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Liaison psychiatry before and after the COVID-19 pandemic

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ABSTRACT

Introduction: the COVID-19 pandemic had an impact on hospital admissions. The clinical profiles of patients referred to liaison psychiatry teams (LPT) remained stable over the last few decades. We postulate changes in patient profiles due to the COVID-19 pandemic.

Materials and methods: a total of 384 patients admitted to a tertiary care University Hospital in Madrid (Spain) and referred to LPTs were recruited. Patients referred 5 months before and after the first admission for COVID-19 were included. Clinical and sociodemographic characteristics were collected, and non-parametric hypothesis contrast tests were used to study possible differences between both periods.

Results: patients referred during the pandemic were significantly older (U = 2.006; p = .045), most of them were admitted to medical hospitalization units ($\chi 2$ (2) = 5.962; p = 015), and with a different reason for admission. There was an increase in the rate of adjustment disorders ($\chi 2$ (1) =7.893; p = 005) and delirium ($\chi 2$ (1) =9.413; p = 002), as well as psychiatric comorbidity ($\chi 2$ (2) = 9.930; p = .007), and a reduction in the proportion of patients treated for substance misuse ($\chi 2$ (5) = 19.152; p = .002). The number of deaths increased significantly ($\chi 2$ (1) = 6.611; p = .010). In persons over 65 years inappropriate prescription was significantly lower ($\chi 2$ (1) = 8.200; p = .004).

Conclusions: the pandemic had an impact on the activity of the LPTs due to the change in the clinical profile and evolution of referred patients, maintaining standards of care that are reflected through prescription.

1. Introduction

The clinical profile of inpatients referred to liaison psychiatry teams (LPTs), also known as consultation-liaison psychiatry, has remained stable in recent years, with alcohol-related disorders, delirium and adjustment disorders being the most frequent diagnoses (Sánchez-González et al., 2018). However, the new psychopharmacological and psychotherapeutic tools, greater social awareness regarding mental health problems, and the increase in life expectancy, have been reflected in the evolution of the results of the LPTs through changes in the prescribed treatments, reasons for consultation, or referrals after discharge (Anderson et al., 2011; Schomerus et al., 2012; Su et al., 2010). Today, we know that the results of LPT interventions are heterogeneous, with the formation and composition of the teams also varying (Saraiva et al., 2020; Walker et al., 2018). Hence the importance of standardizing and protocolizing its activity, including the coordination of outpatient care in Mental Health programs (Smith et al., 2019; Wood and Wand, 2014).

Ever since the World Health Organization (WHO) declared COVID-19 a global pandemic on March 11, 2020, the capacity of health systems has been put to the test, producing structural changes and redistribution of human resources at the hospital level (Cabrera et al., 2020). This was reflected in the LPTs, in which models of care adapted to the situation were implemented to respond to a different demand (Anmella et al., 2020; Butler et al., 2021). Thus, LPTs have been essential not only in the approach and understanding of the neuropsychiatric impact of COVID-19, but also in the psychological care of hospital health personnel (Chen et al., 2020; Horn et al., 2020; Janeway, 2020).

Mental Health research after the onset of the pandemic has mainly focused on the psychiatric manifestations of COVID-19 (Roy et al., 2021; Steardo et al., 2020) and on the consequences that the social factors derived from the pandemic have on the Mental Health of the population

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(Gloster et al., 2020; Hossain et al., 2020). The activity of LPTs is an opportunity to improve the understanding of the relationship between the coronavirus and psychiatric care, as this is still a hot area for research, and much more information is needed (Cabrera et al., 2020; López-Atanes et al., 2021; Shapiro et al., 2021).

We propose to compare the clinical profile, and evolution of inpatients referred to the LPT of the University Hospital La Princesa, a tertiary Hospital in Madrid (Spain) during the COVID-19 period, with those prior to the pandemic.

The hypotheses we formulate are based on the findings reported in the previous literature. During the pandemic, the care of COVID-19 inpatients determined changes in diagnosis at admission (Birkmeyer et al., 2020; Oseran et al., 2020), so we postulate that the reasons for referral to LPTs and the psychiatric interventions should be different. Particularly in drug prescription patterns, considering the changes in the specific treatment for SARS-COV-2 infection over several months (Tarighi et al., 2021) and its impact on a systemic level (Lai et al., 2020).

2. Materials and methods

2.1. Study design and sample

A prospective observational study was carried out at the University Hospital La Princesa, a tertiary Hospital in Madrid (Spain), between October 2019 and July 2020. A total of 384 patients referred to the LPT were included in our sample. In accordance with the objectives of the study, the sample was divided into two periods. The first consisted of the 163 patients referred to the LPT in the 5 months prior to the evaluation of the first patient admitted for Covid-19 in March 2020; the second was made up of the 221 patients referred in the following 5 months.

The sample size was statistically calculated based on the number of liaison psychiatry requests in the Community of Madrid (Spain) in 2020. In order to achieve a representative estimate, with a 95% confidence level and a 5% margin of error, a total number of 377 subjects was required.

The study protocol was approved by the institutional ethics committee (Registry number: 4629).

2.2. Measures

Sociodemographic, healthcare, and clinical data were collected from the information obtained through routine clinical assessment and the regular review of medical records carried out by the LPT.

The following variables were registered: age, sex, the referral hospitalization unit (considering medical, surgical, or Intensive Care Unit -ICU-), and the reason for hospital admission (major surgery, ICU for a non-surgical reason, oncological cause, metabolic cause, infectious cause- not COVID-, COVID, and others). The primary reasons for referral were classified as: agitation, psychopharmacological adjustment, affective disorders, suicidal risk, substance abuse, capacity assessment, and others. At discharge, the need for specific mental healthcare resources was also registered, specifically admission to a Psychiatric Unit, referral to outpatient follow-up programs in a mental health center, or addiction programs. Mortality data were also collected.

The clinical diagnosis was performed by psychiatrists with clinical experience, according to the DSM-5 criteria (American Psychiatric Association, 2019), who also recorded whether it was a decompensation of any previous pathology or a new diagnosis. Substance use prior to admission was also collected.

The level of function was collected with the Barthel Index (Mahoney & Barthel, 1965) and the Lawton and Brody Scale (Lawton & Brody, 1969). The Barthel index was used to measure possible difficulties in performing activities of daily living. It comprises 10 items, which include the skills to eat, wash oneself, dress and groom, possible incontinence in urination or bowel movements, transfers or wandering, and the ability to climb stairs. Their global score can vary between 0 and 100 points, the latter being a reflection of complete functional independence. For its part, the Lawton and Brody Scale is widely used to assess instrumental activities of daily life. It is composed of 8 items that assess the patient's ability to use the telephone, make purchases, prepare food, take care of the house, do the laundry, use public transport, take responsibility for the management of their medication, or manage their financial affairs. Their total score ranges from 0 to 8, the latter being a reflection of complete independence.

Regarding psychopharmacological treatment, it was grouped into four categories (Anxiolytics/hypnotics -BZD-; Antipsychotics -APS-; Antidepressants -AD-; Antiepileptics/stabilizers -AED-), and it was collected in two time periods; before and after the intervention by the LPT. In addition, we specified the need for discontinuation of inappropriate medications and new prescriptions in patients over 65 years old. In order to detect possible inappropriate prescribing (IP) of drugs, the STOPP/START criteria (Gallagher et al., 2008a) specific to the Central Nervous System were applied before and after the intervention by the LPT. We define IP as the presence of a START and/or STOPP criteria. STOPP criteria specific to the Central Nervous System consist of 14 items. The most relevant is item number 5, related to the prescription of benzodiazepines or hypnotics with acute or chronic respiratory failure or if fallen in the past 3 months or prescribed for longer than 4 weeks. Furthermore, item number 10, which states that the prescription of an antipsychotic as hypnotic, unless the sleep disorder is due to psychosis or dementia, is an inadequate prescription, stands out in our study. As for START criteria, these consist of 6 items, the most relevant being the controversial point 3, which states that acetylcholinesterase inhibitors are an adequate prescription for mild-moderate Alzheimer's dementia or Lewy body dementia.

2.3. Statistical analysis

Descriptive analyses were carried out to characterise the sample: frequencies and percentages were calculated for qualitative variables, while medians and interquartile ranges were used for quantitative variables. The normality of the different variables was checked using the Kolmogorov-Smirnov test. Given that our variables did not follow a normal distribution, and to compare the pre-and post-covid results, non-parametric hypothesis contrast tests were performed: Mann-Whitney U in quantitative variables and Chi-square tests in qualitative variables.

All analyses were performed using IBM SPSS Statistics software, version 26 (IBM Corp, 2019). The level of statistical significance was set at $p \leq 0.05$.

3. Results

The complete sample consisted of 384 patients, of which 163 corresponded to the first period. The median age of the patients was 66.0 (IQR, 27.0) years, and 52.1% (n = 200) were women. The total hospitalization time has a median of 23.0 (IQR, 21.0) days, while the time of attention by the LPT was 4.0 (IQR, 8.0) days. Most of the patients were admitted to medical hospitalization units (n = 266; 69.3%), and the most frequent reasons for referral were agitation (31%), mood disorders (29.7%), and adjustment of psychopharmacological treatment (20.8%). In general, the patients had a good level of previous autonomy, both in self-care (Median = 100.0 (IQR, 5.0) and in instrumental activities of daily living (Median = 8.0 (IQR, 2.0), although 85.9% lost level of function at the moment that LPTs started the intervention (Table 1).

After evaluation by the LPT, most patients received a new diagnosis (65.1%), the most frequent being Adjustment Disorder (n = 109; 28.4%) and Delirium (n = 83; 21.6%). Of those patients, 22.1% had a decompensation of a previously known mental disorder. It should be noted that 64.8% had no psychiatric comorbidity prior to referral to the LPT (Table 1).

Upon discharge from hospitalization in the medical or surgical area, 5.5% needed to remain hospitalized in the Psychiatric Unit, and 38.8%

Table 1
Clinical and sociodemographic characteristics of the sample.

Variable	Total sample (n = 384)	PRE-COVID (n = 163)	COVID (n = 221)	U/χ^2 (*p*)
Age (years), median (iqr)	66.0 (27.0)	62.0 (79.0)	67.0 (62.0)	2.006 (.045)*
Sex, n (%)				.052 (.819)
Male	184 (47.9)	77 (47.2)	107 (48.4)	
Female	200 (52.1)	86 (52.8)	114 (51.6)	
Total time of hospitalization (days), median (iqr)	23.0 (21.0)	14.0 (252.0)	12.0 (165.0)	-.601 (.548)
Time of attention by the LPT (days), median (iqr)	4.0 (8.0)	4.0 (64.0)	4.0 (98.0)	1.296 (.195)
Hospital unit, n (%)				7.131 (.028)*
Medical hospital unit	266 (69.3)	102 (62.6)	164 (74.2)	5.962 (.015)*
Surgical hospital unit	66 (17.2)	37 (22.7)	29 (13.1)	6.045 (.014)*
ICU	52 (13.5)	24 (14.7)	28 (12.7)	.338 (.651)
Psychiatric reasons for consultation, n (%)				12.018 (.100)
Agitation	119 (31.0)	44 (27.0)	75 (33.9)	2.114 (.146)
Psychopharmacological treatment adjustment	80 (20.8)	36 (22.1)	44 (19.9)	.269 (.604)
Mood disorder	114 (29.7)	43 (26.4)	71 (32.1)	1.484 (.223)
Substance misuse	24 (6.3)	14 (8.6)	10 (4.5)	2.644 (.104)
Suicide risk	25 (6.5)	17 (10.4)	8 (3.6)	7.147 (.008)*
Protocols	9 (2.3)	4 (2.5)	5 (2.3)	.015 (.902)
Capacity assessment support	10 (2.6)	4 (2.5)	6 (2.7)	.025 (.874)
Others	3 (0.8)	1 (0.6)	2 (0.9)	.103 (.748)
Reason for admission, n (%)				97.252 (<.001)*
Major surgery	68 (17.7)	37 (22.7)	31 (14.0)	4.841 (.028)*
Non-surgical ICU	20 (5.2)	15 (9.2)	5 (2.3)	9.152 (.002)*
Neoplasia	31 (8.1)	14 (8.6)	17 (7.7)	.102 (.750)
Metabolic	68 (17.7)	26 (16.0)	42 (19.0)	.600 (.438)
Infectious	55 (14.3)	32 (19.6)	23 (10.4)	6.505 (.011)*
COVID	85 (22.1)	N/A	85 (38.5)	80.515 (<.001)*
Others	57 (14.8)	39 (23.9)	18 (8.1)	18.484 (<.001)*
Substance use, n (%)				9.235 (.161)
None	310 (80.7)	121 (74.2)	189 (85.5)	7.682 (.006)*
Alcohol	48 (12.5)	28 (17.2)	20 (9.0)	5.666 (.017)*
Cannabinoids	3 (0.8)	2 (1.2)	1 (0.5)	.726 (.394)
Cocaine	11 (2.9)	6 (3.7)	5 (2.3)	.678 (.410)
Methadone	2 (0.5)	1 (0.6)	1 (0.5)	.047 (.828)
Amphetamines	1 (0.3)	-	1 (0.5)	.739 (.390)
Others	9 (2.3)	5 (3.1)	4 (1.8)	.648 (.421)
Number of substances, n (%)				19.152 (.002)*
0	310 (80.7)	121 (74.2)	189 (85.5)	
1	54 (14.1)	35 (21.5)	19 (8.6)	
2	5 (1.3)	-	5 (2.3)	
3	11 (2.9)	4 (2.5)	7 (3.2)	
4	2 (0.5)	1 (0.6)	1 (0.5)	
5	2 (0.5)	2 (1.2)	-	
Diagnosis given by LPT, n (%)				16.462 (<.001)*
Decompensation	85 (22.1)	52 (31.9)	33 (14.9)	15.674 (<.001)*
New diagnosis	250 (65.1)	90 (55.2)	160 (72.4)	12.192 (<.001)*
No psychiatric diagnosis	49 (12.8)	21 (12.9)	28 (12.7)	.004 (.951)
Diagnosis given by LPT coded by DSM-V, n (%)				36.028(<.001)*
Schizophrenia	27 (7.0)	10 (6.1)	17 (7.7)	.348 (.555)
Bipolar disorder	23 (6.0)	16 (9.8)	7 (3.2)	7.364 (.007)*
Depression	35 (9.1)	22 (13.5)	13 (5.9)	6.566 (.010)*
Anxiety Disorder	2 (0.5)	2 (1.2)	-	2.726 (.099)
Adjustment disorder	109 (28.4)	34 (20.9)	75 (33.9)	7.893 (.005)*
Substance use disorder	40 (10.4)	22 (13.5)	18 (8.1)	2.880 (.090)
Delirium	83 (21.6)	23 (14.1)	60 (27.1)	9.413 (.002)*
Neurocognitive	20 (5.2)	13 (8.0)	7 (3.2)	4.393 (.036)*
Personality disorder	30 (7.8)	14 (8.6)	16 (7.2)	.237 (.626)
Others	15 (3.9)	7 (4.3)	8 (23.6)	.114 (.736)
Number of diagnosis DSM-V, n (%)				9.930 (.007)*
1	249 (64.8)	119 (73.0)	130 (58.8)	
2	111 (28.9)	39 (23.9)	72 (32.6)	
3	24 (6.3)	5 (3.1)	19 (8.6)	
Referral, n (%)				9.886 (.042)*
Primary health care	145 (38.1)	58 (36.0)	87 (39.5)	.489 (.484)
Mental Health outpatient program	148 (38.8)	66 (41.0)	82 (37.3)	.542 (.462)
Psychiatric Short-Term Hospitalization Unit	21 (5.5)	12 (7.5)	9 (4.1)	2.018 (.155)
Drug dependence treatment centers	37 (9.7)	19 (11.8)	18 (8.2)	1.389 (.239)
Exitus	30 (7.9)	6 (3.7)	24 (10.9)	6.611 (.010)*
Prescription, n (%)				1.146 (.284)
Yes	268 (69.8)	109 (66.9)	159 (71.9)	
No	116 (30.2)	54 (33.1)	62 (8.1)	
Deprescription, n (%)				2.088 (.148)
Yes	179 (46.6)	69 (42.3)	110 (49.8)	
No	205 (53.4)	94 (57.7)	111 (50.2)	
Number of previous treatments, n (%)				3.004 (.223)

(*continued on next page*)

Table 1 (*continued*)

Variable	Total sample (n = 384)	PRE-COVID (n = 163)	COVID (n = 221)	U/χ^2 (*p*)
0	107 (27.9)	40 (24.5)	67 (30.3)	
1	142 (37.0)	68 (41.7)	74 (33.5)	
> 1	135 (35.2)	55 (33.7)	80 (36.2)	
Number of treatments at discharge, n (%)				.361 (.835)
0	42 (11.0)	17 (10.4)	25 (11.4)	
1	200 (52.2)	88 (54.0)	112 (50.9)	
> 1	141 (36.8)	58 (35.6)	83 (37.7)	
Barthel index before admission, median (iqr)	100.0 (5.0)	100.0 (95.0)	100 (80.0)	2.237 (.025)*
Barthel index during admission, median (iqr)	60.0 (44.0)	60.0 (100.0)	60.0 (100.0)	-1.191 (.234)
Loss of quantitative functionality, median (iqr)	25.0 (35.0)	20.0 (100.0)	35.0 (100.0)	2.209 (.027)*
Lawton index before admission, median (iqr)	8.0 (2.0)	8.0 (8.0)	8.00 (8.0)	-1.954 (.051)

Abbreviations: IQR: Interquartile range; LPT: Liaison Psychiatry Teams; ICU: Intensive Care Unit.

of cases were referred to the mental health network. Thirty patients from the complete sample died during the hospitalization (Table 1).

Regarding psychopharmacological treatment, the LPT prescribed some psychotropic drugs to 69.8% of the patients, and it considered the discontinuation of inappropriate medications in 46.6% of the cases. Before clinical evaluation, the most prescribed drug groups were anxiolytics (49%) and antipsychotics (37.2%). After the evaluation, the most common were antipsychotics (45.2%) and antidepressants (42.3%) (Table 2). In patients over 65 years of age, considering the STOPP/START criteria, 45.4% met inappropriate prescription criteria before the assessment, while 25,9% met them afterwards. The START criteria increased after LPT assessment (n = 18, 8.8% item 3), and the STOPP criteria decreased (n = 34, 16.6% item 5, n = 0, 0% item 10) (Table 3). The rest of the clinical and sociodemographic characteristics can be consulted in Tables 1, 2, and 3.

Compared to the first period, the patients seen after the impact of the Covid-19 pandemic were significantly older (U = 2.006; $p = .045$), most of them were admitted to medical hospitalization units ($\chi2$ (2) = 5.962; $p = 015$), and with a different reason for admission: the proportion of major surgeries ($\chi2$ (1) = 4.841; $p = 028$), non-surgical ICUs ($\chi2$ (1) = 9.152; $p = 002$), and infections decreased ($\chi2$ (1) = 6.505; $p = 011$), whereas those problems derived from Covid-19 increased ($\chi2$ (1) = 80.515; $p = <.001$). As for the impact on autonomy, although we did not observe an increase in the number of patients with functional loss ($\chi2$ (1) = 326; $p = 0.568$), those treated in the pandemic period lost significantly more autonomy in daily life activities (U = 2.209; $p = .027$). Furthermore, there was an increase in the rate of new diagnoses ($\chi2$ (2) = 16.462; $p = <.001$), as well as psychiatric comorbidity ($\chi2$ (2) = 9.930; $p = .007$), with a significant increase in Adjustment Disorder ($\chi2$ (1) =7.893; $p = 005$) and Delirium ($\chi2$ (1) =9.413; $p = 036$), and a significant decrease in Bipolar disorder ($\chi2$ (1) =7.364; $p = 007$), Depression ($\chi2$ (1) =6.566; $p = 010$), and Neurocognitive disorder ($\chi2$ (1) =4.393; $p = 036$). In addition, we found statistically significant differences in substance use disorder by observing a higher proportion of patients without use ($\chi2$ (5) = 19.152; $p = .002$), as well as a lower proportion of alcohol consumption ($\chi2$ (1) = 5.666; $p = 017$). The number of deaths increased significantly ($\chi2$ (1) = 6.611; $p = .010$).

In the second period, after the LPT assessment, the prescription of anxiolytics was significantly lower ($\chi2$ (1) = 11.879; $p = .001$), while the use of stabilizers was higher ($\chi2$ (1) = 5.526; $p = .019$) (Table 2). Furthermore, inappropriate prescription was significantly lower (McNemar test (1) = 21.025; $p = <.001$). Moreover, the STOPP criteria decreased significantly (McNemar test (1) = 25.929; p = <.001 (Table 3).

4. Discussion

As a result of the outbreak of the COVID-19 pandemic, health workers were immersed in an unprecedented health crisis in recent history. In addition to the health, social, and economic implications, its impact on Mental Health has been widely reported in the literature (Hossain et al., 2020). Within this context, our study aims to shed light on the effects that the pandemic has had on liaison psychiatry, showing vast differences in the clinical profile and evolution of patients compared with those treated in the immediate period prior to the outbreak of the coronavirus.

The results of our study showed a significant reduction in hospitalizations for surgical reasons, non-surgical ICUs, and infections (non-COVID), increasing those related to COVID. This unforeseen consequence of the switch in care focus impacted the LPTs, as is described in other published studies (Butler et al., 2021; Prajapati et al., 2021). In our study, the proportion of requests for suicide risk assessment decreased during the pandemic period, related to confinement. On the other hand, there was an increase in the rate of a new diagnosis, the most frequent being adjustment disorders and delirium, both in a higher proportion than in previous months, especially in the case of delirium as reflected in the literature (Rebora et al., 2021). There was also a significant decrease in bipolar disorder and neurocognitive disorder (Butler et al., 2021; Prajapati et al., 2021).

On the other hand, the percentage of patients treated for substance use disorder decreased dramatically, which would be related to confinement and changes in the consumption pattern during the studied months (Benschop et al., 2021; Villanueva et al., 2021). However, the diagnoses made by the LPTs during the months prior to the pandemic were similar to those collected in the literature, which also remained stable in recent decades (Dua and Grover, 2020; Huyse et al., 2001; Sánchez- González et al., 2018).

The prescription of psychotropic drugs after evaluation by the LPTs was also different in both periods. The prescription of BZD was reduced, and that of AD and AED was increased, this change being more evident during pandemic care. This would be explained, mainly, by the attempt to avoid the hypno-sedative effect of benzodiazepines in respiratory

Table 2
Prescription profile in both periods, before and after the LPT evaluation.

COMPLETE SAMPLE		PERIOD 1 (PRECOVID)		PERIOD 2 (COVID)	
Pre- Evaluation by LPT	Post-Evaluation by LPT	Pre- Evaluation by LPT	Post-Evaluation by LPT	Pre- Evaluation by LPT	Post-Evaluation by LPT
BZD(49%)	APS (45,2%)	BZD (52,8%)	APS (42,5%)	BZD (46,2%)	APS (46,8%)
APS (37,2%)	AD (42,3%)	APS (35,6%)	BZP (41,1%)	APS (38,5%)	AD (44,5%)
AD (24,7%)	BZP (31,5%)	AD (24,5%)	AD (39,3%)	AD (24,5%)	BZP (24,5%)
AED (10,2%)	AED (18,3)	AED (9,2%)	AED (12,9%)	AED (10,9%)	AED (22,3%)

Abbreviations: LPT: liaison psychiatry team; BZD: benzodiazepines; APS: antipsychotics; AD: antidepressants; AED: antiepileptic drugs.

Table 3
Inappropriate prescription in both periods, before and after the LPT evaluation.

	SAMPLE OVER AGES 65 YEARS (n= 205)		PERIOD 1 (PRECOVID)		McNemar test (*p*)	PERIOD 2 (COVID)		McNemar test (*p*)
	Pre-evaluation by LPT, n (%)	Post-evaluation by LPT, n (%)	Pre-evaluation by LPT, n (%)	Post-evaluation by LPT, n (%)		Pre-evaluation by LPT, n (%)	Post-evaluation by LPT, n (%)	
IP	93 (45.4)	53 (25.9)	39 (48.8)	29 (36.3)	2.893 (.089)	54 (43.2)	24 (19.2)	21.025 (<.001)*
STOPP criteria	87 (42.4)	35 (17.1)	35 (43.8)	17 (21.3)	11.115 (.001)*	52 (41.6)	18 (14.4)	25.929 (<.001)*
START criteria	10 (4.9)	18 (8.8)	6 (7.5)	12 (15.0)	4.167 (.031)*	4 (3.2)	6 (4.8)	.500 (.480)

Abbreviations: LPT: liaison psychiatry team; IP: inappropriate prescription.

failure as much as possible (Boyer, 2020). In our case, we resorted to two alternatives: on the one hand, GABAergic drugs (gabapentin) to modulate anxiety as well as to avoid withdrawal symptoms after withdrawal of BZD; on the other hand, mirtazapine, included in the AD group. Another possible explanation would be the higher prevalence of adjustment disorders in our sample during this period and an approach not to indicate BZD as a first-line treatment. Both factors would contribute to explaining our results (Stein, 2018).

In both periods and after the LPT intervention, the APS was the most widely used pharmacological group, which could be explained by the number of patients with delirium. It has been described that inpatients with delirium referred to LPTs are more complex: atypical clinical features, severe behavioural disturbances and more psychotropic drug requirements (Hercus and Hudaib, 2020).

After evaluation by the LPT, CNS-related inappropriate prescriptions (IP) were also reduced in older inpatients, which were significantly lower in the second period. This is considered a relevant marker of quality of care (Gallagher et al., 2008b; O'Mahony et al., 2015). In our case, it should be noted that the reduction in IP is maintained despite increasing the START criteria after evaluation by the LPT in both periods. As noted, the most controversial START criteria is point 3, which recommends starting the prescription of anticholinesterase drugs for mild-moderate Alzheimer's disease or Lewy body dementia (Delgado Silveira et al., 2015; Disalvo et al., 2020; Lavan et al., 2020; Lavan et al., 2017). This point is disputed both by the relationship between clinical benefit and adverse effects and by the recommendation not to make a diagnosis of dementia during delirium, not even during hospital admission (Downing et al., 2013; Fong et al., 2015). On the contrary, the percentages obtained in the STOPP criteria arise at the expense of points 5 and 10. These points are related to the optimization of the treatment of BZD and APS and stand out, particularly as the main factors of iatrogenesis in older people (Robles Bayón and Gude Sampedro, 2014).

About the clinical evolution, the mortality of the patients treated by the LPT was significantly higher in the COVID period. This could be related to the fact that delirium is the neuropsychiatric complication most related to mortality in people with SARS-COV-2 infection (Hawkins et al., 2021). On the other hand, referrals to the mental health circuit were reduced, which would be explained both by diagnoses and by the development of specific programs for the follow-up of patients who were admitted for severe COVID pneumonia.

Lastly, the loss of level of function of inpatients assessed during the pandemic period was quantitatively greater than those in the previous period. This phenomenon could be explained by the clinical impact of COVID pneumonia, asthenia, dyspnea, and exhaustion (Hosey and Needham, 2020; Huang et al., 2021; Rooney et al., 2020).

Our study has some limitations that should be considered. First, our results are based on a cross-sectional design, which would prevent us from establishing causal relationships. Second, our entire sample belongs to the patients treated by the LPT of the University Hospital La Princesa, so our results could not be extrapolated to other contexts, given the heterogeneity in the composition and working models of LPTs.

Despite this, we have a relatively large sample that reflects the work carried out by the unit over the last year. The results of our study reveal the great impact that the pandemic had on LPTs according to the profile of patients attended to (Anmella et al., 2020; Cabrera et al., 2020). The standards of prescription improved after the intervention of the LPTs. The added difficulty of changes in specific treatments for COVID and its interactions with psychotropic drugs should be noted (Plasencia-García et al., 2021). The challenge of implementing new treatment and follow-up programs, for example, for healthcare personnel, should also be considered.

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in *Psychiatry Research*.

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CRediT authorship contribution statement

E. Delgado-Parada: Conceptualization, Methodology, Resources, Data curation, Writing – original draft, Writing – review & editing, Supervision, Project administration. **M. Alonso-Sánchez:** Conceptualization, Methodology, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision. **J.L. Ayuso-Mateos:** Conceptualization, Methodology, Resources, Data curation, Writing – review & editing, Supervision. **M. Robles-Camacho:** Conceptualization, Data curation, Writing – review & editing, Visualization. **A. Izquierdo:** Conceptualization, Methodology, Data curation, Formal analysis, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Anderson, D., Nortcliffe, M., Dechenne, S., Wilson, K., 2011. The rising demand for consultation-liaison psychiatry for older people: comparisons within Liverpool and the literature across time. Int. J. Geriatr. Psychiatry 26 (12), 1231–1235. https://doi.org/10.1002/gps.2667.

Anmella, G., Arbelo, N., Fico, G., Murru, A., Llach, C.D., Madero, S., Gomes-da-Costa, S., Imaz, M.L., López-Pelayo, H., Vieta, E., Pintor, L., 2020. COVID-19 inpatients with psychiatric disorders: Real-world clinical recommendations from an expert team in consultation-liaison psychiatry. J. Affect. Disord. 274, 1062–1067. https://doi.org/10.1016/j.jad.2020.05.149.

Benschop, A., van Bakkum, F., Noijen, J., 2021. Changing patterns of substance use during the coronavirus pandemic: self-reported use of tobacco, alcohol, cannabis, and other drugs. Front. Psychiatry 12, 633551. https://doi.org/10.3389/fpsyt.2021.633551.

Birkmeyer, J.D., Barnato, A., Birkmeyer, N., Bessler, R., Skinner, J., 2020. The impact of the COVID-19 pandemic on hospital admissions in the United States. Health Aff. (Millwood) 39 (11), 2010–2017. https://doi.org/10.1377/hlthaff.2020.00980.

Boyer, J., 2020. COVID-19, medication-assisted treatment, and increased risk for further respiratory depression. Am. J. Psychiatry 177 (7), 636. https://doi.org/10.1176/appi.ajp.2020.20030348.

Butler, M., Delvi, A., Mujic, F., Broad, S., Pauli, L., Pollak, T.A., Gibbs, S., Fai Lam, C.C.S., Calcia, M.A., Posporelis, S., 2021. Reduced Activity in an Inpatient Liaison Psychiatry Service During the First Wave of the COVID-19 Pandemic: Comparison With 2019 Data and Characterization of the SARS-CoV-2 Positive Cohort. Front. Psychiatry 12, 619550. https://doi.org/10.3389/fpsyt.2021.619550.

Cabrera, M.A., Karamsetty, L., Simpson, S.A., 2020. Coronavirus and its implications for psychiatry: a rapid review of the early literature. Psychosomatics 61 (6), 607–615. https://doi.org/10.1016/j.psym.2020.05.018.

Chen, Q., Liang, M., Li, Y., Guo, J., Fei, D., Wang, L., He, L., Sheng, C., Cai, Y., Li, X., Wang, J., Zhang, Z., 2020. Mental health care for medical staff in China during the COVID-19 outbreak. Lancet Psychiatry 7 (4), e15–e16. https://doi.org/10.1016/S2215-0366(20)30078-X.

Delgado Silveira, E., Montero Errasquín, B., Muñoz García, M., Vélez-Díaz-Pallarés, M., Lozano Montoya, I., Sánchez-Castellano, C., Cruz-Jentoft, A.J., 2015. [Improving drug prescribing in the elderly: A new edition of STOPP/START criteria]. Rev. Esp. Geriatria Y Gerontol. 50 (2), 89–96. https://doi.org/10.1016/j.regg.2014.10.005.

Disalvo, D., Luckett, T., Bennett, A., Davidson, P.M., Agar, M., 2020. Multidisciplinary perspectives on medication-related decision-making for people with advanced dementia living in long-term care: A critical incident analysis. Eur. J. Clin. Pharmacol. 76 (4), 567–578. https://doi.org/10.1007/s00228-019-02820-z.

Downing, L.J., Caprio, T.V., Lyness, J.M., 2013. Geriatric psychiatry review: Differential diagnosis and treatment of the 3 D's - delirium, dementia, and depression. Curr. Psychiatry Rep. 15 (6), 365. https://doi.org/10.1007/s11920-013-0365-4.

Dua, D., Grover, S., 2020. Profile of patients seen in consultation-liaison psychiatry in india: a systematic review. Indian J. Psychol. Med. 42 (6), 503–512. https://doi.org/10.1177/0253717620964970.

Fong, T.G., Davis, D., Growdon, M.E., Albuquerque, A., Inouye, S.K., 2015. The interface between delirium and dementia in elderly adults. Lancet Neurol. 14 (8), 823–832. https://doi.org/10.1016/S1474-4422(15)00101-5.

Gallagher, P., Ryan, C., Byrne, S., Kennedy, J., O'Mahony, D, 2008. STOPP (Screening Tool of Older Person's Prescriptions) and START (Screening Tool to Alert doctors to Right Treatment). Consensus validation. Int. J. Clin. Pharmacol. Ther. 46 (2), 72–83. https://doi.org/10.5414/cpp46072.

Gloster, A.T., Lamnisos, D., Lubenko, J., Presti, G., Squatrito, V., Constantinou, M., Nicolaou, C., Papacostas, S., Aydın, G., Chong, Y.Y., Chien, W.T., Cheng, H.Y., Ruiz, F.J., Garcia-Martin, M.B., Obando-Posada, D.P., Segura-Vargas, M.A., Vasiliou, V.S., McHugh, L., Höfer, S., Karekla, M., 2020. Impact of COVID-19 pandemic on mental health: an international study. PLoS One 15 (12), e0244809. https://doi.org/10.1371/journal.pone.0244809.

Hawkins, M., Sockalingam, S., Bonato, S., Rajaratnam, T., Ravindran, M., Gosse, P., Sheehan, K.A., 2021. A rapid review of the pathoetiology, presentation, and management of delirium in adults with COVID-19. J. Psychosom. Res. 141, 110350 https://doi.org/10.1016/j.jpsychores.2020.110350.

Hercus, C., Hudaib, A.-R., 2020. Delirium misdiagnosis risk in psychiatry: a machine learning-logistic regression predictive algorithm. BMC Health Serv. Res. 20 (1), 151. https://doi.org/10.1186/s12913-020-5005-1.

Horn, M., Granon, B., Vaiva, G., Fovet, T., Amad, A., 2020. Role and importance of consultation-liaison psychiatry during the Covid-19 epidemic. J. Psychosom. Res. 137, 110214 https://doi.org/10.1016/j.jpsychores.2020.110214.

Hosey, M.M., Needham, D.M., 2020. Survivorship after COVID-19 ICU stay. Nat. Rev. Dis. Primers 6 (1), 60. https://doi.org/10.1038/s41572-020-0201-1.

Hossain, M.M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., McKyer, E.L.J., Ahmed, H.U., Ma, P., 2020. Epidemiology of mental health problems in COVID-19: A review. F1000Research 9, 636. https://doi.org/10.12688/f1000research.24457.1.

Huang, C., Huang, L., Wang, Y., Li, X., Ren, L., Gu, X., Kang, L., Guo, L., Liu, M., Zhou, X., Luo, J., Huang, Z., Tu, S., Zhao, Y., Chen, L., Xu, D., Li, Y., Li, C., Peng, L., Cao, B., 2021. 6-month consequences of COVID-19 in patients discharged from hospital: A cohort study. Lancet (London, England) 397 (10270), 220–232. https://doi.org/10.1016/S0140-6736(20)32656-8.

Janeway, D., 2020. The Role of psychiatry in treating burnout among nurses during the Covid-19 pandemic. J. Radiol. Nurs. 39 (3), 176–178. https://doi.org/10.1016/j.jradnu.2020.06.004.

Lai, C.-C., Ko, W.-C., Lee, P.-I., Jean, S.-S., Hsueh, P.-R., 2020. Extra-respiratory manifestations of COVID-19. Int. J. Antimicrob. Agents 56 (2), 106024. https://doi.org/10.1016/j.ijantimicag.2020.106024.

Lavan, A.H., Gallagher, P., Parsons, C., O'Mahony, D, 2017. STOPPFrail (Screening Tool of Older Persons Prescriptions in Frail adults with limited life expectancy): Consensus validation. Age Ageing 46 (4), 600–607. https://doi.org/10.1093/ageing/afx005.

López-Atanes, M., González-Briceño, J.P., Abeal-Adham, A., Fuertes-Soriano, S., Cabezas-Garduño, J., Peña-Rotella, Á., Sáenz-Herrero, M., 2021. Liaison psychiatry during the peak of the coronavirus pandemic: a description of referrals and interventions. Front. Psychiatry 12, 555080. https://doi.org/10.3389/fpsyt.2021.555080.

O'Mahony, D., O'Sullivan, D., Byrne, S., O'Connor, M.N., Ryan, C., Gallagher, P., 2015. STOPP/START criteria for potentially inappropriate prescribing in older people: Version 2. Age Ageing 44 (2), 213–218. https://doi.org/10.1093/ageing/afu145.

Oseran, A.S., Nash, D., Kim, C., Moisuk, S., Lai, P.-Y., Pyhtila, J., Sequist, T.D., Wasfy, J. H., 2020. Changes in hospital admissions for urgent conditions during COVID-19 pandemic. Am. J. Manag. Care 26 (8), 327–328. https://doi.org/10.37765/ajmc.2020.43837.

Plasencia-García, B.O., Rico-Rangel, M.I., Rodríguez-Menéndez, G., Rubio-García, A., Torelló-Iserte, J., Crespo-Facorro, B., 2021. Drug-drug Interactions between COVID-19 Treatments and Antidepressants, Mood Stabilizers/Anticonvulsants, and Benzodiazepines: Integrated Evidence from 3 Databases. Pharmacopsychiatry. https://doi.org/10.1055/a-1492-3293.

Prajapati, N.K., Parikh, N.C., Shah, N.D., Darji, V.M., Jariwala, H.B., Miroliya, M.T., 2021. Evaluation of Psychiatric Morbidity in COVID-19-Positive Inpatients Referred to Consultation Liaison Psychiatry in a Tertiary Care Hospital. Indian J. Psychol. Med. 43 (4), 330–335. https://doi.org/10.1177/02537176211022146.

Rebora, P., Rozzini, R., Bianchetti, A., Blangiardo, P., Marchegiani, A., Piazzoli, A., Mazzeo, F., Cesaroni, G., Chizzoli, A., Guerini, F., Bonfanti, P., Morandi, A., Faraci, B., Gentile, S., Bna, C., Savelli, G., Citerio, G., Valsecchi, M.G., Mazzola, P., CoViD-19 Lombardia Team, 2021. Delirium in Patients with SARS-CoV-2 Infection: A Multicenter Study. J. Am. Geriatr. Soc. 69 (2), 293–299. https://doi.org/10.1111/jgs.16969.

Robles Bayón, A., Gude Sampedro, F., 2014. Inappropriate treatments for patients with cognitive decline. Neurologia (Barcelona, Spain) 29 (9), 523–532. https://doi.org/10.1016/j.nrl.2012.05.004.

Rooney, S., Webster, A., Paul, L., 2020. Systematic review of changes and recovery in physical function and fitness after severe acute respiratory syndrome-related coronavirus infection: implications for COVID-19 rehabilitation. Phys. Ther. 100 (10), 1717–1729. https://doi.org/10.1093/ptj/pzaa129.

Roy, D., Ghosh, R., Dubey, S., Dubey, M.J., Benito-León, J., Kanti Ray, B., 2021. Neurological and neuropsychiatric impacts of COVID-19 pandemic. Can. J. Neurol. Sci. 48 (1), 9–24. https://doi.org/10.1017/cjn.2020.173.

Sánchez-González, R., Baillès-Lázaro, E., Bastidas-Salvadó, A., Lligoña, A., Herranz-Villanueva, S., Pérez-Solá, V., Pintor-Pérez, L., 2018. Clinical profile of inpatients referred to a consultation-liaison psychiatry service: an observational study assessing changes over a 10-yearperiod. Actas Esp. Psiquiatria 46 (2), 58–67.

Saraiva, S., Guthrie, E., Walker, A., Trigwell, P., West, R., Shuweidi, F., Crawford, M., Fossey, M., Hewison, J., Murray, C.C., Hulme, C., House, A., 2020. The nature and activity of liaison mental services in acute hospital settings: a multi-site cross sectional study. BMC Health Serv. Res. 20 (1), 308. https://doi.org/10.1186/s12913-020-05165-x.

Schomerus, G., Schwahn, C., Holzinger, A., Corrigan, P.W., Grabe, H.J., Carta, M.G., Angermeyer, M.C., 2012. Evolution of public attitudes about mental illness: a systematic review and meta-analysis. Acta Psychiatr. Scand. 125 (6), 440–452. https://doi.org/10.1111/j.1600-0447.2012.01826.x.

Shapiro, P.A., Brahmbhatt, K., Caravella, R., Erickson, J., Everly, G., Giles, K., Gopalan, P., Greenspan, H., Huijón, R.M., Key, R.G., Kroll, D., Prince, E., Rabinowitz, T., Saad-Pendergrass, D., Shalev, D., 2021. Report of the academy of consultation-liaison psychiatry task force on lessons learned from the COVID-19 pandemic: executive summary. J. Acad. Consultat.-Liaison Psychiatry 62 (4), 377–386. https://doi.org/10.1016/j.jaclp.2021.05.001.

Smith, C., Hewison, J., West, R.M., Guthrie, E., Trigwell, P., Crawford, M.J., Czoski Murray, C.J., Fossey, M., Hulme, C., Tubeuf, S., House, A, 2019. Liaison psychiatry-measurement and evaluation of service types, referral patterns and outcomes (LP-MAESTRO): a protocol. BMJ Open 9 (11), e032179. https://doi.org/10.1136/bmjopen-2019-032179.

Steardo, L., Steardo, L., Verkhratsky, A., 2020. Psychiatric face of COVID-19. Transl. Psychiatry 10 (1), 261. https://doi.org/10.1038/s41398-020-00949-5.

Stein, D.J., 2018. Pharmacotherapy of adjustment disorder: a review. World J. Biol. Psychiatry 19 (sup1), S46–S52. https://doi.org/10.1080/15622975.2018.1492736.

Su, J.-A., Chou, S.-Y., Chang, C.-J., Weng, H.-H., 2010. Changes in consultation-liaison psychiatry in the first five years of opearation of a newly-opened hospital. Chang Gung Med. J. 33 (3), 292–300.

Tarighi, P., Eftekhari, S., Chizari, M., Sabernavaei, M., Jafari, D., Mirzabeigi, P., 2021. A review of potential suggested drugs for coronavirus disease (COVID-19) treatment. Eur. J. Pharmacol. 895, 173890 https://doi.org/10.1016/j.ejphar.2021.173890.

Villanueva, V.J., Motos, P., Isorna, M., Villanueva, V., Blay, P., Vázquez-Martínez, A., 2021. [Impact of confinement measures on the Covid-19 pandemic on alcohol risk consumption.]. Rev. Esp. Salud Publ. 95, e202101015.

Walker, A., Barrett, J.R., Lee, W., West, R.M., Guthrie, E., Trigwell, P., Quirk, A., Crawford, M.J., House, A., 2018. Organisation and delivery of liaison psychiatry services in general hospitals in England: results of a national survey. BMJ Open 8 (8), e023091. https://doi.org/10.1136/bmjopen-2018-023091.

Wood, R., Wand, A.P.F., 2014. The effectiveness of consultation-liaison psychiatry in the general hospital setting: a systematic review. J. Psychosom. Res. 76 (3), 175–192. https://doi.org/10.1016/j.jpsychores.2014.01.002.