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Impact of COVID-19 pandemic on involuntary and urgent inpatient admissions for psychiatric disorders in a German-wide hospital network

Jonathan Mathias Fasshauer^{a,b}, Andreas Bollmann^c, Sven Hohenstein^c, Konstantinos Mouratis^c, Gerhard Hindricks^c, Andreas Meier-Hellmann^d, Ralf Kuhlen^e, Andreas Broocks^f, Georg Schomerus^b, Katarina Stengler^{a,*}

^a Department of Psychiatry, Psychotherapy and Psychosomatics, Helios Park Hospital Leipzig, Germany

^b Department of Psychiatry, University of Leipzig, Leipzig, Germany

^c Heart Center Leipzig at University of Leipzig and Leipzig Heart Institute, Leipzig, Germany

^d Helios Hospitals, Berlin, Germany

^e Helios Health, Berlin, Germany

^f Department of Psychiatry and Psychotherapy, Carl-Friedrich-Flemming-Klinik Schwerin, Germany

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ABSTRACT

The impact of COVID-19 on urgent and involuntary inpatient admissions, as well as coercive measures, has not been assessed so far. A retrospective study was performed analyzing claims data for inpatient psychiatric admissions between 2018 and 2020 (total $n = 64,502$) from a large German Hospital network. Whilst the total number of urgent admissions decreased in 2020 (12,383) as compared to 2019 (13,493) and 2018 (13,469), a significant increase in the percentage of urgent admissions was observed in 2020 (62.9%) as compared to 2019 (60.6%) and 2018 (59.7%). Compared to this study period, Odds ratio (OR) for proportion were 0.87 (0.84, 0.91) and 0.91 (0.87, 0.95) for 2018 and 2019, respectively (both $p < 0.00001$). Percentage of involuntary psychiatric admissions also significantly increased in 2020 and OR compared to this study period ranged from 0.86 (0.81, 0.93) in 2019 ($p < 0.0001$) to 0.88 (0.82, 0.95) in 2018 ($p < 0.001$). Proportion of coercive measures significantly increased in 2020 as compared to 2019 ($p = 0.004$). Taken together, the present study shows an increase in the proportion of involuntary and urgent psychiatric admissions during the whole pandemic year 2020 as compared to 2018 and 2019. The long-term impact of these COVID-19 pandemic-related trends on psychiatric health care needs to be assessed in further studies.

1. Introduction

Coronavirus disease 2019 (COVID-19) originated in Wuhan, China, in December 2019 and was declared a worldwide pandemic on March 11, 2020 (Zhu et al., 2020; WHO Director General, 2020). The first case of COVID-19 in Germany was officially confirmed on January 27, 2020 and broad restrictions were initiated by the German government on March 13, 2020 (Böhmer et al., 2020; Carroll et al., 2020).

The pandemic has caused extensive psychological stress for medical staff and people with psychiatric disorders (Bohlken et al., 2020; Luo et al., 2020). In Germany, the partial lockdown decreased number of emergency hospital admissions for psychiatric disorders (Fasshauer et al., 2021a). Some evidence exists that acute and involuntary

admissions increased during the first lockdown (Ambrosetti et al., 2021; Carpinello et al., 2020; Itrat et al., 2020; Tromans et al., 2020).

Several studies indicate an enormous impact of the COVID-19 pandemic on mental health and the increased need of regularized routines (Hou et al., 2020). It has been discussed that the measures worsened mental health especially in vulnerable groups (Brooks et al., 2020). More specifically, the impact of COVID-19 on people at risk of serious mental disorders requiring tertiary care needs to be assessed. However, to the best of our knowledge, no study so far has elucidated the impact of the COVID-19 pandemic year 2020 on urgent and involuntary admissions, as well as coercive measures, compared to previous non-COVID-19 years. Involuntary admissions are important since they are often traumatising for those admitted. The aim of the study is to

* Corresponding author. Department of Psychiatry, Psychotherapy and Psychosomatics, Helios Park Hospital Leipzig Germany, Morawitzstraße 2, 04289, Leipzig, Germany.

E-mail address: katarina.stengler@helios-gesundheit.de (K. Stengler).

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examine whether extensive psychological stress and reduction of community care and social networks led to an increase in involuntary and urgent admissions. To address this open point, data from 13 hospitals of a large and regionally diverse German health care provider (HELIOS hospitals) comprising a total of 64,502 admissions for psychiatric diagnoses between 2018 and 2020 were examined.

2. Material and methods

2.1. Study cohort with inclusion and exclusion criteria

A retrospective analysis of claims data from 13 HELIOS hospitals was performed. Inclusion criteria were inpatient admissions between January 1, 2018 and December 31, 2020 and International Statistical Classification of Diseases and Related Health Problems (ICD) code of main diagnoses F00–F99. Main diagnoses were further subdivided as indicated in Table 1. The terms "urgent" and "involuntary" admissions were defined as follows: "Urgent" admissions were all admissions that needed acute use of psychiatric treatment, i.e., they were neither planned nor pre-registered at the hospital. In the case of "involuntary" admissions, patients received psychiatric treatment pursuant to civil or public law. Therefore, all involuntary admissions were also urgent admissions.

Administrative data were extracted from QlikView (QlikTech, Radnor, Pennsylvania, USA). Detailed psychiatric information is based on the HELIOS documentation (HEDO) dataset. Due to the retrospective study of anonymized data, informed consent was not obtained.

2.2. Study periods

Three periods were defined to compare inpatient admissions for selected psychiatric diagnosis groups. The study period (January 1, 2020 to December 31, 2020) was compared to two control periods, i.e., January 1, 2019 to December 31, 2019 and January 1, 2018 to December 31, 2018.

2.3. Statistical analyses

All psychiatric admissions were analysed. As dependent variables we used several binary factors. Odds ratio (OR) values comparing the study period to each of the control periods (i.e., 2018 vs. 2020 and 2019 vs. 2020) were calculated using logistic generalized linear mixed models with log link function for dichotomous data and binomial distribution (Baayen et al., 2008; Kliegl et al., 2010). Independent variables were based on the three-level factor year-of-admission with two contrasts, i.e., 2018 vs. 2020 and 2019 vs. 2020. Hospitals were specified as random factor. Mixed-effects models were used in these analyses with a variance component for the intercept. Effects were estimated with the lme4 package (version 1.1–21) (Bates et al., 2015) in the R environment for statistical computing (version 3.6.3, 64-bit build) (R Core Team, 2020). Patient characteristics were analysed with logistic regression (for the levels of qualitative variables) and linear regression (numeric variables). For all tests, a two-tailed 5% error criterion for significance was applied. Means, percentages, standard deviations (SD), OR, 95% confidence intervals, and p values are reported as further described in Table 1.

3. Results

3.1. Combined psychiatric diagnoses (F00–F99)

A total of 64,502 inpatient admissions for all psychiatric diagnoses were included in the analysis. Mean age was 48.3 (19.0) in 2020 and was significantly lower as compared to 2018 [49.3 (19.1); $p < 0.00001$] and 2019 [48.6 (19.0); $p = 0.047$]. Sex distribution was similar between the three periods (Table 1). Whilst the total number of urgent admissions decreased in 2020 (12,383) as compared to 2019 (13,493) and 2018

Table 1

Inpatient admissions for psychiatric diagnoses in the German-wide HELIOS hospital network in the years 2018, 2019 and 2020.

Psychiatric diagnoses ICD-10	2018	2019	2020
Combined (F00–F99)			
Total number of admissions	22,560	22,251	19,691
Age (years)	49.3 (19.1)	48.6 (19.0)	48.3 (19.0)
P value	<0.00001	0.047	
Percent female	44.5 (10,044)	44.0 (9782)	44.1 (8681)
P value	0.369	0.805	
Urgent admission			
Percent cumulative admissions	59.7 (13,469)	60.6 (13,493)	62.9 (12,383)
OR	0.87 (0.84, 0.91)	0.91 (0.87, 0.95)	
P value	<0.00001	<0.00001	
Involuntary admission			
Percent cumulative admissions	8.3 (1809)	8.2 (1782)	9.4 (1794)
OR	0.88 (0.82, 0.95)	0.86 (0.81, 0.93)	
P value	<0.001	<0.0001	
Fixation/coercive medication			
Percent cumulative admissions	4.7 (1055)	3.3 (729)	3.8 (746)
OR	1.25 (1.14, 1.38)	0.86 (0.77, 0.95)	
P value	<0.00001	0.004	
F00–F09			
Percent cumulative admissions	11.5 (2584)	10.4 (2303)	10.1 (1991)
OR	1.15 (1.08, 1.22)	1.03 (0.96, 1.09)	
P value	<0.00001	0.421	
F10–F19			
Percent cumulative admissions	34.9 (7878)	36.0 (8003)	36.1 (7101)
OR	0.95 (0.91, 0.99)	1.00 (0.96, 1.04)	
P value	0.014	0.839	
F20–F29			
Percent cumulative admissions	13.4 (3020)	13.6 (3032)	14.1 (2786)
OR	0.94 (0.89, 0.99)	0.96 (0.91, 1.01)	
P value	0.023	0.123	
F30–F39			
Percent cumulative admissions	26.5 (5977)	26.3 (5862)	25.9 (5101)
OR	1.03 (0.99, 1.08)	1.02 (0.98, 1.07)	
P value	0.170	0.306	
F40–F48			
Percent cumulative admissions	7.5 (1701)	7.5 (1660)	7.2 (1419)
OR	1.05 (0.98, 1.13)	1.04 (0.96, 1.12)	
P value	0.191	0.320	

Age is presented as mean (SD), female sex and cumulative admissions as percentage (number), and OR (95% confidence interval). Abbreviations: ICD-10, International Classification of Diseases; OR, Odds ratio. ICD codes represent: mental disorders due to known physiological conditions (F00–F09), mental and behavioral disorders due to psychoactive substance use (F10–F19), schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders (F20–F29), mood [affective] disorders (F30–F39), anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders (F40–F48), behavioral syndromes associated with physiological disturbances and physical factors (F50–F59), disorders of adult personality and behavior (F60–F69), intellectual disabilities (F70–F79), pervasive and specific developmental disorders (F80–F89), behavioral and emotional disorders with onset usually occurring in childhood and adolescence and unspecified mental disorder (F90–F99).

(13,469), a significant increase in the percentage of urgent admissions was observed in 2020 (62.9%) as compared to 2019 (60.6%) and 2018 (59.7%) (Table 1). Compared to this study period, OR for proportion were 0.87 (0.84, 0.91) and 0.91 (0.87, 0.95) for 2018 and 2019, respectively (both $p < 0.00001$; Table 1). Percentage of involuntary psychiatric admissions also significantly increased in 2020 and OR compared to this study period ranged from 0.86 (0.81, 0.93) in 2019 ($p < 0.0001$) to 0.88 (0.82, 0.95) in 2018 ($p < 0.001$). Proportion of fixation/coercive medication significantly increased in 2020 as compared to 2019 [OR 0.86 (0.77, 0.95); $p = 0.004$], whereas it decreased as compared to 2018 [OR 1.25 (1.14, 1.38); $p < 0.00001$] (Table 1).

3.2. Specific psychiatric diagnosis groups studied

When further subdividing the psychiatric diagnoses, significant differences were seen in the comparison of 2018 and 2020 in specific diagnosis groups but not between 2019 and 2020. Proportion of cumulative admissions increased for F10–F19 and F20–F29 with OR compared to 2020 being 0.95 (0.91, 0.99; $p = 0.014$) and 0.94 (0.89, 0.99; $p = 0.023$), respectively (Table 1). In contrast, there was a significant decrease for F00–F09 in 2020 as compared to 2018 [OR 1.15 (1.08, 1.22); $p < 0.00001$] (Table 1).

4. Discussion

To the best of our knowledge, no study so far has assessed urgent and involuntary psychiatric admissions over the whole pandemic year 2020. In the current study, it is shown for the first time in a large inpatient sample (total $n = 64,502$) that the proportion of urgent and involuntary admissions for all psychiatric diagnoses significantly increased in 2020 as compared to 2018 and 2019. This increase might have been caused by a focus on acute psychiatric care due to shifting of health care towards COVID-19 treatment (Ambrosetti et al., 2021; Bojdani et al., 2020). Restrictions imposed by governments might have tightened admission criteria for less urgent admissions and led to a relative increase in the proportion of urgent and involuntary admissions even though psychiatric wards are a more independent department from the rest of the tertiary care system (Fasshauer et al., 2021b). In addition, the adverse impact of COVID-19 on mental health might have also contributed to the current findings (Brooks et al., 2020).

Urgency of psychiatric admissions is also significantly higher in an independent study from an emergency department in Switzerland comprising 579 and 702 consultations during the partial lockdown (April 1, 2020 and May 15, 2020) and a control period, respectively (Ambrosetti et al., 2021). In agreement with our findings, the proportion of involuntary admissions also significantly increased during the partial lockdown period in this study (Ambrosetti et al., 2021). In contrast, involuntary admissions are not changed during the lockdown (March 16, 2020 and May 12, 2020) as compared to a previous year control in a study from Australia comprising a total of 213 patients (Itrat et al., 2020). The discrepant results might be well explained by the different treatment characteristics and patient numbers. Thus, not only inpatient care but also community care units are included in the study from Australia (Itrat et al., 2020). The perspective of community-based mental health care units during the COVID-19 pandemic must be considered in this context. International models indicate the importance of multi-professional community-based care structures, particularly for people with severe and acute mental illnesses (Malone et al., 2007; National Institute for Health and Care Excellence (NICE), 2014). It needs to be assessed in further studies whether shifts towards acute care and changes in proportion of urgent and involuntary admissions during the pandemic might affect long-term outcome in psychiatric patients over the whole range of disease severity.

In the present study, coercive measures in the pandemic year 2020 are significantly higher as compared to 2019. This might well reflect higher use of coercive procedures because of more acute inpatient

treatment (Gather et al., 2021). Interestingly, coercive measures in the pandemic year 2020 are significantly lower as compared to 2018. It is important to note in this context that coercive medication and psychiatric hospitalization ordered by the court have undergone profound changes during the past years in Germany (Adorjan et al., 2021; Gather et al., 2021; Roick et al., 2008). Until 2019, there has been a trend towards more restrictive use of coercive measures and involuntary hospitalization undergoing ethical and legal requirements. Time trends in use of coercive measures independent of the pandemic need to be studied in future years.

In the current study, no consistent significant differences are seen comparing the proportion of specific psychiatric disorders during the COVID-19 pandemic with previous years. Only the diagnosis groups F10–F19 and F20–F29 show a numerical increase in the percentage of cumulative admissions in 2020 as compared to the previous years. It is interesting to note in this context, that recent reports indicate an increase in the utilization of psychiatric treatment for these diagnosis groups (Esposito et al., 2021; Melamed et al., 2020). It needs to be assessed in further studies, whether specific psychiatric disorders will be more affected by the COVID-19 pandemic in the future (Ambrosetti et al., 2021; Tromans et al., 2020). In addition, more work is needed to examine the influence of changes in number of inpatient treatments on outpatient care for psychiatric disorders. Furthermore, it needs to be assessed in which way the COVID-19 pandemic has affected outpatient psychiatric care structures in general (Mangiapane et al., 2020).

Strengths of the study include the large sample size from a regionally diverse German hospital network. Limitations include the retrospective nature of the analysis. Furthermore, data from an administrative, multi-center dataset were studied which were not stored for research purposes but for remuneration reasons.

Taken together, the present study shows that concerning urgent psychiatric admissions, the proportion increased whereas the total number decreased in 2020 as compared to 2018 and 2019. Furthermore, the proportion of involuntary admissions increased in 2020 even though the absolute numbers remained fairly stable over the three years. The long-term impact of these COVID-19 pandemic-related trends on psychiatric health care needs to be assessed in further studies.

Author contribution

Jonathan Mathias Fasshauer: Conceptualization, Methodology, Writing - Original Draft, Visualization. **Andreas Bollmann:** Formal analysis, Investigation, Software, Writing - Review & Editing. **Sven Hohenstein:** Formal analysis, Investigation, Software, Writing - Review & Editing. **Konstantinos Mouratis:** Formal analysis, Investigation, Software, Writing - Review & Editing. **Gerhard Hindricks:** Writing - Review & Editing, Supervision. **Andreas Meier-Hellmann:** Writing - Review & Editing, Supervision. **Ralf Kuhlen:** Writing - Review & Editing, Supervision. **Andreas Broocks:** Writing - Review & Editing, Supervision. **Georg Schomerus:** Conceptualization, Methodology, Writing - Original Draft. **Katarina Stengler:** Conceptualization, Methodology, Writing - Original Draft, Project administration.

Declaration of competing interest

None.

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