Psychological impact of the COVID-19 pandemic and lockdown in a Spanish sample with anxiety disorder: sex differences

Mercedes Valtueña-García[a,b †]
Elena Martín-Gil[a, †]
Leticia González-Blanco[a,b,c,d,e,*]
Lorena de la Fuente-Tomás[a,b,c,d]
Francesco Dal Santo[a],
Clara Álvarez-Vázquez[a]
Carlota Moya-Lacasa[a]
Clara Martínez-Cao[a,f],
Leticia García-Álvarez[b,c,d,e,f]
Pilar A. Sáiz[a,b,c,d,f]
Julio Bobes[a,b,c,d,f]
María Paz García-Portilla[a,b,c,d,f,*]

[a] Servicio de Salud del Principado de Asturias (SESPA), Oviedo, España.
[b] Departamento de psiquiatría, Universidad de Oviedo, Oviedo, España.
[c] Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM)
[d] Instituto de Investigación Sanitaria del Principado de Asturias (ISPA), Oviedo, España.
[e] Instituto Universitario de Neurociencias del Principado de Asturias (INEUROPA), Oviedo, España.
[f] Departamento de psicología, Universidad de Oviedo, Oviedo, España.
[†] Joint first authors

ABSTRACT

Background. The early psychological impact of the COVID-19 pandemic and lockdown is greater in people with mental disorders. This study explored the differences in the psychological impact on people with an anxiety disorder by sex in Spain.

Methods. Cross-sectional, descriptive, comparative study of the data provided by participants in an anonymous online survey between March 19 and 26, 2020. The ad hoc questionnaire included sociodemographic, clinical, and variable data related to COVID-19, along with questions about coping strategies, and the Spanish versions of the Depression, Anxiety, and Stress Scale (DASS-21) and Impact of Event Scale (IES). Descriptive bivariate analyses and logistic regression models were used.

Results. Of the 21,207 participants, 1617 (7.6%) people with self-reported anxiety disorder were analyzed [1347 (83.3%) females; 270 (16.7%) males]. The psychological impact was greater on women than men with statistically significant differences in each subscale of the DASS-21 and subscales of the IES. After adjusting for potential confounding variables, it was observed that being a woman was associated with higher scores on the intrusive and avoidant thoughts subscales.

Conclusions. Our study suggests that women with an anxiety disorder are a group vulnerable to a greater negative impact on mental health and, especially, symptoms related to post-traumatic stress disorder.

Keywords. SARS-CoV-2; COVID-19 pandemic; lockdown; psychological impact; anxiety disorder; sex

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735

IMPACTO PSICOLÓGICO DE LA PANDEMIA COVID-19 Y EL CONFINAMIENTO EN UNA MUESTRA ESPAÑOLA CON TRASTORNO DE ANSIEDAD: DIFERENCIAS ENTRE SEXOS.

RESUMEN

Introducción. El impacto psicológico en las etapas iniciales de la pandemia por COVID-19 y el confinamiento fue mayor en personas con trastornos mentales. En este estudio se exploraron las diferencias en el impacto psicológico según el sexo en personas con trastorno de ansiedad en España.

Metodología. Estudio transversal, descriptivo y comparativo de los datos aportados por los participantes en una encuesta online anónima realizada entre el 19 y el 26 de marzo de 2020. El cuestionario ad hoc incluyó datos sociodemográficos, clínicos y variables relacionadas con COVID-19, junto con preguntas sobre estrategias de afrontamiento y las versiones en español de la Escala de Escalas de Depresión Ansiedad Estrés (DASS-21) y la Escala de Impacto del Estresor (IES). Se utilizaron análisis descriptivos bivariados y modelos de regresión logística.

Resultados. De los 21.207 participantes, se analizaron 1617 (7,6%) personas con trastorno de ansiedad autoin-

*Corresponding author:
Leticia González-Blanco
Postal address: Centro de Salud Mental La Corredoria
C/Alfredo Blanco s/n, Oviedo 33011, Spain
Telephone: +34 985104219 Fax: +34 985103653
E-mail address: leticiagonzalezblanco@gmail.com
(Leticia González-Blanco)

formado [1347 (83,3%) mujeres; 270 (16,7%) varones]. El impacto psicológico fue mayor en las mujeres que en los hombres con diferencias estadísticamente significativas en cada subescala del DASS-21 y subescalas del IES. Después de ajustar por posibles variables de confusión, se observó que ser mujer se asoció con puntuaciones más altas en las subescalas de pensamientos intrusivos y evitativos.

Conclusiones. Nuestro estudio sugiere que las mujeres con trastorno de ansiedad son un grupo vulnerable a un mayor impacto negativo en la salud mental y, especialmente, en los síntomas relacionados con el trastorno de estrés postraumático.

Palabras clave. SARS-CoV-2; Pandemia COVID-19; confinamiento; impacto psicológico; trastorno de ansiedad; sexo.

INTRODUCTION

Currently, both Spain and the rest of the world are experiencing the effects of an unprecedented pandemic due to the novel coronavirus named "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV) on February 11, 2020. This is the causative agent of the disease COVID-19, which is short for "2019 coronavirus disease"[1].

Since the first case of pneumonia caused by COVID-19 was discovered in Wuhan, Hubei Province, China, in December 2019, the number of infected people has rapidly risen worldwide[2]. This coronavirus has higher mortality and a greater impact on physical and mental health than Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) outbreak in 2012[3]. To stop the rapid spread of Covid-19 in Spain, the government declared a state of emergency and lockdown on March 14, 2020[4].

There are precedents for the imposition of quarantine in previous outbreaks. These have shown that fear of infection along with isolation from the environment and deprivation of liberty come at a high psychological cost[5,6]. In circumstances such as these, increases in mean post-traumatic stress scores[7], depressive symptoms, and completed suicides have been reported[8]. Negative emotional reactions occur, including anxiety, irritability, anger, low mood, insomnia, intrusive thoughts, and avoidance behaviors, to name a few[5,9]. The consequences and the severity of the impact on mental health are greatest in vulnerable populations, such as those who contract the virus, the elderly[10], children, pregnant women, people with a history of physical illness, and those who lose financial stability[5,9,11].

A recent research study by García- Álvarez et al., 2020, in a large representative sample of the population residing in Spain, confirmed the hypothesis that people with a psychiatric history have a greater predisposition to anxiety and depression reactions and symptoms related to post-traumatic stress disorder (PTSD)[3]. In addition, some publications from the early stages of the pandemic noted that stigma, interruptions in mental health care and follow-up in mental health services, self-care difficulties, and physical comorbidities are some of the reasons why people with mental disorders are a group that is more vulnerable to the negative effects of the COVID-19 pandemic[12-14]. As a result, people with mental disorders are less able to take advantage of local medical resources and establish coping strategies that would minimize the negative effects of the pandemic on their mental health[15].

At the same time, individuals with mental health conditions may experience worsening of previous symptoms due to a greater susceptibility to stress compared with the general population[14,16,17]. In addition, the results of a study published by González Blanco et al.[18] found a greater negative impact of the pandemic and lockdown on the mental health of people with a severe mental disorder (SMD) than on participants in the control group with no known mental disorders. However, no differences were observed in the psychological impact experienced by participants with SMD versus participants in the control group with common mental disorders such as anxiety or depression.

In the specific case of people with anxiety disorders, the differences in mental health impact could be partly explained by the perception that they have a greater risk of becoming infected[14]. These findings support the hypothesis that having an anxiety disorder is a risk factor for experiencing greater psychological impact from the pandemic and lockdown.

On the other hand, a previous study carried out in the general Cypriot population between 18-60 years old, examines the psychological impact of the COVID 19 pandemic two weeks after the Cypriot government decreed contagion prevention measures. It also explores the existence of individual, demographic, and environmental risk and protective factors during the early phases of the pandemic. This study identifies as risk factors for suffering a greater psychological impact from the pandemic, among others, being a woman, being younger, and being an undergraduate student[19]. Another

study in a general population sample from the Republic of Ireland also found higher rates of generalized anxiety disorder and depression among women, being younger, those who had experienced a drop in income due to the COVID-19 pandemic. The negative impact on mental health was also greater among those who had a loved one with confirmed/suspected COVID-19 and perceived risk of COVID-19 infection in the coming months[20]. However, in both studies the impact on mental health according to sex is not examined, considering the existence at that time of common mental disorders such as anxiety or depression, among others.

So, to our knowledge, there are no studies focused on detecting sex differences in the psychological impact of the COVID-19 pandemic and lockdown, in individuals with anxiety disorder. Therefore, the main objective of the present study was to examine the early psychological impact of the COVID-19 pandemic and lockdown by sex in a large sample of participants with current self-reported anxiety disorder in Spain. A further objective was to determine whether there are sex differences in the coping strategies used.

It is hypothesized that there is a greater psychological impact on mental health in women with an anxiety disorder than in men.

METHODS

Study design

This research study is a secondary analysis of the largest Spanish cross-sectional study to date to measure the psychological impact of the COVID-19 pandemic and lockdown on a sample of population residing in Spain (for more details, see García Alvarez et al.)[3]. All participants answered an online questionnaire, anonymously and voluntarily, between 2:30 p.m. on March 19 and 4:30 p.m. on March 26. At that time, Spain was living under a state of emergency and lockdown declared by the national government on March 14.

The survey was disseminated using a snowball strategy through all types of media and social networks. The objective of this method was to facilitate participation by people from different social groups to form the widest possible sample of all residents in Spain.

The present study was approved by the Ethics Committee of Hospital Universitario Central de Asturias (ref. 2020.162). In addition, this research study was conducted according to the ethical principles of the Declaration of Helsinki[21]. All respondents were 18 years old or more, indicated that they had read the study-related information, and gave their consent to participate.

Participants

Of the total of 21,207 respondents who participated in the original project, those who met the following requirements were selected: Answered affirmatively the question "Do you currently have a mental health problem?" and checked the anxiety disorder option in response to the question "What kind?" At that time, there were 1617 (7.6%) individuals with anxiety disorder. These participants were divided into two groups, males: n= 270 (16.7%) and females: n= 1347 (83.3%). In those groups, 76.2% of people with anxiety disorder received psychotherapy (70.4% men vs 77.4% women, p <0.014) and 53% were taking psychopharmacological treatment (no significant sex differences were observed).

Assessments

An ad hoc online questionnaire collects sociodemographic data (province of residence, age, sex, level of education, marital status, number of people in household, guardianship of children or adults, work status, monthly income, changes in work status due to COVID-19, changes in monthly income due to COVID-19); clinical information related to physical health (history of previous illnesses and data related to COVID-19 infection); clinical information related to mental health (previous psychiatric history including a history of diagnosis of depression or anxiety or current mental health problems). In addition, the psychological impact of COVID-19 was evaluated using the Spanish versions of two self-administered psychometric instruments: Depression, Anxiety, and Stress scale (DASS-21)[22] and Impact of Event Scale (IES)[23]. Both questionnaires were intended to measure the negative psychological impact attributed exclusively to the pandemic and lockdown in the previous 7 days. In the present study, the total scores on scales as well as subscales were analyzed, where a higher score on each subscale indicates greater distress.

The Spanish version of the DASS-21[22] is a quick and simple self-administered instrument with adequate psychometric properties. It consists of 21 items divided into three subscales that evaluate the presence and severity of symptoms related to three negative affective states: depression, anxiety, and stress. The scores on each subscale of the DASS-21[22] also analyze the severity of the symptoms of maladaptive responses: 0-1 "no maladaptive response," 2-3 "doubtful," 4 "mild," 5 "moderate," 6

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735

"severe," and 7 "extremely severe." The IES[23] consists of 15 items, 7 of which measure intrusive thoughts and 8 of which measure avoidance thoughts. Higher scores on the five subscales mean greater distress.

Finally, it is important to note that, as was done in the study by García-Álvarez et al. (2020), the four response options for each item (0-3) of the original IES[23] and DASS-21[22] scales were simplified to a binary option (0 "no", 1 "yes"). The simplification in the answer options was done for two reasons. The first of these is due to the fact that the scores of the validated Spanish versions of the DASS-21[22] and IES[23] scales do not have a validated cut-off point for the Spanish population. The second reason is that as they are self-administered scales, if the response options are reduced from four possibilities to two, participation in the study is facilitated and respondents are encouraged to indicate whether they have a negative affective state due to the COVID-19 pandemic and lockdown (for more details see García-Álvarez et al. (2020))[3].

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences for Windows, version 24.0 (IBM SPSS, Inc., Armonk, NY, USA). The level of statistical significance was set at a confidence level (α) of 95% ($p < 0.05$), and all tests were two-tailed. First, a descriptive analysis was done of the clinical and sociodemographic variables of the two groups, into which the entire sample was divided by sex. The mean and standard deviations were calculated for quantitative variables and the frequencies and percentages for qualitative variables. For the bivariate analysis, the chi-square test was used for categorical variables to detect differences between groups, and Student's t test was used to compare differences between continuous variables in the two groups. For variables that showed statistically significant differences in the bivariate analysis, a multiple logistic regression was subsequently performed to identify factors associated with being classified as a woman.

RESULTS

Sociodemographic and other characteristics related to COVID-19 in the whole sample and by sex

The mean age was 35.4 (SD = 12.5). Most of the participants were single (55.7%) and approximately 50% of the sample had a higher education (52%). A total of 53.9% participants were working at the time of the study, and the majority affirmed not having changed work status (82.7%) or having had changes in income due to the pandemic (72.2%).

Regarding the differences observed by sex, women were younger than men [34.8 (SD = 12.2) vs. 38.1 (SD = 13.5), $p<0.001$*). No statistically significant differences were found in the rest of the sociodemographic variables studied.

On the other hand, it should be noted that more women than men who reported having an anxiety disorder presented symptoms related to COVID-19 (16.8% vs. 11.9%, $p < 0.044$). (For more details see material supplementary material Table 1.)

Early psychological impact of the COVID-19 pandemic and lockdown in the whole sample and by sex

A great number of participants experienced a depressive-type reaction, followed by the stress and anxiety reactions (74.3%, 70.9%, and 41.7%, respectively) as determined by the DASS-21. On the IES, it is noteworthy that 69.8% of the sample reported experiencing an avoidant coping style, while 49.3% of the participants reported intrusive thoughts.

Women with an anxiety disorder reported depressive (76.2% vs. 64.8%, $p < 0.001$), anxiety (44.1% vs. 29.6%, $p < 0.001$), and stress (73.5% vs. 57.8%, $p < 0.001$) reactions more frequently than men. As shown by the IES subscales, intrusive thoughts (51.4% vs. 38.5%, $p < 0.001$) and avoidant behaviors (73.1% vs. 53.7%, $p < 0.001$) were also more frequent in women (Table 1).

Factors associated with the psychological impact of the COVID-19 pandemic and lockdown in people with anxiety disorder by sex

The results of the binary logistic regression showed that age and IES intrusive and avoidant subscales were the only factors associated with sex. Thus, being woman was associated with being younger and having higher scores on the intrusion and avoidance subscales of the IES. Table 2 shows the B coefficients, *p*-values, and odds ratios (OR) (95% CI) of the variables in the model (Table 2).

Coping strategies used in the whole sample and by sex

With regard to the strategies used by the participants to minimize the negative impact of the pandemic and lockdown on mental health, a high percentage of the sample reported being able to enjoy leisure time (80.8%). The most frequent activities were watching television (83.8%) and using social networks (87.9%), as well as painting/listening to music (81.8%). By contrast, a smaller percentage used illegal drugs (4%), alcohol

Table 1 Psychological impact on the whole sample and by sex (Mercedes Valtueña- García, et al).

	Total (n= 1617)	Female (n= 1347)	Male (n = 270)	EStatistics, *p* value
DASS-21 subscales, Mean scores (SD)				
Depression	4.3 (1.2)	4.4 (1.2)	4.1 (1.3)	***t* = 0.248, 0.004**
Anxiety	3.1 (2.1)	3.2 (2.1)	2.4 (2.0)	***t* = 2.612, < 0.001**
Stress	4.5 (2.2)	4.6 (2.2)	3.9 (2.5)	***t* = 28.156, < 0.001**
DASS-21 subscales, n (%)				
Depression				χ^2 **= 15.175, < 0.001**
No	416 (25.7)	321 (23.8)	95 (35.2)	
Yes	1201 (74.3)	1026 (76.2)	175 (64.8)	
Anxiety				χ^2 **= 19.369, < 0.001**
No	943 (58.3)	753 (55.9)	190 (70.4)	
Yes	674 (41.7)	594 (44.1)	80 (29.6)	
Stress				χ^2 **= 26.920, < 0.001**
No	471 (29.1)	357 (26.5)	114 (42.2)	
Yes	1146 (70.9)	990 (73.5)	156 (57.8)	
IES subscales, Mean scores (SD)				
Intrusion	3.49 (2.1)	3.63 (2.1)	2.83 (2.1)	***t* = 0.001, < 0.001**
Avoidance	4.57 (2.0)	4.72 (1.9)	3.8 (2.1)	***t* = 3.884, < 0.001**
Total IES	5.41 (3.4)	8.35 (3.3)	6.63 (3.6)	***t* = 7.030, < 0.001**
IES subscales, n (%)				
Intrusion				χ^2 **= 15.042, < 0.001**
No	820 (50.7)	654 (48.6)	166 (61.5)	
Yes	797 (49.3)	693 (51.4)	104 (38.5)	
Avoidance				χ^2 **= 39.956, < 0.001**
No	488 (30.2)	363 (26.9)	125 (46.3)	
Yes	1129 (69.8)	984 (73.1)	145 (53.7)	

SD: standard deviation; DASS-21: Depression, Anxiety, and Stress Scale (No: includes No and Doubtful; Yes: includes Mild, Moderate, Severe, and Extremely Severe); IES: Impact of Event Scale

(18.9%), or tobacco (24.9%) to cope with the negative consequences of the pandemic, and close to half of the entire sample used work for that purpose.

As shown in Table 3, when exploring the differences in the coping strategies used by sex, a higher percentage of women than men reported spending time cooking (63% vs. 53.3%, $p < 0.003$), using social networks (88.8% vs. 83.7%, $p < 0.019$), and practicing yoga or meditation (24.8% vs. 3%, $p < 0.001$). On the other hand, men preferred to spend time reading or watching news related to COVID-19 (49.7% vs. 59.3%, $p < 0.004$). There were no differences between groups regarding other leisure activities (Table 3).

Table 2 Logistic regression model. Reference Category: "Women with anxiety disorder." (Mercedes Valtueña- García, et al).

	B	OR (95% IC)	*p*
Age	-0.015	0.985 (0.975-0.995)	**0.004**
IES-Intrusion	0.116	1.124 (1.046-1.206)	**0.001**
IES-Avoidance	0.176	1.192 (1.105- 1.286)	**< 0.001**

OR: odds ratio; CI: confidence interval; IES: Impact of Event Scale

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735

Table 3 Coping strategies in the whole sample and by sex (Mercedes Valtueña- García, et al).

	Total (n= 1617)	Female (n= 1347)	Male (n = 270)	Statistics, *p* value
Coping strategies, n (%)				
Able to enjoy free time, Yes	1305 (80.8)	1083 (80.5)	222 (82.2)	χ^2 = 0.420, 0.517
Playing sports, Yes	808 (50.0)	683 (50.7)	125 (46.3)	χ^2 =1.749, 0.186
Watching TV, Yes	1355 (83.8)	1128 (83.7)	227 (84.1)	χ^2 = 0.018, 0.892
Watching/reading news about COVID-19, Yes	829 (51.3)	669 (49.7)	160 (59.3)	χ^2 **= 8.285, 0.004**
Painting/listening to music, Yes	1312 (81.1)	1102 (81.8)	210 (77.8)	χ^2 = 2.391, 0.122
Cooking, Yes	992 (61.3)	848 (63.0)	144 (53.3)	χ^2 **= 8.781, 0.003**
Social media, Yes	1422 (87.9)	1196 (88.8)	226 (83.7)	χ^2 **= 5.486, 0.019**
Working, Yes	716 (44.3)	588 (43.7)	128 (47.4)	χ^2 = 1.285, 0.257
Yoga/meditation, Yes	449 (27.8)	401 (24.8)	48 (3.0)	χ^2 **= 16.127, <0.001**
Alcohol consumption, Yes	305 (18.9)	249 (18.5)	56 (20.7)	χ^2 = 0.747, 0.387
Tobacco use, Yes	402 (24.9)	341 (25.3)	61 (22.6)	χ^2 = 0.893, 0.345
Illegal drug use, Yes	65 (4.0)	50 (3.7)	15 (5.6)	χ^2 = 1.981, 0.159

DISCUSSION

To our knowledge, this is the first study conducted in Spain to assess the early psychological impact that the COVID-19 pandemic and lockdown have had on people with a self-reported anxiety disorder. Likewise, this is the only research study in the scientific literature to explore sex differences in psychological impact and coping strategies used by people with an anxiety disorder. First, the percentage of people who experienced maladaptive responses in any of the five psychological domains we evaluated was different depending on the participants' sex. The main findings of the present study show that women experienced a greater reported psychological impact than men. Taking into account the confounding factors, women presented a greater proportion of PTSD-related symptoms.

When comparing the findings of this study with those obtained from the psychological-impact analysis based on absence or presence of past/current mental disorder in the original sample[3], the percentage of people with anxiety disorder who reported a depressive reaction (74. 3%) in our sample was similar to the current mental disorder (CMD) group (74.4%). However, a higher percentage of people who manifested an anxiety (41.7%) or stress (70.9%) reaction was detected in our population with anxiety disorder compared with the CMD group of García-Álvarez et al. (2020)[3] (37.2% and 66.3%, respectively). As previously reported by García-Álvarez et al. (2020)[3], these findings contrast with the data observed in studies conducted in a Chinese population where anxiety responses predominate over stress and depression responses[24]. The different psychological responses by the Spanish and Chinese populations could be explained in part by the cultural and lifestyle differences between Mediterranean and Eastern populations. At the same time, the DASS-21 anxiety subscale specifically asks about associated physical manifestations that may be greater in the Chinese population than in the Spanish population and are interpreted as symptoms related to COVID-19. However, although it seems that in people with an anxiety disorder there was an anxiety-type response in only a minority, the fact that practically the entire sample was undergoing psychopharmacological and/or psychotherapeutic treatment must be taken into account. Furthermore, it should be noted that the reactions of stress, avoidance, and intrusive thoughts are also different manifestations of anxiety, so almost the entire sample in the present study experienced some form of anxiety.

With regard to sex differences, a higher percentage of women presented reactions of anxiety, stress, and negative mood changes compared with men. In addition, intrusive

thoughts and avoidance behaviors were more frequent among women than in the group of men. However, when all possible confounders were taken into account in the multivariate analysis, the only psychological reactions that were associated with being female were avoidant behaviors and intrusive thoughts. Together, these two symptoms can be associated with PTSD[25].

In several previous general population studies, different responses to acute stress have been reported by sex. Specifically, differences in the neurobiological bases of the acute stress response have been discovered, including cellular and molecular mechanisms that could explain these findings[26,27]. This means, for example, that women survivors of natural disasters are more vulnerable than men to developing stress-related psychiatric disorders, such as panic disorders, anxiety, PTSD, and depression[26]. At the same time, a relationship has been reported between sex and specifically masculine ideals and masculine gender role stress, and the lower effectiveness of psychotherapeutic treatment in men[28,29]. One possible explanation is that men are more reluctant to acknowledge psychological trauma. This hinders the cognitive-emotional processing of trauma and prevents men from seeking treatment[28,30]. Other studies conducted after the 2002-2004 SARS epidemic revealed that, if left untreated at the early stages, psychological disorders can persist for weeks, months, or even years after an outbreak ends[31].

These findings, together with the discovery of sex differences in molecular mechanisms[26] and genetic markers related to the female and male hormones[32] involved in the acute stress response could justify designing different therapeutic strategies for women and men to avoid chronicity, prevent higher proportions of treatment-resistant disorders, and improve quality of life in women and men[28].

Returning to the objectives of the present study, sex differences were observed in coping strategies. Men used more cognitive-type strategies, such as watching or reading news about COVID-19, while women used more therapeutic and occupational strategies, such as sharing on social media, cooking, and yoga/meditation. In this sense, Brooks et al.[5] pointed out the importance of social networks as a means of maintaining communication with loved ones in periods of social isolation such as lockdown. This strategy is believed to be effective in reducing the boredom, feelings of isolation, panic, and stress associated with physical distancing from loved ones.

Furthermore, intentionally or not, the group of women followed the common recommendation to limit exposure to media that report on the evolution of the pandemic to reduce related stress. However, despite limiting this exposure, women were more vulnerable to PTSD symptoms. It is believed that, in people with previous anxiety disorders, this coping strategy is partially effective because they may be more sensitive to such information and they may experience anxiety reactions with less stimuli than those without such disorders[16,33].

Limitations and future research

These findings should be interpreted in light of some limitations. The main one is the bias due to the sample recruitment method used. For this, an online survey was used with dissemination by the snowball effect through different social networks. Therefore, it is difficult to recruit people who do not have access to the internet and older people in general. In addition, the data were obtained from participants through self-report questionnaires, which suggests that depression, anxiety, and stress reactions are not subsequently verified by qualified personnel. Likewise, it is the participants who claimed to have a diagnosis of anxiety when answering the questions. These characteristics make it difficult to extrapolate the findings to people with a diagnosis of anxiety disorder.

Another limitation to highlight is that in the study of the differences in the negative psychological impact of the COVID-19 pandemic and the lockdown experienced by men and women and the different coping strategies developed, only the biological sex of the participants is considered without specify male or female gender role.

However, this study overcomes the limitations of previous research studies by using psychometric assessment instruments validated in Spanish and with high specificity, as well as the large size of the evaluated sample.

The findings of this study are important because they may help to develop personalized public health protocols by sex in the future with the aim of preventing long-term mental disorders such as PTSD. At the same time, this knowledge can be useful in developing early psychological care programs tailored to women with anxiety disorders.

The approved first-line therapeutic options for the treatment of PTSD include prolonged exposure therapy (PE) and cognitive processing therapy (CPT)[34,35]. Mindfulness-based therapies, including meditation-relaxation, mantra repetition, mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), and mindfulness-based exposure therapy (MBET), have recently been shown to be useful for the treatment of PTSD. With them, promising results have been achieved in reducing avoidance reactions and the affective and cognitive repercussions of PTSD. However, more studies are needed comparing their efficacy versus first-line psychotherapies for PTSD, including PE and CPT.

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735

In addition, several reports have shown that women are more responsive than men to psychotherapies for the treatment of PTSD[28,30], and that there are possible molecular targets for new pharmacotherapies with greater specificity in women with PTSD[26]. However, the discovery of new molecular targets for the treatment of stress-related disorders, such as PTSD, is hampered by the paucity of preclinical research conducted in female samples[26,36]. Rather, it has been found that most studies are conducted exclusively in male subjects. In any event, more studies are needed to investigate differences in the benefits obtained with the different coping strategies by sex.

CONCLUSIONS

This work aims to study and compare sex differences in the impact on mental health of the COVID-19 pandemic and lockdown in people with self-reported anxiety disorders. The main findings show that the psychological impact was greater on women than on men, specifically with regard to intrusive thoughts and avoidant behaviors. Additionally, the coping styles used were different in women and men. While women employed therapeutic and occupational coping strategies such as cooking, using social networks, and practicing yoga/meditation to minimize the negative psychological impact on mental health, men preferred cognitive coping strategies that have been linked to an increased risk of experiencing stress reactions, such as watching or reading news related to the evolution of the COVID-19 pandemic. In summary, women with self-reported anxiety disorder represent a group particularly vulnerable to a greater negative impact on their mental health due to the COVID-19 pandemic.

In addition, this study suggests that specific therapeutic interventions should be studied and provided to women with anxiety disorders, especially to prevent the development of PTSD in the long term.

Author note

LGA, LFT, MPGP, PAS, and JB designed the study. All authors reviewed it, gave their Approval, and acquired the data. MVG, EMG, and LGB performed the statistical analyses. MVG and EMG wrote the first draft of the manuscript. All authors reviewed all drafts and gave their final approval. The authors declare no conflicts of interest for the submitted work.

Funding sources

This work was partly supported by the Government of the Principality of Asturias PCTI-2018- 2022 IDI/2018/235, the CIBERSAM and Fondos Europeos de Desarrollo Regional (FEDER), and Fundación para la Investigación e Innovación Biosanitaria del Principado de Asturias (Finba).

Acknowledgments

The authors wish to thank Sharon Grevet for her English assistance.

Appendix A. Supplementary data

Online Supplementary Document related to this article.

References

1. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, et al. Genomic characterization and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *The Lancet. 2020*;395(10224): 565-74.

2. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med. *2020;* 382:727-33.

3. García-Álvarez L, de la Fuente-Tomás L, García-Portilla MP, Sáiz PA, Lacasa CM, Dal Santo F, et al. Early psychological impact of the 2019 coronavirus disease (COVID-19) pandemic and lockdown in a large Spanish sample. *J Glob Health.* 2020;10(2):020505.

4. Real Decreto-ley 463/2020, de 14 de marzo, por el que se declara el estado de alarma para la gestión de la situación de crisis sanitaria ocasionada por el COVID-19. (Boletín oficial del Estado, número 67, de 14 de marzo de 2020: 25390-25400)

5. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet. 2020;395*(10227): 912–20.

6. Rubin GJ, Wessely S. The psychological effects of quarantining a city. *BMJ.* 2020;368:m313.

7. Tan B, Chew N, Lee G, Jing M, Goh Y, YeoL, et al. Psychological Impact of the COVID 19 Pandemic on Health Care Workers in Singapore. *Ann Intern Med.* 2020;173(4):317-20.

8. Barbisch D, Koenig KL, Shih FY. Is There a Case for Quarantine? Perspectives from SARS to Ebola. *Disaster Med Public Health Prep.* 2015;9(5):547-553.

9. Khan S, Huremovic D. Psychology of the Pandemic. Psychiatry of Pandemics: A Mental Health Response to Infection Outbreak. Switzerland,*Springer*; 2019.

10. Applegate WB, Ouslander JG. COVID-19 presents high risk to older persons. *J Am Geriatr Soc*. 2020;68(4):681.

11. Pfefferbaum B, North CS. Mental Health and the Covid-19 Pandemic. N Engl J Med. 2020;383(6):510–12.

12. Chatterjee SS, Barikar C M, Mukherjee A. Impact of COVID-19 pandemic on pre-existing mental health problems. *Asian J Psychiatr*. 2020;51:102071.

13. Druss BG. Addressing the COVID-19 Pandemic in Populations With Serious Mental Illness. *JAMA Psychiatry*. 2020;77(9):891-892.

14. Yao H, Chen JH, Xu YF. Patients with mental health disorders in the COVID-19 epidemic. *Lancet Psychiatry*. 2020;7(4):e21.

15. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. Gen Psychiatr. 2020;33(2):e100213.

16. Asmundson GJG, Taylor S. How health anxiety influences responses to viral outbreaks like COVID-19: What all decision-makers, health authorities, and health care professionals need to know. J Anxiety Disord. 2020;71:102-211.

17. Fineberg NA, Van Ameringen M, Drummond L, Hollander E, Stein DJ, Geller D, et al. How to manage obsessive-compulsive disorder (OCD) under COVID-19: A clinician's guide from the International College of Obsessive Compulsive Spectrum Disorders (ICOCS) and the Obsessive-Compulsive and Related Disorders Research Network (OCRN) of the European College of Neuropsychopharmacology. Compr Psychiatry. 2020;100:152-174.

18. González-Blanco L, Dal Santo F, García-Álvarez L, de la Fuente-Tomás L, Lacasa CM, Paniagua G, et al. COVID-19 lockdown in people with severe mental disorders in Spain: Do they have a specific psychological reaction compared with other mental disorders and healthy controls?. Schizophr Res. 2020;223:192-198.

19. Solomou I, Constantinidou F. Prevalence and Predictors of Anxiety and Depression Symptoms during the COVID-19 Pandemic and Compliance with Precautionary Measures: Age and Sex Matter. *Int J Environ Res Public Health*. 2020;17(14):4924.

20. Hyland P, Shevlin M, McBride O, Murphy J, Karatzias T, Bentall R P, et al. Anxiety and depression in the Republic of Ireland during the COVID-19 pandemic. *Acta Psychiatr Scand*. 2020;142(3);249–256.

21. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. Jama. 2013;310;20:2191-4.

22. Bados A, Solanas A, Andrés A. Psychometric properties of the Spanish version of Depression, Anxiety and Stress Scale (DASS). Psicothema. 2005;17:679-83.

23. Báguena MJ, Villarroya E, Beleña A, Díaz A, Roldán C, Reig R. Propiedades Psicométricas de la Versión Española de la escala Revisada de Impacto del Estresor. Anál. Modif. Conduct. 2001; 27: 581-604.

24. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. Int J Environ Res Public Health. 2020;17(5):1729.

25. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association; 2013.

26. Bangasser DA, Valentino RJ. Sex differences in stress-related psychiatric disorders: neurobiological perspectives. Front Neuroendocrinol. 2014;35(3):303-19.

27. Luft C, Greggio S, Venturin GT, da Costa MS, da Costa JC, Donadio MVF. Sex differences in the effects of acute stress on cerebral glucose metabolism: A microPET study. Brain Res. 2019;1722:146355.

28. Christiansen DM, Berke ET. Gender- and Sex-Based Contributors to Sex Differences in PTSD. Curr Psychiatry Rep. 2020;22(4):19.

29. Cox DW, O'Loughlin J. Posttraumatic stress mediates traditional masculinity ideology and romantic relationship satisfaction in veteran men. Psychology of Men & Masculinity. 2017;18(4),382.

30. Wade D, Varker T, Kartal D, Hetrick S, O'Donnell M, Forbes D. Gender difference in outcomes following trauma-focused interventions for posttraumatic stress disorder: Systematic review and meta-analysis. Psychol Trauma. 2016;8(3):356-64.

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735

31. Ko CH, Yen CF, Yen JY, Yang MJ. Psychosocial impact among the public of the severe acute respiratory syndrome epidemic in Taiwan. Psychiatry Clin Neurosci. 2006;60(4):397-403.

32. Josephs RA, Cobb AR, Lancaster CL, Lee HJ, Telch MJ. Dual-hormone stress reactivity predicts downstream war-zone stress-evoked PTSD. Psychoneuroendocrinology. 2017;78:76-84.

33. Gruber J, Prinstein MJ, Clark LA, Rottenberg J, Abramowitz JS, Albano A M,et al. Mental health and clinical psychological science in the time of COVID-19: Challenges, opportunities, and a call to action. Am Psychol. 2021;76(3):409-26.

34. Boyd JE, Lanius RA, McKinnon MC. Mindfulness-based treatments for posttraumatic stress disorder: a review of the treatment literature and neurobiological evidence. J Psychiatry Neurosci. 2018;43(1):7-25.

35. Resick PA, Williams LF, Suvak MK, Monson CM, Gradus JL. Long-term outcomes of cognitive-behavioral treatments for posttraumatic stress disorder among female rape survivors. J Consult Clin Psychol. 2012;80(2):201-10.

36. Beery AK, Zucker I. Sex bias in neuroscience and biomedical research. Neurosci Biobehav Rev. 2011;35(3):565-72.

SUPPLEMENTARY MATERIAL

Table S1 **Sociodemographic and clinical characteristics for the whole sample with anxiety disorder and by sex. (Mercedes Valtueña- García, et al)**

	Total (n= 1617)	Female (n= 1347)	Male (n = 270)	Statistics, value *p*
Sociodemographic variables				
Age, Mean (SD)	35.4 (12.5)	34.8 (12.2)	38.1 (13.5)	***t* = 5.578, < 0.001**
Civil status, n (%)				χ^2 = 3.760, 0.153
Never married	901 (55.7)	765 (56.8)	136 (50.4)	
Married/Living as married	625 (38.7)	508 (37.7)	117 (43.3)	
Separated/Divorced/Widowed	91 (5.6)	74 (5.5)	17 (6.3)	
Education level, n (%)				χ^2 = 4.453, 0.108
Primary	33 (2)	28 (2.1)	5 (1.9)	
Secondary	744 (46)	604 (44.8)	140 (51.9)	
Higher	840 (52)	715 (53.1)	125 (46.3)	
Work status, n (%)				χ^2 = 5.192, 0.075
Unemployed/ Retired	264 (16.3)	212 (15.7)	52 (19.3)	
Working	871 (53.9)	719 (53.4)	152 (56.3)	
Student/Homemaker/ Other	482 (29.8)	416 (30.9)	66 (24.4)	
Change in income due to COVID-19, n (%)				χ^2 = 4.000, 0.135
None	1167 (72.2)	959 (71.2)	208 (77)	
Reduction	439 (27.1)	378 (28.1)	61 (22.6)	
Increase	11 (0.7)	10 (0.7)	1 (0.4)	
Change of employment status due to COVID-19, n (%)				χ^2 = 3.438, 0.064
No	1320 (82.7)	1088 (81.9)	232 (86.6)	
Yes	277 (17.3)	241 (18.1)	36 (13.4)	
Dependent children, n (%)				χ^2 = 0.280, 0.597
No	1177(72.8)	984 (73.1)	193 (71.5)	
Yes	440 (27.2)	363 (26.9)	77 (28.5)	
Elderly dependent(s), n (%)				χ^2 = 0.975, 0.323
No	1441 (89.1)	1205 (89.5)	236 (87.4)	
Yes	176 (10.9)	142 (10.5)	34 (12.6)	
COVID-19 variables, n (%)				
Current physical disease, yes	548 (37.8)	460 (37.9)	88 (37.8)	
Tested for COVID-19, yes	22 (1.4)	21 (1.6)	1 (0.4)	χ^2 = 2.371, 0.124
Family/Friends infected by COVID-19, yes	351 (21.7)	295 (21.9)	56 (20.8)	χ^2 = 0.159, 0.690
Living with people infected by COVID-19, yes	23 (1.4)	22 (1.6)	1 (0.4%)	χ^2 = 2.558, 0.110
COVID-19 symptoms, yes	258 (16)	226 (16.8)	32 (11.9)	**χ^2 = 4.070, 0.044**

SD – standard deviation

Actas Esp Psiquiatr 2023;51(2): 65-75 | ISSN: 1578-2735