Patient Preference and Adherence

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ORIGINAL RESEARCH

Involuntary Hospitalizations in an Italian Acute Psychiatric Ward: A 6-Year Retrospective Analysis

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Purpose: We evaluated the differences between demographic (age, sex, nationality, employment, housing, schooling, support administrator), clinical (hospitalization reason, aggressive behaviour, length of hospitalization, psychiatric diagnosis and comorbidities, psychiatric medications, discharge destination, "revolving door" hospitalizations) and environmental (pre-and pandemic period) variables in voluntary (VHs) and involuntary hospitalizations (IHs) in an acute psychiatric ward during a 6-year period.

Patients and Methods: We retrospectively collected the selected variables concerning the hospitalizations of subjects over 18 years of age in the Service for Psychiatric Diagnosis and Care of Mental Health and Drug Abuse Department in Modena from 01/01/2017 to 31/12/2022.

Results: We observed a progressive and sharp reduction in the number of VHs (n = 1800; 61.41%) during the pandemic and a stability of IHs (n = 1131; 38.59%), which in 2022 became prevalent. We highlighted the following differences between VHs and IHs: an increase in hospitalization length in IHs (14.25 mean days ± 15.89 SD) in comparison with VHs (8.78 mean days ± 13.88 SD), which increased more during the pandemic; an increase in aggressive behavior in IHs, especially during the pandemic (Pearson Chi2 = 90.80; p = 0.000); a prevalence of schizophrenia and bipolar disorders (Pearson Chi2 = 283.63; p = 0.000) and more frequent maladaptive social conditions among subjects in IHs.

Conclusion: During the 6-year observation period, we underscored a trend of increasingly reduced recourse to VHs, whereas IHs increased even in the pandemic. Our results suggest that IHs in Psychiatry represented an extreme measure for treating the most severe psychopathological situations such as schizophrenia and bipolar disorders, characterized by aggressive behaviour and precarious social conditions, which needed longer stay than VHs, especially during the pandemic.

Keywords: nonadherence to treatment, involuntary psychiatric hospitalizations, pandemic, revolving door

Introduction

In most Western countries, the last 60 years have been characterized by a transition from an asylum-based psychiatric system to a community-based one, with a gradual reduction in psychiatric hospital beds and the implementation of community services. Nowadays, hospitalization in Psychiatry is resorted to only when it is strictly necessary and urgent, and where it is not possible to provide the individual with adequate home-based care, in order to avoid disrupting quality of life and favoring potential regressive behavior associated with hospitalization. Psychiatric hospitalizations no longer respond to a social need for order and custody, but to care needs that cannot be provided and guaranteed in an outpatient setting. However, rapid psychiatric deinstitutionalization has not always been followed by a simultaneous cultural and ethical change towards psychiatric treatments.[1] In some countries, where the legislation is focused on "public safety" rather than individual freedoms, the use of coercive techniques and compulsory hospitalizations has been increased, reminiscent of old asylum practices.[1] Many acute psychiatric conditions may require hospitalization specially when it is

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necessary to offer an alternative to treatment at home. These situations include the need to remove individuals from risky conditions such as highly conflictual family environments or excessively stimulating circumstances or stressful occurrences which cannot be managed elsewhere.[2] In particular, hospitalization can represent a place where interpersonal relationships are focused on protection, safety, and support, and where it is possible to implement intensive pharmacological therapy. In any case, it is essential to consider the risks associated with hospitalization, including regressive behavior, feelings of frustration and social isolation, physical and psychological iatrogenic complications, and the risk of institutional dependence, which can lead to repeated and non-therapeutic hospitalizations.[3] Crisis stabilization, in a safe place with a rapid discharge represents the main outcome in an acute inpatient stay.[4] If hospitalization is necessary, the psychiatrist asks for the subject's consent and full cooperation in the treatment, but if the subject refuses psychiatric hospitalization, the doctor must resort to coercive treatments only if the case meets the legal criteria for involuntary treatment.

Involuntary Hospitalizations (IHs)

Nonadherence to treatment, which can be particularly challenging in many psychiatric disorders, can be due to: psychotic symptoms, lack of illness awareness, helplessness, cognitive impairment, social isolation, conflicting familial relationship and stigma. Nonadherence to treatment is present in more than one-third of individuals with schizophrenia per annum and can increase the risk of relapse, re-hospitalization, self-harm and worsens quality of life.[5] Moreover, nonadherence to treatment can result in compulsory or involuntary psychiatric treatment due to the severity of the cases and the need for urgent therapy. The use of involuntary psychiatric hospitalization varies widely between and within countries, where specific legislation enables the compulsory treatment of people with severe mental health conditions regardless of their consent. Involuntary or compulsory psychiatric treatment is a procedure mainly applied to people with mental disorders, unwilling to consent, when the intensity of the symptomatology is severe enough to jeopardize personal or social safety.[6] The issue of compulsory treatment in Psychiatry is a highly debated topic due to its ethical, clinical and legal implications and is strictly regulated in each country.

Many studies have focused on the most common reasons for IHs. The most frequently associated risk factors for IHs are represented by psychotic disorders, substance abuse,[7–12] and male sex, although not all authors agree on the latter point. Other risk factors include the lack of previous treatments before hospitalization,[13] poor therapeutic compliance or no outpatient care for individuals with a psychiatric disorder,[14–16] unemployment or lack of family support, positive psychotic symptoms, reduced insight into the illness, and police involvement in the hospitalization.[17] Furthermore, IHs are generally associated with more difficult clinical management of treatment and longer duration of hospital stay compared to voluntary hospitalizations.[18,19] Some studies also compared the implementation of IHs in different countries, but because of the different legislations, direct comparison is challenging.[20] In a meta-analysis, Zhang et al, 2015 highlighted several differences between the Italian legislation and other international ones.[21] The Italian Law is the only one among those analyzed which does not require "danger to oneself and others" as a necessary criterion for compulsory hospitalization, although also in Italy IHs are necessary in the most severe and acute clinical situations. In Germany, Denmark, and Norway, a second validating physician is not required for a compulsory hospitalization, as it is an administrative measure. In countries such as New Zealand, Germany, Denmark, Australia, Austria, and the UK, coercive medication is not permitted for hospitalized individuals. Even the use of physical restraint varies widely in terms of regulations and statistics among different countries. One study suggested correlations between involuntary psychiatric admission and several factors: length of hospital stay, aggressive behavior, occurrence of some psychopathologies, uses of coercive measures, psychiatric service activations after discharge, and quality of life.[22]

Some studies focusing on the efficacy of involuntary and voluntary hospitalizations highlighted that voluntarily admitted individuals were readmitted more often without any difference in hospital stay, suggesting that compulsory admissions might be helpful in reducing the risk for exacerbations in severe psychiatric disorders.[23] Other authors did not find any consistent evidence that involuntary admission can reduce readmission or length of stay, but it can enhance outpatient treatment, increasing service provision.[24] People involuntarily hospitalized were less likely to be victims of violent or non-violent crime, according to a Cochrane review.[25]

According to a recent systematic review,[17] previous involuntary hospitalization and diagnosis of a psychotic disorder are the main risk factors for involuntary psychiatric hospitalizations. Another study highlighted that the presence of potential self-harm can be a greater risk for compulsory admissions than potential harm associated with other significant predictors: psychiatric syndrome, previous compulsory admissions, and the specific context of evaluation.[26] On the opposite, another study underscored a decrease in involuntary hospitalizations associated with having experienced a suicide attempt and an increment associated with male gender, high-level education and psychiatric diagnosis of psychosis.[27]

Most studies highlighted that psychiatric IHs are often necessary to contain excessively aggressive behaviors, which are highly prevalent particularly among severe psychiatric disorders and can represent a major barrier to treatment and care, increasing institutionalization rates and reducing the quality of life of patients.[28] The neuro-circuits underlying aggressive behaviors include prefrontal cortical regions and areas of the mesolimbic system, the hypothalamus, amygdala and periaqueductal gray matter. In particular, several clinical and preclinical studies highlighted that the habenula, which is a phylogenetically ancient, bilateral epithalamic structure surrounded by the third ventricle and the thalamus, is fundamental for the modulation of aggressive behaviors.[28] Regarding the quality of life (QoL) in people with schizophrenia, another neuroimaging study through magnetization transfer imaging highlighted that the impairment of QoLis related to microstructural changes in an extended network (lower gray matter values compared to patients with preserved QoL in the bilateral temporal pole, bilateral insula, secondary visual cortex, vermis and cerebellum).[29] A meta-analysis of structural neuroimaging across multiple psychiatric diagnoses highlighted a common neurobiological substrate in the anterior insula/dorsal anterior cingulate-based network, which may relate to executive function deficits observed across multiple psychiatric diagnoses.[30] Recent advances in neuroscience focus on neural substrates to understand the neuropathophysiology of mental illnesses, exploring prefrontal cortex dysfunction that can result in mental illness symptoms.[31] Although clinical and experimental medicine has made considerable progress in understanding pathogenesis, formulating precise diagnoses, searching for biomarkers and exploring new treatments for neuropsychiatric disorders, many issues remain unresolved in the treatment of people who suffer from a psychiatric disorder but refuse treatment.[32]

Objective

The objective of this study was to evaluate the differences between voluntary and involuntary hospitalizations in an acute psychiatric ward during an observation period of 6 years, comparing selected demographic, clinical and environmental variables related to the two admission states.

Materials and Methods

Study Design

This cohort study, with an observational, retrospective and single-center design, analysed demographic, clinical and environmental variables related to voluntary and involuntary hospitalizations in an acute psychiatric ward, the Service for Psychiatric Diagnosis and Care (SPDC) in Modena during an observation period of 6 years ranged between January 1, 2017, and December 31, 2022.

In accordance with the 180/78 and 833/78 Italian Laws, SPDC is located in a general hospital, provides fifteen beds for voluntary and involuntary hospitalizations of adults and is closely connected with the Mental Health and Drug Abuse Department to which it belongs.[33,34]

The catchment area of our SPDC includes a population of approximately 700,000 living in the province of Modena. The Mental Health and Drug Abuse Department in Modena includes seven Mental Health Centres (MHCs) and Substance Use Services (SUS).

Sample Eligibility Criteria

All adult subjects who were hospitalized at the SPDC in the Modena General Hospital during the study period were included in the sample. Individuals under the age of 18 were not considered for inclusion in the study in order to select

a homogeneous sample (acceptance to hospitalization for minors is expressed by those who hold their parental authority and not by the adolescents themselves).

Study Duration

The study period spanned from January 1, 2017, to December 31, 2022. The period from the beginning of the study until March 8, 2020, is defined as the pre-pandemic period, while the period from March 9, 2020, until the conclusion of the study is defined as the pandemic period.

Selected Variables

We collected demographic variables of hospitalized subjects: age, sex, nationality, employment and housing conditions, educational level, presence of a support administrator (SA). In accordance with the Italian Law 6/2004, the functions of SA are not exclusively dedicated to individuals with mental illness and can be applied in all situations where a subject, due to physical or mental illness, is temporarily or permanently unable to take care of his/her interests and health.[35]

We selected the following clinical variables in order to report the characteristics of VHs and IHs in detail to better investigate the clinical issues linked to two modalities of hospitalization: clinical reason for hospitalization, aggressive behavior during hospitalization, length of hospital stay (in days), diagnosis at discharge (ICD 9-CM), substance use comorbidity, medical comorbidity, previous treatment and care, psychiatric medications and mono/polytherapy prescribed at discharge, discharge destination, revolving door (RD) hospitalizations, which are represented by 3 or more hospitalizations of an individual in a calendar year, in accordance with the literature.[36,37] We considered the COVID-19 epidemic as an environmental variable and based on the moment of its onset we divided the study periods into "pre-pandemic period" (from January 1, 2017, to March 8, 2020) and "pandemic period" (from March 9, 2020, to December 31, 2022).

In Italy, on January 31, 2020, the first two cases of SARS-CoV-2 infection were confirmed, and a state of emergency was declared by the Prime Minister.[38,39] This marked the beginning of the State of Emergency, which continued until April 1, 2022, involving "four waves" of infections, the implementation of social restrictions, stringent hygiene measures, and the development of a new vaccine.[40]

Study Procedure

Data were collected from the information system database used at SPDC and mandatory for the hospitalization of subjects. After data processing, the information was anonymized and entered into an Excel database. Each hospitalization was assigned a progressive identifying number based on the chronological order of discharge, and each subject was given a unique code following a chronological order, assigning the same value to repeated hospitalizations for the same individual. The sample of hospitalizations recorded in the study period was divided into voluntary and involuntary hospitalizations and the demographic, clinical and environmental variables of two sample subgroups were compared.

Statistical Analysis

The collected data were statistically analyzed as follows:

- Mean ± Standard Deviation (m ± SD) for continuous variables, *t*-test for the analysis of normally distributed continuous variables, which was previously assessed applying Shapiro–Wilk, Skewness-Kurtosis, and Shapiro-Francia tests; Non-parametric Kruskal–Wallis test for variables with non-normal distribution;
- Percentages and Pearson Chi-square test for categorical variables, using Standardized Residuals (SR) for determining what categories (cells) of variables were major contributors to reject the null hypothesis. When the absolute value of the SR is greater than 2.00, variable was a major influence on a significant Chi-square test statistic.
- Multiple logistic regression (forward and backward stepwise model) was applied between the dependent variable, hospitalization status (Voluntary=0, Involuntary=1), and the other selected variables as independent variables.

In case of occurrence of missing data, they were excluded from the analysis without implementing multiple imputation techniques. A p-value <0.05 was considered statistically significant. The data were analyzed using STATA12 (Stata Corp., College Station, TX, 2011).

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki as a statement of ethical principles for medical research involving human subjects, including research on identifiable human material and data. The study was approved by the Ethics Committee of the Emilia Nord Health Area (Prot. 10826/2023) and authorized by AUSL-Modena (Prot. n. 688; 27/4/2023). As the study was conducted retrospectively, it was not possible to obtain written informed consent from the enrolled subjects, in accordance with the European GDPR 679/2016 and General Authorization no. 9/2016, extended by Provision no. 424/2018. Data access was granted to the study manager and collaborators, who were bound by confidentiality and data processing obligations under applicable regulations.

Results

Hospitalizations During the Observation Period

In the 6 years of the study, we collected 2954 hospitalizations at the SPDC in the Modena General Hospital referring to 1902 subjects, of which 57.05% males (n = 1085) and 42.95% females (n = 817), for a mean of 1.56 (± 2.08 SD) hospitalizations per subject in the observation period.

The sample was subdivided into voluntary hospitalizations (VHs) (n = 1800; 61.41%) and involuntary hospitalizations (IHs) (n = 1131; 38.59%). We observed a progressive decrease in the number of VHs per year during the observation period, with substantial stability of IHs (Pearson Chi2 = 51.03; p = 0.000) (Figure 1). A higher frequency of VHs was recorded in 2019 (SR = 3.08) and a higher frequency of IHs in 2022 (SR = 6.33). In the last year, a trend reversal was observed with more frequent IHs (n = 204) than VHs (n = 179) (Figure 1).

A similar trend was observed between the pre-pandemic and pandemic periods (Pearson Chi2 = 35.79; p = 0.000) (Figure 2).

The frequency of RD phenomenon was higher among VHs in comparison with IHs (SR = 5.31) (Pearson Chi2 = 28.14; p = 0.000) (Figure 3).

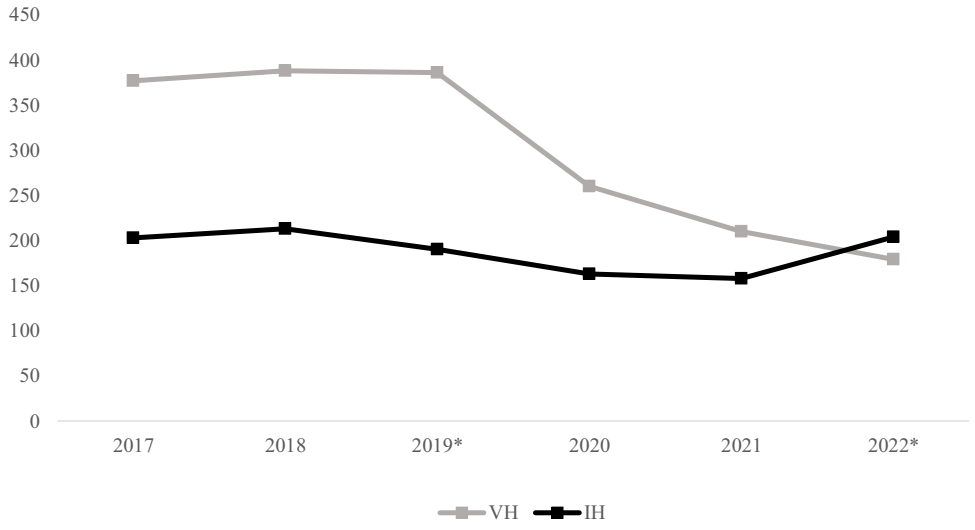

Figure 1 Voluntary (VHs) and Involuntary Hospitalizations (IHs) per year in the Observation Period (Pearson Chi2 = 51.93, p = 0.000; *SR ≥ 2 or ≤ 2).

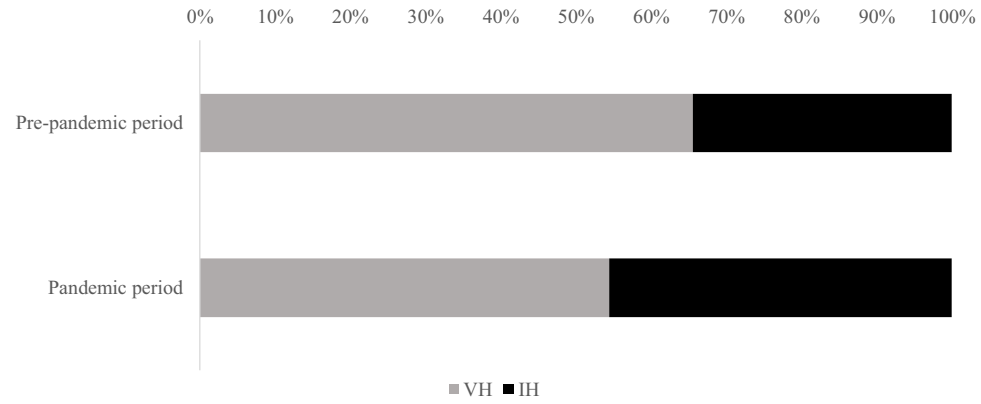

Figure 2 Voluntary (VHs) and Involuntary Hospitalizations (IHs) in the Pre-pandemic and Pandemic Period.

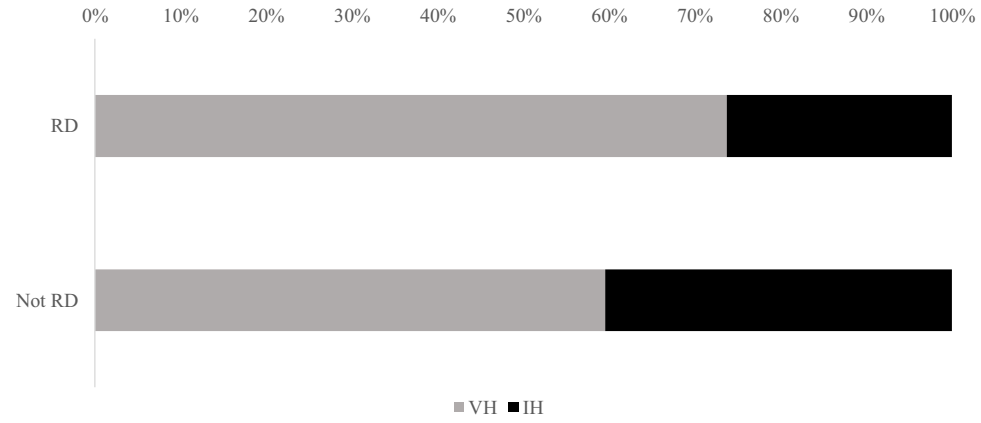

Figure 3 Revolving Door (RD) phenomenon among Voluntary (VHs) and Involuntary Hospitalizations (IHs) in the Observation Period.

Demographic Characteristics of Hospitalized Subjects

The demographic characteristics of hospitalized subjects at their first admission to our ward during the observation period are shown in Table 1.

The mean age of the subjects was 42.68 years (SD = 15.71), higher in females compared to males (44.22 ± 15.74 vs 41.22 ± 15.53) (Chi2 = 24.76; p = 0.041, Kruskal–Wallis test).

The majority of hospitalized subjects were Italians (n = 1466; 77.04%), followed by Extra-Europeans (n = 306; 16.08%) and non-Italian Europeans (n = 131; 6.88%). We observed a statistically significant difference between the two sexes among non-Italian subjects, with a predominance of the female sex between non-Italian Europeans (9.79% vs 4.70%) and of the male sex for Extra-Europeans (18,14% vs 13.34%) (Pearson Chi2 = 24.27; p = 0.000).

Only 3.07% of hospitalized subjects benefited from a support administrator. The majority of the sample was composed of unemployed individuals (25.98%) followed by employees (20.9%), whereas students (6.35%), pensioners by age (4.71%) and by disability (3.92%) were less represented.

The most frequent housing condition in our sample was living in the parental family (26.57%) followed by living in the acquired family (22.39%), whereas other locations were less frequent, as shown in Table 1. We found a statistically significant difference between males and females for housing status (Pearson Chi2 = 80.83; p = 0.000): males more frequently lived in the parental house whereas females more often lived in the acquired family, as shown in Table 1.

The most frequent educational levels in our sample were represented by middle school diploma 27.43% and high school diploma for 20.4%, with a statistically significant difference between males and females (respectively, 17.96% vs 23.65% for middle school diploma and 3.70% vs 6.03% for high school diploma) (Pearson Chi2 = 20.76; p = 0.001), as shown in Table 1.

Table 1 Demographic Variables of Hospitalized Subjects During the Observation Period

Variables	Male N=1085 (57.05%)	Female N=817 (42.95%)	Total N=1902 (100%)	Statistical Test Probability
Age, m ± SD	41.22 ± 15.53	44.62 ± 15.74	42.68 ± 15.71	Chi2 = 24.76, p = 0.041 (Kruskal–Wallis test)
Nationality, n (%)				
Italian	837 (77.14%)	628 (76.87%)	1466 (77.04%)	Pearson Chi2 = 24.27 p = 0.000
European not Italian	51 (4.70%)*	80 (9.79%)*	131 (6.88%)	
Extra-European	197 (18.16)*	109 (13.34%)*	306 (16.08%)	
Support Administrator, n (%)				
Present	37 (3.43%)	21 (2.59%)	58 (3.07%)	Pearson Chi2 NS
Absent	1043 (96.57%)	791 (97.41%)	1834 (96.93%)	
Employment Status, n (%)				
Unemployed	281 (26.04%)	210 (25.89%)	491 (25.98%)	Pearson Chi2 NS
Employed	226 (20.95%)	169 (20.84%)	395 (20.90%)	
Student	63 (5.84%)	57 (7.03%)	120 (6.35%)	
Retired by age	39 (3.61%)	50 (6.17%)	89 (4.71%)	
Disability pensioner	41 (3.80%)	33 (4.07%)	74 (3.92%)	
Missing data	429 (39.76%)	292 (36.00%)	721 (38.15%)	
Housing Status, n (%)				
Parental family	306 (28.49%)*	196 (24.17%)*	502 (26.57%)	Pearson Chi2 = 80.83 p = 0.000
Acquired family	175 (16.29%)*	248 (30.58%)*	423 (22.39%)	
Living alone	128 (11.92%)	114 (14.06%)	242 (12.81%)	
Community or protected facility	120 (11.17%)*	43 (5.30%)*	163 (8.63%)	
Homeless	40 (3.72%)*	11 (1.36%)*	51 (2.70%)	
Prison or judicial hospital	13 (1.21%)	3 (0.37%)	16 (0.85%)	
Missing data	296 (27.56%)	196 (24.17%)	492 (26.05%)	
Educational Level, n (%)				
Illiterate	17 (1.57%)	8 (0.99%)	25 (1.32%)	Pearson Chi2 = 20.76 p = 0.001
Elementary	45 (4.17%)	44 (5.42%)	89 (4.70%)	
Middle school	308 (28.52%)	211 (25.99%)	519 (27.43%)	
High school	194 (17.96%)*	192 (23.65%)*	386 (20.40%)	
University	40 (3.70%)*	49 (6.03%)*	89 (4.70%)	
Missing data	476 (44.07%)*	308 (37.93%)*	784 (41.44%)	

Note: *SR ≥ 2 or ≤ −2, p < 0.05.
Abbreviation: NS, Not Significant.

However, it should be underlined that the data regarding employment, schooling and housing conditions are characterized by a percentage of unavailable data of over 20%.

Demographic Characteristics of Subjects Voluntarily and Involuntarily Hospitalized

We found the following statistically significant differences between the demographic characteristics of subjects voluntarily and involuntarily hospitalized (Table 2):

- the age of individuals in IHs (42.26 m ± 15.31 SD) was higher than those in VHs (41.00 m ± 14.84 SD) in a statistically significant way (Chi2 = 4.18; p = 0.041; Kruskal–Wallis test);

Table 2 Demographic Variables of Subjects Voluntarily and Involuntarily Hospitalized

Variables	Voluntary Hospitalizations N=1800 (61.41%)	Involuntary Hospitalizations N=1131 (38.59%)	Total N=2931 (100%)	Statistical Test Probability
Age, M ± SD				
Years	41.00 ± 14.84	42.26 ± 15.31	41.49 ± 15.03	Chi2 = 4.18; p = 0.041 Kruskal–Wallis test
Sex, n (%)				
Male	1087 (60.39%)	692 (61.18%)	1779 (60.7%)	Pearson Chi2 NS
Female	713 (39.61%)	439 (38.82%)	1152 (39.3%)	
Nationality, n (%)				
Italian	1448 (80.44%)*	839 (74.18%)*	2287 (78.03%)	Pearson Chi2 = 17.09
European not Italian	100 (5.56%)	72 (6.37%)	172 (5.87%)	p = 0.000
Extra-European	252 (14.00%)*	220 (19.45%)*	472 (16.10%)	
Support Administrator, n (%)				
Present	219 (12.17%)	117 (10.35%)	336 (11.47%)	Pearson Chi2 = 2.25
Absent	1581 (87.83%)	1013 (89.65%)	2594 (88.53%)	p= 0.130
Employment Status, n (%)				
Unemployed	461 (25.61%)*	333 (29.47%)*	794 (27.10%)	Pearson Chi2 = 25.29
Employed	336 (18.67%)	201 (17.79%)	537 (18.33%)	p = 0.000
Student	121 (6.72%)	61 (5.40%)	182 (6.21%)	
Retired by age	71 (3.94%)	50 (4.42%)	121 (4.13%)	
Disability pensioner	260 (14.44%)*	102 (9.03%)*	362 (12.35%)	
Missing data	551 (30.61%)	383 (33.89%)	934 (31.88%)	
Housing Status, n (%)				
Parental family	484 (26.89%)	328 (29.03%)	812 (27.71%)	Pearson Chi2 = 28.31
Acquired family	354 (19.67%)	197 (17.43%)	551 (18.81%)	p = 0.000
Living alone	184 (10.22%)*	152 (13.45%)*	336 (11.47%)	
Community	301 (16.72%)*	132 (11.68%)*	433 (14.78%)	
Homeless	80 (4.44%)	39 (3.45%)	119 (4.06%)	
Prison or judicial facility	16 (0.89%)	5 (0.44%)	21 (0.72%)	
Missing data	381 (21.17%)*	277 (24.51%)*	658 (22.46%)	

Note: *SR ≥ 2 or ≤ −2, p < 0.05.
Abbreviation: NS, Not Significant.

- Italian nationality was prevalent (SR = 3.99) among the subjects in VHs and non-European among those in IHs (SR = 3.91) (Pearson Chi2 = 17.09; p = 0.000);
- a prevalence of individuals with disability pensions among subjects in VHs (Pearson Chi2 = 25.29; p = 0.000; 14.44% vs 9.03%; SR = 4.34);
- a higher frequency of people living alone (13.45% vs 10.22%; SR = 2.67) and a lower frequency of individuals living in community (11.68% vs 16.72%; SR = −3.74) among those in IHs (Pearson Chi2 = 28.31; p = 0.000);
- a higher frequency of people with a secondary school education level among subjects in VHs (23.33% vs 19.89%; SR = 2.19; Pearson Chi2 = 14.65; p = 0.012).

Clinical Reasons for Hospital Admissions and Discharge Diagnoses in Our Sample

The most frequent clinical reason for hospitalization was represented by acute psychosis (43.55%), followed by the risk of self-harm/attempted suicide (18.02%) and by manic excitement (15.84%), as shown in Table 3. In IHs, acute psychosis (SR = 16.30) and manic excitement (SR = 4.16) were observed more frequently, whereas other clinical reasons were less represented (Pearson Chi2 = 455.62; p = 0.000) (Table 3).

The most frequent diagnosis at discharge in all hospitalizations was schizophrenia spectrum disorder (42.66%), followed by personality disorders (18.98%) and bipolar disorders (12.76%). We found that schizophrenic spectrum disorders (SR = 11.89) and bipolar disorders (RS = 4.64) were more frequent in IHs (Table 4). Conversely, depressive (SR = −9, 49), personality (SR = −8.46), adjustment (SR = −5.37) and pervasive developmental disorders (SR = −2.01) were more frequent in VHs (Pearson Chi2 = 283.63; p = 0.000), as shown in Table 4.

Clinical Variables of Voluntary and Involuntary Hospitalizations

We found the following statistically significant differences between VHs and IHs (Table 4):

- the duration of IHs (14.25 m ± 15.89 SD) was longer than that of VHs (8.78 m ± 13.88 SD) (Chi2 = 295.60; p = 0.000; Kruskal–Wallis test);

Table 3 Clinical Reasons for Hospital Admissions and Discharge Diagnoses in Our Sample

Variables	Voluntary Hospitalizations N=1800 (61.41%)	Involuntary Hospitalizations N=1131 (38.59%)	Total N=2931 (100%)	Statistical Test Probability
Clinical Reason For Hospital Admissions, n (%)				
Self-harm or attempted suicide	473 (26.28%)*	55 (4.87%)*	528 (18.02%)	Pearson Chi2 = 455.62 p = 0.000
Acute psychosis	571 (31.72%)*	705 (62.39%)*	1276 (43.55%)	
Depressive symptoms	163 (9.06%)*	24 (2.12%)*	187 (6.38%)	
Acute anxiety state	30 (1.67%)*	5 (0.44%)*	35 (1.19%)	
Aggressiveness	114 (6.33%)	83 (7.35%)	197 (6.72%)	
Socio-environmental emergency	22 (1.22%)*	3 (0.27%)*	25 (0.85%)	
Substance intoxication	97 (5.39%)*	17 (1.50%)*	114 (3.89%)	
Psychiatric symptoms in organic disorder	20 (1.11%)	5 (0.44%)	25 (0.85%)	
Manic excitement	245 (13.61%)*	219 (19.38%)*	464 (15.84%)	
Other	65 (3.61%)*	14 (1.24%)*	79 (2.70%)	
Diagnosis at Discharge (ICD 9-CM), n (%)				
Not present	33 (1.83%)	21 (1.86%)	54 (1.84%)	Pearson Chi2 = 283.63 p = 0.000
Organic psychotic conditions	41 (2.28%)	37 (3.27%)	78 (2.66%)	
Schizophrenic spectrum disorders	613 (34.06%)*	637 (56.37%)*	1250 (42.66%)	
Bipolar disorders	189 (10.50%)*	185 (16.37%)*	374 (12.76%)	
Depressive disorders	216 (12.00%)*	24 (2.12%)*	240 (8.19%)	
Anxiety disorders	15 (0.83%)	4 (0.35%)	19 (0.65%)	
Personality disorders	429 (23.83%)*	127 (11.24%)*	556 (18.98%)	
Substance Abuse and dependence	105 (5.83%)	51 (4.51%)	156 (5.32%)	
Adjustment disorders	93 (5.17%)*	15 (1.33%)*	108 (3.69%)	
Intellectual disabilities	46 (2.56%)	20 (1.77%)	66 (2.25%)	
Pervasive developmental disorders	10 (0.56%)*	1 (0.09%)*	11 (0.38%)	
Anorexia nervosa	2 (0.11%)	4 (0.35%)	6 (0.20%)	
Other	8 (0.44%)	4 (0.35%)	12 (0.41%)	

Note: *SR ≥ 2 or ≤ −2, p < 0.05.
Abbreviation: NS, Not Significant.

Table 4 Clinical Variables of Voluntary and Involuntary Hospitalizations

Variables	Voluntary Hospitalizations N=1800 (61.41%)	Involuntary Hospitalizations N=1131 (38.59%)	Total N=2931 (100%)	Statistical Test Probability
Length Of Hospital Stay				
Days (m ± SD)	8.78 ± 13.88	14.25 ± 15.89	10.89 ± 14.92	Chi2 = 295.60 p = 0.0001 (Kruskal–Wallis Test)
Substance Use Comorbidity, n (%)				
Polysubstance abuse	278 (15.44%)	165 (14.60%)	443 (15.12%)	Pearson Chi2 = 18.79 p = 0.005
None	1167 (64.83%)*	797 (70.53%)*	1964 (67.03%)	
Alcohol	154 (8.56%)*	62 (5.49%)*	216 (7.37%)	
Cannabis	122 (6.78%)	68 (6.02%)	190 (6.48%)	
Cocaine	55 (3.06%)	33 (2.92%)	88 (3.00%)	
Opioids	14 (0.78%)	3 (0.27%)	17 (0.58%)	
Pathological gambling	10 (0.56%)	2 (0.18%)	12 (0.41%)	
Previous Care And Treatment, n (%)				
Mental Health Service (MHS)	964 (53.56%)*	661 (58.50%)*	1625 (55.46%)	Pearson Chi2 = 28.35 p = 0.000
Substance Use Service (SUS)	69 (3.83%)	29 (2.57%)	98 (3.34%)	
Private specialist	95 (5.28%)*	36 (3.19%)*	131 (4.47%)	
Other services	24 (1.33%)*	27 (2.39%)*	51 (1.74%)	
Other specialists	8 (0.44%)	2 (0.18%)	10 (0.34%)	
None	321 (17.83%)	196 (17.359%)	517 (17.65%)	
MHS + other(s)	81 (4.5%)	67 (5.93%)	148 (5.05%)	
MHS + SUS	238 (13.22%)*	112 (9.91%)*	350 (11.95%)	
Aggressive Behaviour During Hospitalization, n (%)				
Present	130 (7.22%)	213 (18.85%)	343 (11.71%)	Pearson Chi2 = 90.80 p = 0.000
Absent	1670 (92.78%)	918 (81.15%)	2588 (88.29%)	
Medical Comorbidity, n (%)				
Present	181 (10.06%)	1050 (92.84%)	1231 (42.00%)	Pearson Chi2 = 4.76 p = 0.029
Absent	1619 (89.83%)	81 (7.16%)	1700 (58.00%)	
Seasonality				
Winter	103 (26.48%)	588 (22.92%)	691 (23.39%)	Pearson Chi2 NS
Spring	77 (19.79%)	660 (25.73%)	737 (24.95%)	
Summer	107 (27.51%)	713 (27.80%)	820 (27.76%)	
Autumn	102 (26.22%)	604 (23.55%)	706 (23.90%)	

Note: *SR ≥ 2 or ≤ −2, p < 0.05.
Abbreviation: NS, Not Significant.

- the comorbid use of substances was less frequent in subjects voluntarily hospitalized (Pearson Chi2 = 18.79; p = 0.005), whereas alcohol abuse was more frequent among subjects involuntarily hospitalized (SR = −3.09) (Pearson Chi2 = 18.79; p = 0.005);
- previous treatment and care at MHC (SR = 2.62) and other outpatient services (SR = 2.13) was more frequent among subjects in IHs (Pearson Chi2 = 28.35; p = 0.000);
- more frequent aggressive behavior (Pearson Chi2 = 28.14; p = 0.000) and less frequent medical comorbidities among individuals in IHs (Pearson Chi2 = 7.48; p = 0.024) than those in VHs;

Seasonal differences were not statistically significant in our group.

Clinical Variables of Hospitalization Discharges in Our Sample

We found the following statistically significant differences between VHs and IHs (Table 5):

- the pharmacological therapy prescribed at discharge was less frequently represented by antidepressants (Pearson Chi2 = 133.05; p = 0.000), benzodiazepines (Pearson Chi2 = 6.77; p = 0.009) and other non-psychoactive drugs in IHs, whereas oral antipsychotic drugs (Pearson Chi2 = 4.11; p = 0.043) and LAI (Pearson Chi2 = 139.49; p = 0.000) were more frequently prescribed.
- more frequent destination at IHs discharge was represented by referral to MHC (36.90%) in comparison to VHs (27.02%), whereas less frequent were represented by sending to another acute psychiatric ward, psychiatric

Table 5 Clinical Variables of Hospitalization Discharges in Our Sample

Variables	Voluntary Hospitalizations N=1800 (61.41%)	Involuntary Hospitalizations N=1131 (38.59%)	Total N=2931 (100%)	Statistical Test Probability
Psychiatric Medications Prescribed At Discharge, n (%)				
Oral antipsychotics	1522 (84.56%)	986 (87.26%)	2508 (85.6%)	Pearson Chi2 = 4.11 P = 0.043
LAI antipsychotics	359 (19.94%)	452 (40.00%)	811 (27.68%)	Pearson Chi2 = 139.49 p = 0.000
Antidepressants	367 (20.39%)	56 (4.96%)	423 (14.44%)	Pearson Chi2 = 133.05 p = 0.000
Mood stabilizers	396 (22.00%)	224 (19.82%)	620 (21.16%)	Pearson Chi2 NS
Benzodiazepines	1324 (73.56%)	781 (69.12%)	2105 (71.84%)	Pearson Chi2 = 6.77 p = 0.009
Other non-psychotropic medications	899 (49.94%)	458 (40.53%)	1357 (46.31%)	Pearson Chi2 = 24.74 p = 0.000
Mono/Polytherapy Psychiatric Treatment At Discharge, n (%)				
Monotherapy	193 (10.72%)	123 (10.88%)	316 (10.78%)	Pearson Chi2 NS
Polytherapy	1536 (85.33%)	968 (85.66%)	2504 (85.46%)	
No treatment	71 (3.94%)	39 (3.45%)	110 (3.75%)	
Discharge Destination, n (%)				
MHC	486 (27.02%)*	417 (36.90%)*	903 (30.83%)	Pearson Chi2 = 56.25 p = 0.000
SUS	31 (1.72%)*	6 (0.53%)*	37 (1.26%)	
MHC+ SUS	68 (3.78%)	59 (5.22%)	127 (4.34%)	
Private specialist	21 (1.17%)	8 (0.71%)	29 (0.99%)	
General Practitioner	41 (2.28%)	18 (1.59%)	59 (2.01%)	
Other acute psychiatric ward	765 (42.52%)*	416 (36.81%)*	1181 (40.32%)	
Residential facility	144 (8.00%)	89 (7.88%)	233 (7.95%)	
Psychiatric communities	107 (5.95%)*	38 (3.36%)*	145 (4.95%)	
Non-psychiatric hospital unit	47 (2.61%)	34 (3.01%)	81 (2.77%)	
Non-psychiatric residential facility	30 (1.67%)	21 (1.86%)	51 (1.74%)	
Judicial detention facility	20 (1.11%)	5 (0.44%)	25 (0.85%)	
Other	39 (2.17%)	19 (1.68%)	58 (1.98%)	

Note: *SR ≥ 2 or ≤ −2. p < 0.05.
Abbreviation: NS, Not Significant.

Table 6 Multiple Logistic Regression (Forward and Backward Stepwise Model): Variables Statistically Significantly Associated with "Hospitalization Status" (Voluntary=0, Involuntary=1)

Variables	Coefficient	CI 95%	p-value
Housing status:			
Psychiatric community	−0.41	−0.68; −0.15	0.002
Nationality:			
Extra-European	0.42	0.20; 0.64	0.000
Diagnosis at discharge:			
Depressive disorders	−1.77	−2.46; −1.07	0.000
Personality disorders	−0.68	−1.27; −0.10	0.022
Adjustment disorders	−1.38	−2.16; −0.60	0.000

communities and SUS in comparison to VHs (Pearson Chi2 = 56.25; p = 0.000), as shown in Table 5. The data missing or concerning other unspecified categories is equal to 1.98%.

Multiple Logistic Regression

In the multiple logistic regression model (stepwise forward and backward model) between the dependent variable, VHs (=0) and IHs (=1), and the other selected variables as independent ones (Table 6), the following were statistically significantly associated:

- extra-European nationality with positive coefficient;
- living conditions in a psychiatric community with negative coefficient;
- depressive disorders, personality disorders and adjustment disorders as diagnoses at discharge with negative coefficient.

Discussion

Our study aimed to analyse the demographic, clinical, environmental, and treatment adherence characteristics of hospital admissions at an acute psychiatric ward over 6 years, ranged between January 1, 2017, and December 31, 2022. Additionally, we assessed the impact of several variables on hospital admissions, including admission type, RD admissions, pre-pandemic and pandemic periods, aggression, and seasonality.

Regarding the demographic characteristics of the sample, we reported the prevalence of male sex among sample subjects. This finding is consistent with numerous studies in the literature.[41,42] We also observed a sex difference in the average age of individuals since hospitalized females were older than males on average, confirming the literature report.[43] We observed the prevalence of males among non-European individuals and females among non-Italian European individuals in line with the sex distribution within the foreign population residing in Emilia-Romagna region.[44] Similarly, both housing condition and educational level reflect the distribution of these characteristics in the general population. Females tend to achieve higher levels of education compared to males in the general population, and more frequently live in an acquired family than males.[45,46]

The annual trend of admissions divided between VHs and IHs shows a progressive sharp decrease in VHs admissions, concurrent with the pandemic, while the number of IHs admissions remained relatively stable over time, surpassing the number of VHs admissions in absolute terms by the year 2022. This result clearly highlights that, despite the emergency situation, there was a portion of individuals whose admission was necessary and urgent due to acute and severe conditions, and this is in line with national and international studies,[42,47–50] which reported a similar trend during pandemic with an increase in involuntary hospitalizations and coercive measures in Psychiatry. In accordance with most authors, we can hypothesize that, during pandemic, reduced availability of outpatient service activities and, at the same time, stressful conditions of isolation as well as reduced treatment of non-COVID-19 related disorders could have

worsened many psychiatric disorders, in particular major psychotic disorders. This result put in evidence the need for regular psychiatric treatments and care which, if drastically interrupted or reduced as during lockdown, could negatively influence the long-term course of psychiatric conditions, fostering more dramatic and coercive interventions due to the lack of appropriate treatments.

In such an uncertain and ever-changing pandemic environment, the SPDC noticed a drastic reduction in the number of available beds, resulting in the need to prioritize less severe cases within the MHCS.[47,51,52] Some of these studies also highlighted that, during the pandemic period, the number of emergency department visits for psychiatric reasons significantly decreased in the population without a previous psychiatric diagnosis, while the number of visits by individuals already receiving care at MHCs or enrolled in post-discharge programs increased. Other studies reported a 40% reduction in hospitalizations during the pandemic period compared to the previous years, although these cases tended to be more severe.[53,54] Bahji et al, 2020 emphasized that this reduction was observed only in voluntary admissions, while the number of IHs remained almost unchanged compared to the pre-pandemic period.[42] Other studies highlighted a worsening of the health status of individuals with a positive psychiatric history, who presented more frequent psychomotor agitation and suicide attempts during the emergency period.[55] One study showed that the COVID-19 pandemic in 2020 was associated with a significant decrease in the number of hospital admissions and a greater use of seclusion.[50] These results were confirmed by another study, which reported that while voluntary cases decreased considerably during the pandemic, involuntary cases increased slightly, indicating a deterioration in treatment quality during the pandemic.[48] Another study further confirmed these results during the COVID-19 pandemic,[49] suggesting an overall increased severity of mental disorders during the pandemic, due to deferrals of admissions or reduction of mental healthcare services interventions. This unexpected result underlines the need for regular and careful monitoring of the most serious psychiatric conditions, especially in the outpatient setting, particularly for preventing non-adherence to treatment, the main cause of involuntary hospitalization.[17] Regarding the opposite trend between VHs and IHs reported by our study, we can hypothesize that the decrease in voluntary hospitalizations may have indirectly increased the need for involuntary hospitalizations, which represent the inescapable need for healthcare and treatment in serious clinical situations. Differently from other authors, we could not observe any seasonal trend which may have had a significant effect on the onset and exacerbation of psychopathology of severe mental illness and, therefore, on the need for psychiatric admissions, violence and the risk of mental health coercion.[56,57] We can explain this different result with the relatively short duration of our observation period or with the particular occurrence of the pandemic epidemic, which may have distorted this possible correlation. Individuals involuntarily hospitalized in our sample were more frequently unemployed, living alone, and were more frequently treated by MHCS and social services, compared to those voluntarily hospitalized, probably due to more severe psychopathological conditions with negative impact on individual's daily life. This result is in line with other research observations,[17,22] which suggest close relationship between severity of psychiatric disorders and regressive and maladjusted behavior which result in coercive measures. Our regression model suggests that living in a protected structure such as a psychiatric community can be a protective factor for IHs, whereas non-European nationality can represent a voluntary condition probably due to difficult adaptive conditions and/or a cultural, social and language barrier. Nevertheless, these environmental conditions could represent by themselves risk factors for psychiatric acute episodes and treatment non-adherence in a sort of vicious cycle.[2] Regarding age, our sample indicates that among IHs, subjects were older than those in VHs. The literature is not always consistent on this result,[58] which could indicate longer negative course of psychiatric disorder probably resistant to treatment in accordance with most studies[19,20,27]

Clinical reasons for IH admissions, such as manic excitement and acute psychosis, are rarely present in the clinical reasons for voluntary admissions. Discharge diagnoses are also consistent with the clinical reasons for IH admissions: schizophrenia spectrum disorders and bipolar disorders were higher among IHs, whereas depressive disorders, personality disorders, adjustment disorders and pervasive developmental disorders were more common among VHs, as our regression model confirmed. These findings are supported by most studies.[7–12] An international meta-analysis suggests that individuals voluntarily and involuntarily hospitalized can represent two distinct populations different for psychopathological profile and healthcare needs.[17] Moreover, IHs presented a significantly longer duration, exceeding by more than 60% VH stay, probably due to poor treatment adherence and the severity of psychopathology; often their destination

at discharge was represented by MHCs referral and no other facilities. In contrast, VHs had a shorter mean duration, often due to frequent transfer, accepted by the individuals themselves, to other psychiatric hospital facilities. The results are consistent with a previous study[19] but differ from others[58] due to differences in the healthcare organization. The greater severity in IHs can be highlighted by more frequent aggressive behaviour during the IHs, behavioral alterations often closely linked to the reasons for involuntary admissions and, due to the difficulties in its management, often the cause of delayed discharge, as observed in other studies,[3,22] confirming that aggressive behaviour represents a major obstacle for treatment and care, increasing hospitalization rates and reducing quality of life.[28]

Looking at the pharmacological prescriptions, higher use of Long-Acting Injectable (LAI) antipsychotics can be noticed in IHs compared to VHs due to poor treatment adherence in severe psychosis cases. As a matter of that, LAIs are especially preferred when subject adherence is poor, as seen among individuals in IHs, in accordance with international guidelines.[59,60]

Both longer duration of hospital stays and more frequent use of LAIs can be explained by poor treatment adherence as well as the difficulty in managing treatments for severe psychiatric disorders, such as schizophrenia spectrum disorders and bipolar disorders, characterized by aggressive behavior.[19,58] The duration of hospital stays increased further during the pandemic period compared to the pre-pandemic period and was associated with increased clinical severity, more frequent aggressive behavior, higher number of days in involuntary treatment, and major pathologies such as schizophrenia spectrum disorders and bipolar disorders. These results indicate a higher concentration of individuals with serious and complex conditions in hospital setting, probably due to organizational choices made during the pandemic period, as emphasized by other studies.[47]

In the psychiatric context, the term "Revolving Door" (RD), which refers to frequent hospital readmissions, began to be used in the 1970s to describe those individuals who, following discharge from psychiatric hospitals, repeatedly came into contact with mental health services, requiring frequent readmissions to hospital.[61,62] Historical research revealed that individuals with psychotic disorders, personality disorders, and alcoholism were at higher risk.[61,62] RD hospitalizations were less frequent among IHs confirming opposing attitudes regarding treatment and care among repeatedly or involuntarily hospitalized individuals. Nevertheless, IHs, as suggested by some authors, can reduce risk for re-exacerbations and following readmissions.[23,63]

The extensive recent literature[64–66] highlights that the topic remains of high interest and that understanding the reasons behind frequent readmissions continues to be one of the current challenges for mental health services.[67,68]

Limitations and Advantages of the Study

Among limitations of our study, we enumerate the single-center design, which does not allow us to generalize our results to other national and international contexts;

The retrospective design which cannot allow us to make causal inferences nor to establish a clear causal relationship, but only to provide a trend based on association of variables;

Incomplete data, especially regarding demographic variables such as occupation, education and housing conditions, characterized by a percentage over 20%, which affect the result validity and hamper the implementation of possible stratified analysis.[69]

Regarding the advantages of our study, we note that this research is characterized by a relatively extended observation period and the inclusion of many variables related to hospitalization that allowed us to track the evolution over time of certain phenomena related to three important aspects which can have conditioned inpatient treatments: treatment adherence, repeated hospitalizations and the pandemic period. Another advantage is the real-world setting, which permitted us a detailed analysis of the daily practices of a psychiatric unit.

Conclusion

Our study shows a progressive decrease in voluntary hospitalizations over the 6-year observation period, whereas the number of involuntary hospitalizations remained stable and, by the end of the analyzed period, exceeded the number of voluntary admissions. This result highlights that the need for involuntarily hospitalization persisted even in challenging

and stressful environmental situations like the pandemic, suggesting that severe psychiatric disorders are negatively influenced by extreme environmental situations like the pandemic and can be exacerbated by reduced attention and care.

During the 6-year observation period, we highlighted a trend of increasingly reduced recourse to voluntary psychiatric hospitalization, whereas involuntary hospitalizations reserved for very serious cases and with longer hospital stay increased. We observed the increase of aggressive behavior especially in involuntary hospitalizations and during pandemic period, further suggesting that involuntary hospitalization in Psychiatry represents the extreme measure for treating severe psychopathological situations characterized by behavior alterations.

In light of our results, we confirm the prevalence of schizophrenia and bipolar disorder diagnoses with poor therapeutic adherence, aggressive behavior and precarious social conditions among subjects involuntarily hospitalized. Our results suggest that IHs can represent an extreme therapeutic intervention aimed at reversing risk situations not otherwise treatable in individuals who, due to their disorder, fail to ask for help. It is therefore necessary to maintain respect for people involuntarily hospitalized, to avoid regressive coercive measures even in these conditions, but, on the contrary, to seek their acceptance of treatments as soon as possible, to encourage their participation in medical decisions, taking into account the subjects' values and preferences, thus promoting their independent behavior.

During the pandemic period, we observed a reduction in revolving door admissions and an extension of the length of stay in involuntary hospitalizations, indicating the organizational needs during the environmental crisis to limit hospitalizations only to the most serious situations.

Our study allowed us to analyze the evolution of certain conditions, which significantly influenced the trend of psychiatric hospitalizations, modifying their organization over time. In particular, the observed reduction in voluntary hospitalizations during the lockdown period seems to have been implemented and later maintained by the healthcare system, indicating that the effects of an environmental crisis such as the pandemic will presumably continue to manifest themselves in the near future. Further prospective research on the rate of psychiatric hospitalizations, particularly IHs, will be needed in the coming years after the pandemic to make causal inferences and deepen our knowledge of these clinical observations.

Abbreviations

VHs, voluntary hospitalizations; IHs, involuntary hospitalizations; SPDC, Service for Psychiatric Diagnosis and Care; MHCs, Mental Health Centers; SUS, Substance Use Services; SA, Support Administrator; RD, Revolving Door; SD, Standard Deviation; LAI, Long-Acting Injectable.

Ethics Approval and Informed Consent

The study was approved by the Ethics Committee of the Emilia Nord Health Area (Prot. 10826/2023) and authorized by AUSL-Modena (Prot. n. 688; 27/4/2023).

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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