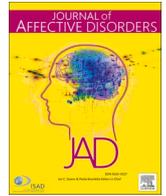




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## Research paper

# Changing trends in psychiatric emergency service admissions during the COVID-19 outbreak: Report from a worldwide epicentre

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## ABSTRACT

**Background:** During the COVID-19 pandemic, a structural reorganization was imposed on public health systems. Psychiatry services were also affected with the imposed reduction of non-urgent consultations. We aim to explore the effect of these changes on a Psychiatry Emergency Service during COVID-19 lockdown in Spain.

**Methods:** A retrospective analysis was performed on all patients admitted to our Psychiatric Emergency Service 90 days before and after March 14<sup>th</sup>, 2020, the first day of lockdown in Spain. Extracted data were compared between the two periods. Poisson regression analysis was performed to analyze changes in admission rates.

**Results:** 1,958 psychiatric emergency admissions were analyzed. Although the number of admissions decreased by 37.9%, we observed a significant increase in the percentage of acute psychiatric hospitalization during the lockdown. Anxiety spectrum disorders accumulated the greatest significant decrease in admission rates during the lockdown. On the other hand, a significant increase in admissions rates was found in patients with dementia, autism spectrum disorders, and substance use disorders during the lockdown.

**Limitations:** This study was conducted in a single psychiatric emergency service, preventing a generalization of our results. The comparison time period might have biased our results due to the influence of external factors.

**Conclusion:** Mental health consequences of COVID-19 are becoming apparent. A reduction of admission rates for anxiety disorders might be related telepsychiatry implementation during the lockdown. Other conditions particularly vulnerable to the routine changes and lack of social support have suffered the most, and efforts should be placed to treat these situations.

## 1. Introduction

COVID-19 has rapidly spread worldwide since the end of January 2020, being declared by the World Health Organization (WHO) a Public Health Emergency of International Concern (World Health Organization, 2020). Due to potentially serious health outcomes, many countries have adopted strict quarantine measures to prevent and control the COVID-19 pandemic. In Spain, the state of emergency was implemented on March 14<sup>th</sup> 2020, imposing a lockdown (Ministerio de la Presidencia, 2020). Although the state of alarm ended on 21<sup>th</sup> June, the number of

cases increased again in July in several Spanish regions including Barcelona, leading to the reinstatement of some restrictions (Ministerio de Sanidad, 2020). As of 21<sup>th</sup> September 2020, Spain has reported a total of 671.468 cases, with 30.663 deaths (Ministerio de Sanidad, 2020).

Most countries, especially those most affected by the pandemic, adopted several major public health measures to reduce the spread of the virus, including forced quarantine, and healthcare systems reorganization, with the redeployment of healthcare professionals from all disciplines to COVID-19 units, as needed.

In this framework, the Hospital Clínic of Barcelona was completely

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restructured by transforming day hospitals, dialysis rooms, and operating rooms into intensive care units to manage the incessantly increasing number of patients with COVID-19 needing immediate assistance. At the peak of the pandemic, our hospital attended a total of 2778 in-patients with COVID-19 (312 in ICU). Psychiatric units were not unaffected: the child and adolescent acute psychiatric inpatient unit was converted into a COVID-19 hospitalization unit, while the adult psychiatric inpatient unit's admission capacity (of 24 beds) was reduced by 50%, and the day hospital was closed (Pacchiarotti et al., 2020), leaving active only the electroconvulsive therapy section (Gil-Badenes et al., 2020).

The saturation and reorganization of medical and psychiatric care caused indirect effects on health assistance. Non-urgent consultations, such as outpatient consultations, several surgical interventions and diagnostic tests were canceled or postponed to avoid collapse and reduce the risk of infection (Lazzerini et al., 2020; Palmer et al., 2020a). One of the first measures adopted to offset the reduction of psychiatric assistance was the intensification of consultation-liaison psychiatry services (Anmella et al., 2020a) and home hospitalization, which has been proposed as a viable alternative to ensure regular assistance for severe patients (Garriga et al., 2020a). Furthermore, telepsychiatry, in the form of videoconferencing and/or phone, was adopted to facilitate patients' follow-up. During the pandemic, telepsychiatry established itself as a practical and distinctive alternative, with the possibility to have a long-lasting use (Shore et al., 2020).

The psychological indirect effects of the COVID-19 outbreak have been reported in numerous studies conducted on different populations, such as healthcare workers (Anmella et al., 2020b; Lai et al., 2020), general population (Fullana et al., 2020; Xiong et al., 2020a), and COVID-19 cases, (Rogers et al., 2020) reporting in particular increasing rates of anxiety, depressive symptoms, and post-traumatic stress disorder. However, the effect on individuals with previously diagnosed mental illness has been less emphasized. A recent study reported that patients with serious mental illness had higher levels of COVID-19-related perceived stress, anxiety, and depressive symptoms compared to individuals without a psychiatric diagnosis (Iasevoli et al., 2020a). Patients with serious mental illness might pay the consequences of the pandemic in two ways: 1) the outbreak and the consequent lockdown strategies may act as a nonspecific stressful life event, favoring an acute relapse, 2) the lockdown may bear a discontinuity in the ability of the health-care system to address the needed continuity of care in this population (Kavoor, 2020; Vieta et al., 2020).

An additional demand for psychiatric assistance, and secondarily, an increased need for psychiatric emergency care could be expected due to the aforementioned reorganization of the public health systems and the probability of onset of psychiatric symptoms or relapses in patients with previous mental illness. On the contrary, previous studies reported a significant decrease in assistance during COVID-19 when compared to previous months (Capuzzi et al., 2020a; Pignon et al., 2020a).

Hence, in our study, we aim to analyze the use of psychiatry emergency services of the Hospital Clínic of Barcelona, during the first three months since the imposed lockdown in Spain, compared to the three months before.

## 2. Methods

### 2.1. Study design and population

This is a retrospective analysis of the data collected from the Psychiatric Emergency Service of the Hospital Clínic of Barcelona, which is a University hospital belonging to a large metropolitan area of Barcelona. The hospital attends a catchment area of 540.000 inhabitants.

The psychiatric emergency team includes two staff psychiatrists, who completed a clinical routine computerized protocol for every admission covering a 24 hours schedule. We retrospectively collected the data from electronic medical records of all patients admitted to the

emergency psychiatric service of the Hospital Clínic of Barcelona from December 14<sup>th</sup> 2019 to June 12<sup>th</sup> 2020. Records of individuals aged over 18 years old were included. Records with invalid or missing values for age, old, sex, method of discharge, primary diagnosis, were excluded.

Data screening and extraction were made by two research fellows (MGR and GF) in terms of socio-demographic characteristics, presentation times, admission reason, primary diagnosis, treatment plan (discharge/admission to the acute inpatient psychiatric unit). Emergency psychiatric admissions are defined as admissions that are unpredictable and occur at short notice because of clinical need.

Every psychiatric admission received a 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) diagnosis. Depressive disorders included major depressive disorder, persistent depressive disorder (dysthymia), and unspecified depressive disorder. Anxiety disorders include separation anxiety disorder, specific phobia, social anxiety disorder, panic disorder, agoraphobia, generalized anxiety disorder, and anxiety disorder due to another medical condition.

Suicidal ideation refers to the presence of thoughts about taking action to end one's life, including identifying a method, having a plan, having the intent to act. Suicidal attempt refers to intentional self-inflicted poisoning, injury, or self-harm which have a fatal intent without death. Psychosocial problems refer to ICD-10-CM diagnosis code (Z65.9) indicating psychosocial and/or socioeconomic factors influencing health status and contact with health service.

The study was carried out in accordance with the Declaration of Helsinki (1989) and was approved by the local ethical committee (approval number HCB/2020/0675).

### 2.2. Time periods

Data were compared among two different time windows: 1) from December 14<sup>th</sup> 2019 to March 13<sup>th</sup> 2020, corresponding to a time period of 90 days before the state of alarm declaration due to the pandemic in Spain (pre lockdown, Pre-L), 2) from March 14<sup>th</sup> to June 12<sup>th</sup> 2020, corresponding to a time period of 90 days during lockdown due to the COVID-19 outbreak in Spain (on lockdown, On-L). The total numbers of monthly psychiatric emergency admissions from January 2019 to February 2020 were compared: no statistically significant changes in monthly rates were found, confirming that the time period selected as comparison (Pre-L) was reliable (Fig. 1A and B).

### 2.3. Statistical analyses

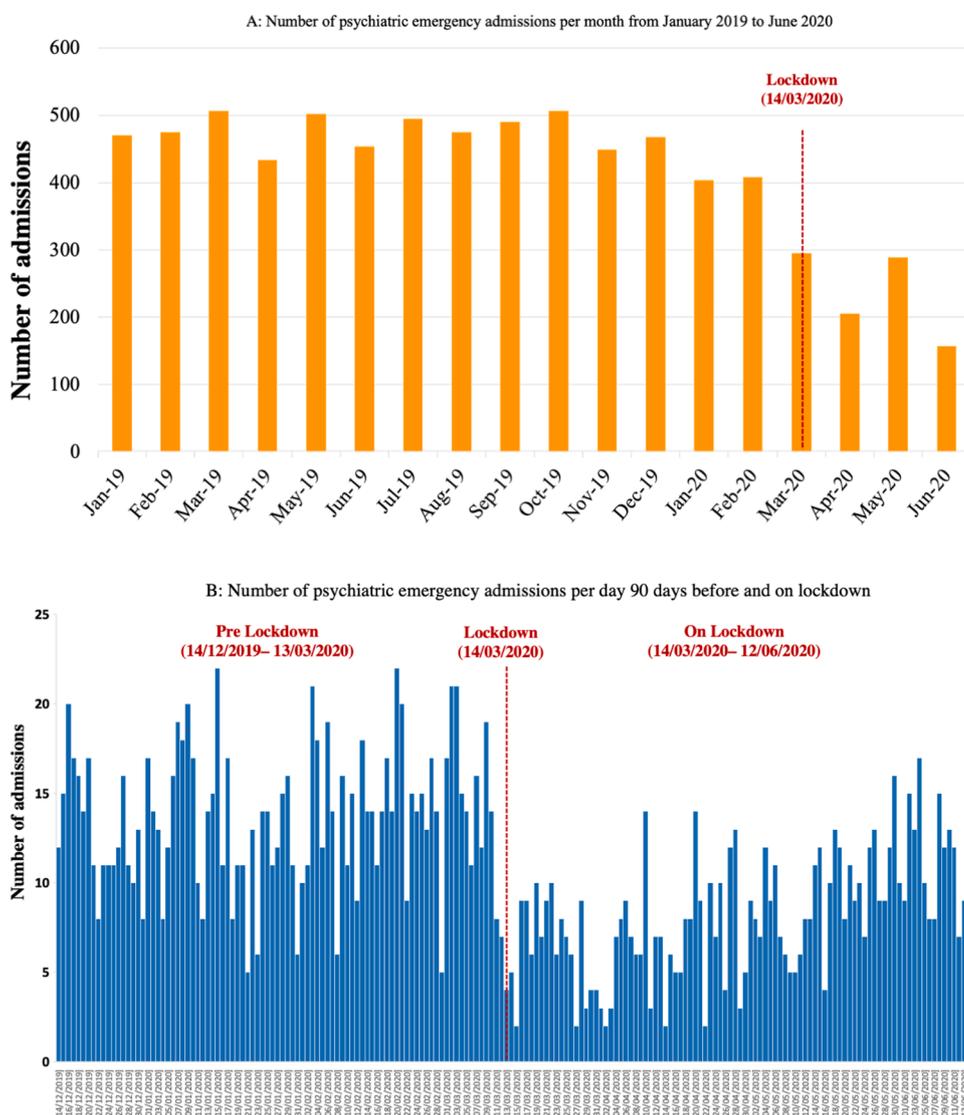
The Kolmogorov-Smirnov test was used to assess whether continuous variables displayed a normal distribution. Continuous variables were reported as mean (standard deviation), while categorical variables were reported as percentages. Categorical and continuous variables were analysed and compared between Pre-L and On-L. Mean age at admission was compared among the two time-windows with unpaired t-test with Bonferroni post-hoc correction. Pearson Chi-square, and Fisher's exact test in contingency tables ( $\chi^2$ ), were used to analyse categorical data. **Poisson regressions were used to test for changes in psychiatric admission rates before and after the implementation of full lockdown in Spain.**

Statistical analyses were performed using SPSS for PC (version 22) software. The level of significance was set at  $p \leq 0.05$  (two-tailed).

## 3. Results

A total of 2410 electronic records were screened. After excluding 452 not fulfilling inclusion criteria, a final number of 1,958 psychiatric emergency admissions were analyzed. Psychiatric emergency admissions were compared between the two different time windows Pre-L and On-L as described before (Table 1).

The overall Poisson model demonstrates a significant overall



**Fig. 1.** A. Number of psychiatric emergency admission per month from January 2019 to June 2020. The Day of lockdown declaration in Spain is written in red. B. Number of psychiatric emergency admission per 90 days before and during lockdown. The respective time periods of pre-lockdown and on-lockdown, as well as the day of declaration of lockdown in Spain, are written in red. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.).

decrease by 37.9% in psychiatric emergency admissions from Pre-L to On-L (95% confidence interval [CI], 0.377–0.558;  $p < 0.01$ ). No differences on age trends between the two study periods were found.

Anxiety disorders were the most represented diagnoses both at Pre-L (N=309; 25.6%) and On-L (N=128; 17.1%), and showed a statistically significant decrease in admission at On-L (95% CI 0.140-0.198,  $p < 0.001$ ). A statistically significant increase in admission rates at On-L in patients with a diagnosis of substance use disorders (95% CI 0.126-0.181,  $p < 0.001$ ), autism spectrum disorders (95% CI 0.11-0.31,  $p < 0.001$ ), and dementia (95% CI 0.007-0.024,  $p < 0.001$ ) was registered. No statistical differences were found between Pre-L and On-L in admission rates of affective disorders, psychoses, other psychiatric diagnoses or suicidal ideation/attempts.

The percentage of emergency admissions requiring acute psychiatric hospitalizations increased significantly at On-L (95% CI 0.310-0.394,  $p < 0.001$ ).

#### 4. Discussion

Our data show a significant decrease in the number of psychiatric emergency admissions during the first three months of lockdown due to the COVID-19 pandemic, compared to the three months before. These results are in line with previous studies providing evidence of a reduction in rates of psychiatric emergency admission during the lockdown

(Capuzzi et al., 2020b; Clerici et al., 2020; Pignon et al., 2020b). Also, this trend does not appear to be exclusive of psychiatry emergency service, since many other specialties experienced a reduction in emergency admissions, and also in surgical and diagnostic procedures during the COVID-19 outbreak (De Filippo et al., 2020; Mafham et al., 2020; Nappi et al., 2020).

The reasons for the decrease in the total number of visits to the emergency are conjectural. Possible explanations might be that people complied with the restrictions on movement and health recommendations made by the Spanish government, which implied going to the hospital only when strictly necessary. Furthermore, some individuals might have experienced fear of personal infection or infecting their relatives, preventing hospital accesses.

Telepsychiatry was implemented worldwide as well as in our hospital to minimize the use of personal protective equipment, maximizing social distancing and assure continuity in patients' care. Telepsychiatry has shown efficacy in managing patients' mental health in previous studies (Doarn, 2018; Shore et al., 2020). Digital health, both with telepsychiatry and its implementation through m-health (mobile health) (Torous and Keshavan, 2020) might be practical and adaptable instruments to suit patients' needs during and after COVID-19 pandemic. Additionally, in our hospital home hospitalization care for serious mental illnesses was maximized to treat moderate severity cases when possible, reduce hospital admission and to lower the risk of infection or

**Table 1**

Descriptive statistics and comparison between psychiatric emergency attendances during the 90 days before the lockdown (Pre-L) and the 90 days during the lockdown (On-L) due to COVID-19 outbreak in Spain.

	Pre-L	On-L	$\chi^2$ -Test	P value
<b>Emergency admissions (N; %)</b>	1208; 61.7%	750; 38.3%	107.132	<0.001
<b>Gender (N; %)</b>			8.354	0.004
Male	597; 49.4%	421; 56.1%		
Female	611; 50.6%	329; 43.9%		
<b>Age at admission (mean <math>\pm</math> SD)</b>	40.84 $\pm$ 16.47	41.78 $\pm$ 16.61		
<b>Diagnosis (N; %)</b>				
Psychosis NOS	87; 7.2%	56; 7.5%		
Schizophrenia	94; 7.8%	67; 8.9%		
Schizoaffective Disorder	32; 2.6%	25; 3.3%		
Delusional Disorder	3; 0.2%	3; 0.4%		
Bipolar Disorder I	42; 3.5%	34; 4.5%		
Bipolar Disorder II	14; 1.1%	3; 0.4%		
Depressive Disorders	74; 6.0%	43; 5.6%		
Anxiety Disorders	309; 25.6%	128; 17.1%	19.341	<0.001
OCD	12; 1%	8; 1.1%		
PTSD	8; 0.7%	1; 0.1%		
Eating Disorders	6; 0.5%	4; 0.5%		
Substance Use Disorders	149; 12.3%	116; 15.5%	3.879	0.049
ADHD	1; 0.1%	3; 0.4%		
Autism Spectrum Disorders	4; 0.3%	14; 1.9%	11.979	0.001
Intellectual Disability	30; 2.5%	14; 1.9%		
Dementia	6; 0.5%	11; 1.5%	3.996	0.046
PD Cluster A	4; 0.3%	1; 0.1%		
PD Cluster B	109; 9%	80; 10.7%		
PD Cluster C	1; 0.1%	0; 0%		
Psychomotor Agitation	17; 1.4%	19; 2.5%		
Suicidal Ideation/Attempt	58; 4.8%	40; 5.3%		
Medical Conditions with psychiatric symptoms	41; 3.4%	34; 4.5%		
Psychosocial Problems	124; 10.3%	65; 8.7%		
<b>Treatment plan (N; %)</b>				
Acute Hospitalization	284; 23.5%	258; 34.4%	27.412	<0.001
Discharged	924; 76.5%	492; 65.6%		

**Psychosis NOS**=Psychosis Not Otherwise Specified; **OCD**=Obsessive Compulsive Disorder; **PTSD**=Post-Traumatic-Stress Disorder; **ADHD**=Attention Deficit Hyperactivity Disorder; **PD**=Personality Disorder. **Pre-L**=Time period from 14/12/2019 to 13/03/2020, corresponding to the three months before confinement due to COVID-19 outbreak in Spain; **On-L**=Time period from 14/03/2020 to 12/06/2020, corresponding to the three months of confinement due to COVID-19 outbreak in Spain. **SD**= Standard Deviation;  $\chi^2$ -Test= Chi-squared test; **P value**= level of significance.

transmission (Garriga et al., 2020b), thus probably contributing to the reduction of emergency admission rates.

We found a significant reduction in admission rates of patients with anxiety disorders. There is a clear evidence that the COVID-19 pandemic and the situation of lockdown may increase anxiety and depressive symptoms in the general population (Lai et al., 2020; Palmer et al., 2020b; Xiong et al., 2020b) and in patients with mental health problems (Iasevoli et al., 2020b). The reduction of admission rates to the psychiatric emergency room of individuals with anxiety disorders might be related to the effective implementation of telepsychiatry during the pandemic outbreak.

Moreover, the fear of infection and movement restrictions may have prevented people with mild-to-moderate anxiety to attend the psychiatric emergency services, by reducing the number of overall admissions due to anxiety disorders. We could not confirm this hypothesis since we did not have data on the severity of patients. Our contrasting results may be in line with the general trend of decreased emergency access due to fear of infection or implementation of telepsychiatry. Also, anxiety disorders are more prevalent in females, thus, it is possible that the reduction of female admissions rates during the lockdown, might be related to the reduction of admission rates of anxiety disorders. Furthermore, the reduction in the number of emergency accesses of female patients during lockdown could be related to the reduction of

accesses for anxiety disorders, given that anxiety disorders are more prevalent in women (McLean et al., 2011).

Conversely, we found a significant increase in admission rates of patients with dementia, cognitive impairment, autism spectrum disorders and substance use disorders. Neuropsychiatric symptoms, such as depression, anxiety, apathy, agitation, and hallucinations, are frequent in individuals with dementia, including Alzheimer's disease or cognitive impairment with an increased tendency to manifest related to external stressors (Lara et al., 2020). Furthermore, measures of social isolation have a great impact on the elderly, and could aggravate the quality of life of the cognitively-impaired patients, resulting in the worsening of their medical condition due to their inability to have medical check-ups (Armitage and Nellums, 2020). Also, day hospitals, social centres, and other adult day centres were closed as well as possibly home assistance of carers decreased. A report from a non-profit organization providing care to persons with cognitive disorders and their families in Barcelona, reported a significant increase in assistance to guarantee the continuity of care during the lockdown (Benaque et al., 2020). Nevertheless, we found a significant increase in psychiatric emergency assistance during the COVID-19 outbreak of patients with dementia and intellectual disability. A recent study investigated the effect of confinement during lockdown on neuropsychiatric symptoms of patients with Alzheimer's diseases reporting a decline in cognitive function in these patients, with the duration of confinement significantly correlated with the severity of symptoms as well as with their caregivers' distress (Boutoleau-Brettonnière et al., 2020).

**The increase of admission rates of patients with autism spectrum disorders, might be explained by the fact these patients often present rituals and repetitive behaviors with a beneficial effect of structuring a daily routine.** The interruption of routines in patients with autism spectrum disorders is a predictor of increasing externalizing behaviors, which may lead to an increase rate of emergency accesses (Henderson et al., 2011; Stoppelbein et al., 2016).

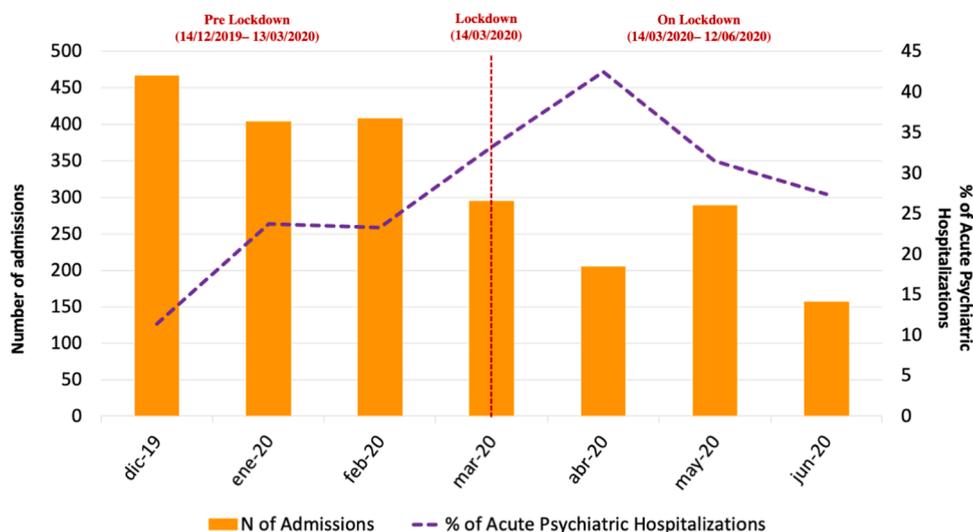
We reported also an increase in admission rates of patients with substance use disorders. Social distancing, isolation and confinement may affect people with substance use disorders exacerbating loneliness, and psychological distress, and relapses (Galea et al., 2020; Narasimha et al., 2020). Moreover, the possible lack of drug supplies (i.e. THC, cocaine, another stimulants) may have contributed to drug abstinence situations in some cases, with the consequent consultations to the emergency room. In these cases, after a period of drug use reduction, the restart of usual dose consumption may have led to increased toxic effects of the drug resulting in more consultations to the emergency room. Also, people suffering from substance use disorders might be stigmatized and marginalized with a higher risk of contract infection during the COVID-19 pandemic (Ornell et al., 2020; Volkow, 2020).

An important point to highlight is that despite the significant decrease in psychiatric emergency admission rates during the lockdown, we reported a significant increase in the percentage of patients requiring acute psychiatric hospitalization during the same period (Fig. 2), probably accounting for a subpopulation of more severe patients that have been hardly affected by COVID-19 outbreak and lockdown. The lack of other resources for these patients such as easy access to outpatient clinics, day hospitals, therapeutic communities, might have prevented an early detection and timely treatment of relapses, thus potentially increasing inpatient admissions.

Indeed, it has been reported that, during the COVID-19 pandemic, patients with serious mental illness show higher level of perceived stress, and 2-3 times higher risk of severe anxiety and depressive symptoms when compared to non-psychiatric patients (Iasevoli et al., 2020b), thus reinforcing the need of providing specific support to severe patients.

## 5. Limitations

Several limitations of this study should be acknowledged. First, this



**Fig. 2.** Number of psychiatric emergency admission per months and percentage of acute inpatient psychiatric admissions in the 90 days before and during lockdown. The bars show a significant decrease in emergency admission rates, while the line show a significant increase in percentage of acute inpatient psychiatric admissions during lockdown. *N* = Numbers.

study was conducted in a single psychiatric emergency service of Barcelona, preventing a generalization of our results. Secondly, there is a possibility of bias in reporting the diagnoses since the evaluation were made by different psychiatrists. The time period selected as comparison (from December 2019 to February 2020) might have in some way biased our results: 1) it usually includes Christmas Holidays which might affect medical assistance due to staff reduction 2) it is in a different season, and some psychiatric disorders, such as bipolar disorder, show a seasonal pattern with a tendency to relapses in specific seasons (Geoffroy et al., 2014). Nevertheless, a seasonal pattern has not been clearly identified in other psychiatric disorders, and recent studies showed contrasting results (Bakstein et al., 2019; Jahan et al., 2020). Also, we do not report significant changes in numbers of monthly admissions from January 2019 to February 2020, as reported in Fig. 1A. Finally, other external factors that may have affect the demand of psychiatric emergency evaluation, such as the presence of a caregiver, the ongoing treatment with long-acting injectable antipsychotics, COVID-19 infection, were not evaluated.

## 6. Conclusion

The mental health consequences of the COVID-19 pandemic are coming to light. The decrease in the total number of psychiatric emergency admissions might be related to compliance with the restrictions on movement and health recommendations made by the government or due to fear of infection. While some psychiatric symptoms, such as anxiety, have been managed better, probably due to the increased use of telepsychiatry, psychiatric conditions most vulnerable to the lack of social support and stimulation, such as autism spectrum disorders, dementias, or substance use disorders, have suffered the most, and efforts should be placed to treat and prevent this situation.

## Contributors

MGR and GF formulated this article and co-wrote the first draft. EV and EP both read the first draft and added critical comments. All other authors substantially participated in the final manuscript, which was reviewed, revised and approved by all authors.

## Role of the funding source

None.

## Declaration of Competing Interest

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