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Profile changes in admissions to a psychiatric hospitalisation unit over 15 years (2006–2021), considering the impact of the pandemic caused by SARS-CoV-2

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ABSTRACT

The objective of this current work was to explore whether modification of the diagnostic criteria upon the publication of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the impact of the COVID-19 pandemic had influenced the diagnostic and sociodemographic profiles of mental health admissions. For that purpose, we designed an observational, longitudinal, and retrospective study of the data recorded in the discharge reports of the Brief Hospitalization Unit at Castellon (Spain), between January 2006 and December 2021. The sample consisted of 7,037 participants, with a mean age of 42.1 years. The mean age of admissions, number of women, and presentation of affective disorders, addictions, and dementias all increased significantly during the DSM-5 period. Beyond diagnoses, the reduction in readmissions before the pandemic could be attributed to the use of long-acting injectable antipsychotics. In contrast, the pandemic did not change the percentage of readmissions or the volume of admissions. Also, during the pandemic period, the significant results obtained indicate that the average stay was reduced, affective disorders decreased, and addictions increased. Therefore, clinicians should consider these diagnostic and sociodemographic fluctuations when adapting clinical care, taking into account gender perspective, ageing of patients and increasing of dual and affective disorders.

1. Introduction

One of the fundamental differences between psychiatry and every other medical speciality is that it is difficult to establish clinical principles in the field of mental health that will remain stable over time (Brenner et al., 2021). Psychiatry is a dynamic and porous speciality with fluctuations in its diagnostic criteria characterised by variability when discerning between normality and pathological states (Brenner et al., 2021). The great difficulty in the diagnostic stability of psychiatric entities is the result of the changes in theoretical trends throughout the 20th century, including institutionalisation in asylums and the use of psychoanalysis or psychopharmacological approaches (Telles Correia, 2017).

Although in recent decades nosological lists have been established which contain criteria supported by scientific evidence, diagnostic classifications arise from the combination of old theories. Thus, the validity of current psychiatric nosology remains questioned: there are no defining neurobiological substrates, no physiological basis that delineates the limit between normality and pathology, the interaction between the biological and psychological perspectives is complex, and there is a high level of comorbidity between diagnostic categories (Micoulaud-Franchi et al., 2018).

Categorical models based on clinical criteria have proven to be reliable and effective in research projects but when applied in routine clinical practice, the low levels of reliability between evaluators is often evident (Nagar et al., 2018). This effect can be so obvious that the outcomes of the evaluation of mood, anxiety, and personality disorders substantially improves when dimensional diagnostic models are used (Nagar et al., 2018). We must also consider that the clinical and diagnostic profiles of psychiatric patients can undergo considerable variations over time, depending on the prevailing theoretical framework within the speciality, the subjectivity of the therapist, local

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idiosyncrasies, quantity and quality of available resources, and the socioeconomic and demographic conditions of the population (Myklebust et al., 2017; Nordgaard et al., 2016).

It has been shown that regular therapists tend to consider the mental disorders they detect in their patients as being less serious compared to the opinions of external observers, thereby minimising false positives at the cost of increasing false negatives (Nagar et al., 2018). There has also been a statistically significant increase in the use of the 'otherwise not specified' typification when categorising psychiatric disorders, with the prescription of psychoactive drugs being higher in cases diagnosed with this specifier (Rajakannan et al., 2016). This typification aggravates the problem of the lack of specificity in the field and indicates a level of uncertainty in the aetiological origin of the symptoms as well as in the potential clinical overlap between disorders (Rajakannan et al., 2016).

In Spain, variability in the approach to psychiatric diagnoses is aggravated when considering the heterogeneity of care between autonomous communities and the absence of epidemiological information at the state level. The exception is substance use disorders and suicide, for which strong longitudinal data are available from the Spanish Observatory of Drugs and Addictions (2021) and the Spanish Foundation for Suicide Prevention (2021), respectively. In any case, the absence of studies that compare the clinical and sociodemographic profiles of patients admitted to hospitalisation units is striking. In addition, the few studies published in this regard were not designed to analyse the diagnostic profiles of users, but rather, to describe the change in the mental health model (institutional versus community model) and its influence of the availability of resources on healthcare pressure (Myklebust et al., 2017; Schiavo et al., 2017).

Given that the therapeutic strategy employed can be influenced by external factors (including the prevailing care model, diagnostic criteria, clinical guidelines, care pressure, and available resources), it is conceivable that there may be substantial changes in the profiles of patients admitted to the acute care hospital units over time. It is possible that psychiatric admission has ceased to depend exclusively upon medical criteria and is now also influenced by the appearance of maladaptive behavioural phenotypes, which tend to cause enormous levels of family/caregiver burnout and for which specific outpatient support resources are still unavailable, despite their increasing incidence (Newton-Howes et al., 2021).

In this sense, it has been hypothesised that the fact that, despite improving therapeutic approaches, the care pressure in mental health remains constant may be explained by the emergence of personality disorders as well as comorbidities and single disease entities (Gawda et al., 2017). These are diseases that predispose and perpetuate psychiatric comorbidities, reduce the effectiveness of treatment and rehabilitation capacity, reduce life quality and life expectancy, and carry a high economic burden through direct and indirect costs (Cailhol et al., 2017), with longitudinal clinical stability comparable to other mental health disorders (Hopwood and Bleidorn, 2018).

Furthermore, the pandemic caused by SARS-CoV-2 represented an unprecedented stressful event which generated significant changes in the relapse rates of psychiatric disorders as a response. The context of the COVID-19 pandemic required rapid adaptations in the healthcare system and in medical care to establish measures aimed at limiting the risk of spreading the virus (Bocher et al., 2020). In addition, this situation made it difficult to provide care directed towards rehabilitation, which promoted psychiatric hospitalisation largely as a result of the restrictions in place and resulting social isolation (Kane et al., 2022). Therefore, the implementation of more demanding admissions criteria was required to help avoid hospitalisations that were not strictly necessary (Jagadheesan et al., 2021).

Psychiatric patients were especially vulnerable to the impact of the COVID-19 pandemic because they often suffer from stigma and receive poor medical care and are more likely to live in poor socioeconomic environments (Conrad et al., 2020). This made them sensitive to the effects of social isolation, the economic consequences, and traumatic components related to the COVID-19 pandemic (Conrad et al., 2020).

There was a significant reduction in hospitalisation rates during the first wave, with a relative increase in involuntary admissions and in psychotic disorder relapses (Panariello et al., 2021). In the second wave, an increase in affective and anxious conditions was observed, along with an increase in disorders related to trauma and stress (Panariello et al., 2021). In general, a reduction in the volume of hospitalisations has been described, although the magnitude of this decrease differs between different regions, even within the same country (Simpson et al., 2021). This decrease was greater during the first weeks of the pandemic, with a similar trend amongst different patient age, sex, and diagnosis groups (Rømer et al., 2021). In our care environment, which includes Valencian public health system healthcare departments (types 1–3), hospitalisation was centralised to one ward that maintained the same number of beds (40 in 20 double rooms) throughout the whole study period (15 years).

The purpose of this current work was to explore whether modification of the psychiatric diagnostic criteria upon the publication of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the impact of the COVID-19 pandemic had influenced the diagnostic and sociodemographic profiles of mental health admissions. This was an interesting study given that few papers have previously been published describing the impact of the pandemic on hospitalisations and comparing a period of almost two years before and after the onset of the pandemic caused by SARS-CoV-2 has been previously published.

2. Methodology

This was a single-centre, descriptive, longitudinal, and retrospective study that analysed the data collected in the register of discharge reports from the *Unidad de Hospitalización Breve* (Brief Hospitalization Unit or UHB) of the Provincial Hospital Consortium of Castellon in Spain. Despite sharing physical space, users of the Serious Dual Pathology Program and the Hospital Detoxification Unit were excluded, given that, because of the nature of both these programs, the profile of these patients was more consistent over time.

The data corresponding to all the admissions to the UHB between January 2006 and December 2021 were analysed. We set the starting point to the year 2006 because it was the date from which the documentation service could access the computerised discharge reports. The study did not modify the clinical diagnoses or therapeutic strategies of the patients because all the reports had been definitively closed and electronically signed long before the design and execution of this work.

The psychiatric diagnoses recorded on the discharge reports were coded using 70 categories. Subsequently, the diagnostic labels were grouped into 5 larger diagnostic groups (psychotic disorders, affective disorders, personality disorders, addictions, and dementias). Considering the possible comorbidities, the groups were constituted as dichotomous variables (presence/absence of the variable) and it was possible for the same participant to simultaneously present comorbidities in several categories. The diagnoses assigned to each label are shown in table 1. Those that did not fit into any specific category were not considered because they distracted from the fundamental objective of this specific work.

The level of significance for the data analysis was set at 5% and p-values less than 0.05 were considered significant. All analyses were performed using SPSS software (version 23.0; IBM Corp., Armonk, NY). Kolmogorov–Smirnov tests indicated that the admission and length of hospital stay data did not meet the conditions of normality, although in large samples this test is extremely sensitive to small variations in normality. According to the central limit theorem, it is possible to reduce the normality requirements in cases such as ours where the samples are large enough, given that it is certain that the original populations do obey a normal distribution pattern. Regardless, parametric and non-parametric tests were employed with these variables, with matching results in all cases. Quantitative variables were compared using Student t

Table 1
Diagnoses included in each diagnostic label.

Psychotic disorders	Affective disorders	Personality disorders	Addictions	Dementias
schizophrenia, schizoaffective disorder, delusional disorder, unspecified psychosis, toxic psychosis, schizophreniform disorder, shared psychotic disorder, reactive psychosis	major depressive disorder, dysthymia, bipolar disorder, cyclothymia	borderline, antisocial, histrionic, avoidant, schizoid, schizotypal, paranoid, organic, narcissistic, dependant, obsessive-compulsive, and unspecified personality disorder	substance use disorder involving alcohol, cocaine, delta9-tetrahydrocannabinol, opioids, sedative-hypnotics, or other toxins	vascular dementia, Alzheimer's disease, other dementias

and Mann–Whitney U tests and categorical variables were analysed using chi squared tests.

In the pre-pandemic stage, two periods were compared: (1) the time up until the end of the validity of the DSM-IV (2006–2012) and (2) from the year of publication of the DSM-5 (2013) up until February 2020, the last month before the pandemic caused by SARS-CoV-2. The DSM-5 was published in May 2013, but in order for both periods to have an identical duration, the sample was divided into full years, and so the DSM-IV period was maintained until 31 December 2012 and the DSM-5 period started on 1 January 2013.

Although the axes of the DSM-IV in the discharge reports continue to be maintained to this day (because of computer system issues), the diagnostic orientation in psychiatry was substantially modified in 2013 with the update of the reference diagnostic guide to the DSM-5. Therefore, we considered that year as the separation limit between the two stages. The data from the five diagnostic blocks were modelled using interrupted time series, introducing this limit (DSM-IV or DSM-5 period) as a predictor event. The series were finalized in 2019, since 2020 only included two months. Differences in incidence rates were also analysed.

Subsequently, the sample was divided into two large and balanced groups for further comparison: (1) pre-pandemic period, which encompassed the previous 22 months from February 2020 (inclusive), and (2) the pandemic period from March 2020 to December 2021. The data from the five diagnostic blocks were modelled using interrupted time series, introducing the time period (pre-pandemic or pandemic) as a predictor event. Differences in incidence rates were also analysed.

The principles of the Declaration of Helsinki and the Convention of the Council of Europe were followed at all times in this work. The confidentiality of the participants and the data was guaranteed according to the General Data Protection Regulation (RGPD) established through Organic Law 3/2018, of 5 December, on the Protection of Personal Data and guarantee of digital rights. This study was authorised by the Ethics Commission for Drug Research (CEIm) at the Provincial Hospital Consortium of Castellon (ref. A-01/29/20).

3. Results

3.1. Descriptive analysis of the sample

The overall mean age was 42.1 years ($SD = 14.7$). The age range was from 18 to 92 years, with a median of 41 years. The mean age for males was 40.1 years ($SD = 14.3$) while for females the mean age was 44.5 years ($SD = 14.9$). The differences in age by sex were statistically significant (Student t-test $= -12.5$; $p < 0.001$/Mann-Whitney U test; $p < 0.001$). The mean number of days in hospital was 26.6 days ($SD = 29.5$) with an average duration of 25.9 ($SD = 30.2$) and median of 19 ($IQR = 21$) for men and 27.5 ($SD = 28.5$) and 20 ($IQR = 24$) for women. The differences, according to sex, in the average length of stay were statistically significant (Student t-test $= -2.2$; $p = 0.026$/Mann-Whitney U test; p-value < 0.001). The minimum stay duration was 0 days (discharged within 24 of admission), while the maximum was 475 days. The median length of hospital stay was 19 days ($IQR = 23$). Table 2 provides a description of the study sample.

Table 2
Sample description.

$N = 7037$		
Age	42.10 ($SD = 14.72$)	
Number of admission days	Mean = 26.63 ($SD = 29.49$) Median = 19 ($IQR = 23$)	
Distribution by sex		
Men	3868 (55%)	
Women	3169 (45%)	
Distribution by diagnostic group		
	Absence	Presence
Psychotic disorders	3831 (54.4%)	3206 (45.6%)
Affective disorders	4086 (58.1%)	2951 (41.9%)
Personality disorders	5645 (80.2%)	1392 (19.8%)
Addictions	5338 (75.9%)	1699 (24.1%)
Dementias	6865 (97.6%)	172 (2.4%)
Referral destination after hospital discharge		
Home	6098 (86.7%)	
Transfer to another acute healthcare unit	239 (3.4%)	
Transfer to a residential facility	226 (3.2%)	
Transfer to a medium–long stay unit	218 (3.1%)	
Others	135 (1.9%)	
Patient flight	50 (0.7%)	
Voluntary discharge	50 (0.7%)	
Death	19 (0.3%)	
Discharge into disciplinary custody	2 (~0%)	
Distribution according to the number of admissions per year		
1 admission	5859 (83.3%)	
2 admissions	885 (12.6%)	
3 admissions	218 (3.1%)	
4 or more admissions	75 (1.1%)	
Somatic comorbidities		
Any type of comorbidity	3982 (56.6%)	
Endocrine	1129 (16%)	
Cardiovascular	551 (7.8%)	
Neurological	436 (6.2%)	
Digestive	264 (3.8%)	
Infectious	191 (2.7%)	

3.2. Comparison between DSM-IV and DSM-5 periods

The comparison between the DSM-IV and DSM-5 periods is shown in Table 3. There was evidence of an increase in the mean age of admissions, which went from 40.79 years ($SD = 14.39$) to 43.27 years ($SD = 15$), with this difference reaching statistical significance ($t = -6.67$; $p \leq 0.001$). Although in both periods the predominant sex was male, there was also a significant increase ($X^2 = 5.369$; $p = 0.02$) in the presence of women by almost three percentage points (from 43.8% to 46.7%). The median length of stay is longer in the DSM-5 period ($p<0.001$). On the other hand, there was a significant reduction in the number of average admissions per year ($t = 5.15$; $p \leq 0.001$).

Regarding the diagnostic blocks, there was a significant increase in affective disorders ($X^2 = 4.570$; $p = 0.033$), addictions ($X^2 = 41.517$; $p < 0.001$), and dementias ($X^2 = 6.390$; $p = 0.011$). In contrast, there was a significant reduction in the number of personality disorders ($X^2 = 30.060$; $p < 0.001$). There was no substantial change in the prevalence of psychotic disorders. Fig. 1 shows the sequence graphs and Table 4 shows the fit indices to the time series tested models. The period (DSM-5) was only a predictor of regression in personality disorders ($B = -26.143$; CI (95%) $= -39.875, -12.411$); $p = 0.001$), while the increase in the number of addictions was predicted by the year ($B = 3.705$; CI(95%) =

Table 3
Comparative analysis between the DSM-IV period (2006–2012) and the DSM-5 period (2013–2020).

		DSM-IV (n = 3115)	DSM-5 (n = 3128)	
Age		40.79 (SD = 14.39)	43.27 (SD = 15)	Student t-test = −6.67 (p < 0.001)**
Number of admission days		Mean = 26.65 (SD = 34.24) Median = 18 (IQR = 23)	Mean = 27.24 (SD = 25.22) Median = 21 (IQR = 22)	Student t-test = −0.77 (p = 0.44) Mann-Whitney U test = 4,433,042,5 (p<0.001)**
Average number of admissions per year		1.26 (SD = 0.61)	1.19 (SD = 0.52)	Student t-test = 5.17 (p < 0.001)**
Sex	Men	1752 (56.2%)	1668 (53.3%)	X^2 = 5369 (p = 0.020)*
	Women	1363 (43.8%)	1460 (46.7%)	
Psychotic	Absence	1727 (55.4%)	1706 (54.5%)	X^2 = 0.513 (p = 0.474)
	Presence	1388 (44.6%)	1422 (45.5%)	
Affective	Absence	1835 (58.9%)	1759 (56.2%)	X^2 = 4570 (p = 0.033) *
	Presence	1280 (41.1%)	1369 (43.8%)	
Personal	Absence	2402 (77.1%)	2586 (82.7%)	X^2 = 30,060 (p < 0.001) **
	Presence	713 (22.9%)	542 (17.3%)	
Addiction	Absence	2573 (82.6%)	2377 (76%)	X^2 = 41,517 (p < 0.001) **
	Presence	542 (17.4%)	751 (24%)	
Dementia	Absence	3055 (98%)	3037 (97%)	X^2 = 6390 (p = 0.011) *
	Presence	60 (2%)	91 (3%)	
Care centre destination after discharge	Home	2828 (90.7%)	2611 (83.4%)	X^2 = 212,309 (p < 0.001) **
	Others	180 (2.8%)	43 (1.4%)	
	Another acute healthcare unit	92 (2.9%)	128 (3.8%)	
	Patient flight	21 (0.6%)	11 (0.3%)	
	Voluntary or disciplinary discharge	19 (0.6%)	28 (0.8%)	
	Residential centre	60 (1.9%)	129 (4.1%)	
	Medium–long stay unit	1 (~0%)	115 (3.6%)	
	Death	6 (~0%)	12 (0.3%)	
Comorbidities	Cardiovascular	162 (5.2%)	289 (9.2%)	X^2 = 41.45 (p < 0.001) **
	Digestive	93 (3%)	117 (3.7%)	
	Endocrine	269 (8.6%)	694 (22.2%)	
	Infectious	60 (1.9%)	63 (2%)	
	Neurological	138 (4.4%)	220 (7%)	

Note:
* $p < 0.05$.
** $p < 0.01$.

0.633, 6.778; $p = 0.022$).

For the DSM-IV period, the incidence of admission for psychotic disorder was 0.0025, while for the DSM-5 period it was 0.0024 (Z = 1.4526; p = 0.2096). By affective disorders 0.0023 for DSM-IV and 0.0023 for DSM-5 (Z = 0.1098; p = 0.912). Due to personality disorders 0.0013 and 0.0009 (Z = 6.0819; p<0.001). For addictions 0.0010 and 0.0012 (Z = −4.4890; p<0.001). For dementia, the rates were 0.0001 and 0.0002 (Z = −1.9990; p = 0.045). In other words, in the DSM-5 period there is a lower incidence of admissions for personality disorders and a higher incidence for addictions and dementias.

There were also significant differences in post-discharge referral care centre destinations (X^2 = 212.309; p < 0.001), with a reduction in the percentage of home discharges and an increase in discharges to residential and medium–long stay units. There was also a significant increase in the presence of physical comorbidities, especially those of endocrine, cardiovascular, and neurological origin (X^2 = 41.45; p < 0.001).

3.3. Comparison between the pre-pandemic and pandemic period

There was evidence of a statistically significant (t = 2.5; p = 0.012; U = 279,750,5; p<0.001) reduction of more than three days in the average length of stay. No significant changes were found in terms of age, annual income, and proportion by sex.

Regarding the diagnostic blocks, a significant decrease in affective disorders was observed (X^2 = 6.460; p = 0.011), with a relative proportion (38%) lower than the initial DSM-IV block (41.1%). In turn, the addiction group maintained the upward trend detected in previous periods and also registered a statistically significant increase (X^2 = 70.816; p < 0.001). There were no changes in the proportion of psychotic, personality, or dementia disorders. Fig. 2 shows the sequence graphs and table 5 shows the fit indices to the time series tested models. The period pandemic was only a predictor of regression in affective disorders (B = −2.091; CI(95%) = −4.117, −0.065); p = 0.043), while the increase in the number of addictions was predicted by the date (B = 0.334; CI(95%) = 0.217, 0.451; p<0.001).

For the pre-pandemic period, the incidence of admission for psychotic disorder was 0.0007, while for the pandemic it was 0.0007 (Z = −0.4030; p = 0.686). For affective disorders 0.0006 for pre-pandemic and 0.0005 for pandemic (Z = 1.9557; p = 0.050). For personality disorders 0.0002 and 0.0002 (Z = 0.1844; p = 0.853). For addictions 0.0004 and 0.0007 (Z = −6.3912; p<0.001). Due to dementia, the rates were less than 0.0001 in both periods (Z = 0.2004; p = 0.841). Therefore, in the pandemic there was a higher incidence of admissions due to addictions. Table 6

Significant differences were evident when comparing the post-hospital care centre discharge destinations (X^2 = 19.416; p = 0.013), with fewer transfers to other acute care units or rehabilitation resources (medium–long stay units) and increasing numbers of discharges to home or residential units. In addition, the significant changes detected in physical comorbidities (X^2 = 44.53; $p \leq 0.001$) were related to the reduction in endocrine comorbidities and an increase in infectious and neurological processes.

4. Discussion

To the best of our knowledge, this is the first study to evaluate psychiatric hospital admissions through two different 6-year periods. This work was structured to analyse the periods before and after one of the main diagnostic classification systems was changed (DSM-IV to the DSM-5) and during 22 months of the COVID-19 pandemic compared to the 22-month period prior to the pandemic. Our research shows that there were variations at the diagnostic and sociodemographic levels during the 15-year study period in the acute psychiatric hospitalisation unit we studied. These changes seemed to be related to the change in diagnostic criteria and the outbreak of the SARS-CoV-2 crisis.

Compared to the DSM-IV period, the average age of admissions significantly increased during the DSM-5 period, perhaps because of the ageing of the population at the societal level resulting in an increase in complex neuropsychiatric syndromes that generate family/caregiver burnout and which can overload emergency services (Rutherford et al.,

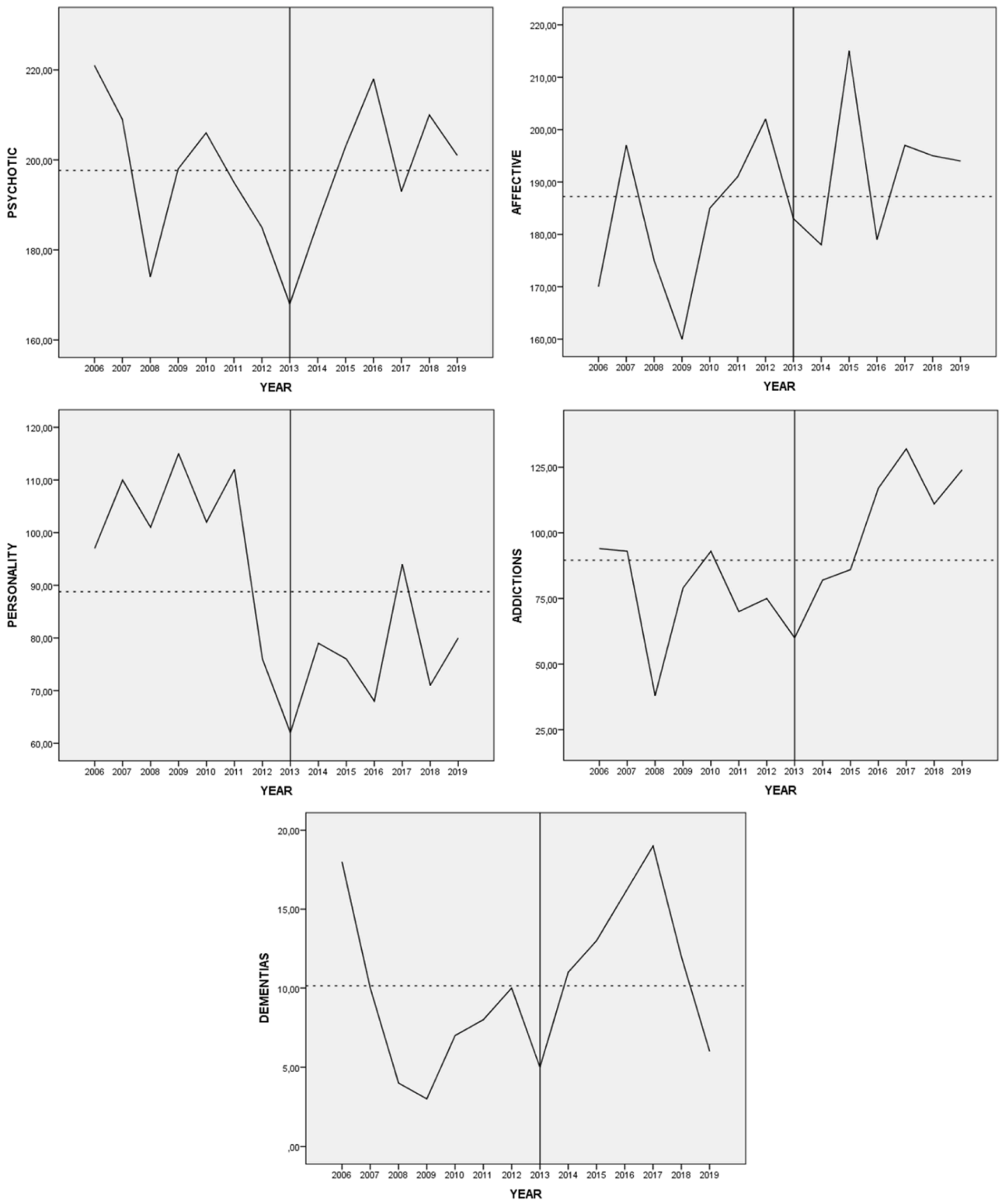

Fig. 1. Diagnoses by year (DSM-IV or DSM-5 period) interrupted time series: sequence graphs. The vertical line marks the start of the pandemic. The horizontal line indicates the overall mean of the series.

2017), as well as the absence of psychogeriatric care centres (Avari and Meyers, 2017). This hypothesis is reinforced when considering the significant increase that is evident for cases of dementia, although these results could also be influenced by the growth in admissions of women, with the mean age of the latter being significantly older.

The increase in admissions for neurocognitive disorders demonstrates the need for training in psychogeriatrics (Avari and Meyers, 2017), a marginal subspecialty within this discipline (Fisher and Teodorczuk, 2017), albeit one of growing importance considering the prevalence of neuropsychiatric processes associated with ageing (Rutherford et al., 2017). In fact, in addition to psychogeriatrics, several other subspecialisations are also currently becoming more mainstream,

Table 4
Fit indices of tested models: diagnoses by year (DSM-IV or DSM-5 period).

VARIABLE	MODEL	Stationary R-squared	R-squared	RMSE
PSYCHOTIC	ARIMA (0,0,0)	1.077E-14	1.077E-14	15.475
AFFECTIVE	ARIMA (0,0,0)	6.328E-15	6.328E-15	14.316
PERSONALITY	ARIMA (0,0,0)	.589	.589	11.791
ADDICTIONS	Simple	.139	.196	22.993
DEMENTIAS	Simple	−.040	.131	4.723

including child and adolescent, liaison, addiction, and forensic psychiatry (National Health Service, 2022).

In turn, the reduction in the rate of annual admissions during the DSM-5 period particularly stands out, which could perhaps be explained by considering the progressive generalisation of the use of extended-release antipsychotics (Patel and Tankersley, 2021). The change to start using the DSM-5 would also explain the increase in the physical comorbidities (especially endocrine and cardiovascular) that are characteristic side effects of these drugs (Grajales et al., 2019). Another hypothesis to explain the increase in somatic comorbidities could be the development of a holistic view of mental health along with greater awareness of the importance of physical health, which may have encouraged psychiatrists to be more attentive when diagnosing and treating this type of illness (Butler et al., 2020). The increase in referrals to residential and medium–long stay residences is also noteworthy, a fact that is favoured by a growing interest in the rehabilitation process (Vita and Barlati, 2019), but may also be because of the burden on families that caring for a mentally ill person entails (Navarro and Carbonell, 2018).

The decrease in the prevalence of personality disorders was particularly striking and contrasts with the conclusions of previous work that showed their prevalence was constant (Gawda and Czubak, 2017). This discrepancy can be explained considering that these are highly variable diagnoses (Nordgaard et al., 2016; Winsper et al., 2020) and that, in our specific environment, hospital mental health care is centralised and does not provide specific resources for personality disorders. Furthermore, the increase in admissions for addictions, affective disorders, and dementia could have displaced the diagnosis of personality disorders, thereby reducing registrations of their presence. It is also possible that, when addiction is diagnosed, the additional diagnosis of personality disorder may be omitted given that active substance consumption decreases the reliability of these diagnoses, requiring more time for observation and to monitor evolution to confirm them. In fact, it has been suggested that at least one month of abstinence must have elapsed before personality disorders can be adequately evaluated (Pedrero et al., 2003). In addition, the increase in affective disorders, which are more prevalent in women, may be one of the reasons behind the significant increase in their admissions (Hyde and Mezulis, 2020).

We also found that there had been a reduction in the average admission length during the pandemic phase which may have been the consequence of the negative impact the socio-healthcare context was having on the logistics of hospitalisation units, with a reduction in the number of beds, a decrease in personnel, and limited occupational and psychological therapy services (Montes and Hernández-Huerta, 2021). Given the limitations imposed by this situation and the risk of contagion that staying in a hospital environment entailed, hospital stays were shortened as much as possible. The high risk of contagion in hospital environments could also explain the reduction in patient transfers to other rehabilitation units or resources, thereby increasing referrals to home or other residential facilities. These findings indicate of the general desire to minimise hospital stays and maintain only essential admissions, always for the shortest amount of time possible (Kalanj et al., 2021).

It is also noteworthy that infectious comorbidities significantly increased during the pandemic phase. After designing a specific space for respiratory isolation, patients with psychiatric pathologies and symptoms suggestive of SARS-CoV-2 infection continued to be admitted to our unit throughout the COVID-19 pandemic. This would explain the increase in infectious-type somatic pathologies, perhaps due to non-specific diagnoses related to syndromes caused by SARS-CoV-2 infection (Fletcher, 2020).

In the 22 months of the COVID-19 pandemic that we analysed, there had been no evidence of a reduction in the volume of hospital admissions, with figures comparable to those registered during the 22 months before the declaration of the global pandemic. This contrasts with other published results which detected a reduction in total hospitalisation rates, with decreases ranging from 12% (Jagadheesan et al., 2021) up to 33% (Ornell et al., 2021), despite an increase in involuntary and urgent admissions (Ambrosetti et al., 2021; Fasshauer et al., 2021; Gómez-Ramiro et al., 2021).

Our UHB is the only reference care centre for psychiatric hospitalisation in a province that, in 2019, had a population of 571,601 inhabitants. This may have influenced the fact that there were no major variations in admissions, given that care activities were maintained and were prioritised in patients with more severe psychopathologies, in other words, those with the highest risk of being admitted during the COVID-19 pandemic (Ambrosetti et al., 2021). Many admissions were also favoured by the consequences of the pandemic: social isolation, anguish due to the health context, difficulty in accessing consultations, interruption of the daily routine, loss of employment, loss of loved ones, overexposure to the news media, cancelled electroconvulsive therapy sessions, or increased drug use (Seiler et al., 2022).

Our work showed that, during the 22 months of the pandemic that we analysed, there had been a significant increase in the presentation of substance use disorder, a finding that was consistent with previous results that detected an increase during the first quarter after the outbreak of SARS-CoV-2 (Gómez-Ramiro et al., 2021). In contrast, the reduction in the presentation of affective disorders stands out to us because it contradicts other works that described an increase in their incidence (Panariello et al., 2021). The stability in the personality disorders, dementia, or psychotic symptoms detected in our centre was also noteworthy. Although the risk of the onset of psychosis is thought to be greater amongst patients exposed to highly stressful events (Fusar-Poli et al., 2017), it is possible that those presenting for the first time during the context of the COVID-19 pandemic had psychopathological illnesses of a moderate intensity for which they did not require hospital admission.

The most significant increase over the 15-year study period was in the diagnosis of addictions. This result is even more significant if we consider that patients admitted to hospitalisation units specialised in addictions (severe dual diagnoses and detoxification) were excluded from our study. Still, an increased number of patients with addictions were admitted to the psychiatric inpatient unit. However, while the pandemic may have played a role in the increase in drug use, this upward trend in admissions had appeared earlier. Along these lines, other studies have found that substance abuse is a significant predictor of admission to acute treatment units (Myklebust et al., 2017), probably due to maladaptive and disruptive behaviours and the psychiatric symptoms they cause.

This increase may also be due to the high levels of comorbidity between addictions and personality disorders (Newton-Howes et al., 2020), which can further enhance decompensation. The fact that diagnoses of addictions increased but those of personality disorder decreased while hospitalised could be because assessment of the criteria for the former are more dependable than those for the latter during admissions. In addition, the increased consumption of substances such as methamphetamine, gamma-hydroxy-butyric acid, ketamine, and meta-chlorophenyl piperazine which can all produce psychotic symptoms and behavioural disorders (National Plan on Drugs, 2022) may also be influencing this trend. This increase in the admissions of patients with addictions suggests the need to reinforce the provision of specific resources for substance-related disorders and dual diagnoses.

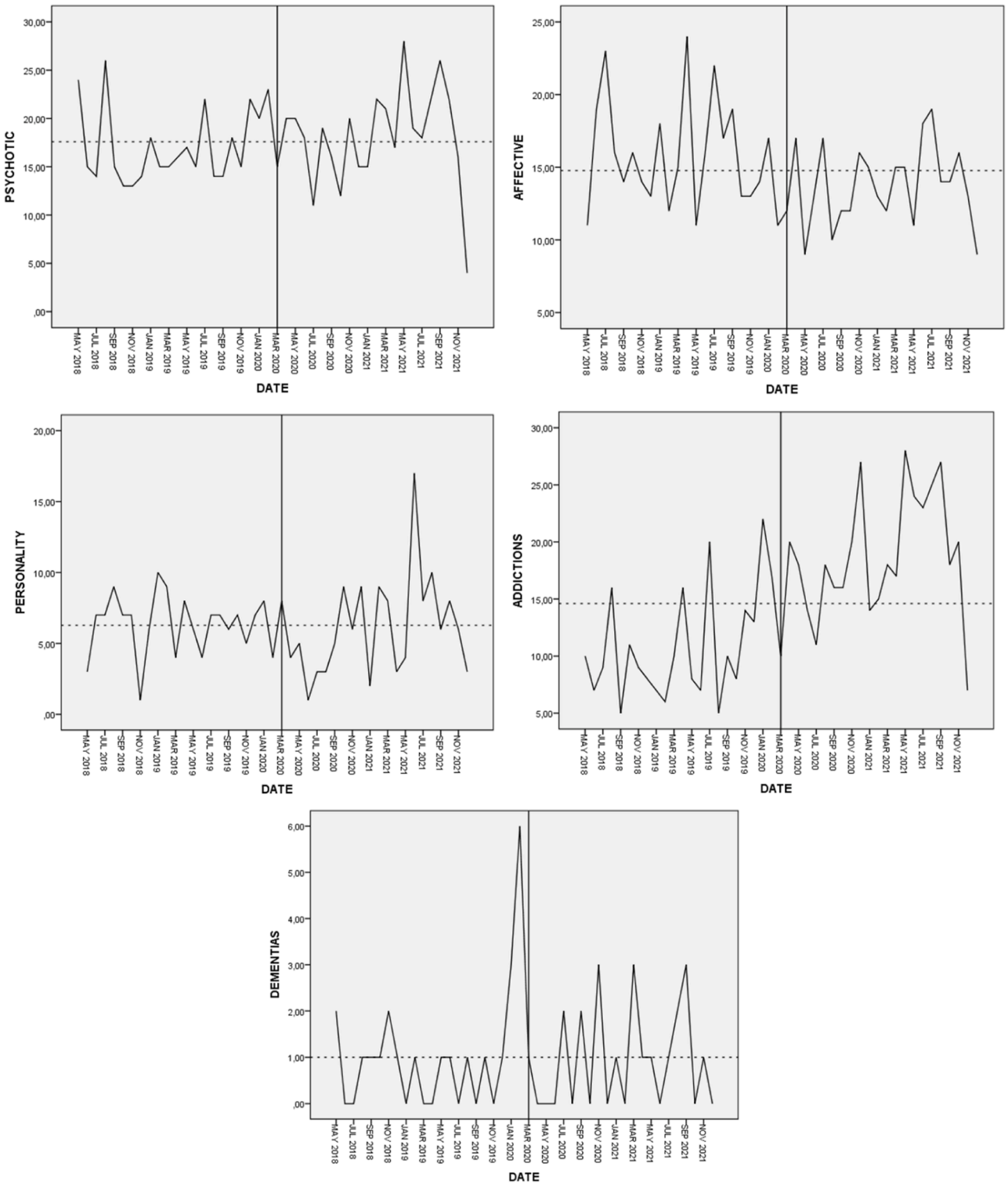

Fig. 2. Diagnoses by date (pre or post-pandemic period) interrupted time series: sequence graphs. The vertical line marks the start of the pandemic. The horizontal line indicates the overall mean of the series.

The main limitations of this work were its retrospective nature and its single-centre design which both limited its external validity. In addition, we analysed some data that was stored for administration and management purposes rather than specifically for research. This fact makes it impossible, for example, to compare the legal nature of the admissions (involuntary versus voluntary) because this information was not recorded in the documentation records. Furthermore, this work was conducted using records coded in medical reports and so there was a risk that this data could have been erroneously coded by the clinical or administrative staff by diagnosing without adjusting to the established criteria or by assigning the wrong code to a medical diagnosis, respectively. In this sense, a systematic review showed a moderate Kappa score (0.45–0.55) between the original data and registered categories and found more clinical errors than administrative coding mistakes.

The diagnostic categories with the worst reliability were anxiety disorders and schizoaffective disorder, while the those with the highest

Table 5
Fit indices of tested models: diagnoses by date (pre or post-pandemic period).

VARIABLE	MODEL	Stationary R-squared	R-squared	RMSE
PSYCHOTIC	Simple Seasonal	.752	.217	4.047
AFFECTIVE	ARIMA (0,0,0) (0,0,0)	.094	.094	3.330
PERSONALITY	ARIMA (0,0,0) (0,0,1)	.086	.141	2.717
ADDICTIONS	Winters' Additive	.778	.479	4.766
DEMENTIAS	ARIMA (3,0,0) (0,0,0)	.158	.158	1.133

levels of reliability were for schizophrenia, unipolar depression, and bipolar disorder (Davis et al., 2016). Another noteworthy limitation was the successive changes in the staff psychiatrists working at the UHB during the 15-year study period, each with different special interests and specific profiles that could have contributed to some diagnostic fluctuations. Lastly, the study design did not allow causality to be inferred and so the changes found may have been related to other variables that have changed over time such as socioeconomic conditions, the increase in outpatient resources, or the emphasis on the model of community care.

5. Conclusions

This work highlights the changes in the sociodemographic and clinical profiles of patients admitted to a psychiatric hospitalisation unit over a study period of 15 years. The number of admitted women and their average age increased during the pre-pandemic phase, with an increase in diagnoses of affective disorders, dementias, and addictions and a decrease in the diagnosis of personality disorders. The average hospital length of stay reduced after the COVID-19 pandemic started, likely reducing the diagnosis of affective conditions while the upward trend in addictions was maintained. For all these reasons, it is essential to consider diagnostic fluctuations when adapting clinical care, developing specific care centres and promoting psychiatric subspecialisation.

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Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Institutional Review Board at the Provincial Hospital Consortium in Castellon (ref. A-01/29/20).

Data availability statement

The data that support the findings of this study are available from the corresponding author upon request. The data are not publicly available because of privacy and/or ethical restrictions.

CRediT authorship contribution statement

M Peraire: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Writing – original draft, Writing – review & editing. **C Guinot:** Data curation, Investigation, Methodology, Writing – original draft. **M Villar:** Conceptualization, Funding acquisition, Investigation, Writing – original draft. **A Benito:** Writing – review & editing. **I Echeverria:** Writing – review & editing. **G Haro:** Data curation, Funding acquisition, Project administration, Writing – review & editing.

Table 6
Comparative analysis between the pre-pandemic period (April 2018–February 2020) and the pandemic period (February 2020–December 2021).

		Pre-pandemic (n = 785)	Pandemic (n = 794)	
Age		42.38 (*SD* = 15.12)	42.61 (*SD* = 14.52)	Student *t*-test = −0.3 (p = 0.757)
Admission length		Mean = 27.35 (*SD* = 26.23) Median = 21 (*IQR* = 22)	Mean = 24.13 (*SD* = 24.32) Median = 18 (*IQR* = 17)	Student *t*-test = 2.5 (p = 0.012) * Mann-Whitney *U* test = 279,750,5 (p <0.001)
Average number of admissions per year		1.20 (*SD* = 0.60)	1.21 (*SD* = 0.53)	Student *t*-test = −0.05 (p = 0.96)
Sex	Men	428 (54.5%)	448 (56.4%)	X^2 = 0.577 (p = 0.447)
	Women	357 (45.5%)	346 (43.6%)	
Psychotic	Absence	407 (51.8%)	398 (50.1%)	X^2 = 0.468 (p = 0.494)
	Presence	378 (48.2%)	396 (49.9%)	
Affective	Absence	437 (55.6%)	492 (62%)	X^2 = 6460 (p = 0.011) *
	Presence	348 (44.4%)	302 (38%)	
Personal	Absence	646 (82.3%)	657 (82.7%)	X^2 = 0.056 (p = 0.813)
	Presence	139 (17.7%)	137 (17.3%)	
Addiction	Absence	547 (69.7%)	388 (48.8%)	X^2 = 70,816 (p < 0.001) **
	Presence	238 (30.3%)	406 (51.2%)	
Dementia	Absence	762 (97%)	773 (97.3%)	X^2 = 0.118 (p = 0.731)
	Presence	23 (3%)	21 (2.7%)	
Care centre destination after discharge	Home	618 (78.7%)	659 (83%)	X^2 = 19,416 (p = 0.013) *
	Others	11 (1.4%)	4 (0.5%)	
	Another acute healthcare unit	41 (5.2%)	19 (2.4%)	
	Flight or death	5 (0.6%)	8 (0.9%)	
	Voluntary or disciplinary discharge	11 (1.2%)	5 (0.6%)	
	Residential centre	26 (3.3%)	37 (4.6%)	
	Medium–long stay unit	73 (9.3%)	62 (7.8%)	
Comorbidities	Cardiovascular	95 (12.1%)	100 (12.6%)	X^2 = 44.53 (p < 0.001) **
	Digestive	49 (6.2%)	54 (6.8%)	
	Endocrine	267 (34%)	166 (20.9%)	
	Infectious	24 (3%)	68 (8.6%)	
	Neurological	67 (8.5%)	78 (9.8%)	

Note.
* $p < 0.05$.
** $p < 0.01$.

Declaration of Competing Interest

The authors declare that doctoral student Marc Peraire is the main author of the research presented, as well as declare that they agree with the presentation of this article by said doctoral student in his doctorate by compendium of articles. Non-doctoral authors waive the use of this article in their future PhDs. The authors declare that they have no conflicts of interest.

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