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Are patients improving during and after a psychiatric hospitalisation? Continuity of care outcomes of compulsory and voluntary admissions to an Italian psychiatric ward

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Abstract

Background: To compare the characteristics of compulsory admissions (CAs) and voluntary admissions (VAs) in a General Hospital Psychiatric Unit (GHPU), and to assess whether CA and VA patients' outcomes improved during hospitalisation and follow-up in mental health services (MHS) based on community continuity of care.

Design and methods: Observational longitudinal study comparing 19 CAs and 83 VAs consecutively admitted to GHPU of Udine, Italy, and followed-up for six-months by MHS. Five psychometric scales assessed psychosocial and clinical characteristics for each patient at admission (T0), discharge (T1) and follow-up (T2). Statistical analyses were performed using: multivariate logistic regression for comparing CA and VA; Friedman $\chi2$ and Mann-Whitney tests for outcomes' improvement.

Results: Being hospitalised for a psychotic crisis was the most significant predictor of CA (OR = 5.07). An outcomes' improvement was observed from T0 to T1 in almost all psychometric tests, while from T1 to T2 only for PSP-A (useful social activities), CGI-S (severity of illness) and CGI-EI (drug's efficacy related to side effects). CA was associated to lower performances in all scales at T0, in GAF and CGI-S at T1, while no difference with VA was observed at T2.

Conclusions: CA and VA patients improved to a same extent during hospitalisation and follow-up, particularly in relation to social functioning. This fosters the hypothesis that community-based MHS using a longitudinal continuity of care model might achieve recovery in a long-term perspective. Future research may benefit by considering patients' subjective experiences and assessing long-term improvement in those who received person-centred interventions.

Introduction

Given the huge burden of mental disorders worldwide in terms of years of life lost with disabilities (YLD),[1] a strong integration between primary and secondary mental health care has been claimed. In particular, the World Health Organisation (WHO) fostered legislative processes to promote voluntary admission (VA), and to safeguard against not necessary compulsory admission (CA).[2] Therefore, CA has been considered as an indicator for the quality of national mental health policy.[3] Although CA has not been generally associated to greater negative or harmful outcomes,[4,5] it has been described as traumatic, stigmatising, and associated with high readmission rates and lower quality of life.[6,7]

Several factors differ CA from VA, such as psychiatric disorders, occupational status, previous compulsory or voluntary hospitalisations, and the length of stay (LoS) at hospital.[4,5,8,9] CA is broadly affected by national legislations and mental healthcare organisation and there are still important unexplained variation of CAs across countries.[5,10] A recent review has shown that the highest rate among 22 high-income countries was found in Austria (282 CAs per 100.000 inhabitants), while an almost 20-fold lower rate has been observed in Italy.[10] Even in Italy, noteworthy differences in rates of CAs have been found among psychiatric units of the same Region (Piedmont).[11] Moreover, rates of CA increased by 36% from 2007 to 2016, considering all countries.[10] In this scenario, it would be crucial to assess the outcomes of CA using standardised methods. International research analysing the outcomes of CA *vs* VA is still few, and generally showed lower levels of social functioning, and lower satisfaction with treatment for Cas.[4] Moreover, very few studies used psychometric tests to assess these outcomes in a sample of psychiatric patients.[4]

After more than 40 years from the Italian psychiatric reform,

Significance for public health

This study demonstrates that patients voluntarily or involuntarily admitted to an inpatient psychiatric service improve to a same extent during hospitalisation, and this improvement is maintained during a six-month follow-up by outpatient mental health services. Moreover, the greatest improvement after discharge from hospital is observed in social functioning. To our knowledge, this is also the first study analysing psychiatric patients' outcomes in a longitudinal continuity of care model, allowing preliminary scientific evidences valuable for mental health policy. The study also shed a light on the hypothesis that a mental health system strongly community-based and applying a whole-system continuity of care approach might achieve recovery in a long-term perspective, particularly with regard to psychosocial outcomes in more severely-ill patients.

which lead to the total closure of psychiatric hospitals and the progressive consolidation of a community-based system of mental care, a main milestone was the dramatic decline of CAs, from more than 20,000 in 1978 to less than 9000 in 2015.[12,13] This is linked to the fact that CAs are reserved only to certain circumstances, which are: the need of an emergency intervention, the refusal of the patient of the treatment, and the unavailability of alternative community treatment. Besides these circumstances, only VAs are allowed. Nonetheless, high variations between Italian regions are still present.[12]

The lowest Italian CA rate has been found in Friuli Venezia Giulia (FVG) region.[14] Its main city, Trieste, was the centre of the psychiatric reform, which led to the first closure of a psychiatric hospital in Europe in 1980.[13,15] Afterwards, the mental health regional system was organised in an innovative way, and was mainly based on the Community Mental Health Centres (CMHCs), mostly opened all days on the 24 hours. Regional General Hospital Psychiatric Units (GHPUs) are only three and are mainly addressed to emergency first aid.[16] The professional staff of each CMHC is, thus, responsible for the care of the patient, even when hospitalised in a GHPU. This has guaranteed a care model based on longitudinal continuity of care. Continuity of care has been defined as the "uninterrupted movement of patients among the diverse elements of the service delivery system".[17] In particular, longitudinal continuity of care refers to the comprehensive care across different care episodes over time provided by the mental health services (MHS).[18] For instance, this regards the transition of a patient from a GHPU to the outpatient services, which is a well-established practice in FVG.[13,15,19] However, little is known on the long-term clinical, functional and psychosocial outcomes of patients compulsorily or voluntarily admitted to a GHPU in such community-based settings, albeit the degree of outpatient services available was found to have a preventive effect on CAs.[20] An improvement on long-term outcomes for CA was observed with structured patient-centred care planning interventions,[6] which is also a peculiar component of FVG mental care system.[15]

Moreover, international studies have been mainly concentrated on the effects of specific transitional interventions after discharge from inpatient psychiatric facilities,[21,22] but we did not find evidences on patients' outcomes after a follow-up period, in a mental health setting based on longitudinal continuity of care. In a previous study from the region,[23] we observed that both CA and VA patients improved during hospitalisation. Further, no differences between CA and VA patients' outcome, were found at discharge from GHPU.

In the present study we aimed, thus: i) to compare the characteristics of consecutive CAs and VAs in a GHPU followed-up for six months by MHSs, and ii) to assess whether CA and VA patients' outcomes improved during hospitalisation and follow-up, using five different psychometric tests.

Design and methods

This observational longitudinal study was developed in Friuli Venezia Giulia (FVG), a north eastern Italian region with 1,2 million inhabitants. The study evaluated the clinical and social characteristics of a sample of 102 patients with mental disorders at three consecutive endpoints:
- At the moment of admission to a General Hospital Psychiatric Unit (GHPU) (T0);
- At the moment of discharge from GHPU (T1);
- After a follow-up period of six months (T2).

All participants were treated in accordance with the WMA Declaration of Helsinki. The study was approved by the Ethics Committee of the FVG Region.

Description of the field

Data has been collected in the Mental Health Department (MHD) of the "Friuli Centrale" Healthcare Agency. The MHD covers a large area of FVG, with a catchment population of almost 500,000 inhabitants with 18 years old and more. Similarly to the rest of region, the mental health model is characterized by a strong community-oriented system, made up of open door-no restraint services and very low use of compulsory interventions.[23] The MHD coordinates a broad range of services and facilities, such as the CMHCs, the GHPU and many residential and supported housing facilities and daily centres. The main services of the MHD are the CMHCs, each looking after a catchment area of 30,000 to 100,000 inhabitants. Eight out of the 10 CMHCs in "Friuli Centrale" MHD are open 24 hours a day, 7 days a week, with six to eight beds each. All psychiatric patients are referred to a CMHC according to the place of residence. The CMHCs coordinate mental health needs, including management of acute conditions, prevention of mental disorders, treatment, and rehabilitation.[15] The GHPU is located in the general hospital of "Santa Maria della Misericordia" of Udine. The GHPU is a 15 beds unit, mainly used in case of psychiatric emergencies, consequent to severe mental disorders.[16,23]

Description of the sample

A total number of 166 patients consecutively admitted to the GHPU from the 1st of October 2017 to the 31st of March 2018 were recruited in the study, after being administered the informed consent. All patients agreed to participate, but 2 were excluded since the hospitalisation was too short to retrieve data. Sixty-two patients were then excluded from the follow-up after discharge from GHPU for the following reasons: 9 subjects did not belong to "Friuli Centrale" MHD, 21 subjects were judged not to be in need of a long-term follow-up and then were discharged from MHD after hospitalisation, 20 subjects were followed by a CMHC, which denied to participate to the study, 6 subjects chose to be followed-up in a private setting, 3 subjects were inmates (and we could not have access to their follow-up data), and 3 subjects died during follow-up.

The final number of study participants was 102. Eighty-three were voluntarily admitted (VA) to GHPU, while 19 were compulsorily admitted (CA). CA implies a Compulsory Treatment Order (CTO), on involuntary basis. The CTO is ruled by Italian law, in Articles 33, 34, 35 and 64 of the General Health Law n. 833/1978. The CTO has to be requested by two physicians. The CTO is ordered by the resident's municipality mayor and it is then authorised by a judge entrusted with the jurisdictional safeguard of the procedure. CTO lasts seven days, and the procedure has to be repeated in case of extension.

All personal data (first name, last name, date of birth) were converted into an anonymous unique code, in accordance with Data Protection Act (EU Regulation 679/2016).

Data collection

A structured interview was filled for each patient by the researchers (SG, LP) prior to discharge from GHPU (T1). The interview included different socio-demographic and clinical information, such as gender, age, occupation, previous contact with

mental care, and so on. Detailed information on the hospitalisation were also retrieved, including reason and length of hospitalisation, diagnosis and pharmacological treatment at discharge, and placement after discharge. The interview was then completed after six months (T2) by the same researchers, including information on number and length of hospitalisations during the follow-up, type and number of pharmacological treatments at T2, and suicidal ideation at T2. Patients were reached by the professionals at the CMHC, whose they were referred. The researcher was not directly involved in the clinical activities of the GHPU and the CMHCs.

Psychometric tests

Each patient was interviewed at the time of admission to GHPU (T0), at the time of discharge from GHPU (T1), and after six-months (T2) with five psychometric tests: the Global Assessment of Functioning (GAF) scale, the Clinical Global Impressions (CGI) scale; the Personal and Social Performance (PSP) scale; the Mini-ICF-APP Social Functioning scale, and the Health of Nation Outcome Scale (HoNOS).

The GAF is a widely used scale independent of cross-cultural differences which assesses the psychological, social and occupational/school functioning of individuals with mental disorders. The scale ranges from 0 (inadequate functioning) to 100 (superior functioning). According to previous research, a score of 60 out of 100 was taken as the cut-off to identify patients with moderate to severe impairment in functioning. Therefore, a GAF score ≤60 represents patients with low functioning and a GAF score >60 represents some mild difficulty in socio-professional activities or a satisfactory activity.[24] A functional remission was defined as having a GAF score >60.[25-27]

The CGI[28,29] was developed for use in NIMH-sponsored clinical trials to provide a brief, stand-alone assessment of the clinician's view of the patient's global functioning prior to and after initiating a study medication. The CGI provides an overall clinician-determined summary measure that takes into account all available information, including a knowledge of the patient's history, psychosocial circumstances, symptoms, behaviour, and the impact of the symptoms on the patient's ability to function.

Its three items assess:
– Severity of illness (CGI-Severity - CGI-S);
– Global symptoms' improvement (CGI-Improvement - CGI-I);
– Efficacy Index (CGI-EI), which is a measure of drugs' efficacy related to side effects.

The PSP scale provides a single, overall rating score ranging from 1 to 100, where higher scores represent better personal and social functioning. The PSP assesses functioning related to four different areas: useful social activities (PSP-A), interpersonal and social relationship (PSP-B), self-care (PSP-C) and disturbed and aggressive behaviours (PSP-D).

The patient's PSP score should be consistent with the following benchmarks:[30]
– Scores 71 to 100: no dysfunction or 'mild' difficulties known only to those familiar with the person;
– Scores 1-70: dysfunction or difficulties ranging from 'manifest' in one or more domains to 'marked' or 'very severe' difficulties in one or more domains. In particular, scores ≤30 demonstrate such poor social function as to require intensive support or supervision.

The Mini-ICF-APP[31] is a clinician-rated measure for limitations of capacities in the context of mental disorders. It has been developed following the structure and dimensions of ICF,[32] with additional reference to definitions of the Groningen Social

Disabilities Schedule II (GSDS II).[3]. It has been validated in Italy in the context of a MHD on patients with schizophrenia, bipolar, major depression and anxiety disorders.[34] Activity and capacity limitations are rated under the aspect of competence – means activity competence limitations. Thirteen domains are assessed: adherence to regulations; planning and structuring of tasks; flexibility; competency; endurance; assertiveness; contact with others; public exposure; intimacy; non-work activities; self-maintenance; mobility; competence to judge and decide.

Each dimension is rated on a five-point Likert-scale (0: no disability; 1: mild disability; 2: moderate disability; 3: severe disability; 4: total disability). The scale ranges from 0 to 52 scores. We used the cut-off of 8 scores to differentiate moderately to extremely ill patients to borderline/mildly ill.[35] In the present study, we also used three subscales:[34]
– Mini_ICF A for cognitive abilities and performance: sum of scores in items 1 to 7;
– Mini_ICF B for relationships abilities: sum of scores in items 8 to 10;
– Mini_ICF C for individual physical autonomy: sum of scores in items 11 to 13.

The HoNOS is an observer-rated multidimensional assessment scale in the domains of behaviour, symptoms, impairment, and social functioning, regardless of the diagnostic category.[36] It comprises 12 domains of functioning (aggressiveness; non-accidental self-injury; problem drinking or drug taking; cognitive problems; physical illness or disability; hallucinations and delusions; depressed mood; other mental and/or behavioral problems; problems with relationships; problems with activities of daily living; problems with living conditions; and problems with occupation and activities). Each domain is evaluated on a score scale that ranges from 0 (no problem) to 4 (maximum severity of the problem). A total score can be obtained from the sum of each item's scores and a 4-level severity index (subclinical, mild, moderately severe and very severe) by combining responses to the various items, as follows:[15]
– Subclinical: 0 item >2;
– Mild: ≥1 item =2
– Moderately severe: 1 item >3;
– Very severe: ≥2 item ≥3.
– Each psychometric test was used:
– Considering the mean total score in both VA and CA;
– Considering a cut-off score for each test, as follows: 60 for GAF; 70 for PSP-A, B, C and D; 2 for CGI-S; 4 for CGI-I; 8 for CGI-EI; 8 for Mini-ICF-APP A, B and C;
– Considering 0 item >2 vs. almost 1 item >2 for HoNOS.

Statistical analysis

Continuous variables, as days of hospitalization, were summarized using the median as a measure of central tendency and the range as a measure of dispersion. Dichotomous or categorical variables (sociodemographic and clinical related to VA and CA) were tabulated into contingency tables and differences between proportions were tested using Chi-square statistics (χ^2) or Fisher exact test. A multivariate logistic regression analysis was used to assess the associations between outcome (types of hospitalisation) and socio-demographic and clinical predictors. A feature selection algorithm was used to improve accuracy, avoiding overfitting and simplifying the model.[37] This reduced the set of dummy coded variables to 20 (model 1) and to 9 (model 2). A bootstrap with 5000 repetitions was performed. Odds ratio (OR) with relative Wald 95% Confidence Intervals (95% C.I.) was estimated for each of the

selected variables. The Student's *t*-test was used to compare differences in accuracy means between the two models.

Differences in distribution of cut-off scores of psychometric tests within endpoints (T0, T1 and T2), were assessed using Poisson regression analysis. Differences between median of psychometric tests' scores in VA and CA within endpoints (T0, T1 and T2) was assessed using the Friedman χ^2 for dependent samples. The Mann-Whitney rank test for independent samples was then used to compare the median between VA psychometric tests 'scores and CA psychometric tests' scores, related to each endpoints (T0, T1 and T2).

A p-value <0.05 was set as the threshold for statistical significance for all the analyses. Descriptive and inferential analyses were performed using the statistical software R (RStudio, Boston, MA, USA) and Python (Python Software Foundation, Wilmington, DE, USA).

Results

Subjects admitted to GHPU and then followed for a six-month study period, were 83 (81.4%) VAs, and only 19 (18.6%) CAs. The mean LoS in GHPU was 7.7 days (median = 5; range = 1-39) for VA and 18.6 days for CA (median = 15; range = 3-79).

Sociodemographic and clinical variables

As summarized in Table 1, the majority of subjects in both groups were Italians, aged more than 30 years old, living alone, unemployed, and in contact with MHDs in the last 10 years. Re-hospitalisation during the follow-up was found in less than half of subjects. Significant differences were found when comparing VA with CA. In particular, at the multivariate logistic analyses (models 1 and 2), being hospitalised for a psychotic crisis was the most significant predictor of CA in both models. Other factors significantly associated with CA (ORs increased by two or three times) were: a longer LoS, being placed in a CMHC after discharge, having a diagnosis of non-affective psychosis, being prescribed a long-acting APs during hospitalisation and being re-hospitalised for a CA during the follow-up. CA was negatively associated with being aged less than 30 years, having suicidal ideation at admission to GHPU (in both models), being hospitalised for anxiety, depression or self-harm episode, going home after discharge, and using more than 3 drugs at discharge (in model 1) (Table 2).

Hospitalisation and follow-up outcomes

When a cut-off score was applied to distinguish between impairment and remission or partial remission, a significant improvement of clinical and psychosocial outcomes was observed from T0 to T1 in all psychometric tests, but Mini-ICF for individual physical autonomy. In contrast, an improvement from T1 to T2 was observed only for PSP-A (useful social activities), and for CGI-S and CGI-EI (severity of illness and drug's efficacy related to side effects). There was also a two-ways impairment decrease and improvement increase from T0 to T2 in all psychometric scales, but Mini-ICF for individual physical autonomy (Table 3).

As summarized in Figure 1, an improvement in all scales was observed within endpoints (T0, T1 and T2), in both VA and CA groups (Friedman (p) <0.0001).

When comparing VA and CA, a significant difference at T0 was observed with regard to mean scores of all outcomes' scales, with the exception of HoNOS. CA was associated to lower performances in all scales. At T1, this difference has been still observed with

regard to GAF and CGI-S. At T2, no difference between VA and CA was observed for all outcomes scales (Table 4).

Discussion

A main finding of this study is the improvement from the clinical and psychosocial perspective in patients both voluntary and involuntary admitted to a GHPU, measured using different outcomes scales. The improvement was particularly significant during the hospitalisation period and levelled-off after discharge during the six-month follow-up. Moreover, no differences between CAs and VAs were found at the end of the follow-up, while patients admitted involuntarily showed worse clinical conditions and lower functioning compared to those admitted voluntarily at the beginning of the hospitalisation.

In line with other studies male gender predicted positively CAs, while younger age did negatively.[5,38-4]. Clinical factors associated with CAs were admission due to a psychotic crisis, as well as a diagnosis of psychotic disorder, and the use of long-acting APs. This is expected, since psychosis is commonly associated with a greater severity of symptoms, poor insight, behavioural alterations and reduced compliance.[5,9,23,38,40,41] Consistently, the longer LoS among CAs may be due to the need of a longer time for patients' clinical management, and the mean time of hospitalisation was similar to other studies based on GHPU.[41,42] This is also corroborated by the fact that CAs were more likely of being placed in a CHMC, since they may require a continuation of treatment in the community settings. However, 37% of CAs were involuntarily re-hospitalised at least once during the follow-up, in line with other researches.[5,21] On the other hand, the low number of patients admitted in a compulsory regime may also indicate that CAs were limited to more complex and severe cases, with poor treatment compliance, which is the target for CTO.

Suicidal ideation at admission and being hospitalized for anxiety, depression or self-harm episode were negatively associated with CA. This may be due to a different clinical and compliance profile of these patients, but also it may deal with human rights implications, which were a main concern when rules of CTO were defined in Italy.[1] In contrast, many countries are using CAs as a measure to prevent suicidal risk,[43] although the association between involuntary hospitalization and risk of self-harm appears mixed.[4,5]

As previously observed,[23] a significant improvement in the scores of all scales were found during hospitalisation. Outcomes at discharge were also similar in CA and VA, consistent with other studies measuring psychopathological improvement.[4,39] In contrast, CAs previously showed a lower level of social functioning at discharge from hospital, although same range improvement was found also for social functioning after hospitalisation.[4] Considering both types of hospitalisations, we observed, for instance, a reduction of more than 40% of the Mini-ICF APP items, and likewise a change of more than 8 points on the HoNOS, which are considered an indication of good response to treatment. Consistently, we also observed a decrease in illness severity and an improvement in drug's efficacy related to side effects, according to CGI-S and CGI-EI.[44,45]

It is also noteworthy that the improvement obtained during hospitalisation in all psychometric tests, in both CA e VA, was maintained at the follow-up. In particular, PSP-A indicated a significant improvement in useful social activities. Since PSP offers the advantage of evaluating the psychosocial aspects of functioning in detail, without mixing them with the psychopathological aspects,[46] this improvement might be related to the efficiency of recovery-oriented care in a community-based setting. In this respect, mental care in FVG strongly focuses on social inclusion programs,

Table 1. Sociodemographic and clinical variables related to patients voluntarily (VA) and compulsory (CA) admitted to the General Hospital Psychiatric Unit and followed up for 6 months. Chi-square test (X^2) or Fisher Exact test and respective p-values were used to assess the differences between proportions. Significant p-values were highlighted in bold.

	VA (n = 83)	CA (n = 19)	X^2 Fisher*
Sociodemographic variables	n (%)	n (%)	p-value
Gender			
Females	41 (49.4)	7 (36.8)	0.32
Males	42 (50.6)	12 (63.2)	
Age (years)			
18-29	19 (22.9)	2 (10.5)	0.15*
30-49	31 (37.3)	12 (63.7)	
≥50	33 (39.8)	5 (26.3)	
Place of birth			
Italy	64 (77.1)	12 (63.2)	**0.04***
EU	11 (13.2)	1 (5.3)	
Extra EU	8 (9.6)	6 (31.6)	
Marital Status			
Married or cohabitant	28 (33.7)	2 (10.5)	**0.05***
Alone	55 (66.3)	17 (89.5)	
Occupational Status			
Unemployed	32 (38.5)	12 (63.2)	0.36*
Employed	27 (32.5)	4 (21.0)	
Ecomically inactive	15 (18.1)	2 (10.5)	
Retired	9 (10.8)	1 (5.3)	
Education (years)°			
≤8	33 (42.3)	8 (44.4)	0.87
>8	45 (57.7)	10 (55.6)	
Family History for mental disorder#			
No	45 (63.4)	5 (33.3)	**0.03**
Yes	26 (36.6)	10 (66.7)	
Somatic disorder at admission			
None	48 (57.8)	9 (47.4)	0.41
Present	35 (42.2)	10 (52.6)	
Cognitive impairment			
None	61 (73.5)	17 (89.45)	0.14*
Present	22 (26.5)	2 (10.5)	
Contacts with MHDs in the last 10 years			
None	16 (19.3)	1 (5.3)	0.18*
Present	67 (80.7)	18 (94.7)	
Hospitalisation variables (T0–T1)			
Reason for hospitalisation			
Agitation	11 (13.2)	1 (5.3)	**<0.0001***
Anxiety/depression	20 (24.1)	0	
Self-harm	33 (39.8)	0	
Psychotic crises	19 (22.9)	18 (94.7)	
First hospitalisation at GHPU			
No	36 (43.4)	8 (42.1)	0.92
Yes	47 (56.6)	11 (57.9)	
Length of hospitalisation			
≤7 days	57 (68.7)	4 (21.0)	**<0.0001***
≥8 days	26 (31.3)	15 (79.0)	
Placement after discharge			
Home	59 (71.1)	8 (42.1)	**0.002 ***
CMHC	11 (13.2)	10 (52.6)	
Other	13 (15.7)	1 (5.3)	

	VA (n = 83)	CA (n = 19)	X^2 Fisher*
Psychiatric disorder at discharge			
Affective disorders	16 (19.3)	1 (5.3)	**<0.0001***
Non affective psychosis	23 (27.1)	17 (89.5)	
Post traumatic stress disorder	22 (26.5)	0	
Substance use	13 (15.7)	1 (5.3)	
Other disorders	9 (10.8)	0	
Suicide ideation at admission			
No	40 (48.2)	19 (100)	**<0.0001***
Yes	43 (51.8)	0	
N drugs at discharge			
0	4 (4.8)	1 (5.3)	0.51*
1	15 (18.1)	4 (21.0)	
2	29 (34.9)	10 (52.6)	
≥3	35 (42.2)	4 (21.0)	
Type of psychotropic drug at discharge§			
AP typical	35 (42.2)	14 (73.7)	**0.01**
AP atypical	46 (55.4)	5 (26.3)	**0.02**
AD	22 (26.5)	0	**0.01***
BDZ	61 (73.5)	14 (73.7)	0.98
Mood stabilizers	17 (20.5)	0	**0.04***
Other drugs	14 (16.9)	3 (15.8)	0.91*
Long-acting AP treatment at discharge			
No	75 (90.4)	8 (42.1)	**<0.0001**
Yes	8 (9.6)	11 (57.9)	
Follow-up Variables (T1–T2)			
N VA			
0	49 (59.0)	9 (47.4)	0.50*
1	24 (28.9)	8 (42.1)	
≥2	10 (12.1)	2 (10.5)	
N CA			
0	80 (96.4)	12 (63.2)	**<0.0001**
1	3 (3.6)	7 (36.8)	
Suicide ideation at T2			
No	79 (95.2)	18 (94.7)	0.65*
Yes	4 (4.8)	1 (5.3)	
N drugs used			
0	9 (10.8)	8 (42.1)	**0.02***
1	13 (15.7)	3 (15.8)	
2	29 (34.9)	5 (26.3)	
≥3	32 (38.6)	3 (15.8)	
Type of psychotropic drug at T2c			
AP typical	22 (26.5)	4 (21.0)	0.77*
AP atypical	40 (48.2)	5 (26.3)	0.08
AD	28 (33.7)	3 (15.8)	0.17*
BDZ	55 (66.3)	7 (36.8)	**0.02**
Mood stabilizers	18 (21.7)	1 (5.3)	0.11*
Other drugs	17 (20.5)	2 (10.5)	0.51*
Long-acting AP treatment at discharge			
No	70 (84.3)	12 (63.2)	**0.04**
Yes	13 (15.7)	7 (36.8)	

VA voluntary admission; CA compulsory admission; N numbers; OR odds ratio; CI confidence interval; EU European Union; MHD mental health departments; GHPU General Hospital Psychiatric Unit; CMHC Community Mental Health Center; AD antidepressants; BDZ benzodiazepine; AP antipsychotic; °5 subjects are missing; #16 subjects are missing; §each type of drug is treated as a categorical variable (0/1). Individuals who were not prescribed each drug type, were used as reference category (odds ratio=1).

community integrated and personalized interventions,[13-15] as well as adaptability of maintain the continuity of care, also in emergency situation as the ongoing COVID-19 pandemic.[47] Given the similar outcomes in both CAs and VAs, it seems that this model of care might be more efficient in more severely-ill patients. However, several factors may influence the performance of psychiatric patients in terms of social improvement,[10] and it is not easy to establish whether the model can be more effective than other models, for instance based on transitional interventions.[21,22]

Strengths and limitations

A main strength of this study was the population-based design, which permitted a real-world insight, and an accurate evaluation of the outcomes through several validated psychometric tools at discharge from hospital and after six-months of follow-up. To our knowledge, this is also the first study analysing psychiatric patients' outcomes in a longitudinal continuity of care model, allowing preliminary scientific evidences valuable for mental health policy.

A number of limitations, however, should be taken into account. First, the small sample size, especially regarding CAs, hindered more detailed analyses in specific subgroups. This did not allow, for instance, to assess whether the changes in the scores on the evaluation scales correlated with different diagnostic subsamples and to which extent this could have influenced the scores.[45] However, the last seems a minor shortcoming, since psychometric tests, such as CGI or Mini-ICF-APP, can be considered diagnosis-independent for clinical assessment or judgment of functionali-

Table 2. Adjusted odds ratios (OR) and 95% confidence intervals (95% CI) for patients compulsory admitted to the General Hospital Psychiatric Unit and followed up for 6 months, estimated by means of logistic regression analysis. The multivariate logistic regression models were realized with balance techniques of "unbalanced" dataset and bootstrap. Independent t-test was used to assess the differences between logistic models' accuracy. Significant OR and 95% CI were highlighted in bold.

Variables	Multivariate logistic regression	
	Model 1° OR (95% CI)	Model 2# OR (95% CI)
Gender		
Males	**1.76 (2.57–5.48)**	
Age (years)		
18-29	**0.46 (0.26–0.80)**	**0.47 (0.26–0.82)**
Occupational status		
Employed	0.87 (0.52–1.44)	
Somatic disorder at admission		
Present	1.18 (0.71–1.98)	
Cognitive impairment		
Present	0.65 (0.39–1.06)	
Contacts with MHS in the last 10 years		
Present	1.48 (0.87–2.52)	1.53 (0.93 -2.53)
Reason for hospitalisation		
Anxiety/depression	**0.58 (0.47–0.72)**	
Self-harm	**0.62 (0.54–0.72)**	
Psychotic crises	**3.76 (2.57–5.48)**	**5.07 (3.49–7.39)**
Length of hospitalisation		
≥8 days	**3.54 (2.30–5.44)**	**3.64 (2.31–5.74)**
Placement after discharge		
Home	**0.61 (0.39–0.95)**	
CMHC	**1.73 (1.11–2.71)**	**2.47 (1.46–4.15)**
Psychiatric disorder at discharge		
Non affective psychosis	**2.63 (1.75–3.94)**	**2.98 (2.02–4.40)**
Suicide ideation at admission		
Yes	**0.41 (0.32–0.52)**	**0.39 (0.32–0.49)**
N drugs at discharge		
≥3	**0.61 (0.43–0.85)**	
Type of psychotropic drug at discharge#		
AP typical	1.44 (0.95–2.18)	
AP atypical	0.89 (0.56–1.41)	
Long-acting AP treatment at discharge		
Yes	**2.57 (1.54–4.29)**	**2.81 (1.69–4.68)**
N CA during follow-up		
1	**1.73 (1.08 -2.76)**	**2.12 (1.26 -3.56)**
Type of psychotropic drug at T2		
Other drugs	**0.57 (0.36–0.89)**	

OR, odds ratio; CI, confidence interval; MHS mental health services; CMHC, community mental health center; AP, antipsychotic; N, number; °accurancy mean = 0.899 (95% CI = 0.806–0.968); #accurancy mean = 0.878 (95% CI = 0.774–0.968); *t*-test (p) for differences between models' means <0.0001.

ty.[28,44] Second, it is not easy to assess whether the differences in scores of psychometric tests indicate a real variation between inpatient and community patients' functioning, or rather a vulnerability in the reliability of measurement. Different factors may influence test scoring, such as the time to refer for the assessment period, which can vary from inpatient to outpatient settings, or the timeframe chosen for re-testing.[48] Third, psychometric tests were all administered by the assessors. This could have led to an underestimation of the personal experience of patients and their perception of care path. Fourth, more than 60 patients admitted to GHPU were not followed-up for different reasons. This could have led to a selection bias, since it is likely that patients more severely-ill were taken in charge by outpatient services. However, this could apply only to 21 patients out of 64 excluded from the follow-up, who were discharged from MHD and were not followed upwards by mental care. Finally, we did not administered tests to patients discharged from CMHC and followed upwards by the same service.

In FVG, most of CMHCs have beds and more than 30% of CAs occurs in CMHCs.[13-15,47] Although longitudinal continuity of care applies both to GHPU and CMHC, it may be even more emphasized for patients hospitalised in CMHCs.

Conclusions

This study demonstrated that patients voluntarily or involuntarily admitted to GHPU improved to a same extent during hospitalisation, and this improvement was maintained during a six-month follow-up by mental health services. Moreover, the greatest improvement after discharge from hospital was observed in social functioning. This fosters the hypothesis that a community mental health system based on a longitudinal continuity of care model might achieve recovery in a long-term perspective, particularly with regard to psychosocial outcomes in more severely-ill patients. Our

Table 3. Cut-off scores of psychometric tests in subjects hospitalised in the General Hospital Psychiatric Unit and followed-up for six months. Poisson regression and respective p-values were used to assess the differences between distributions within the different endpoints (T0, T1 and T2).

Psychometric tests	Cut-off scores	T0 Admission to GHPU N (%)	T1 Discharge from GHPU N (%)	T2 Six-months follow-up N (%)	T0–T1	T1–T2	T0–T2
					Poisson regression (p)		
GAF							
Impairment	≤60	101 (99.0)	54 (52.9)	51 (50.0)	<0.001	0.37	<0.001
Functional remission	>60	1 (1.0)	48 (47.1)	51 (50.0)	<0.001	0.30	<0.001
PSP-A (Useful social activities)							
Manifest/marked difficulties	≤70	102 (100.0)	73 (71.6)	58 (56.9)	0.002	0.04	<0.001
No disfuction/mild difficulties	>70	0	29 (28.4)	44 (43.1)	<0.001	0.003	<0.001
PSP-B (interpersonal and social relationship)							
Manifest/marked difficulties	≤70	99 (97.1)	67 (65.7)	65 (63.7)	<0.001	0.43	<0.001
No disfuction/mild difficulties	>70	3 (2.9)	35 (34.3)	37 (36.3)	<0.001	0.32	<0.001
PSP-C (self-care)							
Manifest/marked difficulties	≤70	86 (84.3)	21 (20.6)	20 (19.6)	<0.001	0.47	<0.001
No disfuction/mild difficulties	>70	16 (15.7)	81 (79.4)	82 (80.4)	<0.001	0.42	<0.001
PSP-D (disturbed and aggressive behaviours)							
Manifest/marked difficulties	≤70	27 (26.5)	9 (8.8)	17 (16.7)	<0.001	0.99	0.027
No disfuction/mild difficulties	>70	75 (73.5)	93 (91.2)	85 (83.3)	0.018	0.78	0.11
CGI-severity (illness severity)							
Midly to severly ill	>2	102 (100.0)	79 (77.5)	73 (71.6)	0.01	0.27	0.001
Normal/borderline ill	≤2	0	23 (22.5)	29 (28.4)	<0.001	<0.001	0.09
CGI-improvement (global sympthoms' improvment)							
Not improved	≥4		10 (9.8)	17 (16.7)		0.98	
Improved	<4		92 (90.2)	85 (83.3)		0.74	
CGI - efficacy index (drugs' efficacy related to side effects)							
Not improved	>8		38 (37.3)	23 (22.5)		0.99	
Improved	≤8		64 (62.7)	79 (77.5)		0.029	
Mini-ICF A (cognitive abilities and performance)							
Moderately to extremely ill	>8	97 (95.1)	61 (59.8)	62 (60.8)	<0.001	0.58	<0.001
Borderline/mildy ill	≤8	5 (4.9)	41 (40.2)	40 (39.2)	<0.001	0.52	<0.001
Mini-ICF B (relationships abilities)							
Moderately to extremely ill	>8	51 (50.0)	8 (7.8)	17 (16.7)	<0.001	0.99	<0.001
Borderline/mildy ill	≤8	51 (50.0)	94 (92.2)	85 (83.3)	<0.001	0.81	<0.001
Mini-ICF C (individual physical autonomy)							
Moderately to extremely ill	>8	9 (8.8)	2 (2.0)	7 (6.9)	0.006	0.99	0.32
Borderline/mildy ill	≤8	93 (91.2)	100 (98.0)	95 (93.1)	0.21	0.66	0.39
HoNOS							
Mild to very severe	almost 1 item >2	100 (98.0)	49 (48.0)	53 (52.0)	<0.001	0.75	<0.001
Subclinical	0 item >2	2 (2.0)	53 (52.0)	49 (48.0)	<0.001	0.67	<0.001

GHPU, general hospital psychiatric unit; GAF, global assessment of functioning; PSP, personal and social performance; CGI, clinical global impression; HoNOS, health of nation outcome scale.

Table 4. Median and range of outcome scales in patients voluntarily and compulsory admitted (T0) and discharged (T1) from the General Hospital Psychiatric Unit, and then followed-up for six months (T2). Mann Whitney test and respective p-values were used to assess the differences between medians. Significant p-values were highlighted in bold.

Outcome scales	Admission at GHPU (T0)		Mann-Whitney	Discharge from GHPU (T1)		Mann-Whitney	Follow-up (T2)		Mann-Whitney
	VA	CA	p-value	VA	CA	p-value	VA	CA	p-value
GAF									
Median (range)	45 (15-65)	25 (5-35)	**<0.001**	65 (15-85)	55 (35-75)	**0.03**	55 (15-85)	65 (15-75)	0.77
CGI - Severity									
Median (range)	5 (3-7)	5 (5-6)	**<0.001**	3 (1-7)	4 (2-6)	**0.05**	3 (1-7)	4 (1-7)	0.37
PSP									
Median (range)	45 (5-65)	25 (15-45)	**<0.001**	55 (15-85)	55 (25-75)	0.48	65 (15-85)	55 (25-75)	0.40
Mini ICF									
Median (range)	26 (6-44)	33 (24-47)	**<0.001**	16 (0-37)	16 (2-33)	0.35	16 (0-51)	12 (1-44)	0.35
HoNOS									
Median (range)	16 (5-28)	18 (10-25)	0.19	8 (0-23)	9 (2-15)	0.36	9 (0-27)	8 (1-32)	0.77

VA, voluntary admission; CA, compulsory admission; GHPU, general hospital psychiatric unit; GAF, global assessment of functioning; PSP, personal and social performance; CGI, clinical global impression; HoNOS, health of nation outcome scale.
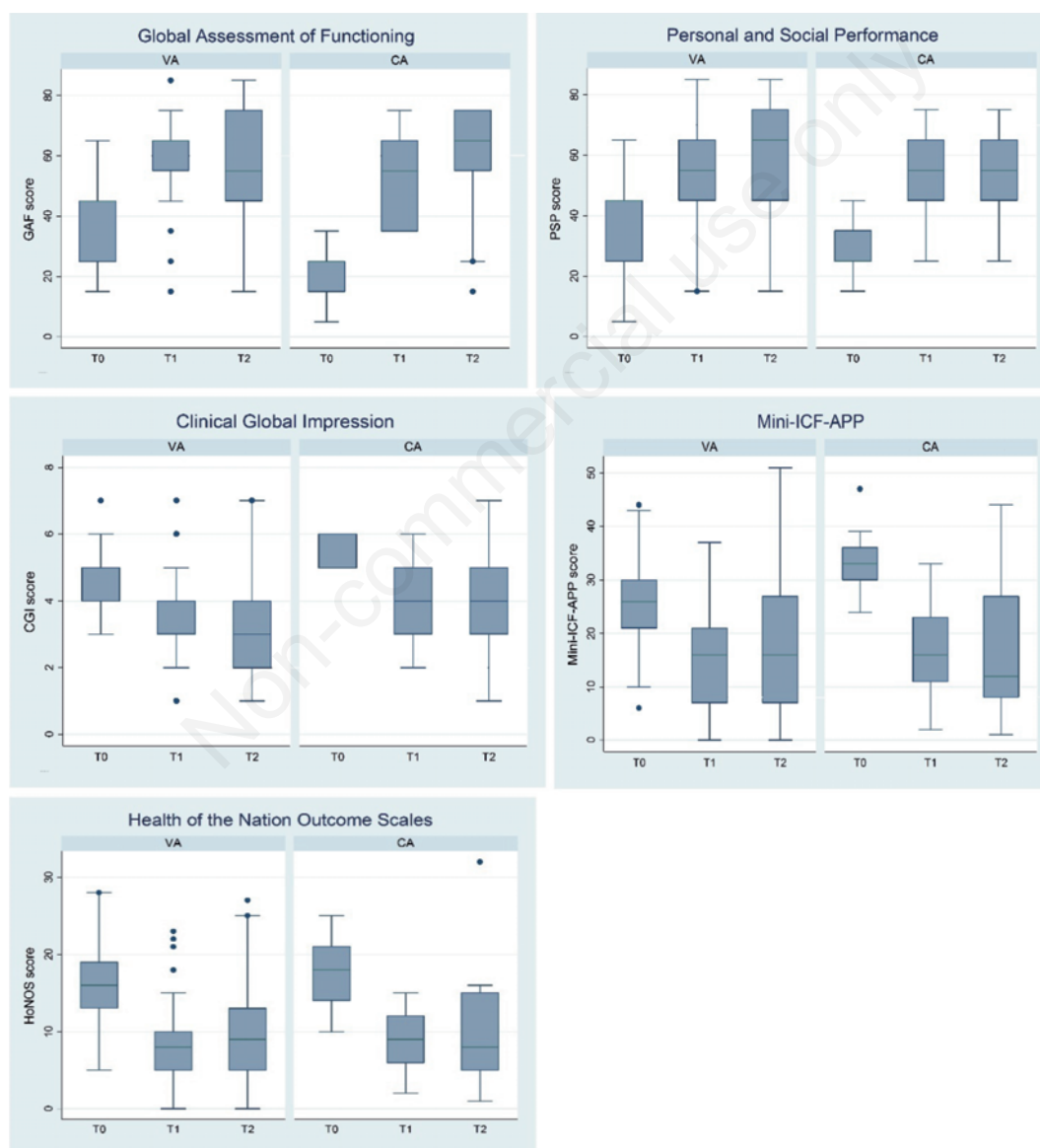
Figure 1. Mean scores of psychometric tests in subjects voluntarily and compulsorily hospitalised in the General Hospital Psychiatric Unit and followed-up for six months. Friedman (χ^2) and respective p-values were used to assess the differences between means within the different endpoints (T0, T1 and T2). VA, voluntarily admission; CA, compulsory admission; Friedman (χ^2) for all scales within endpoints (T0, T1, T2) = from 93.86 to 110.84, degree of freedom = 2, p-value <0.0001, in both VA and CA.

findings are also corroborated by other studies based on the same mental health system.[13-15,23,47] We further shed a light on the need of an accurate and comprehensive evaluation of the outcomes in routine clinical practice, in order to enhance decision making from a clinical and policy perspective. The identification of specific features, determining, for instance, a greater risk for CA per region, by hospital, or by population subgroups, can help to target cost-effective interventions.[9,1] Nonetheless, our finding should be taken with caution, due to the small sample size, especially among CAs. More research is, thus, warranted to analyse outcomes of subjects treated merely at the outpatient level. Future studies may benefit also by taking into account patients' subjective experiences and assessing long-term improvement in those who received person-centred interventions,[6] as it is extensively developed in the region.[15]

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