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Research paper

Impact of the COVID-19 pandemic on mental health service use among psychiatric outpatients in a tertiary hospital

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ABSTRACT

Background: The aim was to explore the impact of the COVID-19 pandemic on mental health service use according to mental disorder diagnosis among psychiatric outpatients.

Methods: Psychiatric outpatient visits and patient diagnostic information were extracted from the EHR (electronic health records) of a Korean tertiary hospital during 3 months of the COVID-19 pandemic and 3 months before the COVID-19 outbreak. Visit rates of psychiatric outpatients according to primary psychiatric diagnosis category before and after the COVID-19 pandemic were compared using an over-dispersed Poisson regression model. The temporal associations between the number of daily outpatient visits and the daily number of newly confirmed cases were examined by time-series analysis within each diagnosis category.

Results: Total daily outpatient visit rate was significantly reduced during the pandemic. Among the nine most prevalent diagnosis categories, the daily visit rates for anxiety disorders, depressive disorders, and schizophrenia-spectrum disorders were significantly reduced by about 29.8%, 14.8%, and 13.3% respectively. Time-series analysis showed significant temporal correlations between the daily number of newly confirmed cases and the daily visit rates for anxiety disorders and depressive disorders, whereas patients with schizophrenia-spectrum disorders showed no significant temporal association.

Limitations: Potential confounding factors unrelated to the pandemic might have influenced the results.

Conclusions: The present findings suggest that patients with anxiety or depressive disorders may have concerns regarding the spread of COVID-19, and may be more reluctant to visit psychiatry outpatient clinics. Delivery strategies for mental healthcare services, such as telepsychiatry, would be helpful to enhance continuity of care during the pandemic.

1. Introduction

South Korea was one of the first countries outside China to face a major outbreak of coronavirus disease 2019 (COVID-19). The strong infectivity of COVID-19 and rapid increase in the number of infected people caused collective fear and health anxiety. In addition, the socioeconomic impact of COVID-19 under robust quarantine and surveillance has contributed to the development or exacerbation of various psychiatric problems. (Tull et al., 2020; Becerra-García et al., 2020; Verma and Mishra, 2020; Franchini et al., 2020; Brooks et al., 2020) An updated meta-analysis of cross-sectional community-based studies between December 2019 and August 2020 during the COVID-19 pandemic showed that anxiety in the general population increased 3-fold during the COVID-19 pandemic (estimated overall prevalence of anxiety: 25%), and that anxiety was associated with the initial or peak phase of the outbreak and several risk factors, such as the female sex, younger age, and social isolation. (Santabarbara et al., 2021) A more recent study using a large electronic health record (EHR) showed that survivors of COVID-19 were associated with an increased risk for psychiatric sequelae, and a previous psychiatric diagnosis was independently associated with an increased risk for COVID-19. (Taquet et al., 2021) While the COVID-19 pandemic could increase psychological distress and health anxiety, fear of contracting COVID-19 may increase a patient’s reluctance to visit hospitals for appointments. (Bojdani et al., 2020; Yao

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According to data from a healthcare technology company which included more than 1600 provider organizations of the United States, a substantial cumulative reduction in outpatient visits across all medical departments, including behavioral health, was reported over the course of the pandemic in 2020. (Ateev Mehrtra et al., 2021) An Italian study of a neurology outpatient clinic showed that 30% of patients suspended hospital treatments, mostly due to fear of COVID-19 infection. (Piano et al., 2020) In the field of psychiatry, another Italian study reported a reduction in the total number of voluntary psychiatry admissions in seven general hospitals of Lombardy after the COVID-19 outbreak. (Clerici et al., 2020) A recent report showed a decrease in mental health emergency service utilization in a large German psychiatric hospital during the rapid rise of the COVID-19 pandemic. (Hoyer et al., 2020) The fear or reluctance to visit hospitals in people with pre-existing mental health problems could increase the risk of discontinuation of mental healthcare service use and exacerbation of psychiatric problems. In particular, recent reports have revealed that older patients with mental disorders missed their treatments considerably after the COVID-19 outbreak. (Bojdani et al., 2020; Wong et al., 2020) While studies on mental healthcare in the pandemic have been gradually accumulated, (Rajkumar, 2020; Neelam et al., 2021; Sheridan Rains et al., 2021) there has been no study regarding the impact of the COVID-19 pandemic on the patients’ use of psychiatry outpatient services by diagnoses until the present time of March 2021. Identifying the types of mental disorder which are liable to discontinuation of mental healthcare service use during a pandemic, such as COVID-19, would be important to provide a basis for policymakers to plan appropriate delivery method and level of support for people with different mental disorders.

We aimed to explore the impact of the COVID-19 outbreak on patterns of mental health service use according to mental disorder diagnosis among psychiatric outpatients in a tertiary general hospital in Korea. Since telemedicine is still illegal in South Korea, a decrease in the number of ambulatory visits would be a parameter that can reflect a reduction in healthcare utilization. We examined the number of visits by psychiatric outpatients according to psychiatric diagnosis over 3 months (Mar 2020 - May 2020) during the COVID-19 pandemic compared to 3 months (Oct 2019 - Dec 2019) before the first confirmed case of COVID-19 in Korea (Jan. 20, 2020) (https://covid19.who.int/table). In addition, we examined whether an increase or decrease in the number of daily visits to psychiatric outpatient clinics were affected by the daily number of newly confirmed cases of the COVID-19 using a Poisson regression model with time series analysis.

2. Methods

Data source and study population

Data for daily outpatient visits to the Department of Psychiatry at Severance Hospital, one of the largest tertiary general hospitals in Seoul, were collected retrospectively through the electronic health record (EHR) system. The research site hospital provides hospital-based mental health service mostly through the outpatient clinic with no community mental health teams. Data collected from Oct. 2019 to May 2020 were chosen, as we defined the periods before and during the COVID-19 pandemic as Oct. 2019 to Dec. 2019 and Mar. 2020 to May 2020, respectively. The first case of COVID-19 in South Korea was confirmed on January 20, 2020, and the daily confirmed COVID-19 cases started to exceed 100 from February 22, 2020. Visits to faculty members who consistently worked during both periods were included, and visits to faculty members who moved to a different workplace during either of the two periods were excluded to control for confounding effects associated with physician availability. Patients aged under 18 years were excluded. Data were de-identified prior to use. The daily number of confirmed COVID-19 cases in South Korea was obtained from the WHO Coronavirus Disease Dashboard (https://covid19.who.int/table). This study was approved by the Severance Hospital Institutional Review Board.

Variables

We collected the following data for each visit: patient age, date and day of visit, psychiatric diagnoses, and whether each diagnosis was definite or putative. Then we selected only one primary definite psychiatric diagnosis per visit in the order of priority. All primary diagnoses by the International Classification of Diseases 10th revision (ICD-10: F0. x-F9.x) were categorized into clinically distinct groups. The following nine diagnosis groups were selected as the most prevalent among adult psychiatric outpatients at the tertiary hospital:

- Neurocognitive disorders, delirium, and other organic mental disorders (F0.x),
- “Schizophrenia spectrum disorders (F2.x),” “Bipolar disorders (F30.x, F31.x),” “Depressive disorders (F32.x-F39.x),” “Anxiety disorders (F40.x, F41.x),” “Obsessive-compulsive disorders (OCU) (F42.x),” “Stress-related disorders (F43.x),” “Somatoform disorders (F45.x),” and “Sleep-related disorders (F51.x, G47.x).”

The primary variable was set as the daily number of visits.

Analytical procedures

We first investigated whether daily outpatient visit rates to the department of psychiatry were affected by COVID-19. To compare the daily number of outpatient visits during the two periods, before and during the COVID-19 pandemic, we used a Poisson regression model of the observed daily number of outpatient visits and the logarithm of daily session number was included as an offset. As overdispersion was observed in the Poisson model, we adjusted for the day of the week and a overdispersion parameter. The overdispersion parameter was estimated using the Pearson’s Chi-squared statistic. We performed subgroup analysis by psychiatric disorder group in the same way. In addition, since sex and age are important variables that can influence risk perception of the COVID-19 pandemic and unwillingness to visit healthcare service, (Bojdani et al., 2020; Wong et al., 2020; Mehra et al., 2020; Liu et al., 2020; Banerjee, 2020) the effect of sex and age was examined. In the analysis by age groups, subjects were divided into three age groups; young age group (18 to 35 years old), middle age group (36 to 55 years old), and old age group (56 years old or more). We determined the age boundaries according to a previous Korean psychiatric study. (Kim and Yoon, 2018)

We then investigated the short-term effects of new daily confirmed COVID-19 cases on psychiatric outpatient clinic visits by time-series analysis using an overdispersed Poisson regression model for those psychiatric disorders with significant changes. By averaging the new daily COVID-19 cases leading up to and including the day of the visit, we constructed cumulative lag variables, lag3, lag7, and lag14, to examine the association. We adjusted for the day of the week as a covariate.

The SAS version 9.4 (SAS Institute, Cary, NC) was used for statistical analyses. A two-sided P-value less than 0.05 was considered statistically significant and the Bonferroni-adjusted method was used for the multiple comparisons.

3. Results

The total daily outpatient visit rate, or the number of visits per day, during the period from March 1, 2020 to May 31, 2020 (n = 12,119, mean age, 47.8 years; 59.9% female) was reduced by about 13.1%, compared to the visit rate from October 1, 2019 to December 31, 2019 (n = 14,053, mean age, 48.3 years; 61.0% female). This reduction was statistically significant after adjustment for confounders including the daily session number of psychiatric outpatient clinics and the number of working days during each period. In addition, reduction in the total daily outpatient visit rate was observed in both males (RR = 0.900) and females (RR=0.849) (Figure S1). In the analysis by age groups, the
reduction was also found in all the three age groups, and the reduction was observed to be larger in the old age group compared to young age group (RRs in young, middle, and old age group, 0.919, 0.876, and 0.824, respectively) (Figure S1).

Among the nine most frequent diagnosis groups, the relative risks (RRs) were statistically significant in the “schizophrenia spectrum disorders” group, “anxiety disorders” group, and “depressive disorders” group, while the other six groups showed no statistically significant changes between the two periods (Table 1). The “anxiety disorders” group showed the greatest reduction in the visit rate of 29.8%. Findings and detailed statistics from the subgroup analyses by sex or age groups in the “schizophrenia spectrum disorders” group, “anxiety disorders” group, and “depressive disorders” group are presented in Supplementary materials (Table S1, S2).

Among the three diagnosis groups that were shown to be significantly affected after the pandemic, the “anxiety disorders” group and “depressive disorders” group showed a significant temporal association between the daily outpatient visits and the daily number of newly confirmed cases of COVID-19. Outpatient visits among the “anxiety disorders” group decreased by an average of about 5.8% during lag 3 days, 5.5% during lag 7 days, and 5.7% during lag 14 days per 100-case daily increase in the newly confirmed COVID-19 cases. For depressive disorders, a 100-case daily increase in newly confirmed cases corresponded to a 4.0% decrease (lag3), 3.9% decrease (lag7), and 4.6% decrease (lag14) in visit rates. On the other hand, the “schizophrenia spectrum disorders” group did not show any significant temporal association with the daily increase in newly confirmed cases (Table 2). Fig. 1 shows the trend lines of daily outpatient visits corresponding to the trend lines of daily confirmed COVID-19 cases in the “anxiety disorders” group and “depressive disorders” group.

4. Discussion

To the best of our knowledge, this is the first study to investigate the effect of the COVID-19 pandemic on mental healthcare service use of outpatients according to psychiatric diagnoses. The present study showed significant decreases in psychiatric outpatient visit rates during the COVID-19 outbreak, in particular for anxiety disorders, depressive disorders, and schizophrenia-spectrum disorders. Our findings suggest that outpatients with mental health problems had poorer access to appropriate psychiatric care during the COVID-19 pandemic. Since the pandemic could increase the risk of psychiatric problems and exacerbate mental health conditions, (Zhou et al., 2020; Huang and Zhao, 2020; Frank et al., 2020) the actual reduction rates in mental health service use may be even larger than those shown in the present results. Therefore, unmet clinical needs related to psychiatric problems under viral outbreaks like COVID-19 are a critical concern, and strategies are needed to enhance continuity of mental healthcare and improve delivery to mental healthcare services.

In particular, in a time-series analysis, significant temporal correlations were found between the daily number of newly confirmed cases of COVID-19 and daily visit rates among outpatients with anxiety disorders and depressive disorders. Among anxiety disorders, a 100-case daily increase in new confirmed cases corresponded to a 5.8% decrease (lag3) and 5.5% decrease (lag 7) in the visit rates. These results indicate that patients with anxiety or depressive disorders tended to have more sensitive responses to changes in the risk of viral infection and were reluctant to seek mental healthcare services, possibly due to concerns regarding the spread of COVID-19 in healthcare settings. In addition, individuals with anxiety-related disorders are more frightened about COVID-19 infection and more likely to self-isolate than those without mental disorders. (Asmundson et al., 2020) Since those with excessive worry, contamination fear, and health anxiety tend to engage in avoidant behaviors, anxious or depressive patients may even become housebound. (Asmundson and Taylor, 2020; Taylor and Asmundson, 2020) In addition to patient-related factors, various other factors, such as operational changes related to the pandemic, could contribute to the findings of reduced ambulatory visits. Since remote healthcare services are prohibited under the Korean medical regulations, the reduction of in-person psychiatric outpatient visits in the present Korean study is unlikely to be related to alternative healthcare service use of telemedicine. A possible explanation is that the patients may utilize primary hospital near their homes transiently under social distancing guidelines. Another explanation is that psychiatrists may have prescribed medications for longer durations at the preceding appointment to avoid overcrowding in hospitals or due to concerns of potential travel restriction, although South Korea has not enforced travel restriction in the COVID-19 pandemic.

On the other hand, while visit rates to mental healthcare services among outpatients with schizophrenia-spectrum disorders were significantly reduced after the COVID-19 outbreak compared to before the outbreak, their daily visit rates showed no significant temporal association with the daily number of newly confirmed cases of COVID-19. The different results between the psychosis group and neurosis group of anxiety and depression suggest that the decrease in mental healthcare service use seen in schizophrenic patients might be associated with reasons other than fear or health anxiety related to viral spread. Under the unique situation created by the COVID-19 pandemic, decreased casual contacts might have burdened schizophrenia-spectrum disorder patients with decreased social support and changes in routine, increasing their risk of symptom aggravation or social isolation, which might in turn have led them to disengage from treatments. (Kozloff et al., 2020; Fonseca et al., 2020; Yang et al., 2012; Sendt et al., 2015) Patients with OCD did not show a significant reduction in visit rates during the pandemic. Previous studies reported that people with OCD were affected by worsening of the COVID-19 pandemic and exhibited clinical worsening or relapse of their OCD symptoms. (Davide et al., 2020; Fineberg et al., 2020; Benatti et al., 2020) While some people with aggravation of OCD symptoms could have increased avoidance behaviors, others may have exhibited a greater need for medication revision, reassurance, and treatment. In addition, the impact on OCD may be different according to the type of
symptom dimension during the pandemic; for example, subgroups with contamination symptoms could be more affected and reluctant to visit hospitals due to the fear of possible contamination. (Benatti et al., 2020) Different illness behaviors and symptom types may partially explain the lack of significant reduction in mental health outpatient services in different diagnosis groups. In addition, limited statistical power related to small sample sizes in certain groups may have led to a false negative result. Considering their nominal significance shown in the groups of somatoform disorders or sleep-related disorders, this warrants further investigation, despite the results not having survived the Bonferroni correction. Further studies with larger sample sizes are required to understand how illness behaviors and seeking healthcare services are affected by individual factors among specific mental health conditions, including fear of viral spread, health anxiety, unemployment, and social isolation in response to the COVID-19 pandemic.

This study had several limitations. First, potential confounding factors unrelated to the COVID-19 pandemic, including seasonal variation, might have influenced the changes in outpatient visit rates between the periods before and during the COVID-19 outbreak. Second, since this was a retrospective study with all data obtained solely from EHR and with no psychometric assessment tools, we cannot confirm which factors changed the visit rates during the pandemic. Third, since we classified the ICD-10 codes from clinician’s primary psychiatric diagnosis on EHR system, without using a structured interview, into nine diagnostic categories, unmeasured diagnostic factors such as comorbid psychiatric disorders and medical diseases may bias the results of treatment compliance and dropout rates. Lastly, the present findings should not be generalized, as the results are only based on data from a tertiary hospital. This study should be replicated in other settings, such as in diverse regions with different disease prevalence and in different countries with various institutional and cultural backgrounds. Since the ongoing COVID-19 pandemic could further increase social isolation, unemployment, and financial distress, which are common risk factors of discontinuation of outpatient psychiatric treatment, (Minamisawa et al., 2016; Henzen et al., 2016; Khazaie et al., 2013) the long-term effects of the COVID-19 pandemic on mental health service use should be investigated.

5. Conclusion

In summary, we investigated the impact of the COVID-19 pandemic on psychiatry outpatient clinic use in a tertiary hospital according to psychiatric diagnosis. The “anxiety disorders” group, “depressive disorders” group and “schizophrenia-spectrum disorders” group showed significant reductions in mental health service use during the COVID-19 pandemic. In addition, while the visit rates of the “anxiety disorders” group and “depressive disorders” group were significantly affected by the daily number of newly confirmed cases, that of the “schizophrenia-spectrum disorders” group was not. The present findings suggest that outpatients with psychiatric disorders such as anxiety or depression may have more concerns regarding the spread of COVID-19, and may be more reluctant to visit psychiatry outpatient clinics during a pandemic. Under the pandemic situation, introduction of other service delivery methods, such as telepsychiatry, should be considered.

Contributor

Authors Jee In Kang and Jun Ho Seo designed the study and Jun Ho Seo collected the data. Author Myeongjee Lee performed the statistical analyses. Authors Jun Ho Seo, Se Joo Kim and Jee In Kang interpreted
the findings, and Jun Ho Seo and Jee In Kang prepared the main manuscript. All authors contributed to and have approved the final manuscript.

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Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2021.04.070.

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