Original Article/Research

The impact of Covid-19 pandemic on community-oriented mental health services: The experience of Friuli Venezia Giulia region, Italy

Giulio Castelpietra [a,b,*], Chiara Colli [b], Davide Tossut [c], Morena Furlan [a], Matteo Balestrieri [b], Fabrizio Starace [d], Massimiliano Beghi [e], Fabio Barbone [a], Alfredo Perulli [a], Luis Salvador-Carulla [f,g]

[a] Central Health Directorate, Friuli Venezia Giulia Region, Riva Nazario Sauro 8, 34100, Trieste, Italy
[b] Department of Medicine (DAME), University of Udine, Ple Santa Maria della Misericordia 15, 33100, Udine, Italy
[c] Welfare Area, Friuli Venezia Giulia Region, Borgo Aquileia 2, 33057 Palmanova (UD), Italy
[d] Department of Mental Health & Drug Abuse, AUSL Modena, Vle Ludovico Antonio Muratori 201, 41124, Modena, Italy
[e] Department of Mental Health, AUSL Romagna, pzle Giommi, 47521, Cesena, Italy
[f] Centre for Mental Health Research, Research School of Population Health, ANU College of Health and Medicine, Australian National University, 63 Eggleston Rd Acton ACT 2601, Canberra, Australia
[g] Menzies Centre for Health Policy, Faculty of Medicine and Health, University of Sydney, Charles Perkins Centre, The University of Sydney, NSW, 2006, Sydney, Australia

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ABSTRACT

Objectives: to assess the changes in prevalence, incidence and hospitalisation rates during the first four months of 2020, compared to the same period of 2019, in Friuli Venezia Giulia Mental Health Departments (MHDs); to analyse the features of MHDs patients tested for Sars-Cov-2, and to monitor whether MHDs applied and adhered to regional recommendations.

Methods: Observational study using MHDs' administrative data and individual data on suspected and positive cases of Sars-Cov-2. Adherence to recommendations was assessed using 21 indicators. Changes in rates were calculated by Poisson regression analysis, while the Fisher exact test was used for assessing differences between suspected and positive cases.

Results: The decrease in voluntary admission rates on 100,000 inhabitants in hospital services was significantly larger from January to April 2020, compared to the same period of 2019 ($P<0.001$), while no other data showed a significant decrease. Among the 82 cases tested for Sars-Cov-2, five were positive, and they significantly differ from suspected cases only in that they were at home or in supported housing facilities prior to the test. The MHDs mostly complied with the indicators in the month after the publication of recommendations.

Conclusions: Outpatient services continued to work normally during the emergency, while hospital services decreased their activities. A low number of positive cases was found among MHDs' users, which might be linked to a rapid reconversion of services, with an extensive use of home visits and telepsychiatry. These preliminary data should be interpreted with caution, due to the small size and the limited period of observation.

Public interest summary

Thanks to the availability of a database that recorded most of the cases identified and monitored in the region Friuli Venezia Giulia, Italy, we can analyse the situation of a mental health system during Covid-19 pandemic from three different perspectives: the burden on mental health services, the size and characteristics of psychiatric users involved in the pandemic, and the operational changes put into action in mental health services. We demonstrated that a community-based mental health system might be better placed to respond to the Covid-19 pandemic. A high level of integration between primary, community and tertiary elements of healthcare may enhance the flexibility of services, making the need of rapid reorganisation more feasible. Being used to person-

* Corresponding author at: Regione Friuli Venezia Giulia, Riva Nazario Sauro 8 – 34124 Trieste, Italy.
E-mail address: giulio.castelpietra@regione.fvg.it (G. Castelpietra).

alised and tailored approaches may allow the reconversion of interventions, with the aid of telepsychiatry. A community-based model may also reduce feelings of isolation and loneliness of patients.

Introduction

The Coronavirus 2019 (Covid-19) pandemic, due to Severe Acute Respiratory Syndrome Coronavirus 2 (Sars-Cov-2), has heavily affected not only physical health, but the whole daily living of the general population, with an increased burden on global public health and social system [1]. In this context, Italy has been the first European country to face the pandemic emergency. The first patient in Italy was found positive the 29th of January 2020, although the pandemic had been probably spreading months before. Nonetheless, from February the incidence of contagion dramatically increased, with 1000 deaths reported by the 28th of March [2].

The pervasive contagion, along with the consequent widespread fear and the necessary containment measures to limit the outbreak (e.g. quarantine and lockdown), is likely to lead psychological consequences in the general population, but the distress in people with pre-existing psychiatric conditions is likely to have been greater [1,3–5]. Although general literature provides evidence of a greater susceptibility of psychiatric patients to environmental stress related to trauma [1,6,7], a recent review focusing on the psychological impact of quarantine included only one study considering mental illness as a risk factor [4]. Studies suggest that psychiatric patients seem to be at high risk of infection, due to pre-existing disorders, unhealthy lifestyle, cognitive impairment or reduced level of awareness of the risk [3,8,9]. In contrast, recent findings from United Kingdom (UK) indicated that mentally-ill patients were at lower risk of contracting the infection compared to general population [10]. Nonetheless, the continuity of mental care and the integration of mental health services with public health is crucial to guarantee an effective response to the Covid-19 emergency [11]. International agencies, such as the United Nations (UN), the World Health Organization (WHO) and the World Federation for Mental Health, drafted editorials and documents addressing the urgent need for actions on mental health to reduce the detrimental effect of the pandemic on psychiatric patients [1,12,13]. Despite these recommendations, mental care has been reported to be generally under-resourced and under-prepared in assisting new psychiatric patients and those already in charge. However, community mental health systems, well integrated with general healthcare, have demonstrated better adaptability compared to systems based on inpatient care [5].

In Italy, different population subgroups were identified at high risk of developing severe psychological consequences linked to Covid-19 pandemic, also among patients with mental disorders [14]. Therefore, the need to reorganize mental health services and develop new approaches to rapid response to crisis quickly became clear. For instance, by March 2020 the Italian Society of Epidemiological Psychiatry (SIEP), for instance, had already published a list of practical recommendations for Mental Health Departments (MHDs) to ensure the best possible psychiatric health care during the emergency. The aim of these recommendations was to avoid the spread of the infection and to maintain an adequate level of care supports, developing also new strategies to cope with this reality, such as telemedicine [15]. Unfortunately, early evidence from Italian MHDs showed a different reality, similar to the international scenario. During the emergency, a number of psychiatric emergency units were converted to Covid-19 services, and professionals were re-designated to work there. Moreover, many community services, where patients typically spend several hours a day finding immediate help for their problems, were severely restricted or temporarily closed [3,13,14,16]. A general decrease of hospitalisa-

tions in inpatient units, as well as in psychiatric consultations, was also observed [17–20,35]. Concern has been expressed for those severely ill patients who have disappeared from mental health services and are holed up in other settings without any kind of support [1,13].

Global data on the extent of cases affected by the Covid-19 pandemic among people with mental disorders are largely missing [3]. This seems inversely striking to correctly drafting and applying helpful recommendations for mental care. Furthermore, there is a lack of evidence regarding the success of existing recommendations in containing the infection and in keeping services working to support patients, whose opportunities for social contact are increasingly reduced, and who suffer increased social isolation and loneliness as a result [14].

According to the WHO, the Friuli Venezia Giulia (FVG) region is an example of how the Italian movement realized deinstitutionalization with the development of community-based mental healthcare and social inclusion programs [21]. Our hypothesis, hence, is that a strong community mental care network can have additional and more flexible tools to rapidly adapt to a sudden healthcare emergency. In parallel we expect a greater prevalence of Sars-Cov-2 infection among psychiatric patients, with a consequent high burden and pressure on mental care.

The aim of the present study was: i. to assess the changes on administrative prevalence, incidence and hospitalisation rates during the first four months of 2020 compared to the same period of the previous year; ii. to analyse the sociodemographic and clinical features of patients tested for Sars-Cov-2 infection among those in the care of regional mental health services, and iii. to monitor whether regional mental health services applied and adhered to regional reccomendations, using a series of indicators.

Materials and methods

The study was set in Friuli Venezia Giulia (FVG), an Italian north-eastern region with a population of 1.2 million inhabitants. Three MHDs, strongly community-based [21–24], provide mental care to 20,551 individuals aged 18 years and older. The main services of the MHDs are Community Mental Health Centres (CMHCs), which each look after a catchment area of 50,000 to 80,000 inhabitants. Seventeen regional CMHCs are open 24 h a day, 7 days a week, with four to eight beds each (CMHC/24h). The remaining 5 CMHCs are open 12 h a day, 6 days a week, without beds. CMHCs deal with the most of mental care needs, including management of acute conditions, prevention of mental illness, pharmacological treatment, and rehabilitation. There are also several different "supported housing" facilities, managed by the Third Sector in collaboration with MHDs, where psychiatric patients can be hosted [21,24]. Hospital psychiatric services are provided by three "General Hospital Psychiatric Units" (GHPU), with the lowest number of beds used for psychiatric acute care in Italy (2.6 beds per 100,000 inhabitants) [23].

Aggregated data on individuals in the care of MHDs

The FVG Regional Social and Health Information System (SISSR) was used to retrieve data on all subjects registered as patients of the regional MHDs from the 1st of January 2020 to the 30th of April 2020 (pandemic period) and from the 1st of January 2019 to the 30th of April 2019 (control period). The pandemic period involved the recognition, initiation and the subsequent acceleration interval of the initial wave of Covid-19 [2]. SISSR is an administrative database wherein a unique anonymous identifier is provided for each individual resident in the Region. It also covers all the regional public healthcare services, which represent almost 100% of the mental care, since there are no private clinics in the region

[24]. We further provided a detailed description of SISSR and used it in other studies [23,25–27].

Data retrieved for the present study included: administrative prevalence and administrative incidence of all subjects in charge MHDs during the above periods, date of admission and date of discharge of each hospitalization in GHPUs and CMHCs/24h, type of hospitalization (voluntary admission (VA) and compulsory admission (CA)), length of each hospitalizations (LoS). "Compulsory" hospitalizations is ruled by Italian law (Articles 33, 34, 35 and 64 of the General Health Law no. 833/1978 [23]. FVG region is characterised by a low CA rate compared to other Italian regions [22].

Individual data on suspected and positive Sars-Cov-2 cases in the care of MHDs

Information on individuals with mental disorders tested for Sars-Cov-2 virus was obtained from MHDs' database available on SISSR and used for the monitoring of healthcare services during the pandemic. Individual data, with a unique anonymous identifier, included all subjects in the care of regional MHDs, involving patients hospitalised in GHPUs, CMHCs and different supported housing solutions, as well as patients at home. For the present study, we used data retrieved from the 1st of February to the 31st of May2020. Data included: gender, age, nationality, marital status, occupational status, presence of comorbid medical conditions or cognitive impairment, suicide attempts, main psychiatric diagnosis, pharmacological treatment, dates of each nasopharyngeal swab test execution and provenience prior to the test. In cases of hospitalization, date of admission and date of discharge of each hospitalization in GHPUs and CMHCs/24 h, type of hospitalization (VA and CA) and length of each hospitalizations were included.

The operative recommendations for regional MHDs during Sars-Cov-2 pandemic

In response to the pandemic emergency, on the 22nd of April 2020 the "Direzione Centrale Salute, Politiche Sociali e Disabilità" of the FVG region published a policy document called: "Prevenzione e gestione infezione COVID 19 – Indicazioni organizzative e gestionali per i Servizi per la salute mentale" (Prevention and management of the COVID 19 infection: Organizational and administrative recommendations for mental health services) [28] which included several operative recommendations regarding the organization of mental health services during the pandemic. These recommendations mostly summarized the practical changes in how services should be administered, which MHDs had already been applying. The recommendations were also published as Best Practices during Covid-19 emergency by the Italian National Agency for Regional Healthcare Services (AGENAS). A set of 21 recommendations were then adopted to monitor how closely regional MHD followed these recommendations in the subsequent months of the pandemic emergency. In the present study, we referred to this monitoring period from the publication of the document to the 31st of May 2020.

Statistical analysis

Poisson regression analysis was used to compare prevalence and incidence of MHDs patients across the two study periods (year 2019 and 2020). Poisson regression analysis was also used to compare rates of VA and CA to GHPU and CMHC/24 h and respective lengths of hospitalizations in the same different periods. Continuous variables (age, days of hospitalization) were summarized using the median as a measure of central tendency and the range as a measure of dispersion. All other variables were dichotomous or categorical and were tabulated into contingency tables; the Fisher
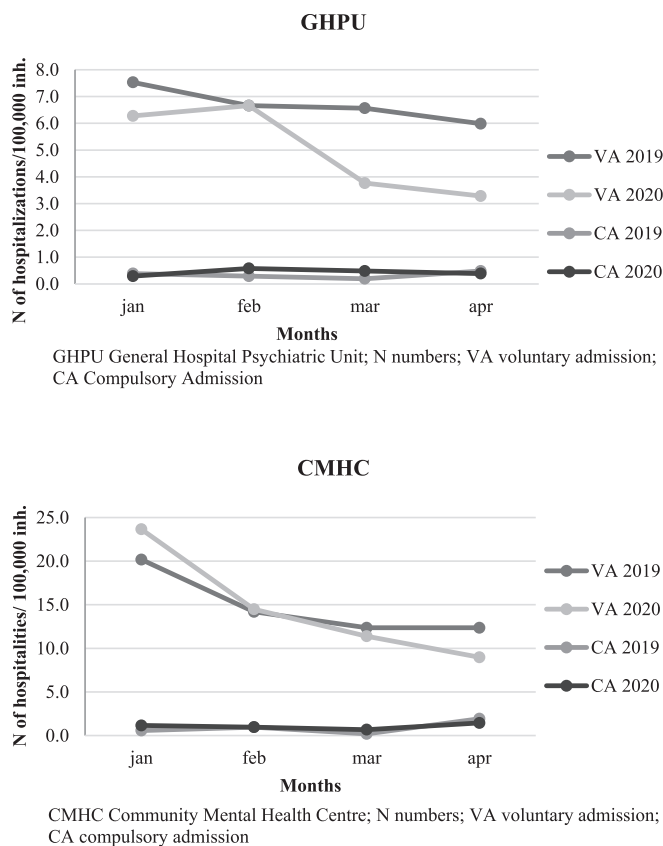

GHPU General Hospital Psychiatric Unit; N numbers; VA voluntary admission; CA Compulsory Admission

CMHC Community Mental Health Centre; N numbers; VA voluntary admission; CA compulsory admission

Fig. 1. Number of hospitalizations/hospitalities on 100.000 inhabitants per type (voluntary and compulsory) in General Psychiatric Hospital Unit and in Community Mental health Centres, from January to April 2019 and 2020, respectively.

Exact test was used to test the differences between proportions. A P-value (P) < 0.05 was set as the threshold for statistical significance.

Descriptive and inferential analyses were performed using the statistical software Stata/SE (version 15.1).

Results

Administrative prevalence, incidence and hospitalizations

Prevalence of patients in the care of regional MHDs was 12.9 patients per 1000 inhabitants during the control period; this rate decreased to 11.9 patients per 1000 inhabitants during the pandemic period (Poisson P =0.41). The incidence rate was 1.8 patients per 1000 inhabitants during the control period; the rate decreased to 1.3 patients per 1000 inhabitants during the pandemic period (Poisson P = 0.37).

As shown in Fig. 1, VA rates in GHPU decreased from 7.53 in January 2019 to 5.98 hospitalizations per 100,000 inhabitants in April 2019, while the reduction was from 6.27 to 3.28 hospitalizations per 100,000 inhabitants during the same period of 2020 (Poisson P<0.001). When VA rates were calculated in CMHC, they decreased from 20.17 to 12.36 in 2019 and from 23.65 to 8.98 in 2020 (Poisson P =0.41). CA rates slightly increased during the first four months of 2019 and 2020, but this rise was not significant either in GHPU (Poisson P = 0.12) or in CMHC (Poisson P = 0.15).

The mean LoS of VA in GHPU decreased from 7.1 to 6.1 days per hospitalization during the control and pandemic period, respectively, while increasing in CMHC from 16.1 to 18.6 days per hospitalization. The mean LoS of CA in GHPU decreased from 11.7

Table 1
Sociodemographic and clinical characteristics of patients suspected and positive to Sars-Cov-2 infection in regional mental health services. Fisher Exact test and respective P-values were used to assess the differences between proportions. Significant P-values were highlighted in bold.

	Suspected cases ($n = 77$)	Positive cases ($n = 5$)	Fisher Exact test
Variables	N (%)	N (%)	*P-value*
Gender			
Females	38 (49.3)	0	0.58
Males	39 (50.6)	5 (100)	
Age (years)			
18-29	13 (16.9)	0	0.83
30-59	43 (55.8)	3 (60.0)	
≥60	21 (27.3)	2 (40.0)	
Nationality			
Italy	68 (88.3)	4 (80.0)	0.18
EU	8 (10.4)	0	
Extra EU	1 (1.3)	1 (20.0)	
Marital Status			
Alone	61 (79.2)	0	0.57
Cohabintant	16 (20.8)	5 (100)	
Occupational Status *			
Employed	21 (25.6)	1 (20.0)	0.2
Unemployed	51 (67.1)	3 (60.0)	
Ecomically inactive	1 (1.3)	1 (20.0)	
Retired	3 (3.9)	0	
Somatic disorder			
None	53 (68.8)	2 (40.0)	0.32
Present	24 (31.2)	3 (60.0)	
Cognitive impairment			
None	67 (87.0)	3 (60.0)	0.15
Present	10 (12.1)	2 (40.0)	
Suicide attempt at admission			
No	73 (94.8)	4 (80.0)	0.27
Yes	4 (5.2)	1 (20.0)	
Psychiatric disorder			
Non affective psychosis	27 (35.1)	1 (20.0)	
Affective disorders	20 (26.0)	1 (20.0)	
Anxiety disorders	4 (5.2)	2 (40.0)	0.13
Personality disorders	8 (10.4)	1 (20.0)	
Substance use	5 (6.5)	0	
Other disorders	13 (17.0)	0	
Pharmacological treatment *			
AP typical	5 (6.6)	1 (20.0)	
AP atypical	12 (15.8)	1 (20.0)	
AD	1 (1.3)	1 (20.0)	0.07
Lithium	1 (1.3)	0	
Polytherapy	57 (75.0)	2 (40.0)	
Provenience prior to test			
CMHC	10 (13.0)	0	
GHPU	29 (37.7)	0	**0.005**
Supported Housing	4 (5.2)	3 (60.0)	
Home	26 (33.8)	2 (40.0)	
Other	8 (10.4)	0	

N numbers; EU European Union; AD antidepressants; AP antipsychotic; CMHC Community Mental Health Center; GHPU general hospital psychiatric unit
 * 1 subject was missing

to 8.2 days per hospitalization during both periods, while greatly increasing in CMHC from 2.9 to 20.1 days per hospitalization.

Suspected and positive cases of Sars-Cov-2

Among the 82 cases tested for Sars-Cov-2 infection, only five (6.1%) tested positive for the infection; one of these cases died due to Sars-Cov-2 complications. The other four positive cases were hospitalized in general hospital Covid-wards with MHD support. No positive cases were found among patients hospitalized in GHPU and CMHC/24h during the emergency. The mean age for positive cases was 48.6 (median = 49.5, range = 34 - 74), while for suspected cases the mean was 57.1 (median = 57.0, range = 19 – 80). As summarized in Table 1, there were no significant differences between suspected and positive cases with regard to socio-demographic or clinical characteristics, with the exception of

provenience prior to the test. Positive cases were more likely to be at home and in supported housing facilities (P = 0.005).

Fifty-five (71.4%) out of the 77 suspected cases were hospitalized in MH services during the emergency, 38 in GHPU (70%) and 17 in CMHC (30%). Eight of them were hospitalized more than once. The mean length of first hospitalization was 16.4 days (median = 12.5, range = 1 – 58) in GHPU, and 48.4 days (median = 16.5, range = 1 – 263) in CMHC. Only 11 out of the 55 subjects hospitalized were CA, mainly in GHPU.

Monitoring of operative recommendations for MHDs

As shown in Table 2, a set of 21 monitoring indicators were selected and divided in three macro areas: "Covid" team, Preventive interventions and Reorganization of activities. The MHDs generally complied with the indicators in the month after the publication of the operative r recommendations. One MHD only partially reorganized ambulatory activities, home visits and transports. Although

Table 2

Indicators for the monitoring of operative indications for regional MHDs during Sars-Cov-2 epidemic, explantion of indicators and respective results

Monitoring indicators	Explanation of indicators	Result
Covid Team		
1. MHD Covid Team	Team is responsible for supervising:- PPE supply and sanitization procedures; - Reorganization of MHD activities; - Monitoring of positive cases; - Training of professionals on preventive measures in line with regional and national indications.	Activated in all MHDs
2. Referent of Covid Team for each CMHC	Referent is responsible for: - Activate and monitor services' organization in line with Covid emergency development; - Maintaining communication between patients, family and professionals; - Coordinate actions of Covid-Team; - Collaborate with the Public Health Department on epidemic surveillance activities.	Activated in all MHDs
Preventive interventions		
3. Professionals	Professionals respect the indications	✓
4. PPE	PPE available and used by professional	✓
5. Hospitalities in MHD services and supported housing	New hosts underwent testing for Sars-Cov-2 infection	✓
6. Telepsychiatry	Individual and group phone/video calls were activated	✓
7. MH services' room	Services' room was reorganized in order to deal with preventive measures	✓
Reorganization of activities		
8. Admissions to MHD services	- Prior to admission, patients should be administered, by phone or in the admission area, a screening form with epidemiological and clinical information; - If suspected to be infected, patients should be isolated waiting for the testing Sars-Cov-2 infection; - Prior to every hospitalities/hospitalizations, patients should be tested for Sars-Cov-2 infection	Indications applied in all MHDs
9. Ambulatory activities	Provision of a list of patients with severe MH issues needing continuity of care, preferably by phone/video	Indications applied in two MHDs and partially in one
10. Home visits	- To be done in case of issues in phone/video support; - Anticipated by phone calls to assess clinical conditions of the patient and his/her relatives; - PPE should be used both by professionals, patients and relatives, together with hygienic measures	Indications applied in two MHDs and partially in one
11. Transports	Transport should be done only for essential conditions, with PPE, respecting hygienic measure and distance of almost one metre inside the vehicle	Indications applied in two MHDs and partially in one
12. Meetings (within the MHD and with other healthcare services)	Meeting should be done using phone/video calls	Indications applied in two MHDs and not available in one
13. Pharmacological treatment	- If feasible, reorganization and rationalisation of drugs' distribution with regard to time and place (ex: at home and once a week, instead at service daily); - Extension of the scheduled time for drugs' distribution at service, endorsing scheduled drugs' delivery; - Foster drugs' delivery and administration at home.	Indications applied in all MHDs
14. Meal distribution in CMHC	Follow the preventive measures and social distance during meals, also by the presence of professionals to monitor the adherence to indications	Indications applied in all MHDs
15. Daily and night hospitalities in CMHC	- Limited to selected clinical needs; - Prior to every hospitalities, patients should be tested for Sars-Cov-2 infection; - New suspected and positive cases cannot be hosted; - Daily monitoring of clinical conditions related to Sars-Cov_2 symptoms; - Beds in single rooms are privileged; - Visits of relatives/friends are avoided, except in case of MD indications.	Indications applied in all MHDs
16. Hospitalizations in GHPU	- Hospitalizations limited to emergency situations; - Prior to every hospitalities, patients should be tested for Sars-Cov-2 infection; - New suspected and positive cases cannot be hospitalized; - Daily monitoring of clinical conditions related to Sars-Cov_2 symptoms; - Visits of relatives/friends are avoided, except in case of MD indications. - Psychiatric consultations to ER or other wards should be done, at first instance, by phone. In case of consultations at the patient's bed, professionals should wear PPE differentiated in relation to the type of ward (ex: Covid vs. non-Covid ward)	Indications applied in all MHDs

Table 2 (*continued*)

Monitoring indicators	Explanation of indicators	Result
17. ITRP and IHB	Reorganization (ex. using video calls), reduction or suspension of ITRP and activation of IHB	Reorganization applied in all MHDs
18. Rehabilitation activities in groups	Reorganization (ex. using video calls), reduction or suspension of group activities	Reorganization applied in two MHDs and reduction in one
19. Supported employment	Reorganization (ex. maintaining the salary, when it is difficult to assure social distance), reduction or suspension of supported employment	Reorganization applied in all MHDs
20. Collaboration with Associations	Reorganization (ex. using video calls), reduction or suspension of collaborations	Reorganization applied in all MHDs
21. Clinical pathway for Sars-Cov-2 positive patients	In case of Sars-Cov-2 infection, patients should follow a different clinical pathway: - Moderate/severe infection: Intensive Care or Covid-ward, indifferently for psychopathological condition; - Mild/no infection symptoms: • Moderate/severe psychopathological condition/no compliance: Covid-ward with MHD support; • Good psychopathological condition/ compliance: home with MHD support or MHD residential services identified for positive cases	Indications applied in all MHDs

MHD Mental Health Department; PPE Personal Protective Equipment; MD medical doctor; CMHC Community Mental Health Centre; GHPU General Hospital Psychiatric Unit; ITRP Individualised Therapeutic Rehabilitation Plan; IHB Individual Health Budget; MD medical doctor

an increased use of telepsychiatry was immediately activated in all MHDs, according to indicator 6, one MHD had problems activating video calls for meetings and, consequently, should decrease the rehabilitations in groups using remote devices.

Discussion

Inpatient and outpatient mental health services

A significant decrease of VAs in GHPU was observed during the pandemic period compared to the control period, while no significant changes were found regarding CAs in GHPU or either hospitalisation type in CMHC/24h. This decrease was paralleled with a decreased incidence of patients seeking mental care during the pandemic period, even not significant. Although no literature is available with regard to CMHCs, another Italian study focusing on admissions to seven GHPUs in the Lombardy region showed a significant decrease of VAs during the pandemic period compared to the same period in 2019 [18]. Similarly, findings from Emilia Romagna showed a decrease in both hospital admissions and accesses to ER for psychiatric disorders in March and April 2020 [17,35]. A reduced use of psychiatric emergency was also described in other countries, such as Germany [19] and France [20].

The international evidence of a lower number of patients seeking mental care is cause for concern, since a greater degree of mental problems during and in consequence of lockdown or similar restrictive measures can be expected at the general population level [3]. Possible explanations for this reduction may be a more cautious attitude of healthcare professionals or an increased family tolerance of behavioural problems due to the fear of contamination in hospital [18]. Moreover, the lockdown may have had an attenuating effect on the experience of marginalization of the patient with psychiatric disorders, who suddenly share the same position of other people.

The need to develop and implement innovative strategies for mental health care delivery has been strongly argued [1,3,14,29]. In this regard, our finding of no significant change in admissions between the pandemic and the control period in CMCHs was relevant. CMHCs in FVG remained open during the pandemic crisis and were able to offer an appropriate level of healthcare, especially through the enhancement of home services. Moreover, a proportion of patients that in normal conditions would have been hospitalised for mental care were instead followed at home due to the Covid-19 emergency [5].

We also found an increase in the LoS of patients in CMHC/24h during the pandemic period, especially for CAs, but this did not apply to GHPU. In contrast, a study from Lombardy GHPUs described an increased LoS during the Covid-19 emergency [18]. We agree that increased LoS may be due to the difficulties involved with discharging patients safely during the emergency, the greater availability of free beds, or the delay in swab testing. In FVG, however, psychiatric patients, even with severe conditions, had the possibility of being discharged discharged from hospital and being hosted in outpatient services. This could have led to choose CMHCs for managing patients with psychopathological difficulties, and decrease pressure on hospitals, more engaged in crisis response [2,5].

From this first piece of data, community services demonstrated a greater ability to maintain an adequate level of activity and provide a continuity of care during the pandemic emergency, showing a greater adaptability compared to hospitals. This was in line with a recent summary of different international experiences regarding mental care provision during the emergency [5]. In contrast with this evidence, however, community mental services worldwide tended to have closed, strongly reduced or even converted their services in favour of physical care [3,12,13].

Extent of Covid-19 pandemic on subjects with mental disorders

In contrast with our *a priori* hypothesis, subjects with mental disorders were not found to test positive for Sars-Cov-2 infection more than the general population. The cumulative incidence in FVG population was 2.69 positive cases per 100,000 inhabitants on the 31st of May 2020 [30], while it was only 0.24 positive cases per 100,000 inhabitants among MHDs' users at the same date. A recent British study demonstrated that patients with psychiatric disorders were more likely to be tested for Sars-Cov-2 infection and to be negative more frequently than the general population [10]. We did not find, however, other studies with individual data on positive patients to Sars-Cov-2 among mental health services.

Our findings differed from both the hypothesis of a greater susceptibility to Sars-Cov-2 among psychiatric patients [3] and of their lower ability to adhere to restrictions, such as social distancing and use of masks [31]. Although only 82 patients were tested for Covid-19 on a total number of 20,551 MHDs' users, it is likely that patients with severe mental disorders (SMD), who have frequent contacts with mental health services, were administered swab tests after being identified by MHDs. In a community-based context, mental health professionals often represent a primary contact point with general healthcare for their patients with SMD and, thus, in

many cases act as first responders during the pandemic [32]. When tested, however, only 6% of MHDs' users suspected to have Sars-Cov-2 tested positive for the illness. Positive cases did not differ from suspected cases for any of the sociodemographic and clinical variables considered, except the provenience prior to the test. That is, patients who tested positive for Sars-Cov-2 were more likely to be at home or in supported housing facilities than hospitalised in MHDs' services. This finding highly differed from preliminary data from a GHPU in Lombardy, were 15 positive cases were hospitalised in only 20 days during March 2020 [16]. Although in FVG almost 40% of suspected cases were in GHPUs, none was found positive to infection. This may have to do with a different regional epidemiological situation compared to Lombardy, but is likely also linked to FVG's different MHD organisation, where a strong community system allowed a more rapid response to pandemic emergency [2,5] and permitted the identification of positive cases prior to hospitalisation, for example during home visits. This consequently might have had a role in preventing the spread of infection inside mental health services.

Application and adherence to regional recommendations for MHDs

Another possible explanation of the good response to the pandemic emergency in FVG MHDs may be related to a rapid reorganization of services and staff [5,32]. Although operative recommendations were delivered to MHDs only at the end of April 2020, when the pandemic was showing a slight deceleration, the great majority of changes in routine practice were applied during the acceleration phase. Major challenges included the initial provision of PPEs for professionals and users as well as a rapid technological predisposition for a broader use of remote devices. These issues were similar for the general healthcare sector, especially in countries which experienced an explosive acceleration of the pandemic, such as Italy [2,13,14], although research from Catalonia (Spain), which has been facing a situation similar to Italy, showed an exponential increase in teleconsultations from the March 2020 [33]. In spite of these challenges, regional MHDs complied quickly with the operative recommendations, and monitoring indicators were mostly achieved after one month from their delivery. The changes included an increased use of remote devices, which has been observed in all MHDs. A key point of this positive outcome may be found in the so called "whole system recovery-oriented approach", which distinguishes the mental health system of FVG. This approach is characterised by a multi-sectoral provision of services by multiple professional organizations that are strictly integrated and connected [22,34]. New forms of social connections established during the health emergency period can further enhance the collective effort to tackle the social problems deriving from the pandemic [2,13]. This may be helpful also for professionals working in mental health services. A study from UK, for instance, highlighted that keeping mental care services working and maintaining contact with the community during the emergency was helpful, as was the communication between staff members [29].

Strengths and limitations

Due to the availability of a database that recorded most of the cases identified and monitored in the region, a main strength of this study was that we could analyse the situation of a mental health system during a key phase of the Covid-19 pandemic through three different perspectives: the burden on mental health services, the size and characteristics of MHDs' users directly involved in the pandemic and the operational changes put into action in mental health services. The study also shed a light on the importance of combining expert based information and represen-

tative administrative population data for a rapid response to the Covid-19 crisis, which can drive better local decision-making [5].

However, a number of limitations should be acknowledged. Firstly, the period considered was short, hindering the possibility of carrying out further considerations as the emergency progressed. The study period included the recognition, initiation and acceleration interval of the pandemic in Italy, which is consistent with the importance of follow-up applying systems for coding the phases of the pandemic, in order to allow international comparison, and consequently enhance the understanding of the impact of Covid-19 on health planning [2]. Secondly, we did not consider emergency psychiatric consultations, with a consequent possible loss of information on the impact of pandemic-related stress among patients with pre-existing psychiatric conditions. Thirdly, the limited sample size, especially of positive cases to Sars-Cov-2 infection, hindered more detailed analysis. This small number of positive and suspected cases may be due to a lack of nasopharyngeal swab tests during the study period, but this is to be applied to all the population as well. Another reason for the small number of positive and suspected cases may be a selection bias, since patients without SMD could not be in close contact with MHDs. Swab tests, hence, could have been done on the recommendation of general practitioners, or patients may have been hospitalised in general care, without involving MHDs. This could have led to an underestimation of positive cases with mental disorders. On the other hand, it is reasonably likely that most of patients with SMD were included. Since they also represent the individuals theoretically more subjected to the negative effects of infection [1,3,10,13], this low number seems an important epidemiological achievement. Finally, a strong adherence to monitoring indicators may be linked to the attitude of mental health professionals to tackle a new emergency, while adherence to recommendations monitored through a longer period may be diluted. In this context, continuous monitoring or the use of direct interviews with MHDs' professionals may provide qualitative data on telepsychiatry, in order to further support the hypothesis that a community mental health system is able to provide rapid responses.

Conclusions

In line with our first hypothesis, we demonstrated that a community-based mental health system may be better placed to respond to events such as Covid-19 pandemic. The high level of integration between primary, community and tertiary elements of healthcare may enhance the flexibility of services, making the need for rapid reorganisation more feasible [5]. Further, being used to personalised and tailored approaches may allow the reconversion of interventions, also with the aid of telepsychiatry [13,29,32]. In this context, a community-based model may reduce feelings of isolation and loneliness of patients and, thus, prevent the risk of relapses [18]. This was also confirmed by epidemiological data. Outpatient services have continued to work during the emergency more or less in the same way they did previously, while hospital mental care services have strongly decreased their activities. In contrast to our second hypothesis, however, we observed a very low number of Covid-19 cases among MHDs' users. Possible explanations for the low rate of infection might be linked to a rapid reconversion of services, with an extensive use of home visits and telepsychiatry, together with a probable good compliance to general preventive rules (i.e. handwashing, use of PPEs, social distancing, and so on). Nonetheless, our preliminary data should be interpreted with caution, due to the small size and the limited period of observation. More research is needed to assess if similar data can be replicated in other regions or countries, especially if characterised by a strong community-based mental health system.

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