and precautionary measures against COVID-19 in the main outbreak and then 4 weeks later, coinciding with the peak of the pandemic in China. The researchers concluded that high levels of trust in health authorities and satisfaction with knowledge related to health information and personal precautions could be considered protective factors against COVID-19.[40]

No correlation was either found between the level of self-perceived health and anxiety levels, although it should be noted that there are studies in the literature showing the importance of assessing the perception of risk in both its cognitive and affective dimension, with the intention of understanding people's behaviour when related to infectious diseases[50] and the prediction of protective behaviours against them.[51] In this same line, as Ro et al.[52] report, the existence of disease-related effects as an emotional response influences the adoption of behaviours that promote favouring attitudes for mental health during the development of infective-contagious diseases such as Middle East respiratory syndrome or COVID-19.

Thus, the COVID-19 pandemic can be considered to be a public health emergency that poses a major challenge to the mental health of the affected population, as it has abruptly changed the way we live, work and relate,[13] compromising not only the physical health of people but also the other spheres that make up human beings.[53] These facts can be observed in the results of the present study, where women, married, with primary and/or secondary education level, and who work in the public transport, services and/or hospitality sectors are more likely to have high levels of fear and anxiety.

For all of the above, it is important to set out the importance of research to analyse both triggers and protectors of attitudes and mental disorders arising from the COVID-19 pandemic in the general population, with the aim that governments

achieve an adequate and comprehensive management of population health based on recommendations primarily aimed at identifying high-risk groups, creating multidisciplinary mental health teams, improving the screening of psychiatric comorbidities; as well as providing adequate information to the population[54–56] and improve psychotherapeutic intervention using cognitive-behavioural therapies via the internet,[57] which are very effective, especially in treating psychiatric symptoms associated with COVID-19 such as insomnia.[58]

Regarding the limitations of the present study, it is worth mentioning that the sampling process was not probabilistic. In addition, 28% of the sample were health professionals, and according to national statistics, this group only represents 1.28% of the general population.[26] It should therefore be noted that the results of the present study are not entirely representative of the Spanish population, with respect to the sectors of occupation, although a sample of considerable size has been collected. On the other hand, with respect to gender, the total percentages of women and men in the sample do resemble the percentages reported by national statistics, 51% and 48%, respectively.[26] In this sense, the differences obtained for the sex variable in this study can be considered representative of the Spanish population in general. All in all, the findings of this study provide relevant and valuable information for institutions and management bodies about the levels of anxiety and fear of the Spanish population with respect to the COVID-19 pandemic situation.

Conclusions

The results show that moderate anxiety values against COVID-19 appear to occur in the Spanish population. Likewise, only significant differences are found when analysing the sex, marital status, level of education and work area variables, while on the contrary there are no significant differences regarding the level of self-perceived health or the age of the participants.

Given the increase in psychopathologies that COVID-19 can produce, it is of particular interest that governments develop strategies aimed at preparing, educating, and strengthening the mental health of the population by paying special attention to the most vulnerable population groups in order to reduce the psychosocial impact of the epidemic on the population.

These results could be used to propose both therapeutic and preventive psychological interventions, as well as to plan new research taking into account, for example, the sex perspective or the socio-economic environment of the population.

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