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# 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?

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## ABSTRACT

The COVID-19 pandemic and the lockdown restrictions could have adverse consequences for patients with severe mental disorders (SMD). Here, we aim to compare the early psychological impact (depression, anxiety, and stress responses, intrusive and avoidant thoughts, and coping strategies) on people with SMD ( $n = 125$ ) compared with two control groups: common mental disorders (CMD,  $n = 250$ ) and healthy controls (HC,  $n = 250$ ).

An anonymous online questionnaire using a snowball sampling method was conducted from March 19–26, 2020 and included sociodemographic and clinical data along with the DASS-21 and IES scales. We performed descriptive and bivariate analyses and multinomial and linear regression models.

People with SMD had higher anxiety, stress, and depression responses than HC, but lower scores than CMD in all domains. Most people with SMD (87.2%) were able to enjoy free time, although control groups had higher percentages. After controlling for confounding factors, anxiety was the only significant psychological domain with lower scores in HC than people with SMD (OR = 0.721; 95% CI: 0.579–0.898). In the SMD group, higher anxiety was associated with being single ( $\beta = 0.144$ ), having COVID-19 symptoms ( $\beta = 0.146$ ), and a higher score on the stress subscale of DASS-21 ( $\beta = 0.538$ ); whereas being able to enjoy free time was a protective factor ( $\beta = -0.244$ ).

Our results showed that patients with SMD reacted to the pandemic and the lockdown restrictions with higher anxiety levels than the general public, and suggesting this domain could be a criterion for early intervention strategies and closer follow-up.

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## 1. Introduction

After the outbreak of a new coronavirus subtype SARS-CoV-2 in China in late 2019, a global pandemic developed, generating a health, economic, and social emergency (Wang et al., 2020a). In Spain, the first case of COVID-19 disease was reported in February, and since that

time, there has been an exponential increase in the number of people infected. Consequently, a state of emergency was declared and a strict lockdown order was issued on March 14, 2020 to reduce the spread of the virus.

Previous literature has provided evidence of the negative psychological impact that epidemic outbreaks have on the general population (Lam et al., 2009). Multiple concurrent factors can contribute to increased fear or anxiety, including the physical distancing and self-isolation strategies used to contain the spread of the infectious agent (Brooks et al., 2020). Recent studies during the COVID-19 outbreak have reported early emotional distress in more than half of the general public surveyed in China (Lima et al., 2020; Wang et al., 2020b), and

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rates may be higher in vulnerable population groups (Pfefferbaum and North, 2020). García-Álvarez et al. (2020a) examined the early impact of the COVID-19 pandemic and lockdown on mental health in a large sample of the Spanish population. They found that people reporting a current mental disorder were experiencing the greatest psychological impact, followed by those reporting a past mental disorder. Both groups experienced a stronger psychological impact than the general population. It should be noted that most of these people had symptoms of common mental disorders such as anxiety or depression.

In people with severe mental illnesses, psychological stress and adverse life experiences have been recognized as risk factors for psychosis onset and relapse (Fusar-Poli et al., 2017). Moreover, this population may be particularly exposed to stress and physical distancing measures (Brown et al., 2020; Druss, 2020) and thus disproportionately vulnerable to public health interventions to fight the COVID-19 pandemic (Kozloff et al., 2020). However, far too little attention has been paid to these patients and, to our knowledge, there are no specific data about the emotional distress caused by the current pandemic and lockdown restrictions in this population. One study during the SARS epidemic showed that psychiatric inpatients had more anxiety than the staff and the same dysphoria (Iancu et al., 2005).

Thus, the main objectives of this study are (1) to compare early psychological impact in people with severe mental illness and two control groups (common mental disorders and healthy controls) and (2) identify the risk and protective factors associated with a maladaptive psychological response.

## 2. Methods

### 2.1. Study design

We performed a secondary analysis of a larger cross-sectional study exploring the early psychological impact of the COVID-19 pandemic and the lockdown restrictions in a sample of 21,279 people living in Spain (García-Álvarez et al., 2020a). It consisted of an anonymous online questionnaire conducted from March 19–26, 2020, five days after the official declaration of a state of emergency and issuance of the lockdown order. A virtual snowball sampling recruitment strategy was used. Inclusion criteria were 1) being older than 17 years (72 participants excluded) and 2) giving informed consent (for more details, see García-Álvarez et al., 2020a).

The Clinical Research Ethics Committee of Hospital Universitario Central de Asturias in Oviedo, Spain approved the study protocol (Ref. 2020.162), and online informed consent was obtained from all participants before enrolment. The study followed the ethical principles of the Declaration of Helsinki (World Medical Association General Assembly, 2013).

### 2.2. Participants

To accomplish the aims of the present study, we analyzed a subset of the original sample. People were asked if they had past or current mental health problems (yes/no questions) as well as the type of mental disorder (anxiety, depression, psychotic and bipolar disorders). On that basis, a total of 625 people was included. Of those, 125 had severe mental disorders consisting of 65 cases of bipolar disorder (BD) and 60 of psychotic disorders (severe mental disorder group – SMD), 250 had other current mental disorders consisting of 125 cases of depression and 125 of anxiety (common mental disorder control group – CMD), and 250 had no current or past mental disorders (healthy control group – HC). Subjects in each of the two control groups were matched (ratio 1:2) for sex and age ( $\pm 1$  year) with the SMD group and, in most cases, also for geographic area ( $\chi^2 = 223,586, p = .676$ ). Geographic area distribution for each group is presented in Table 1 of the Supplementary Material. In addition, as the psychological impact changed from day to day and was affected by a further 14-day extension

of the lockdown on March 22 (García-Álvarez et al., 2020a), we matched the groups for the two periods of pandemic (March 19–22 and 23–26) in almost all cases (see Table 1).

### 2.3. Assessments

The assessment consisted of an ad hoc online questionnaire and the Spanish versions of the Depression, Anxiety, and Stress Scale (DASS-21) (Bados et al., 2005) and the Impact of Event Scale (IES) (Báguena et al., 2001). The ad hoc questionnaire included sociodemographic and clinical data such as age, sex, province of residence, education, marital status, living arrangement, work status, monthly income, changes in work status due to COVID-19, changes in monthly income due to COVID-19, number and age of dependent children, and dependent older adults. Clinical variables included current medical conditions and past/current mental disorders. The survey also included questions about engaging in different leisure activities during the lockdown (exercise; watching movies or television programs; reading or watching news about COVID-19; drawing, writing, reading, or listening to music; cooking; using social networks; drinking alcohol; smoking tobacco; smoking other illicit substances; working; and doing yoga or meditation) (for more details, see García-Álvarez et al., 2020a).

To measure the psychological impact of COVID-19 and maladaptive responses, we employed the self-rated DASS-21 and IES scales. The DASS-21 provided scores (range 0–7) on three subscales: depression, anxiety, and stress, while the IES provided scores (0–7 and 0–8) on two subscales: intrusion (intrusive thoughts) and avoidance (avoidant thoughts). Subjects were asked to report whether they had experienced any of the psychological symptoms mentioned in the questionnaires during the last week. Higher scores on the five subscales meant greater distress. We adopted a binary response solution (yes/no) for the scale items to simplify the survey and promote a more inclusive and user-friendly experience (García-Álvarez et al., 2020a).

### 2.4. Data analysis

Statistical analyses were performed using the software package IBM SPSS Statistics for Windows, Version 23.0. Significance levels were set at  $p < .05$ . Univariate and bivariate analysis was performed on all variables, and data were expressed as percentages or means and standard deviations (SD). Differences among groups for continuous data were analyzed using a one-way analysis of variance (ANOVA) and least significant difference (LSD) post hoc test, while the chi-square test was used for categorical variables.

To identify the specific psychological COVID-19 response of the people with SMD, we performed a multinomial logistic regression, using the SMD group as the reference group. In the regression, as independent predictors we included each variable that demonstrated significant differences among the three groups in the bivariate analysis. The possible existence of multicollinearity among the included variables was discarded before carrying out the analysis. Our second objective concerned exclusively the psychological dimensions that constituted the specific phenotype of the people with SMD, i.e., the anxiety response. We initially performed bivariate analyses to identify the variables significantly associated with it. Then, we included all the identified variables in a multiple linear regression model to determine the risk and protective factors of the anxiety response to COVID-19 in people with SMD.

## 3. Results

### 3.1. Sociodemographic and clinical characteristics of SMD

The mean age of the SMD group was 43.25 (SD = 14.41) years, and 77 (61.6%) were women. Almost 50% were never married, and 58.4% were people with a university education. As expected, a lower percentage of people with SMD were working (39.2%) compared with the other

two control groups, and a higher proportion of people with SMD had no income or less than 500 € a month (29.6%). A total of 78.4% were living with other people, and most of them reported not having dependent older adults or children. It should be noted that more than 60% of people with SMD had a current physical disease, which was significantly higher than in the HC group. At the time of the assessment, a small group of people with SMD presented self-reported symptoms of COVID-19 (14.4%), were living with infected people (4%), or had family or friends with the illness (19.4%). Additional data on sociodemographic and clinical aspects are presented in Table 1.

Regarding leisure activities, the majority of people with SMD were able to enjoy free time, although the highest percentage was among HC (87.2% vs. 94.7%,  $p = .022$ ) (see Table 2). Their preferred activity was watching television, followed by using social networks, and painting or listening to music (all of them engaged in by more than 84% of people). By contrast, using illicit drugs (7.2%) and drinking alcohol (15.2%) represented the lowest percentages in all groups, and there were no differences between groups.

When compared with the CMD group, a significantly higher proportion of people with SMD engaged in exercise (CMD = 39.6% vs SMD =

**Table 1**  
Sociodemographic and clinical characteristics of the study sample groups.

	Severe Mental Disorder N = 125	Common Mental Disorder N = 250	Healthy Control N = 250	Statistical test, P; Post Hoc P
Age [Mean (SD)]	43.25 (14.41)	43.17 (14.27)	43.27 (14.37)	F = 0.003, 0.997
Sex, female [n (%)]	77 (61.6%)	154 (61.6%)	154 (61.6%)	$\chi^2 = 0.000, 1.000$
Marital status				$\chi^2 = 5.485, 0.241$
Never married	62 (49.6%)	108 (43.2%)	100 (40.0%)	
Married/Living as married	46 (36.8%)	107 (42.8%)	122 (48.8%)	
Separated/Divorced/Widowed	17 (13.6%)	35 (14.0%)	28 (11.2%)	
Education level [n (%)]				$\chi^2 = 4.858, 0.088$
Primary/Secondary	52 (41.6%)	121 (48.4%)	97 (38.8%)	
University	73 (58.4%)	129 (51.6%)	153 (61.2%)	
Work status [n (%)]				$\chi^2 = 29.863, <0.001;$
Unemployed	18 (14.4%)	25 (10.0%)	16 (6.4%)	<sup>a</sup> 0.005
Working	49 (39.2%)	146 (58.4%)	170 (68.0%)	<sup>b</sup> < 0.001
Retired	27 (21.6%)	32 (12.8%)	25 (10.0%)	<sup>c</sup> > 0.05
Student/Homemaker/Other	31 (24.8%)	47 (18.8%)	39 (15.6%)	
Income (€) [n (%)]				$\chi^2 = 17.959, 0.006;$
No income or less than 500	37 (29.6%)	50 (20.0%)	43 (17.2%)	<sup>b</sup> 0.002
500–1499	46 (36.8%)	91 (36.4%)	73 (29.2%)	<sup>a,c</sup> > 0.05
More than 1500	37 (29.6%)	91 (36.4%)	119 (47.6%)	
Prefer not to answer	5 (4%)	18 (7.2%)	15 (6%)	
Change in work status due to COVID-19 [n (%)]				$\chi^2 = 9.253, 0.160$
No	107 (87.74%)	207 (83.5%)	201 (81.4%)	
ETLA/EPLO <sup>#</sup>	6 (4.9%)	29 (11.7%)	25 (10.1%)	
Termination	2 (1.6%)	6 (2.4%)	5 (2.0%)	
Furlough	7 (5.7%)	6 (2.4%)	16 (6.5%)	
Change in income due to COVID-19 [n (%)]				$\chi^2 = 9.030, 0.340$
No	96 (76.8%)	179 (71.6%)	188 (75.2%)	
Reduction, up to 25%	11 (8.8%)	20 (8.0%)	25 (10.0%)	
Reduction, 26–50%	9 (7.2%)	21 (8.4%)	19 (7.6%)	
Reduction, 51–100%	9 (7.2%)	30 (12.0%)	16 (6.4%)	
Increase	0 (0.0%)	0 (0.0%)	2 (0.8%)	
Living situation [n (%)]				$\chi^2 = 9.886, 0.042;$
Alone	27 (21.6%)	46 (18.4%)	37 (14.8%)	<sup>b</sup> 0.008
Two people	56 (44.8%)	95 (38.0%)	87 (34.8%)	<sup>a,c</sup> > 0.05
More than three	42 (33.6%)	109 (43.6%)	126 (50.4%)	
Dependent children [n (%)]				$\chi^2 = 17.709, 0.001$
None	103 (82.4%)	168 (67.2%)	163 (65.2%)	<sup>a</sup> 0.008
One	13 (10.4%)	51 (20.4%)	40 (16.0%)	<sup>b</sup> 0.002
Two or more	9 (7.2%)	31 (12.4%)	47 (18.0%)	<sup>c</sup> > 0.05
Elderly dependents [n (%)]				$\chi^2 = 3.689, 0.450$
None	108 (86.4%)	214 (85.6%)	221 (88.4%)	
One	14 (11.2%)	23 (9.2%)	17 (6.8%)	
Two or more	3 (2.4%)	13 (5.2%)	12 (4.8%)	
Current physical disease*, Yes	62 (63.3%)	116 (52.3%)	48 (20.5%)	$\chi^2 = 72.408, <0.001$
Tested for COVID-19				$\chi^2 = 9.010, 0.173$
No	124 (99.2%)	245 (98.0%)	248 (99.6%)	
Yes, negative	0 (0.0%)	4 (1.6%)	1 (0.4%)	
Yes, results pending	1 (0.8%)	0 (0.0%)	0 (0.0%)	
Yes, positive	0 (0.0%)	1 (0.4%)	0 (0.0%)	
COVID-19 symptoms, Yes	18 (14.4%)	34 (13.6%)	24 (9.6%)	$\chi^2 = 2.606, 0.272$
Family/Friends infected with COVID-19, Yes	24 (19.40%)	49 (19.7%)	42 (16.9%)	$\chi^2 = 0.691, 0.708$
Living with people infected with COVID-19, Yes	5 (4.0%)	7 (2.8%)	3 (1.2%)	$\chi^2 = 3.074, 0.215$
Survey response period				$\chi^2 = 0.396, 0.821$
March 19–22	68 (54.4%)	143 (57.2%)	137 (54.8%)	
March 23–26	57 (45.6%)	107 (42.8%)	113 (45.2%)	

<sup>#</sup> ETLA: Employee Temporary Lay Off. EPLO: Employee Permanent Lay Off.

\* Physical disease includes hypertension, diabetes, cardiovascular diseases, respiratory diseases (asthma, COPD, etc.), and cancer.

<sup>a</sup> Comparison between Severe Mental Disorder (SMD) vs. Common Mental Disorder (CMD).

<sup>b</sup> SMD vs. Healthy Controls (HC).

<sup>c</sup> CMD vs. HC.

**Table 2**  
Lockdown leisure activities of the study sample groups.

	Severe Mental Disorder N = 125	Common Mental Disorder N = 250	Heathy Control N = 250	Statistical test, P; Post Hoc P
Able to enjoy free time, Yes	109 (87.2%)	200 (80.0%)	235 (94.0%)	$\chi^2 = 27.480, <0.001$ ; <sup>b</sup> 0.022 <sup>c</sup> < 0.001
Doing exercise, Yes	63 (50.4%)	99 (39.6%)	147 (58.8%)	$\chi^2 = 18.492, <0.001$ ; <sup>a</sup> 0.047 <sup>c</sup> < 0.001
Yoga/Meditation, Yes	37 (29.6%)	66 (26.4%)	49 (19.6%)	$\chi^2 = 5.507, 0.064$ ; <sup>b</sup> 0.030
Watching TV, Yes	107 (85.6%)	200 (80.0%)	223 (89.2%)	$\chi^2 = 8.286, 0.016$ ; <sup>c</sup> 0.004
Reading COVID news, Yes	89 (64.0%)	146 (58.4%)	176 (70.4%)	$\chi^2 = 7.850, 0.020$ ; <sup>c</sup> 0.005
Painting/Listening to music, Yes	105 (84.0%)	190 (76.0%)	216 (86.4%)	$\chi^2 = 9.592, 0.008$ ; <sup>c</sup> 0.003
Cooking, Yes	66 (52.8%)	143 (57.2%)	175 (70.0%)	$\chi^2 = 13.568, 0.001$ ; <sup>b</sup> 0.001 <sup>c</sup> 0.003
Social networks, Yes	106 (84.8%)	217 (86.8%)	234 (93.6%)	$\chi^2 = 8.968, 0.011$ ; <sup>b</sup> 0.006 <sup>c</sup> 0.011
Working, Yes	43 (34.4%)	109 (43.6%)	157 (62.8%)	$\chi^2 = 32.574, <0.001$ ; <sup>b</sup> < 0.001 <sup>c</sup> < 0.001
Smoking, Yes	30 (32.0%)	59 (23.6%)	46 (18.4%)	$\chi^2 = 8.688, 0.013$ ; <sup>b</sup> 0.003
Drinking, Yes	19 (15.2%)	48 (19.2%)	37 (14.8%)	$\chi^2 = 1.978, 0.372$
Illicit drug use, Yes	9 (7.2%)	12 (4.8%)	9 (3.6%)	$\chi^2 = 2.363, 0.307$

<sup>a</sup> Comparison between Severe Mental Disorder (SMD) vs. Common Mental Disorder (CMD).

<sup>b</sup> SMD vs. Healthy Controls (HC).

<sup>c</sup> CMD vs. HC.

50.4%,  $p = .047$ ). On the other hand, compared with HC, people with SMD more often practiced meditation or yoga (HC = 19.6% vs. SMD = 29.6%,  $p = .030$ ), but less often activities such as cooking, using social networks, or working. Tobacco use as a coping method was more frequently observed among people with SMD compared with HC.

### 3.2. Early psychological impact of the COVID-19 pandemic and lockdown on people with SMD compared with control groups

The bivariate analyses comparing the three groups (Table 3) showed that people with SMD had statistically significantly higher scores on anxiety, stress, and depression subscales of the DASS-21 compared with the HC group, but lower scores compared with the CMD group (all  $p < .05$ ). Regarding IES subscales, people with SMD had lower intrusive thoughts and avoidance scores compared with the CMD group but no differences compared with the HC group (Table 3).

In the next analysis step, all variables with statistically significant differences among the three groups (work status, income, living situation, dependent children, current physical disease, several leisure activities, and DASS-21 and IES subscale scores) were included in the multinomial logistic regression along with education level ( $p = .088$ ). The results of this regression showed that COVID-19 was associated with a more intense anxiety response in people with SMD compared with HC [ $B = -0.327, p = .004$ ; OR (95% CI) = 0.721 (0.579–0.898)]. No differences in psychological impact were observed between SMD and CMD groups. Table 4 shows the B coefficient,  $p$ -value, and odds ratio (OR) (95% CI) of every potential statistically significant predictive variable that was included in the model.

### 3.3. Risk and protective factors of the anxiety response to the COVID-19 pandemic and lockdown in people with SMD

Age was negatively correlated with the anxiety subscore ( $r = -0.295, p = .001$ ), but no differences by sex were observed ( $p > .05$ ). Regarding other sociodemographic characteristics, differences were found based on marital status ( $F = 6.494, p = .002$ ), work status ( $F = 5.134, p = .002$ ), income ( $F = 4.454, p = .005$ ), living situation ( $F = 4.285, p = .016$ ) and having dependent children ( $t = -4.328, p < .001$ ). Higher scores were found on the anxiety subscale in people with SMD who were never married, were students, had monthly income less than 500, lived alone, and had no dependent children. No differences were found for education level, change in work status or income, or having elderly dependents.

There were also no differences in the anxiety response in people with SMD and underlying physical conditions, but higher anxiety levels were experienced by those who reported COVID-19 symptoms ( $t = 2.580, p = .018$ ) or had infected family or friends ( $t = 2.258, p = .031$ ).

Higher scores on the anxiety subscale were also positively correlated with scores on the DASS-21 depression and stress subscales ( $r = 0.524, p < .001$ ;  $r = 0.713, p < .001$ ) and scores on the IES intrusive thoughts and avoidance subscales ( $r = 0.545, p < .001$ ;  $r = 0.487, p < .001$ ). Finally, people who were able to enjoy free time had a lower anxiety response [mean 1.38 (SD = 1.63) vs 4.00 (SD = 1.71),  $t = 5.969, p < .001$ ]. However, engaging in specific activities during lockdown had no effect on anxiety scores.

Considering all potential confounders, the multiple linear regression model ( $R^2 = 0.580, F = 41.027, p < .001$ ) detected being single ( $\beta = 0.144, t = 2.291, p = .024$ ), having symptoms of COVID-19 ( $\beta =$

**Table 3**  
Psychological impact on the study sample groups.

	Severe Mental Disorder N = 125	Common Mental Disorder N = 250	Heathy Control N = 250	Statistical test, P; Post Hoc P
DASS-21				
Depression subscale	3.96 (1.19)	4.26 (1.40)	3.59 (1.04)	$F = 18.850, <0.001$ ; <sup>a</sup> 0.026 <sup>b</sup> 0.006 <sup>c</sup> < 0.001
Anxiety subscale	1.77 (1.86)	2.38 (2.15)	0.92 (1.29)	$F = 42.201, <0.001$ ; <sup>a</sup> 0.001 <sup>b</sup> < 0.001 <sup>c</sup> < 0.001
Stress subscale	2.76 (2.60)	3.57 (2.52)	2.19 (2.30)	$F = 20.050, <0.001$ ; <sup>a</sup> 0.003 <sup>b</sup> 0.034 <sup>c</sup> < 0.001
IES				
Intrusive thoughts subscale	2.40 (2.00)	3.02 (2.31)	1.96 (1.87)	$F = 16.401, <0.001$ ; <sup>a</sup> 0.006 <sup>c</sup> < 0.001
Avoidance subscale	2.32 (1.99)	4.10 (2.09)	3.14 (2.03)	$F = 14.846, <0.001$ ; <sup>a</sup> 0.001 <sup>c</sup> < 0.001

DASS-21: Depression, Anxiety, and Stress Scale; IES: Impact of Event Scale.

<sup>a</sup> Comparison between Severe Mental Disorder (SMD) vs. Other Mental Disorder (CMD).

<sup>b</sup> SMD vs. Healthy Controls (HC).

<sup>c</sup> CMD vs. HC.

**Table 4**

Results from the multinomial regression model. Reference Category: "Group of people with Severe Mental Disorder".

	B	OR (95% CI)	P
Common Mental Disorder			
Intercept	1.467		0.092
Physical disease, reference: Yes	-0.676	0.509 (0.304; 0.851)	0.010
Income (€), reference: More than 1500			
No income or less than 500	-0.956	0.385 (0.156; 0.946)	0.037
500–1499	-0.621	0.537 (0.290; 0.995)	0.048
Healthy Control			
Intercept	2.033		0.039
Anxiety subscale of DASS-21	-0.327	0.721 (0.579; 0.898)	0.004
Cooking, reference: Yes	0.752	2.121 (1.231; 3.652)	0.007
Mediation/Yoga, reference: Yes	-0.759	0.468 (0.250; 0.877)	0.018
Working, reference: Yes	0.721	2.056 (1.182; 3.576)	0.011
Smoking, reference: Yes	-0.775	0.461 (0.252; 0.841)	0.012
Physical disease, reference: Yes	-2.027	0.132 (0.076; 0.228)	<0.001

OR: odds ratio; 95% CI: 95% confidence interval.

Only statistically significant associations are shown.

0.146,  $t = 2.395$ ,  $p = .018$ ), and higher scores on the DASS-21 stress subscale ( $\beta = 0.538$ ,  $t = 7.635$ ,  $p < .001$ ) as risk factors for anxiety response in people with SMD; whereas a protective effect was associated with being able to enjoy free time ( $\beta = -0.244$ ,  $t = -3.692$ ,  $p < .001$ ).

#### 4. Discussion

To our knowledge, this is the first study to explicitly examine the early psychological impact (depression, anxiety, stress, intrusive and avoidant responses) of the COVID-19 pandemic and lockdown restrictions on patients with severe mental disorders (bipolar and psychotic disorders) in Spain.

We observed a higher anxiety response in our sample of people with SMD compared with HC. However, no different psychological reaction phenotype was identified between patients with SMD and patients with CMD after considering potential confounding factors. It should be noted that the people in each group were matched for age and sex, as well as geographical area, and that the temporal distribution of survey responses was similar among the three groups. Other differences detected in work and income status or living situation were taken into account for multivariate analyses.

Lockdown, isolation, and fear of infection are known to have a negative psychological impact on the global population (Brooks et al., 2020). People with previous physical illnesses, older adults, and patients with mental problems are especially vulnerable (García-Álvarez et al., 2020a), and we expect a differential psychological impact on people with severe mental disorders when facing a lockdown situation. Moreover, these patients may find themselves at a disadvantaged starting point because they tend to build poorer quality social networks (Green et al., 2018), and lower use of online and mobile technologies could further aggravate their isolation (Firth et al., 2016), which might also involve worse functional outcomes (Degnan et al., 2018). Previous studies in individuals with BD have reported a more significant impact of life events on their clinical course than in people with unipolar depression and suggested an increased number of life events before an acute mood episode in people with BD (Lex et al., 2017).

Surprisingly, we observed that a high percentage of people with SMD were able to cope with the first few weeks of the pandemic, with more than 85% being able to enjoy their free time. This strategy was also turned out to be a protective factor for anxiety in our study, as previously reported in García-Álvarez et al. (2020a) for the whole population. Furthermore, these people with SMD more frequently engaged in relaxing activities or meditation compared with those without a mental disorder, perhaps helped by dedicated activities in mental health facilities (Fibbins et al., 2018; Potes et al., 2018). However, it must be remarked that the patients in our sample, who required better digital

literacy and motivation in order to participate in the survey, could also be those most proficient in engaging in leisure activities and thus more capable of enjoying their free time. Furthermore, a significant proportion of the SMD group (around 50%) consisted of people with a diagnosis of BD, which could explain the high percentage of people with a higher education, an active work status, and varied leisure activities.

In contrast, they use tobacco more frequently as a coping strategy in the current circumstances. It should be noted that higher smoking rates, as we might expect during the COVID-19 pandemic (García-Álvarez et al., 2020b), not only increase the risk of infection but have also been associated with worse prognosis if the illness develops (Druss, 2020).

One of the main results of the present study was that the COVID-19 outbreak was associated with a higher anxiety response in people with SMD. These findings are consistent with previous studies from the SARS epidemic, which reported higher levels of anxiety in inpatients with schizophrenia compared with the staff (Iancu et al., 2005), but this reaction was not more severe than in people with other common mental disorders in our sample. The existing literature found that anxiety, a frequent yet often neglected comorbidity in SMD (Buonocore et al., 2018), could lead to a worse prognosis in both BD (Corry et al., 2013; Spoorthy et al., 2019) and schizophrenia (Braga et al., 2013). While other people may be able to develop functional coping strategies to face this emotional reaction, anxiety could determine unfavorable outcomes in the vulnerable population with SMD, such as triggering a relapse (Druss, 2020). Moreover, anxiety could lead to pathological psychological responses, and there is some evidence for an increased number of suicides after previous pandemics (Chan et al., 2006).

Other impressive results from our study are that we found a higher anxiety response to the pandemic and lockdown in people with SMD who were not married, had symptoms of COVID-19, and presented a more severe stress response. With regard to marital status, our results contrast with those obtained in the population with a past mental disorder (García-Álvarez et al., 2020a), in which not being married was a protective factor for the anxiety response. Being married could represent a protective factor for functional impairment in patients with BD (Bonín et al., 2019) and it is plausible that, in the current lockdown situation, married patients could be more protected from social isolation and more likely to receive emotional, psychosocial, or financial support if needed (Wingo et al., 2010). Another explanation could be that people with no family of their own had worse personal and social functioning at baseline, making them more vulnerable to the psychological impact of the COVID-19 outbreak.

During previous infectious outbreaks, patients reported higher anxiety levels (Mauder et al., 2003), and these dysfunctional reactions seem to be replicated in symptomatic COVID-19 patients, independent of previous mental health status (García-Álvarez et al., 2020a). Finally, it is not surprising that stress response and anxiety were strongly associated, since there may be a natural continuity between these domains (Corry et al., 2013). Among the sociodemographic factors, we did not find that older age or being female were risk factors for anxiety symptoms in the SMD group, while other authors have found in the general population that younger people and females were at higher risk of anxiety in the context of the pandemic (Wang et al., 2020a, 2020b).

In summary, our findings support previous research showing that anxiety is mainly determined by early environmental factors, as well as by socio-cognitive dimensions such as personal distress (Buonocore et al., 2018). Therefore, we stress the importance for clinicians to routinely assess anxiety responses in people with SMD, as they may represent an early sign of greater vulnerability to psychological distress due to the current lockdown situation. As our results reflect the impact of only the first few weeks of the COVID-19 pandemic, future research should focus on long-term psychological consequences, considering the possible distress due to loss of family members and caregivers as well as increasing rates of unemployment or homelessness.

However, the current study has certain limitations. Besides those already reported by García-Álvarez et al. (2020a) in terms of

representativeness and selection bias of the sample, we should add the fact that people with psychosis have less access to digital technologies (Firth et al., 2016; Robotham et al., 2016). We assume that people with SMD who responded to the survey have greater access to these resources and, therefore, may not adequately represent the target population. This is also demonstrated by the higher percentage of people with SMD who have a university education (more than 50%). We should also mention that diagnoses were self-reported, and the diagnostic category for “psychosis” could include a broad spectrum of disorders, from single acute episodes to chronic disorders like schizophrenia. Moreover, we did not address the current state of patients who reported BD, nor the predominant polarity. Symptoms of depression, anxiety, or stress experienced by respondents were also collected from self-reported psychometric instruments, with the common drawbacks of such instruments. Also, the use of a binary response solution (“no” or yes”) instead of a Likert-type scale to rate behaviours could represent another limitation.

Even so, several strengths of the present study should be considered, such as its nationwide population-based design and the matching performed to compare three similar groups regarding sociodemographic variables. Moreover, it is essential to point out that, to our knowledge, this is the first study to provide information on the early psychological impact of the COVID-19 outbreak and lockdown measures on people with SMD.

## 5. Conclusions

In conclusion, in the current study, we provide the first pieces of evidence of the psychological impact of the early phase of the COVID-19 outbreak on people with severe mental disorders. Overall, our results show that these patients with psychotic or bipolar disorders reacted to the pandemic and the lockdown restrictions with higher anxiety than healthy controls. Furthermore, this response was associated with being single, having COVID-19 symptoms, being highly stressed, and having less ability to enjoy free time.

If replicated, these results could suggest the utility of anxiety, an often neglected but frequent symptom in this population, as a criterion for strategies of early intervention and closer follow-up in the months to come.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.schres.2020.07.018>.

## Authors' contributions

LGA, LFT, MPPG, PAS, and JB designed the study. All authors reviewed and approved it and acquired the data. LGB and FDS conducted the statistical analyses. LGB, FDS wrote the first draft of the manuscript. All authors reviewed all drafts and gave the final approval.

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## Declaration of competing interest

The authors declare no conflict of interest for the submitted work.

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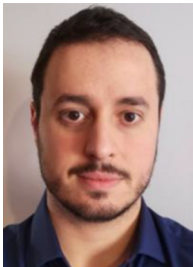
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