

**BRIEF REPORT**

# Effects of COVID-19 pandemic on mental health outcomes in a cohort of early psychosis patients

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**Abstract**

**Aim:** To evaluate the impact of the COVID-19 pandemic on clinical outcomes, we used data from Electronic Health Records from 128 patients receiving care at a First Episode Psychosis clinic.

**Methods:** Rates of admission or emergency room (ER) visits from January 2020 to July 2020 were analysed using difference-in-difference regression. We used the same weeks in 2019 to control for seasonality.

**Results:** We found 17 hospitalizations or ER visits between 1 January 2020 and 13 March 2020 (incidence rate: 71.4 events/1000 person-weeks) and 6 between 14 March 2020 and 20 June 2020 (incidence rate: 18.5 events/1000 person-weeks) for an incidence rate ratio of 0.26. The severity of presentation worsened after transition to telemedicine. No signs of significant interruptions of care were found.

**Conclusions:** We report that patients have avoided accessing higher levels of care, except in extreme cases. We argue that this is not a sustainable trajectory and that public health actions are required.

**KEYWORDS**

coronavirus 19, employment, hospitalizations, schizophrenia, substance abuse

## 1 | INTRODUCTION

The COVID-19 pandemic has adversely impacted individuals with psychiatric disorders directly (given their high burden of medical comorbidities) (Druss, 2020; Tsai & Wilson, 2020) and indirectly (due to the stresses of social isolation, care disruption due to logistical barriers and engagement issues impeding the implementation of telemedicine, physical inactivity, job losses, poverty, and food insecurity) (Campion et al., 2020; Talley et al., 2020). There is a growing literature describing the early stages of these developments, with online surveys showing self-reported interruption of care, worsening of psychiatric condition, reduced medication adherence, and concerns for access to treatment and loss of income (Zhou et al., 2020). Survey studies are subject to multiple biases (e.g., sicker patients

selectively responding, or clinical status affecting perception), and they cannot capture the evolving clinical condition of people with psychiatric disorders during the pandemic. Medical record reviews can provide valuable additional information in this context, as they can be used to chart symptomatic course as well as to inspect prescription fills, substance abuse, or employment status, among other parameters.

Individuals receiving care for a first episode of psychosis (FEP) constitute a unique population within psychiatry, given the enormous positive and negative impact that interventions at this stage yield on long-term outcomes (McGorry & Mei, 2018). Thus, it is of special importance to understand the impact of the COVID-19 pandemic on FEP patients and adapt care delivery based on this information to optimize outcomes in this population. In this study, we analysed

medical record data to compare post-pandemic clinical outcomes to control periods before the pandemic.

## 2 | METHODS

We used data from the Electronic Health Records (EHR) to identify all active patients receiving care at McLean OnTrack, McLean Hospital's subspecialty FEP clinic (Shinn et al., 2017). We extracted information available at each clinical encounter from 1 January 2019 to 20 June 2019 and 1 January 2020 to 20 June 2020. Clinical encounters occur on a weekly, fortnightly, or monthly basis depending on clinical status. Patients could enter the cohort (i.e., enrol to our program) at any time within that time window. Patients who were lost-to-follow-up (i.e., did not reach 20 June 2020 enrolled in our cohort) contributed with information only during the weeks that they remained enrolled. The study was approved by the MassGeneral Brigham institutional review board.

### 2.1 | Covariates

Demographic and past psychiatric information was extracted from the admission interview. At each clinical encounter, we extracted information on symptomatic status (by means of MIRECC GAF scores, which is measured from 0 to 100 and higher scores imply better symptomatic profile) (Niv et al., 2007), medication type, medication dosage (using chlorpromazine equivalents [CEQ]) (Leucht et al., 2016), adherence (using the Brief Adherence Rating Scale [BARS], which uses a visual analogue to assess the proportion of doses taken by the patient since the last visit, between 0% and 100%) (Byerly et al., 2008), substance abuse (measured as times per week of each substance reported), and employment and education status. All hospital admissions, as well as emergency room (ER) visits, were recorded. The severity of the presentation at hospital admission was assessed using a composite score including involuntary commitment, police involvement, behavioural component (bizarre, aggression, or assault), and degree of suicidality (ideation, plan, or attempt). We defined interruption of care in the context of COVID-19 as no telemedicine visits in a patient who was active as of 1 March 2020.

### 2.2 | Statistical analysis

The incidence rate ratio of hospitalizations and ER visits was calculated by comparing the incidence rates for the pre-period (1 January–13 March) and post-period (14 March–20 June) in 2020. The series of weekly counts were assumed to follow a zero-inflated Poisson distribution allowing for overdispersion to plot their trajectory. Observed trajectories of symptoms scores, proportion of employment, and substance abuse were also plotted. To test whether changes were due to seasonal trends, rates for the same weekly periods between 1 January and 20 June in 2019 and 2020 were recorded. We adopted a

difference-in-difference model where the effect of the transition to telemedicine was assessed by an interaction term between an indicator of week after 13 March and year (Table S1, Supporting Information). To assess the gradual effects of the transition over time, we included an interaction term between week and the indicator of post-transition when appropriate. Two sensitivity analyses were conducted. First, since MIRECC GAF score assignment based on clinic encounter notes can be imprecise and subject to bias, we explored changes in the trends of medication dosage. Finally, to properly deal with losses-to-follow-up, we used inverse probability of censoring weights [IPCW]) (Robins & Finkelstein, 2000) using all variables in Table 1.

## 3 | RESULTS

Clinical and demographic characteristics of the sample are shown in Table 1. Overall, 80 of subjects were active by 1 January 2019 (defined as having the intake interview before 2019) and provided a median of 32.7 months (IQR: 17.5–51.4) of data. The remaining 48 patients entered the cohort between 1 January 2019 and 24 March 2020. Two patients were enrolled in 2020. Interruption of care was observed in five patients (3.9%). Eight patients (6.3%) reported experiencing symptoms compatible with COVID-19. Of these, five

**TABLE 1** Baseline characteristics of study patients

| Baseline characteristic                          | Entire cohort (n = 128) |
|--|-------------------------|
| Age, years – mean (SD)                           | 22.4 (3.8)              |
| Female sex – n (%)                               | 30 (23.4)               |
| Black – n (%)                                    | 10 (7.8)                |
| Past hospital admissions – median (IQR)          | 1 (0–2)                 |
| Diagnosis – n (%)                                |                         |
| Bipolar disorder                                 | 59 (46.0)               |
| Schizophrenia                                    | 40 (31.3)               |
| Schizoaffective                                  | 17 (13.3)               |
| Psychiatric and clinical comorbidities – n (%)   |                         |
| Substance abuse                                  | 26 (20.3)               |
| ADHD   | 10 (7.8)                |
| Anxiety disorder                                 | 9 (7.0)                 |
| Asthma   | 3 (2.3)                 |
| Immunocompromise (HIV, other)                    | 3 (2.3)                 |
| Obesity  | 15 (11.7)               |
| Education, living, and employment status – n (%) |                         |
| High school graduate                             | 89 (69.5)               |
| College graduate                                 | 21 (16.4)               |
| Living alone                                     | 11 (8.6)                |
| Quarantine with – n (%)                          |                         |
| Family   | 50 (39.1)               |
| Alone  | 5 (3.9)                 |
| Significant other                                | 7 (5.5)                 |

were tested and all tests were negative. Of the 352 individual visits occurring after 13 March 2020, 331 were through videoconference (94%) and 14 via phone (4%). The median interval between visits before transition to telemedicine for the entire cohort was 31.5 days (IQR: 26.5–53.1) and after the transition was 21.0 days (IQR: 14.0–28.0).

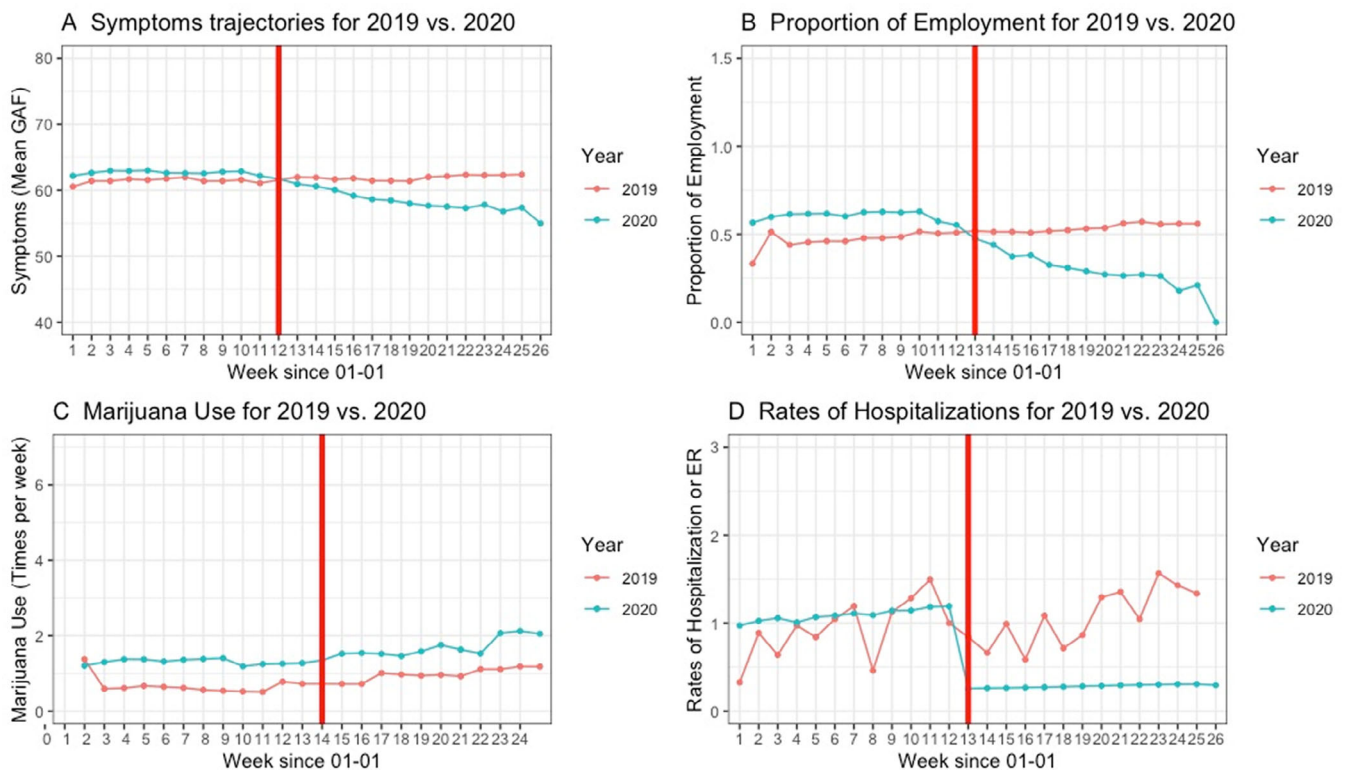
The effects of the transition to telemedicine are shown in Figure 1. There were a total of 17 hospitalizations or ER visits between 1 January 2020 and 13 March 2020 (incidence rate: 71.4 events/1000 person-weeks) and 6 between 14 March 2020 and 20 June 2020 (incidence rate: 18.5 events/1000 person-weeks) for an IRR of 0.26 (95% CI: 0.18–0.36). The severity of presentation at the time of admission deteriorated, with a mean increase of 1.35 points in our composite score (95% CI: 0.06–2.63). Specifically, 21% of admissions were involuntary before the transition while all of them were after the transition; moreover, the prevalence of suicide attempts in the context of hospital admission was 2.6% before and 25% after.

A worsening in the trend of symptomatic status was observed in the pandemic context. In 2020, average MIRECC GAF symptomatic scores after the stay-at-home order was instituted were, on average, an additional 4.83 points lower (95% CI: 3.85–5.81) lower than before the orders in the same year, as compared to the same difference in 2019, with an expected decay of 0.18 points per week (95% CI: –0.03 to 0.40). Estimates were practically unchanged using IPCW (4.68, 95% CI: 3.69–5.68). Antipsychotic medication use increased in the post-period (5.4 higher CEQ, 95% CI: –3.95 to 14.67). Employment status

deteriorated notably: in 2020, average employment after the stay-at-home order was instituted was, on average, an additional 38.0% (95% CI: 30.4–45.8) lower than before the orders in the same year, as compared to the same difference in 2019. There was a small increase in the trend of alcohol use—measured as times per week of use—as compared to pre-pandemic weeks (0.16, 95% CI: –0.32 to 0.64) but not for marijuana (–0.12, 95% CI: –0.50 to 0.25). Finally, a decrease for self-reported adherence was observed (3.78 points in the BARS scale, 95% CI: 1.62–5.95), also showing a gradual decrease of 0.8% per week (95% CI: 0.26–1.28).

## 4 | DISCUSSION

In this clinical cohort of FEP patients, we used EHR data to demonstrate significant reductions in hospitalizations and ER visits with an accompanying increase in severity of presentations after institution of 'stay-at-home' orders due to the COVID-19 pandemic. These observations are in keeping with recent reports in cardiovascular and other clinical areas (Solomon et al., 2020). On the other hand, we found no significant interruptions in clinical care; there was a low proportion of patients not having telemedicine visits and interval between two consecutive visits was significantly shortened after the transition. Despite these encouraging findings, there were also signs of underlying clinical deterioration of this cohort, eroding medication adherence, and abrupt socio-economic consequences in this population.



**FIGURE 1** Trajectories of symptomatic scores (a), employment status (b), marijuana use (c), and hospitalization and ER visits (d) before and during the COVID-19 pandemic in 2020 and during the same period in 2019

Some limitations need to be considered when appraising these results, namely that the study sample comes from a single centre, and that symptomatic, employment, and education status information was extracted from EHR and is usually based on self-report from the patient to the clinician, and could reflect reporting errors. Future studies should validate our findings using different data sources. Finally, we were unable to evaluate challenges associated with the transition to telemedicine visits that could help explain symptomatic deterioration (e.g., length of the visit, engagement of the client, aversion of clients to full disclosure of symptoms in this context). Taken together, our results indicate that this cohort of FEP patients have by and large remained in ongoing routine care during the COVID-19 pandemic but they have avoided accessing higher levels of care except in extreme cases despite concerning clinical and socio-economic developments. This is not a sustainable trajectory for the FEP population, and clinicians caring for these patients need to be prepared for the accumulation of adverse developments to translate to abrupt clinical events. In addition, new and innovative approaches for FEP care may be needed to improve outcomes, since we observe deterioration despite normal or supra-normal numbers of routine clinic visits.

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#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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#### SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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