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Research Article

The next pandemic: impact of COVID-19 in mental healthcare assistance in a nationwide epidemiological study



Felipe Ornell^{a,b,*}, Wyllians Vendramini Borelli^c, Daniela Benzano^{a,b},
Jaqueline Bohrer Schuch^{a,b}, Helena Ferreira Moura^{a,b,d}, Anne Orgler Sordi^a,
Felix Henrique Paim Kessler^{a,b}, Juliana Nichterwitz Scherer^a, Lisia von Diemen^{a,b}

^a Hospital de Clínicas de Porto Alegre, Center for Drug and Alcohol Research, Ramiro Barcelos Street, 2350, Santa Cecília, Porto Alegre, RS, Brazil

^b Universidade Federal do Rio Grande do Sul, Faculty of Medicine, Graduate Program in Psychiatry and Behavioral Sciences, Ramiro Barcelos Street, 2350, Santa Cecília, Porto Alegre, RS, Brazil

^c Hospital de Clínicas de Porto Alegre, Neurology Service, Ramiro Barcelos Street, 2350, Santa Cecília, Porto Alegre, RS, Brazil

^d Universidade de Brasília, Faculty of Medicine, Department of Psychiatry, Brasília DF, Brazil

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ABSTRACT

Background: Studies have reported the worsening of psychiatric symptoms during the COVID-19 pandemic. However, few studies have evaluated the impact on the access to mental health services during COVID-19. Our aim was to analyze temporal trends and prediction of appointments held in Brazil's public health system, to compare the observed and expected number of mental healthcare appointments during the COVID-19 pandemics.

Methods: An ecological time-series study was performed, analyzing mental health appointments before and during the pandemic (from 2016 and 2020) from the Brazilian governmental database. The structural break in the data series was assessed using the Chow test, with the break considered in March 2020. Bayesian structural time-series models were used to estimate current average appointments and the predicted expectation if there was no pandemic.

Findings: Compared to the expected, between March and August 2020 about 28% less outpatient appointments in mental health were observed, totaling 471,448 individuals with suspended assistance. Group appointments and psychiatric hospitalizations were also severely impacted by the pandemic (decreased of 68% and 33%, respectively). On the other hand, mental health emergency consultations and home care increased during this period (36% and 52%, respectively).

Interpretation: Our findings demonstrate a dramatic change in mental health assistance during the COVID-19 pandemic, which corroborates a recent WHO survey. This phenomenon can aggravate the mental health crisis and generate a parallel pandemic that may last for a longer time than the COVID-19 pandemic.

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* Corresponding author: Felipe Ornell. Center for Drug and Alcohol Research, Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Ramiro Barcelos Street, 2350, Santa Cecília, Porto Alegre, RS, Brazil, Zip code 90035-903. Tel.: +55 51 33596472.

E-mail address: fornell@hcpa.edu.br (F. Ornell).

Research in context

Evidence before the study

We searched PubMed and Web of Science from database inception to May 8, 2021, for studies published in English, with the terms (covid* or coronavirus or sars-cov-2) AND ((mental or psychiatr* or neurolog*) AND (health or ill* or disease*)) AND (assistance* or consultation* or appointment* or care). We found a few systematic reviews and meta-analysis that mentioned the impact of the pandemic on health services, although they all focused on individuals' psychological distress caused by the pandemic. One retrospective study measured the consequences of misdiagnosis in primary care, although it assessed only the first diagnosis. No study has actually measured the impact or the secondary consequences of lockdowns in mental health assistance. We are not aware of any large-scale data regarding the magnitude of the "harm" on mental health assistance because of the COVID-19 pandemic.

Added value of this study

To our knowledge, this is the first population-based study to evaluate the impact of the pandemic on mental health assistance provided by a large, public health system with nationwide coverage. We report that outpatient appointments, group consultations and psychiatric admissions were severely hampered by the pandemic. However, psychiatric emergency consultations and home caring increased, and suicide risk remained stable. A major strength of this study is the representativeness of the data, covering a whole nation with routinely collected health data.

Implications of all the available evidence

COVID-19 was consistently associated with increased psychological distress and the onset of psychiatric conditions. Mental health assistance is historically insufficiently funded in low and middle-income countries, even before the onset of the pandemic. Compulsory lockdowns have massively affected the poor mental health assistance. Data presented in the study represents a continental-size country with potential representativeness of a myriad of countries with weaken mental health policies worldwide. The reduction of access, with consequent increased emergency assistance, precludes a mental collapse subsequent to the COVID-19 pandemic.

1. Introduction

Since the COVID-19 pandemic was declared by the World Health Organization (WHO), countless investigations performed worldwide have demonstrated the impact of COVID-19 in global mental health. Isolation, less income, symptoms of anxiety, fear, sadness, and mourning have been widely reported during this period [1,2]. These stressors have been associated with an increased incidence of mental disorders and worsening of pre-existing psychiatric conditions [3]. In this sense, it has been suggested that concurrent to the COVID-19 pandemic there is a psychiatric epidemic with wider, longer, and still unexpected consequences [2,4,5].

The high demand for health services generated by COVID-19, aiming to contain the spread of the coronavirus, reduced or even interrupted several other health services, including non-COVID diseases, common acute care, elective surgeries, and outpatient appointments [6-8]. Moreover, it is possible that the emergency services are being prioritized at the expense of elective care, and many health professionals were relocated to assist in handling

the COVID-19 pandemic. A recent report published by WHO highlighted that essential mental health services were disrupted in 93% of countries around the world during the period of social isolation [9]. Although 89% of countries intend to invest in mental health care in response to the COVID-19 pandemic, only 17% of these countries have full funding to cover most of the recommended intervention strategies [9]. This situation ultimately hampers psychological and psychiatric appointments and care for chronic patients, worsens a ramshackle scenario of mental health worldwide. This may have aggravated a severe mental health situation in the world, previously reported by The Lancet Commission in 2018 [10].

Middle-income countries are particularly affected by the COVID-19 pandemic due to several factors, including insufficient financial health, lack of personal protective equipment, insufficient beds and supplies for treatment (i.e. mechanical ventilators) [11], shortage of human resources, and difficulty in implementing social distance measures [12,13]. This can be aggravated in countries of great territorial extension and with great socioeconomic disparities and access to health services. Among these countries, Brazil stands out for being a major epicenter of the COVID-19 pandemic, with currently the highest rate of deaths and new cases [14]. Moreover, it also presents an exceptionally high prevalence of mental disorders when compared with other middle-income countries [15]. Despite the increase in mental health care services in the last years, it is estimated that 77% of the Brazilian population still lives in areas with insufficient mental assistance (less than 50% of the area is covered) [16]. Brazil, like other countries, is currently experiencing a politic and economic crisis [17], which can reflect and impact mental illness, exacerbating disparities in health care, especially for patients in situations of social vulnerability [18]. Overall, it is expected that the mental health burden and demand will increase [15,19-21], leading to an overload of the mental healthcare system soon.

Brazil has an organized system that includes data collection on all appointments regarding public health. This health system aims to provide free healthcare access to the whole population, including mental health assistance in outpatient services and hospital admissions. The records of appointments performed by public and/or private health systems are a proxy of the population's access to mental healthcare during the COVID-19 pandemic. For instance, European countries have reported a decrease in the number of appointments of mental health [8]. However, similar surveys should be conducted in low- and middle-income countries, to ascertain how the COVID-19 pandemic affected medical care in these countries or whether due to particular sociodemographic characteristics, the effects of COVID-19 were even more intense [12,13]. Herein, we aimed to analyze temporal trends on appointments held in Brazil's public health system (in the twenty-seven states), focusing on mental health services, from 2016 to 2020, to compare the observed and predicted number of appointments during the COVID-19 pandemic.

2. Methods*2.1. Population and health system particularities*

Brazil is a continental-size country with a population of approximately 213,308,410 individuals where healthcare services are a constitutional right [22]. The public healthcare infrastructure is based on a single, unified, and free healthcare system (Brazilian Universal Healthcare Program - "SUS"), that covers the entire country and provides outpatient and inpatient services administered by the Ministry of Health. Only 22.8% of the Brazilian population has private medical insurance, and the tendency is for this percentage to be reduced in the face an economic crisis [23].

The information about health care is recorded in the TABNET (<http://tabnet.datasus.gov.br/>), a public database developed by the Department of Informatics of the Unified Health System (DATASUS) of the Ministry of Health of Brazil. These records include the services that took place in the 27 Brazilian states and this system records all outpatient (SUS outpatient information system) and hospital (SUS hospital information system) appointments and procedures performed in the Brazilian health system [24].

Information on outpatient care was obtained from records of more than 3,000 Psychosocial Care Centers (PSCC) throughout Brazil. In these health units, mental care is provided by a multidisciplinary team (physician, psychologist, psychiatrist, social worker, nurse, occupational therapist, among others), individually or in groups. For patients who need more complete care but do not meet the admission criteria, intensive (daily) or semi-intensive (weekly) care is offered, which can be full- (short-stay admission) or part-time. Crisis intervention is offered for unscheduled patients when necessary. Severe cases that meet the criteria for inpatient treatment are referred to the hospital, where emergency rooms and inpatient treatment are available. The consultation of hospital care was carried out based on hospital records.

2.2. Study design and procedures

This is an ecological time series study. All the records concerning appointments and procedures of mental health in outpatient and inpatient services were collected in the TABNET database in January 2021, encompassing the period between January 2016 and August 2020, which includes a period corresponding to the first six months of the COVID-19 pandemic in Brazil (Mar 20 to Aug 20). This period was defined to compare the number of appointments, regarding mental health, before and during a COVID-19 pandemic. Since, data for this study was collected in a public database, and previous ethic committee approval was deemed not compulsory (Resolution nº 510/2016). The following variables were retrieved:

- Data collected on outpatient care:* total number of outpatient appointments, individual appointments, individual psychotherapy, first referral appointments, crisis appointments, intensive follow-up, home appointments, short stay admission (< 14 days), group appointments (including group psychotherapy).
- Data collected on inpatient assistance:* total number of psychiatric hospitalizations, psychiatric hospitalization days, psychiatric hospitalization days for drug abuse (alcohol and other drugs), psychiatric hospitalization for suicide risk, psychiatric hospitalization for other mental disorders.

More information on the registration of healthcare assistance according to TABNET is provided in the Supplementary material.

2.3. Statistical analysis

The numbers of visits before and during the COVID-19 pandemic over the years were analyzed. Initially, data was extracted from DATASUS to identify the total number of mental health consultations performed each month, according to the categories previously presented. Statistical analysis was performed in R version 4.0.2.

The structural break in the data series was assessed using the Chow test, with the break considered in March 2020. The Chow test checks whether there was a structural break in the period fixed, and it is ideal for testing a possible structural break when we know *a priori* the break date. The test is performed dividing the sample in two sub-periods (before and after March 2020), estimating the parameters for these sub-periods considering the actual number of appointments, and using the F statistic to test the

equality of the parameter. Moreover, to estimate the current average number of visits, and the predicted number if there was no COVID-19 pandemic, a Causal Impact R package for causal inference using Bayesian structural time-series models was used. This model was used to try to predict the counterfactual, that is, how the consultations would have evolved after the breaking point (March 2020) if the pandemic had never occurred.

2.4. Ethics committee approval

Investigations using public databases do not need approval by ethics committees, according to Brazilian law.

Role of the funding source

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

3. Results

There was a monthly average of 1,188,860 outpatient appointments for mental health during the COVID-19 pandemic from March to August 2020. The Chow test indicates a break in all appointments analyzed, corroborated by Bayesian analyses that show differences in the number of observed appointments compared to what should be expected (Table 1 and Figure 1 – in blue the expected number of appointments according to the prediction, which is based on data from previous months [January 2016 to March 2020]). Overall, compared with the expected number of outpatient consultations on mental health before the COVID-19 pandemic, an average of 471,448 fewer appointments were reported during the COVID-19 pandemic period of six months (total outpatient appointments: -28%, CI 95%: -45% to -12%, Table 1), ultimately leading to a reduced number of mental health diagnosis (-49%, 95% CI -59% to -40%). Among all outpatient appointments, group appointments showed the most dramatic decrease (-68%, 95% CI -81% to -56%), followed by intensive follow-up care (-44%, CI 95%: -56% to -32%) and individual psychotherapy sessions (-41%, 95% CI -53% to -30%). On the other hand, home appointments increased in 52% ($p < 0.001$, Table 1), but not in the same magnitude of appointments no performed (raw decrease in total appointments = 471,448 vs. raw increase in home appointments = 7583). Individual appointments were not affected. ($p = 0.291$). Notably, there was an average increase of 7,445 crisis appointments (36%, Table 1) in outpatient services than expected during the COVID-19 pandemic period. A similar scenario was observed for short stays admission, which increased 21% (95% CI 8.5% to 35%) during the same period.

Regarding inpatient care, there was a 33% (95% CI -45% to -20%, $p < 0.001$) decrease in the total number of hospital admissions during the COVID-19 pandemic (Table 1). The average number of appointments observed in this period was 289,279, while the expected average number of consultations was 430,396 (95% CI 374,190 to 483,024). Daily psychiatry treatment for patients admitted showed a decrease of 66% (95% CI -105% to -29%) in the period aforementioned. Drug and substance abuse admissions also decreased, as well as other mental disorders ($p < 0.01$ for both). However, suicide risk for admitted patients remained stable ($p = 0.235$).

4. Discussion

To our knowledge, this is the first study to estimate the impact of the COVID-19 pandemic on the total number of mental health appointments in a large, nationwide public health system in

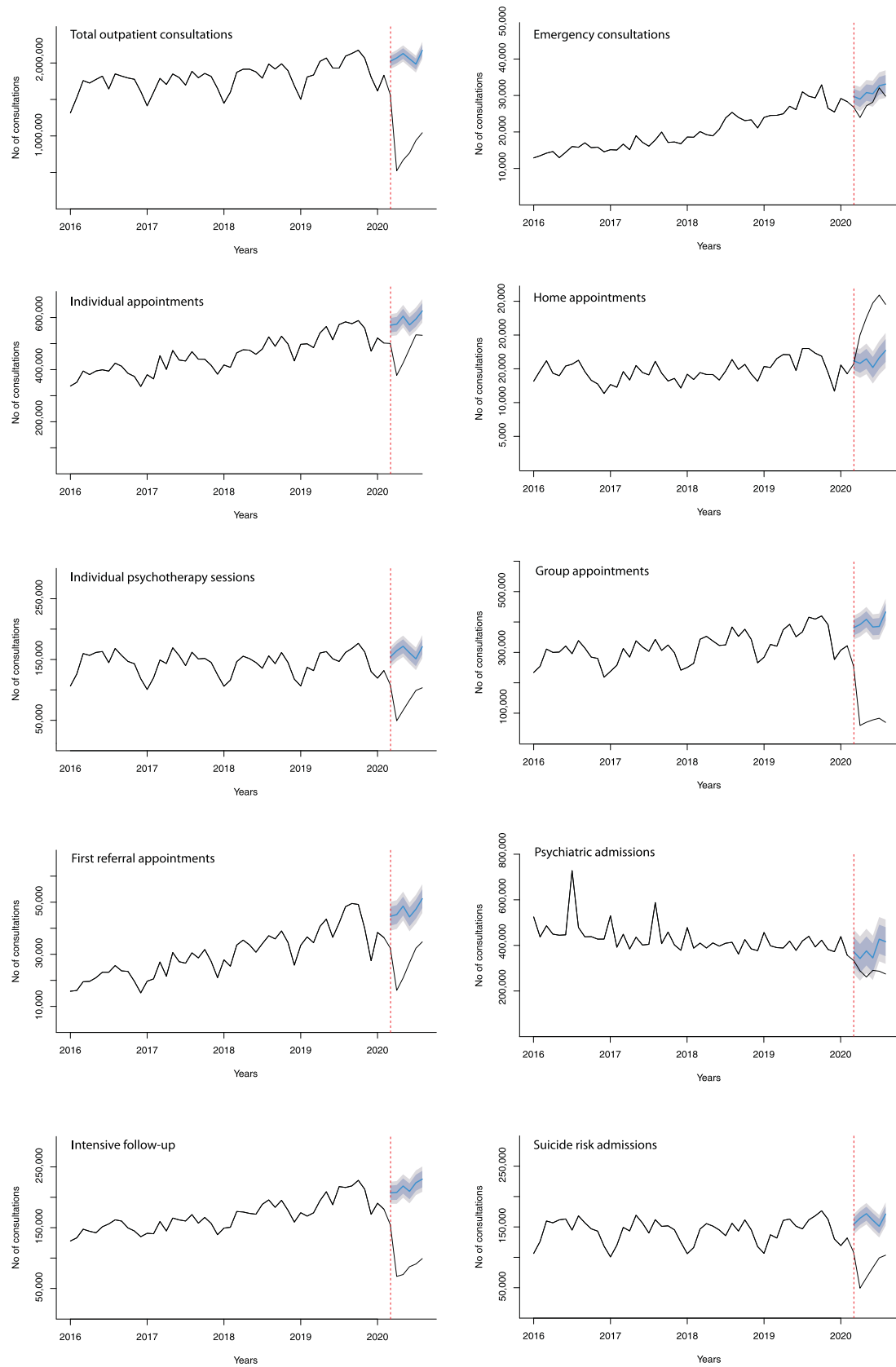


Figure 1. The impact of COVID-19 in temporal trends and prediction analyses of mental health appointments from 2016 to 2020. The blue line represents the expected number of appointments according to the prediction, which is based on data from previous months (January 2016 to March 2020).

Table 1

Comparison between an average number of mental health appointments and its predicted expectation based on previous years (2016-2019), for both outpatient and inpatient care from March to August 2020 in Brazil.

| | Average during the pandemic | Prediction*(95%CI) | Relative effect (95%CI)* | Bayesian p-value ** | Chow test p-value *** |
|--|-----------------------------|---------------------------------------|--------------------------|---------------------|-----------------------|
| Outpatient appointments | | | | | |
| Total outpatient appointments | 1,188,860 | 1,660,308 (1,385,237 to 1,900,000) | -28% (-45% to -12%) | 0.002 | <0.001 |
| Individual appointments**** | 474,920 | 457,073 (398,421 to 516,569) | 3.9% (-9.1% to 17%) | 0.291 | <0.001 |
| Individual psychotherapy sessions | 84,956 | 143,353 (127,796 to 160,468) | -41% (-53% to -30%) | 0.001 | <0.001 |
| First referral appointments | 27,220 | 30,284 (23,142 to 37,434) | -10% (-34% to 13%) | 0.219 | <0.001 |
| Intensive follow-up | 95,435 | 169,590 (149,684 to 190,932) | -44% (-56% to -32%) | 0.001 | <0.001 |
| Crisis appointments | 28,004 | 20,559 (16,151 to 24,933) | 36% (15% to 58%) | 0.002 | 0.021 |
| Home appointments | 22,248 | 14,665 (13,220 to 16,014) | 52% (43% to 62%) | 0.001 | <0.001 |
| Short stay admission (< 14 days) | 17,603 | 14,535 (12,552 to 16,370) | 21% (8.5% to 35%) | 0.001 | 0.009 |
| Group appointments (included group psychotherapy) | 102,453 | 317,854 (279,229 to 359,170) | -68% (-81% to -56%) | 0.001 | <0.001 |
| Total general psychiatric and psychological disorders diagnosis*** | 5,140 | 10,090 (9,151 to 11,049) | -49% (-59% to -40%) | 0.001 | <0.001 |
| Inpatient appointments | | | | | |
| Psychiatric hospitalization | 289,279 | 430,396 (374,190 to 483,024) | -33% (-45% to -20%) | 0.001 | 0.014 |
| Daily psychiatry treatment | 105,581 | 312,808 (195,586 to 433,382) | -66% (-105% to -29%) | 0.001 | 0.016 |
| Drug abuse (alcohol and other drugs) | 29,239 | 38,153 (36,534 to 39,672) | -23% (-27% to -19%) | 0.001 | <0.001 |
| Suicide risk | 13,831 | 14,594 (12,538 to 16,583) | -5.2% (-19% to 8.9%) | 0.235 | <0.001 |
| Other mental disorders | 41,820 | 45,800 (42,960 to 48,613) | -8.7% (-15% to -2.5%) | 0.007 | <0.001 |

Prediction is an estimate of the predicted value in the absence of a pandemic state

Relative effect is an estimate of the relative variation of the measures after the declaration of the pandemic state

* (95%CI) credibility confidence interval

** Bayesian one sided-tail area analyzed

*** Chow test

**** Some patients may exhibit more than 1 condition

a middle-income country. Our findings demonstrate the dramatic decline of consultations and group interventions in mental health and the increase in emergency assistance since the beginning of the COVID-19 pandemic. This is in line with a recent WHO survey stating that 93% of all countries have halted mental health services during the COVID-19 pandemic [9]. As a consequence, this phenomenon can aggravate the mental health crisis and generate a parallel pandemic that may last for a long time.

Our findings indicate that an alarming number of patients had impaired mental health assistance during the pandemic, corroborating findings from previous studies conducted in Italy [25], German [26], England [6], France [27], India [28], and the United States of America [29]. Both outpatient and inpatient settings suffered consequences due to the unpreparedness in the COVID-19 care logistic and to the onset of social distancing and lockdown measures. Moreover, a recent investigation reported that depressive, anxiety, and post-traumatic stress symptoms were frequent in patients after the acute phase of COVID-19, regardless of previous psychiatric diagnosis. In fact, not all people who experience mental suffering will develop psychiatric disorders [30-32]. However, the demand for mental health care was already greater than the supply even before the pandemic, and even people who were already in health care may have had their treatment interrupted. This can lead to an increase in the global burden of disease. This highlights the need for monitoring after discharge from treatment for COVID-19. Although this is possibly due to the social and psychological context related to the disease, neurobiological mechanisms also need to be investigated [33].

In a similar way to our results regarding suicide risk, data from 21 countries show that the suicide rate was similar in the first months of the pandemic compared to the expected number based on the pre-pandemic period [34]. However, Japan has reported an increase in suicide after an initial decline during the COVID-19 pandemic [35]. Similarly, Canada estimated an increase in the number of suicides due to the impact of COVID-19 on unemployment [18]. In areas with higher levels of social inequality, this can be even more dramatic.

There might be a relationship between an increase in some treatment modalities and a decrease in others during the COVID-19 pandemic. A dramatic decrease in psychotherapy, intensive and group care was observed in Brazilian mental healthcare. Moreover, inpatient treatment, psychiatric hospitalizations and length of hospitalization were dramatically reduced, which may have overloaded PSCc with severe cases that would otherwise be referred to hospitals. Other countries also observed a reduction in hospital appointments [36]. The reduction of vacancies due to the distance between beds or even the reallocation of beds and health care workers to attend cases of COVID-19 could explain this scenario. The reduction of the aforementioned appointments together with the "pandemic fear effect" [5] may have also contributed to the increase in "crisis intervention" and semi-hospitalizations of patients who were already treated in the PSCc. Although we observed an overall increase of crisis attendance during the pandemic, there was some variations among the months for all types of appointments evaluated here [Figure 1], which may be related to lockdown measures, with reduced or increased demand according

with isolation recommendations and determinations [35,37]. Also, an increase in home appointments was observed, although insufficient to cover the increased demand for psychiatric assistance. This possible “compensatory” phenomenon could also occur in other countries that reported a decrease in mental health appointments focusing on long term and following up treatment and assistance. Indeed, several mental health conditions [i.e., psychosis, mood, and substance use disorders] need long-lasting follow-ups, controlled medication, and an outpatient setting might not be appropriate for more severe cases. Moreover, the reduction of inpatient psychiatric beds was associated with higher incarceration [38] and suicidality rates [39]. Besides that, non-pharmacological strategies are essential to improve treatment and avoid relapses or hospitalizations. Consequently, the replacement of inpatient care by emergency care and alternative consultations – which are effective in controlling psychiatric breakdowns and other momentary situation, but not to provide psychological and psychiatric support as constant care – may be responsible for the increase in worse mental health outcomes, such as suicide and drug abuse hospitalizations, which are already being reported in other countries [35,37]. Interestingly, the average of individual appointments and the search for the first psychosocial appointment remained stable in the first six months of the pandemic, although a slightly more pronounced decrease can be observed in April and May [Figure 1].

Looking at the world scenario, it is evident that new strategies to enlarge mental care should be implemented to mitigate the negative effect of the pandemic in mental health breakdown [40]. The adaptation of existing mental services is a cornerstone in assisting individuals that need long-term follow-up and also to assess populations at high risk for developing mental disorders [41]. In the face of social isolation measures, telehealth is one of the main costless and available strategies to rapidly promote access to health care and mitigate the lack of assistance [42]. A recent review discusses the advancement of health strategies during the first six months of the pandemic, which is uneven across countries [43]. It is necessary to note that in high-income countries, such as Canada, many health services already had a technological structure, so this process may have been facilitated [44]. Low- and middle-income countries, however, face a shortage of financial resources and technological structure, which can affect the implementation of these strategies [43]. In addition, it is necessary to consider that access to information and communication technologies (ICT) and the internet network is heterogeneous in Brazil, and many socially vulnerable individuals do not have access to teleconsultations. It is relevant to mention that teleconsultations can be especially difficult for patients with disabilities, ophthalmological problems, oncologic patients, the elderly, and psychiatric patients, especially with acute symptoms, including those experiencing psychotic symptoms [45-49]. Home care could also be an alternative to provide some support to patients with high demand, and our findings indicate an increase in this health service [19]. Nevertheless, Brazil’s public database does not have a specific code for remote appointments, and some appointments may have been made and recorded as “home care” or even as a usual “individual appointment”. Following this kind of strategy, many countries have implemented the use of telemedicine. Therefore, it is important to note that this type of approach should be adapted to the population characteristics (location, age, social status, access to technology) and to consider the type of intervention (i.e., screening, monitoring, counseling, emergency care, psychological first aid).

This study has some limitations, mainly related to data collected on TABNET. Despite being considered a satisfactory system and the best representative evidence of the health situation in Brazil, it is not without inconsistencies. It is necessary to consider that TABNET collects information only from public health services and not from private ones. In addition, data is subject to systematic

recording bias (errors or failures in recording information, delay in reporting, underreporting, errors in the integration of information). Still, what is registered is the service (or procedure) and not the patient, that is, a single patient can generate multiple records. Although there were occasional seasonal variations, the average number of appointments was similar over the months before to the pandemic, with a slight decrease in the vacation months (December, January to February) over the years. Data inconsistencies are constant, occurring both before and during the pandemic. Finally, in Brazil, despite the health system being unified, the strategies to fight the pandemic were heterogeneous and implemented with a different chronology between the regions, which could interfere in health assistance available. Although the TABNET platform is a great source of healthcare data in Brazil, there is a delay in updating the data. Thus, the 2021 data were not up-to-date at the time of manuscript preparation, therefore were not included in the analyses.

Although access to health has been affected in several medical specialties, it is important to consider that mental health is a historically neglected area and that the number of health services is insufficient. Stress, grief, and morbidity related to the pandemic are associated with increased psychiatric illnesses, being at odds with the decrease in demand for care. This situation can have critical negative repercussions not only in the mental area. After the development of a mental disorder, the problem is not resolved in timely intervention and the patient remains in treatment for a long time. More than that, evidence shows that there is a delay between the onset of the first mental disorder symptoms and the search for specialized care [50] which means that we will probably see the mental health consequences of the pandemic busting and seeking assistance in the next years. Given this scenario, it is possible that the health system around the world will not be able to cope with the repressed and the new demand unless countries wisely increase resources and measures to this field in a short period.

In summary, our findings may provide insights into the current mental health situation in Brazil and maybe in other countries worldwide, especially in those that were severely hampered during the pandemic. Taken together, the negative impact of COVID-19 in the socioeconomic scenario, quality of live, psychological wellness, and the changes that occurred in mental care availability worldwide will culminate in the next pandemic – a mental health collapse outbreak. Therefore, to be prepared for this worrisome scenario, we must start developing novel possibilities of prevention interventions, screening and diagnosis, treatment, and health assistance.

Contributors

FO: Conceptualization, Data curation, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing

WVB: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing

DB: Conceptualization, Data curation, Formal Analysis, Writing – review & editing

JBS: Conceptualization, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing

HFM: Conceptualization, Visualization, Writing – original draft, Writing – review & editing

AOS: Conceptualization, Visualization, Writing – review & editing

FHPK: Conceptualization, Investigation, Methodology, Project Visualization, Writing – original draft, Writing – review & editing

JNS: Conceptualization, Investigation, Methodology, Project Visualization, Writing – original draft, Writing – review & editing

LVD: Conceptualization, Investigation, Methodology, Project Visualization, Writing – original draft, Writing – review & editing.

Declaration of interests

The authors have no conflicts of interest.

Data sharing statement

Data is publicly available in TABNET. Collected data and scripts for analysis may be provided to those who ask.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.lana.2021.100061](https://doi.org/10.1016/j.lana.2021.100061).

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