Risk Management and Healthcare Policy

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Impact of the SARS-CoV-2 Pandemic on Hospitalizations in an Acute Psychiatric Ward

Rosaria Di Lorenzo[1], Matteo Reami[2], Diego Dragone[1], Martina Morgante[1], Giulia Panini[1], Paola Ferri[3], Sergio Rovesti[3]

[1]Mental Health Department and Drug Abuse, AUSL-Modena, Modena, 41124, Italy; [2]School of Medicine & Surgery, Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, 41125, Italy; [3]Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena, 41125, Italy

Correspondence: Rosaria Di Lorenzo, Tel +39-335-5410018, Email saradilorenzo1@alice.it; r.dilorenzo@ausl.mo.it

Background: The Sars-CoV-2 pandemic imposed unprecedented and drastic changes in health care organizations all over the world.
Purpose: To evaluate the impact of the pandemic on hospitalizations in an acute psychiatric ward.
Patients and Methods: We retrospectively identified and compared acute psychiatric hospitalizations in the Service for Psychiatric Diagnosis and Care (SPDC) of AUSL-Modena during the pre-pandemic (n = 1858) and pandemic period (n = 1095), from 01/01/2017 to 31/12/2022. Data were statistically analyzed using STATA12.
Results: We collected 1858 hospitalizations in the pre-pandemic and 1095 in the pandemic. During the pandemic, we observed a progressively sharp reduction in voluntary hospitalizations, whereas involuntary ones remained stable with an increase in 2022 ($p < 0.001$), longer hospital stays (12.32 mean days vs 10.03; $p < 0.001$), longer periods of involuntary hospitalizations (8.45 mean days vs 5.72; $p < 0.001$), more frequent aggressive behaviour (16.10% vs 9.12%; $p < 0.001$) and referral to psychiatric communities at discharge (11.04% vs 6.13%; $p < 0.001$); non-Italians ($p = 0.001$), people with disability pension ($p < 0.001$) and Support Administrator ($p < 0.001$) were more frequently hospitalized.
Conclusion: During the pandemic, voluntary psychiatric hospitalizations decreased, but not involuntary ones, and the most vulnerable people in serious clinical conditions were hospitalized.
Keywords: psychiatric hospitalizations, COVID-19 pandemic, community mental health, psychiatric involuntary treatment

Introduction

On 31 January 2020, the first two cases of the SARS-CoV-2 infection in Italy were confirmed by the Prime Minister, and a state of emergency was declared.[1] The spread of the virus proceeded rapidly and, on 23 February 2020,[2] in eleven municipalities in north-eastern Italy, including Modena, it was necessary to implement quarantine measures, which were soon extended to the entire nation from 9 March 2020. The state of emergency lasted until 1 April 2022,[3] even if the last emergency measure, obligatory masks inside hospital facilities, would be removed on 1 May 2023. During the 26 months of emergency, it is estimated that SARS-CoV-2 affected 25 million people and caused 180 thousand deaths in Italy. During COVID-19, four "waves" of infections were experienced in Italy, requiring the implementation of restrictive social measures never recorded before. The SARS-CoV-2 epidemic was the first pandemic of the digital age that allowed us to observe a new phenomenon renamed "infodemic".[4] COVID-19 changed most social aspects and daily life habits, with an increase in fear, anxiety and worry in the general population, also among health care professionals and physicians.[5] During the COVID-19 emergency, a remodelling of psychiatric services occurred all over the world.[6,7]

The world population was exposed to an excess of information from both traditional media such as newspapers and television, and from "informal" ones such as social networks and the Internet in general. This condition created an extremely chaotic environment in which much information was conflicting, thus providing excellent breeding ground for new "conspiracy theories" and fuelling a mistrust in the safety of vaccines, sometimes even questioning the existence of the virus itself. The WHO promoted research that demonstrated that, during the pandemic, psychiatric disorders,

Received: 6 April 2024
Accepted: 22 May 2024
Published: 25 June 2024

especially among the younger population, increased significantly, and individuals who already suffered from psychiatric disorders usually experienced an exacerbation of their condition, resulting in the request for emergency consultation and/or hospital admission.[8]

During the pandemic, a drastic decrease in the number of available beds in acute psychiatric wards occurred and, consequently, many severe cases were treated in outpatient Mental Health Service (MHS) and community facilities.[9–11] An Italian study reported that urgent psychiatric consultations decreased by 24% in Emergency Room (ER), whereas they increased by 4% in MHS during the pandemic in comparison with the pre-COVID-19 period. In both settings, the most vulnerable people, who lived in psychiatric facilities or with disability pensions, more frequently required urgent psychiatric consultations.[12] In China, the COVID-19 epidemic led to a reduction in the use of psychiatric hospitalization during the four phases of the pandemic by up to 51%.[13] An Italian study underscored a 41% reduction in psychiatric admissions with an increase in long-stay during the lockdown compared to 2018 and 2019.[14] Another Italian study confirmed a similar admission rate during the first peak of COVID-19 pandemic, reporting that hospitalizations decreased by 38% in comparison with the previous year,[15] although they were required for more severe cases. In their study, Clerici et al[16] highlighted that this reduction was found exclusively in voluntary hospitalizations, while involuntary hospitalizations remained almost unchanged compared to the pre-pandemic period. Other studies[17] showed a worsening of the health conditions of people already affected by psychiatric disorders, who more often presented altered behaviour and suicide attempts during the emergency period. Another study confirmed the greater severity of clinical conditions of hospitalized patients during the pandemic, as suggested by the length of stay, the rate of involuntary admissions and the incidence of restraints and seclusion.[18]

Objective

To evaluate the impact of the SARS-CoV-2 pandemic on psychiatric hospitalizations in an acute psychiatric ward, comparing selected demographic, clinical and environmental variables related to hospitalizations in a 6-year range, subdivided into the pre- and pandemic periods.

Materials and Methods

Study Design, Period and Setting

The design of this study was observational, retrospective, and single centre. The whole study period ranged between 1 January 2017 and 31 December 2022 and was divided into the pre-pandemic period (from 1 January 2017 to 8 March 2020), and the pandemic period (from 9 March 2020 to 11 December 2022).

The setting was the Service for Psychiatric Diagnosis and Care (SPDC) of AUSL-Modena, which, in accordance with Italian Laws 180/78 and 833/78,[19,20] is in a general hospital, provides 15 beds for voluntary and involuntary hospitalizations of adults and 2 beds for adolescents. SPDC is closely connected with the Mental Health and Drug Abuse Department to which it belongs.[19,20] The catchment area includes a population of 701,751 living in the province of Modena.

During the pandemic, our local Mental Health and Drug Abuse Department implemented new guidelines: ("Operational indications for the activities of departments of mental health during coronavirus emergencies").[21]

Outpatient activities provided by Mental Health Services (MHSs) were totally re-organized to maintain the social confinement imposed by SARS-CoV-2 epidemic: the professionals of MHSs re-evaluated the patients' health conditions through telephone contacts and informed them about the activities carried out by the MHS during the pandemic. Direct, urgent and unscheduled accesses were guaranteed in case of necessity during normal opening hours of the service, but scheduled follow-up consultations were reduced or suspended; semi-residential activities, such as day centres and day hospitals, and all group activities (group psychotherapies, psychoeducation groups, etc.) were suspended.[21] Although the emergency conditions of the pandemic imposed filters on Emergency Department access, with a drastic reduction of all consultation requests to the ER other than for COVID-19 infection due to the risk of contagion,[10] psychiatric consultations in ER were maintained, as was the 15-bed availability in SPDC for voluntary and involuntary hospitalizations.[21]

The guidelines for combating the spread of the Covid-19 epidemic ended in March 2022 (with the exclusion of wearing a mask in the hospital), when the end of the state of emergency was announced.[3]

Sample Eligibility Criteria and Selected Variables

We included all ≥18-year subjects hospitalized at the SPDC of AUSL-Modena during the study period. We collected demographic variables of hospitalized subjects: age, sex, nationality, employment and housing conditions, educational level, presence of a support administrator, who legally supports a person temporarily or permanently unable to manage his/her interests and health, according to Italian Law 6/2004.[22]

We selected the following clinical variables: clinical reason for hospitalization, voluntary hospitalizations (VHs) and involuntary hospitalizations (IHs), diagnosis at discharge (ICD 9-CM), length of all hospital stays (in days) and length of stay in IHs (in days), substance use comorbidity, medical comorbidity, previous treatment and care, previous psychiatric hospitalizations, aggressive behaviour during hospitalization, psychiatric medications and mono/poly-therapy prescribed at discharge and discharge destination.

Data Sources and Sample Size

Data were collected from the discharge letters available in the information system database used at SPDC. The sample size was determined by identifying all cases of hospitalizations that met the inclusion criteria during the study period. No formal sample size calculation was necessary due to the complete inclusion of all eligible cases.

Study Procedure

The sample of hospitalizations was divided according to discharge date into two groups (pre- and pandemic), and demographic, clinical and environmental variables of the two groups were compared.

Statistical Analysis

We Analyzed

- Mean ± Standard Deviation (m ± SD) for continuous variables, *t*-test for the analysis of normally distributed continuous variables, which were 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 Chi2 test for categorical variables, Standardized Residuals (SR ≥ 2 or ≤ −2; $p < 0.05$) for subcategories of variables with statistically significant differences;
- Multiple logistic regression (forward and backward stepwise model) was applied between the dependent variable, period of hospitalization (pre-pandemic = 0, pandemic = 1), and the other selected variables as independent variables.

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 complies with the Declaration of Helsinki and was performed according to ethics committee approval. The study was approved by the Ethics Committee of the Emilia Nord Health Area (Prot. 10,826/2023) and authorized by AUSL-Modena (Prot. n. 688; 27/4/2023). 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 n. 9/2016, extended by Provision n. 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

We collected 1858 hospitalizations in the pre-pandemic and 1095 in the pandemic.

Demographic Characteristics of Hospitalized Subjects During the Study Period

We reported the following demographic characteristics of hospitalized subjects in the pandemic period, as shown in Table 1:

- A reduction of Italians (SR = −3.46) and an increase of non-Italian Europeans (SR = 2.72) and extra-Europeans (SR = 2.15) (Pearson Chi2 = 13.52; p = 0.001);
- An increase in subjects with Support Administrator (SA) (9.44% vs 15.14%; Pearson Chi2 = 201.77; p < 0.001);
- An increase in subjects with disability pension (SR = 3.82) and a reduction of unemployed (SR = −4.38), employed (SR = −4.93) and retired for age (SR = −2.54) (Pearson Chi2 = 96.72; p < 0.001).

However, we underline that 20% of data regarding employment and housing conditions were unavailable.

Clinical Variables of Hospitalizations in the Pre- and Pandemic Periods

The number of hospitalizations decreased in the pandemic years in a statistically significant way (Chi2 = 1499.59, p = 0.0001, Kruskal-Wallis test) with a reduction of 5% between 2019 and 2020 which increased to 6% in 2021 and 2022: 579 hospitalizations in 2017, 609 in 2018, 584 in 2019, 425 in 2020, 374 in 2021 and 383 in 2022. In particular, VHs

Table 1 Demographic Variables of Hospitalized Subjects in the Pre- and Pandemic Periods

Variables	Pre-pandemic Period N=1858 (62.92%)	Pandemic Period N=1095 (37.08%)	Total N=2953 (100%)	Statistical Test Probability
Age, M ± SD				
Years	41.32±15.19	41.80±14.74	41.49±15.03	Chi2=1.510, p= 0.219 Kruskal–Wallis test
Nationality, n (%)				
Italian	1488 (80.09%)*	818 (74.64%)	2306 (78.06%)	Pearson Chi2 = 13.52 p = 0.001
European Non-Italian	92 (4.95%)	81 (7.39%)*	173 (5.86%)	
Extra-European	278 (14.96%)	197 (17.97%)*	475 (16.08%)	
Support administrator, n (%)				
Present	175 (9.44%)	165 (15.14%)	340 (11.55%)	Pearson Chi2 = 21.77 p < 0.001
Absent	1678 (90.56%)	925 (84.86%)	2603 (88.45%)	
Employment status, n (%)				
Unemployed	560 (30.29%)*	239 (21.91%)	799 (27.18%)	Pearson Chi2 = 96.72 p < 0.001
Employed	382 (20.66%)*	155 (14.21%)	537 (18.27%)	
Student	128 (6.92%)	56 (5.13%)	184 (6.26%)	
Retired by age	90 (4.87%)*	32 (2.93%)	122 (4.15%)	
Disability pension	196 (10.60%)	168 (15.40%)*	364 (12.38%)	
Not known	493 (26.66%)	441 (40.42%)*	934 (31.77%)	
Housing condition, n (%)				
Parental family	513 (27.77%)	301 (27.61%)	814 (27.72%)	Pearson Chi2= 7.90 p = 0.246
Acquired family	364 (19.71%)	188 (17.25%)	552 (18.79%)	
Living alone	205 (11.10%)	131 (12.02%)	336 (11.44%)	
Community or protected facility	286 (15.48%)	149 (13.67%)	435 (14.81%)	
Homeless	68 (3.68%)	51 (4.68%)	119 (4.05%)	
Prison or judicial facility	12 (0.65%)	9 (0.83%)	21 (0.72%)	
Other or not known	399 (21.60%)	261 (23.94%)	660 (22.47%)	

Notes: *Standardized Residuals (SR) ≥ 2, p < 0.05.

were reduced in comparison with IHs (Pearson Chi2 = 51.03, p < 0.001) between the pre-and pandemic periods, with the greatest number of VHs in 2019 (SR = 3.08, p < 0.05) and the greatest number of IHs in 2022 (SR = 6.33, p < 0.05).

As shown in Table 2, the most frequent clinical reason for hospitalization in the pre- and pandemic periods was "Acute psychosis", followed by "Self-harm/suicide attempt" and "Manic excitement". During the pandemic, we reported an increase in "Acute psychosis" (SR = 5.22) and "Aggressive behaviour" (SR = 5.03) and a reduction of "Depressive symptoms" (SR = −4.38), "Acute anxiety" (SR = −2.81), "Substance abuse" (SR = −3.22) and "Manic excitement" (SR = −3.47) among the clinical reasons for hospitalizations (Pearson Chi2 = 92.80, p < 0.001).

Schizophrenic spectrum disorders were more frequent in the pandemic, whereas Depressive disorders and Substance abuse disorders were more frequent in the pre-pandemic period, as shown in Table 2.

In the pandemic, we observed the following statistical differences in comparison with the previous period:

- The duration of hospitalizations was 23% longer (10.03 ± 15.03 vs 12.32 ± 14.61 days) (Pearson Chi2 = 40.78, p = 0.001); in particular, the duration of IHs was 48% longer (5.72 ± 5.31 vs 8.45 ± 6.68 days) (Chi2 = 29.97, p < 0.001, Kruskal Wallis test) (Table 2);
- Polysubstance abuse (SR = 2.85) was more frequent, whereas alcohol addiction (SR = −2.51) and cannabis addiction (SR = −2.10) were less frequent (Pearson Chi2 = 21.73, p = 0.001) (Table 3);

Table 2 Clinical Variables of Hospitalizations in the Pre- and Pandemic Periods

Variables	Pre-Pandemic period N=1858 (62.92%)	Pandemic Period N=1095 (37.08%)	Total N=2953 (100%)	Statistical Test Probability
Clinical reason for hospitalization, n (%)				
Self-harm or attempted suicide	333 (18.07%)	195 (17.94%)	528 (18.02%)	Pearson Chi2 = 92.80 p < 0.001
Acute psychosis	735 (39.88%)	541 (49.77%)*	1276 (43.55%)	
Depressive symptoms	145 (7.87%)*	42 (3.86%)	187 (6.38%)	
Acute anxiety state	30 (1.63%)*	5 (0.46%)	35 (1.19%)	
Aggressive behaviour	91 (4.94%)	106 (9.75%)*	197 (6.72%)	
Socio-environmental emergency	17 (0.92%)	8 (0.74%)	25 (0.85%)	
Substance intoxication	88 (4.77%)*	26 (2.39%)	114 (3.89%)	
Psychiatric symptoms in organic disorder	17 (0.92%)	8 (0.74%)	25 (0.85%)	
Manic excitement	325 (17.63%)*	139 (12.79%)	464 (15.84%)	
Other	62 (3.36%)*	17 (1.56%)	79 (2.70%)	
Diagnosis at discharge (ICD 9-CM), n (%)				
Not present	45 (2.44%)*	9 (0.83%)	54 (1.84%)	Pearson Chi2 = 48.18, p < 0.001
Organic psychotic conditions	48 (2.60%)	30 (2.76%)	78 (2.66%)	
Schizophrenic spectrum disorders	726 (39.39%)	525 (48.25%)*	1251 (42.68%)	
Bipolar disorders	239 (12.97%)	135 (12.41%)	374 (12.76%)	
Depressive disorders	179 (9.71%)*	61 (5.61%)	240 (8.19%)	
Personality disorders	345 (18.72%)	211 (19.39%)	556 (18.97%)	
Substance abuse and dependence	110 (5.97%)*	46 (4.23%)	156 (5.32%)	
Adjustment disorders	76 (4.12%)	32 (2.94%)	108 (3.68%)	
Intellectual disabilities	38 (2.06%)	28 (2.57%)	66 (2.25%)	
Other	37 (1.99%)*	11 (1.0%)	48 (1.63%)	
Hospitalization period (days), M ± SD				
All hospitalizations	10.03±15.03	12.32±14.61	10.88±14.92	Chi2 = 40.78 p < 0.0011 Kruskal–Wallis test
Involuntary hospitalizations	5.72±5.31	8.45±6.68	6.92±6.10	*t* = 29.97, *t*-test p < 0.001

Notes: *Standardized Residuals (SR) ≥ 2, p < 0.05.

Table 3 Clinical Variables of Hospitalized Subjects in the Pre- and Pandemic Periods

Variables	Pre-pandemic period N=1858 (62.92%)	Pandemic period N=1095 (37.08%)	Total N=2953 (100%)	Statistical test probability
Substance use comorbidity, n (%)				
Polysubstance abuse	252 (13.67%)	191 (17.57%)*	443 (15.12%)	Pearson Chi2(5) = 21.59
None	1222 (66.30%)	742 (68.26%)	1964 (67.03%)	p = 0.001
Alcohol	153 (8.30%)*	63 (5.80%)	216 (7.37%)	
Cannabis	133 (7.22%)*	57 (5.24%)	190 (6.48%)	
Cocaine	60 (3.26%)	28 (2.58%)	88 (3.00%)	
Other	23 (0.71%)	6 (0.37%)	29 (0.58%)	
Previous care and treatment, n (%)				
Mental Health Service (MHS)	1017 (55.00%)	615 (56.37%)	1632 (55.51%)	Pearson Chi2 = 18.66
Substance Use Service (SUS)	77 (4.16%)*	21 (1.92%)	98 (3.33%)	p = 0.002
Private specialist	103 (5.57%)*	38 (3.48%)	141 (4.80%)	
Other services	31 (1.68%)	20 (1.83%)	51 (1.73%)	
None	319 (17.25%)	198 (18.15%)	517 (17.59%)	
MHS + other services	302 (16.33%)	199 (18.24%)	501 (17.04%)	
Previous psychiatric hospitalizations, n (%)				
Present	1041 (56.27%)	666 (60.99%)	1707 (58.02%)	Pearson Chi2 = 6.28
Absent	809 (43.73%)	426 (39.01%)	1235 (41.98%)	p = 0.012
Aggressive behaviour during hospitalization, n (%)				
Present	168 (9.12%)	175 (16.10%)	343 (11.71%)	Pearson Chi2 = 32.26
Absent	1690 (90.88%)	920 (83.90%)	2610 (88.29%)	p < 0.001
Medical comorbidity, n (%)				
Present	778 (42.21%)	453 (41.67%)	1231 (42.01%)	Pearson Chi2=0.82
Absent	1080 (57.79%)	642 (58.33%)	1722 (57.99%)	p = 0.775

Notes: *Standardized Residuals (SR) ≥ 2, p < 0.05.

- Hospitalized subjects had been more frequently treated in MHS and in other outpatient services before hospitalizations (SR = 2.81) and less frequently in SUS (SR = −3.27) and by private psychiatrist (SR = −2.15) (Pearson Chi2 = 26.12, p < 0.001) (Table 3);
- Hospitalized subjects had been previously hospitalized in the same ward more often (Pearson Chi2 = 6.28, p = 0.012) (Table 3);
- Hospitalized subjects more frequently presented aggressive behaviour during hospitalizations (9.12% vs 16.10%) (Pearson Chi2 = 32.26, p < 0.001) (Table 3).

We underscored the following statistically significant differences between the pre- and pandemic period (Table 4):

- The drug therapy prescribed at discharge was less frequently represented by antidepressants (Pearson Chi2 = 5.69, p = 0.017), mood stabilizers (Pearson Chi2 = 9.54; p = 0.002) and other non-psychoactive drugs (Pearson Chi2 = 5.45, p = 0.020) in the pandemic period, whereas oral (Pearson Chi2 = 19.51, p < 0.001) and Long-Acting Injection (LAI) antipsychotic drugs (Pearson Chi2 = 18.36, p < 0.001) were more frequently prescribed;
- The destination at discharge before the pandemic was more frequently represented by both MHS and SUS (SR = 3.33), other acute psychiatric wards (SR = 3.78) and non-psychiatric hospital units (SR = 2.08) in comparison to the pandemic, whereas psychiatric communities (SR = 4.74) and judicial facilities (SR = 2.65) were more frequently chosen during the pandemic (Pearson Chi2 = 65.87, p < 0.001).

Table 4 Clinical Variables of Hospitalization Discharges in the Pre- and Pandemic

Variables	Pre-pandemic period N=1858 (62.92%)	Pandemic Period N=1095 (37.08%)	Total N=2953 (100%)	Statistical test Probability
Prescribed psychiatric medications, n (%)				
Oral Antipsychotics:				
Used	1537 (83.40%)	971 (89.33%)	2508 (85.60%)	Pearson Chi2 = 19.51
Not Used	306 (16.60%)	116 (10.67%)	422 (14.40%)	p < 0.001
LAI Antipsychotics:				
Used	460 (24.96%)	351 (32.29%)	811 (27.68%)	Pearson Chi2 = 18.36
Not Used	1383 (75.04%)	736 (67.71%)	2119 (72.32%)	p < 0.001
Antidepressants:	288 (15.63%)	135 (12.42%)	423 (14.44%)	
Used				Pearson Chi2 = 5.69
Not Used	1555 (84.47%)	952 (87.58%)	2507 (85.56%)	p = 0.017
Mood Stabilizers:				
Used	357 (19.37%)	263 (24.20%)	620 (21.16%)	Pearson Chi2 = 9.54
Not Used	1486 (80.63%)	824 (75.80%)	2310 (78.84%)	p = 0.002
Mono/poly-therapy therapy, n (%)				
Monotherapy	243 (13.19%)*	73 (6.72%)	316 (10.78%)	Pearson Chi2 = 34.08
Poly-Therapy	1543 (83.72%)	961 (88.41%)*	2504 (85.46%)	p < 0.001
No Treatment	57 (3.09%)	53 (4.88%)*	110 (3.75%)	
Destination after discharge, n (%)				
Mental Health Service (MHS)	38 (2.06%)	20 (1.84%)	58 (1.98%)	Pearson Chi2 = 65.87
Substance Use Service (SUS)	560 (30.40%)	343 (31.55%)	903 (30.83%)	p < 0.001
MHS+ SUS	33 (1.79%)*	4 (0.37%)	37 (1.26%)	
Private specialist	89 (4.83%)	38 (3.50%)	127 (4.34%)	
General practitioner	22 (1.19%)	7 (0.64%)	29 (0.99%)	
Other acute psychiatric ward	51 (2.77%)*	8 (0.74%)	59 (2.01%)	
Residential facility	736 (39.96%)	445 (40.94%)	1181 (40.32%)	
Psychiatric communities	113 (6.13%)	120 (11.04%)*	233 (7.95%)	
Non-psychiatric hospital unit	103 (5.59%)*	42 (3.86%)	145 (4.95%)	
Non-psychiatric residential facility	54 (2.93%)	27 (2.48%)	81 (2.77%)	
Judicial Facility	23 (1.25%)	28 (2.58%)*	51 (1.74%)	
Other	20 (1.09%)	5 (0.46%)	25 (0.85%)	

Notes: *Standardized Residuals (SR) ≥ 2, p < 0.05.

We highlighted the following independent variables statistically significantly associated with the dependent variable, pre-pandemic period (=0) and pandemic period (=1), at our multiple logistic regression model (Table 5):

- "Community or protected facility", "Homeless" as Housing condition and "Acute psychosis" and "Aggressive behaviour" as Clinical reason for hospitalization with odds ratio >1;
- "Depressive symptoms" as Clinical reason for hospitalization and "Substance Use Service (SUS)", "Private specialist", "None" as Previous care and treatment with odds ratio <1.

Discussion

Our study, which evaluated the impact of the SARS-CoV-2 pandemic on psychiatric hospitalizations in an acute psychiatric ward, shows a drastic organizational change in psychiatric hospitalizations from 2020 to 2022. In line with other studies,[10,17] we re-ported from 5% to 6% reduction of voluntary hospitalizations, whereas involuntary maintained

Table 5 Multiple Logistic Regression (Forward and Backward Stepwise): Variables Statistically Significantly Associated with "Pre-Pandemic Period" (=0) and "Pandemic Period" (=1)

Variables	Odds Ratio	CI 95%	P-value
Housing Condition:			
Community or protected facility	1.40	1.09; 1.78	0.006
Homeless	1.75	1.16; 2.64	0.008
Clinical reason for hospitalization:			
Acute psychosis	1.30	1.05; 1.61	0.014
Depressive symptoms	0.46	0.31; 0.67	0.000
Aggressive behaviour	1.79	1.27; 2.53	0.001
Previous care and treatment:			
Substance Use Service (SUS)	0.34	0.21; 0.56	0.000
Private specialist	0.52	0.35; 0.77	0.001
None	0.67	0.55; 0.83	0.000

Abbreviations: COVID-19, Coronavirus Disease 2019; ER, Emergency Room; ICD 9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; LAI, Long Acting Injection; MHS, Mental Health Service; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; SPDC, Service for Psychiatric Diagnosis and Care; SR, Standardized Residual; SUS, Substance Use Service; WHO, World Health Organization.

a frequency like the pre-pandemic period, with an increase in 2022. We hypothesize that this trend could indicate the reduction of all hospitalizations during the pandemic due to both the fear of infection and the general health care service reorganization, which reserved hospital admissions only for the most severe clinical situations.[12] Nevertheless, it can indirectly represent the lack of regular care and daily treatment provided to a population with psychiatric disorders by community services, which was reduced to a minimum in the pandemic due to the restrictions imposed by lockdown.[11] During the pandemic, in MHS only the activity of urgent psychiatric consultations was maintained, reporting a significant increase.[12] In fact, most programmed activities in MHS were suspended and performed remotely through telephone or video calls, and group activities and Day-Hospital were completely suspended; admissions to psychiatric facilities were extremely reduced.[12,23] Therefore, this result could indirectly highlight the importance of daily clinical and rehabilitative community service activities in preventing hospital admissions of people suffering from psychiatric pathologies, especially if long-lasting and serious.[9] This choice forced by the pandemic circumstances, which limited hospitalizations to the most serious clinical cases, fostered longer hospitalizations, often in involuntary regimen and characterized by aggressive behaviour from hospitalized subjects, as reported in another recent study.[18] In fact, we reported a relatively stable number of involuntary hospitalizations during the whole study period, suggesting that the most serious clinical cases needed to be hospitalized even during a health emergency such as the pandemic, probably because they reported worsened conditions due to stressful situations of infection fear and/or restrictive lockdown measures. Involuntary (or compulsory) psychiatric treatment is necessary in case of need for urgent therapy refused by the subject in a serious psychiatric clinical situation. Treatment nonadherence can frequently occur among subjects affected by schizophrenia,[24] who represented the highest number among hospitalized subjects in our study, increased during the pandemic. Specific legislation, which varies between countries, regulates involuntary psychiatric hospitalization for people affected by serious mental health conditions who refuse necessary treatments that cannot be postponed because the intensity of the symptoms may put personal or social safety at risk.[25] Treatment nonadherence can be a challenging psychiatric topic because it can be related to the risk of relapse and re-hospitalization, worsening quality of life.[24]

During the pandemic, our study highlighted that the most clinically or socially vulnerable people required hospitalization, as suggested by our regression model, which underscored that being homeless or living in a community or protected facility were risk factors for hospitalization during the pandemic. People staying at the facilities may have suffered from "forced coexistence" with others due to lockdown, and homeless people could have remained totally isolated due to the closure of all community services. In accordance with the literature,[10,11] we must underscore that the hospital remained the only place where vulnerable and isolated people could ask for help during the social confinement imposed by lockdown.[6,10] In contrast, people treated privately or not in care were less at risk of hospitalization during the pandemic, as suggested by our regression model. We also observed an increased

number of non-Italians among hospitalized subjects during the pandemic, probably due to the lack of a social and familial network, as well as people with SA and disability pensions, probably because of their limited autonomy during the stressful conditions of the pandemic, as underscored by other authors.[10,26,27] Furthermore, subjects who had already been admitted to SPDC in the past or who had been treated in more than one community service or with multiple drug addiction, were more frequently represented among people hospitalized during the pandemic, suggesting higher complexity and difficulty in clinically managing them during the pandemic. All these observations highlight that conditions of social stress such as those created by the SARS-CoV-2 epidemic amplify the vulnerability of people already fragile and dependent on institutions, who require hospitalization due to the worsening of their pathological conditions.

Motivations for admission during the pandemic were mostly represented by aggressive behaviour and acute psychosis, and the diagnosis of schizophrenia spectrum disorders was the most frequent during the pandemic, results also confirmed by our regression model. Consequently, psychotic disorders were the most common diagnosis at discharge in our psychiatric ward, as reported by other authors,[13,28] although an increased prevalence of major depressive disorders has been reported in the pandemic.[29]

In this regard, we highlight that we did not report any increase in depressive disorders among our hospitalized subjects and, consistent with this result, we reported a decrease in the prescription of antidepressant drugs. Likewise, the reduction in voluntary hospitalizations is also in line with this result, as more often people with depressive disorders are hospitalized voluntarily. In contrast, we observed an increase in the use of antipsychotic medications, particularly LAI, at discharge from hospitalizations, which is consistent with the higher number of people with schizophrenia spectrum disorders in our sample. Our research reports conflicting data on substance use during the pandemic. In fact, if comorbid polysubstance abuse increased among our hospitalized subjects during the pandemic, Substance intoxication as reason for hospitalization and substance abuse and dependence as discharge diagnosis decreased. In line with the literature,[9,10] we can hypothesize that psychiatric hospitalizations during the pandemic were more selectively dedicated to people with psychiatric disorders, as our regression model confirms, since being in care at Substance Use Service (SUS) represented a protective factor against hospitalization. However, people with psychiatric disorders hospitalized during the pandemic in our sample more frequently presented polysubstance abuse, which can be interpreted as a sign of stressful life conditions.

The longer hospitalizations, the longer involuntary hospitalizations, and the higher rate of aggressive behaviour during hospitalizations further indicate the greater severity and complexity of people hospitalized during the pandemic. Similar data have been collected by other studies that analyzed the first few months of the pandemic.[9,16,17]

The discharge destinations let us see how the pandemic modified the health care organization during the pandemic: in a period characterized by a reduced number of hospital beds because of Sars-CoV-2 limitations, subjects who required prolonged treatment were more frequently sent to community care.

It is important to underscore how the new hospitalization organization implemented during the pandemic was still present during 2022, when the state of emergency and, consequently, the imposed limitations were removed, suggesting that the changes made during the pandemic will probably continue to be implemented going forward. Future research can confirm this trend.[30,31]

Limitations and Potential Future Research

Our study presents some limitations: the single centre design, which does not allow us to generalize our results to other contexts and settings; the retrospective design, which cannot allow us to make causal inferences; incomplete data, especially regarding demographic variables such as working and housing conditions, which can represent an ascertainment bias; and the lack of symptom assessment scales. Moreover, our results cannot permit us to separate the effect of the restrictive administrative measures during the pandemic from the pandemic itself, since, in our Italian health organization, the one was related to the other and both responded to the single criterion of a state of necessity that could not otherwise be managed.

Nevertheless, our study presents some advantages concerning a long observation period and the inclusion of many variables, which can describe in detail the psychiatric activity during the pre- and pandemic periods. This research provides clinical information from a real-world clinical setting on a particular historical moment, deepening our knowledge of the impact of a pandemic on mental health and psychiatric services. Future research conducting additional year-over-year comparisons to look for long-term longitudinal trends may provide additional information on this topic.

Conclusion

Our analysis shows that the pandemic modified the utilization of hospital beds because only the most severe cases and/or involuntary treatments were hospitalized, with a drastic reduction of voluntary hospitalizations. The most clinically and socially vulnerable people were more frequently hospitalized during the pandemic, suggesting the stronger impact of the outbreak on the most fragile individuals in terms of living and/or psychopathological conditions. Pandemic conditions did not change the need for psychiatric hospitalizations among people with more serious illnesses without therapeutic adherence. Conversely, people suffering from psychiatric disorders with good therapeutic compliance required less frequent psychiatric hospitalizations. This result suggests two different populations for disease awareness and therapeutic adherence, psychological dimensions that may have influenced adaptation to the pandemic. In light of our findings, we can underscore that people suffering from psychiatric disorders, particularly severe psychotic disorders, require greater attention, resources and intensive treatments in emergency contexts, such as a pandemic catastrophe. Future research will deepen the knowledge brought to light by our results.

Institutional Review Board Statement

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).

Acknowledgments

The authors thank O. R. for her meaningful support in language revision.

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.

Funding

This research received no external funding.

Disclosure

The authors report no conflicts of interest in this work.

References

1. RESOLUTION OF THE COUNCIL OF MINISTERS 31 January 2020. Declaration of the state of emergency as a consequence of the health risk connected to the onset of pathologies deriving from transmissible viral agents. Available from: https://www.gazzettaufficiale.it/eli/id/2020/02/01/20A00737/sg. Accessed January 20, 2024.
2. DECREE OF THE PRESIDENT OF THE COUNCIL OF MINISTERS 23 February 2020. Implementing provisions of the legislative decree 23 February 2020, n. 6, containing urgent measures regarding the containment and management of the epidemiological emergency of COVID-19. Available from: https://www.gazzettaufficiale.it/eli/id/2020/02/23/20A01228/sg. Accessed January 20, 2024.
3. DECREE-LAW 24 March 2022, n. 24 Urgent provisions to overcome the measures to combat the spread of the COVID-19 epidemic, following the termination of the state of emergency. Available from: https://www.gazzettaufficiale.it/eli/id/2022/03/24/22G00034/sg. Accessed January 20, 2024.
4. The Lancet Infectious Diseases. The COVID-19 infodemic. *Lancet Infect Dis*. 2020;20:875. doi:10.1016/S1473-3099(20)30565-X
5. Salehiniya H, Abbaszadeh H. Prevalence of Corona-associated anxiety and mental health disorder among dentists during the COVID-19 pandemic. *Neuropsychopharmacol Rep*. 2021;41:223–229. doi:10.1002/npr2.12179
6. Capuzzi E, Di Brita C, Caldiroli A, et al. Psychiatric emergency care during Coronavirus 2019 (COVID 19) pandemic lockdown: results from a Department of Mental Health and Addiction of northern Italy. *Psychiatry Res*. 2020;293:113463. doi:10.1016/j.psychres.2020.113463
7. Seifert J, Meissner C, Birkenstock A, et al. Peripandemic psychiatric emergencies: impact of the COVID-19 pandemic on patients according to diagnostic subgroup. *Eur Arch Psychiatry Clin Neurosci*. 2021;271:259–270. doi:10.1007/s00406-020-01228-6
8. World Health Organization. Mental Health and COVID-19: early evidence of the pandemic's impact: scientific brief, 2 March 2022. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Mental_health-2022.1. Accessed January 20, 2024.
9. Carpiniello B, Tusconi M, Zanalda E, et al. Executive committee of the Italian society of psychiatry. Psychiatry during the Covid-19 pandemic: a survey on mental health departments in Italy. *BMC Psychiatry*. 2020;20:593. doi:10.1186/s12888-020-02997-z
10. Di Lorenzo R, Frattini N, Dragone D, et al. Psychiatric emergencies during the covid-19 pandemic: a 6-month observational study. *Neuropsychiatr Dis Treat*. 2021;17:1763–1778. doi:10.2147/NDT.S307128

11. Di Lorenzo R, Fiore G, Bruno A, et al. Urgent psychiatric consultations at mental health center during COVID-19 pandemic: retrospective observational study. *Psychiatr Q*. 2021;92:1341–1359. doi:10.1007/s11126-021-09907-w
12. Di Lorenzo R, Pinelli M, Bertani D, et al. The Impact of COVID-19 pandemic on psychiatric emergencies in two different settings: emergency room and community mental health service. *Front Psychiatry*. 2022;13:894939. doi:10.3389/fpsyt.2022.894939
13. Li H, Chen X, Pan J, et al. Impact of the COVID-19 pandemic on utilization of inpatient mental health services in Shanghai, China. *Healthcare*. 2022;10:1402. doi:10.3390/healthcare10081402
14. Boldrini T, Girardi P, Clerici M, et al. Italian network for research on mental health during COVID-19 Pandemic. Consequences of the COVID-19 pandemic on admissions to general hospital psychiatric wards in Italy: reduced psychiatric hospitalizations and increased suicidality. *Prog Neuropsychopharmacol Biol Psychiatry*. 2021;110:110304. doi:10.1016/j.pnpbp.2021.110304
15. Piccinelli MP, Bortolaso P, Wilkinson GD. Rethinking hospital psychiatry in Italy in light of COVID-19 experience. *World J Virol*. 2022;11:73–81. doi:10.5501/wjv.v11.i1.73
16. Clerici M, Durbano F, Spinogatti F, et al. Psychiatric hospitalization rates in Italy before and during COVID-19: did they change? An analysis of register data. *Ir J Psychol Med*. 2020;37:283–290. doi:10.1017/ipm.2020.29
17. Ambrosetti J, Macheret L, Folliet A, et al. Psychiatric emergency admissions during and after COVID-19 lockdown: short-term impact and long-term implications on mental health. *BMC Psychiatry*. 2021;21:465. doi:10.1186/s12888-021-03469-8
18. Mahgoub Y, Forrest LN, Luther J, et al. The Impact of COVID-19 on psychiatric acuity in a community psychiatric hospital. *J Nerv Ment Dis*. 2023;211:910–918. doi:10.1097/NMD.0000000000001735
19. LAW 13 May 1978, n. 180. Voluntary and mandatory health checks and treatments. [LEGGE 13 maggio 1978, n. 180. Accertamenti e trattamenti sanitari volontari e obbligatori]. (GU Serie Generale n.133 del 16-05-1978). Italian. Available from: https://www.gazzettaufficiale.it/eli/id/1978/05/16/078U0180/sg. Accessed January 20, 2024.
20. LAW 23 December 1978, n. 833 Establishment of the National Health Service. [LEGGE 23 dicembre 1978, n. 833 Istituzione del Servizio Sanitario Nazionale]. (GU Serie Generale n.360 del 28-12-1978 - Suppl. Ordinario). Italian. Available from: https://www.gazzettaufficiale.it/eli/id/1978/12/28/078U0833/sg. Accessed January 20, 2024.
21. Italian Society of Psychiatric Epidemiology. Operational instructions for the activities of mental health departments during coronavirus emergency; 2020. Available from: https://siep.it/wp-content/uploads/2020/03/istruzioni-operative-siep-30-03-2020.pdf. Accessed January 20, 2024.
22. LAW 9 January 2004, n. 6 Introduction in the first book, title XII, of the civil code of chapter I, relating to the establishment of the support administration and modification of articles 388, 414, 417, 418, 424, 426, 427 and 429 of the Civil Code concerning interdictions and interdictions, as well as related implementing, coordination and final rules. Available from: https://www.gazzettaufficiale.it/eli/id/2004/01/19/004G0017/sg. Accessed January 20, 2024.
23. Di Carlo F, Sociali A, Picutti E, et al. Telepsychiatry and other cutting-edge technologies in COVID-19 pandemic: bridging the distance in mental health assistance. *Int J Clin Pract*. 2021;75. doi:10.1111/ijcp.13716
24. Haddad PM, Brain C, Scott J. Nonadherence with antipsychotic medication in schizophrenia: challenges and management strategies. *Patient Related Outcome Meas*. 2014;5:43–62. doi:10.2147/PROM.S42735
25. Adebiyi MO, Mosaku SK, Irinoye O, et al. Socio-demographic and clinical factors associated with relapse in mental illness. *Int J Afr Nurs*. 2018;8:149–153.
26. Napoli G, Garzitto M, Magliulo V, et al. Changes in revolving-door mental health hospitalizations during the COVID-19 Pandemic: a 5-year chart review study. *J Clin Med*. 2023;12:2681. doi:10.3390/jcm12072681
27. Der T, Helmke N, Stout JE, et al. Impact of the COVID-19 pandemic on adult mental health-related admissions at a large university health system in North Carolina - one year into the pandemic. *PLoS One*. 2023;18:e0293831. doi:10.1371/journal.pone.0293831
28. Goldschmidt T, Kippe Y, Finck A, et al. Psychiatric presentations and admissions during the first wave of Covid-19 compared to 2019 in a psychiatric emergency department in Berlin, Germany: a retrospective chart review. *BMC Psychiatry*. 2023;23:164. doi:10.1186/s12888-023-04629-8
29. Santomauro DF, Mantilla Herrera AM, Shadid J. COVID-19 Mental Disorders Collaborators. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *Lancet*. 2021;398:1700–1712. doi:10.1016/S0140-6736(21)02143-7
30. Moreno C, Wykes T, Galderisi S, et al. How mental health care should change as a consequence of the COVID-19 pandemic. *Lancet Psychiatry*. 2020;7:813–824. doi:10.1016/S2215-0366(20)30307-2
31. Simpson SA, Loh RM, Cabrera M, et al. The Impact of the COVID-19 pandemic on psychiatric emergency service volume and hospital admissions. *J Acad Consult Liaison Psychiatry*. 2021;62:588–594. doi:10.1016/j.jaclp.2021.05.005