MAYO CLINIC

Demographic Trends in Emergency Department Visits for Psychiatric Concerns During the COVID-19 Pandemic

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Abstract

Objective: To describe changes in emergency department (ED) psychiatric visits during the pandemic in both rural and nonrural regions in the United States.

Methods: This cohort study was performed across 22 EDs in the Midwest and Southern United States from January 1, 2019 to April 22, 2021. Prevalence of psychiatric visits before and after the COVID-19 pandemic, defined as starting on March 1, 2020, were compared. Psychiatric and nonpsychiatric visits were defined on the basis of primary clinician–assigned diagnosis. The primary end point was average daily visits normalized to the average daily visit count before the pandemic, labeled as relative mean daily visits (RMDVs).

Results: Psychiatric visits decreased by 9% [RMDVs, 0.91; 95% confidence interval (CI), 0.89-0.93] during the pandemic period, whereas nonpsychiatric visits decreased by 17% (RMDVs, 0.83; 95% CI, 0.81-0.84). Black patients were the only demographic group with a significant increase in psychiatric visits during the pandemic (RMDVs, 1.12; 95% CI, 1.04-1.19). Periods of outbreaks of psychiatric emergencies were identified in most demographic groups, including among male and pediatric patients. However, the outbreaks detected among Black patients sustained the longest at 6 months. Unlike older adults who experienced outbreaks in the spring and fall of 2020, outbreaks among pediatric patients were detected later in 2021.

Conclusion: In this multisite study, total ED visits declined during the pandemic; however, psychiatric visits declined less than nonpsychiatric visits. Black patients experienced a greater increase in psychiatric emergencies than other demographic groups. There is also a concern for increasing outbreaks of pediatric psychiatric visits as the pandemic progresses.

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The coronavirus disease 2019 (COVID-19) pandemic has negatively impacted mental health on a global scale.[1] Emerging literature suggests that COVID-19 may harm the mental health either because of the illness itself or because of treatment side effects.[2] Further, social and economic changes associated with the COVID-19 pandemic have exacerbated symptoms of mood and stress disorders and burnout among health care workers, family members of those infected, and the general public.[3,4] Emergency department (ED) visits are an important metric to assess the burden of decompensated psychiatric disease, which is expected to increase with environmental stressors.

Early survey studies observed an initial increase in the prevalence of psychologic distress among US adults during the early stage of the pandemic, between March and April 2020, while offering contradictory reports on improvement by June 2020.[5-7] In contrast, ED psychiatric visits decreased during the onset of the pandemic in the context of an overall decrease in ED visits.[8,9] Since then ED visits have partially rebounded to prepandemic volumes; however, the proportion of total visits related to mental health were higher than before the pandemic.[10] This correlates with long-term longitudinal survey studies, which have demonstrated persistent psychologic distress through 2020 and 2021.[11,12] Similar longitudinal studies for psychiatric visits in the ED are lacking.

The COVID-19 pandemic affects mental health differentially by sociodemographic

groups,[13] and pandemic stressors were compounded by civic reckoning with the social injustice sparked by the murder of George Floyd and a tumultuous election cycle in 2020-2021. Health disparities rooted in structural racism, in particular, impact access to health care and other resources to cope with the abovementioned stressors.[14] Long-term studies are needed to characterize the ongoing mental health impact of the pandemic across patient demographics.

The purpose of this study was to investigate trends in ED visits for psychiatric complaints in a single health care system spanning 4 states and involving rural and urban areas. We investigated trends in psychiatric emergency visits by demographic categories, including age, sex, race, and ethnicity over time during the COVID-19 pandemic. We hypothesized that psychiatric ED visits would decrease less than nonpsychiatric visits during the pandemic.

METHODS

Participants

The present study included all patients who visited the Mayo Clinic Hospital EDs in the urban sites including Rochester (Minnesota), Jacksonville (Florida) Phoenix (Arizona), and in the rural and suburban sites of Minnesota and Wisconsin. All visits between January 1, 2019 and April 22, 2021 across these 22 EDs were included. The start of the pandemic interval was defined as March 1, 2020, 1 day after the first death from COVID-19 in the United States.[15] Patients of all ages were included and grouped by age, defined as pediatrics (age of <18 years), adults (age between 18-65 years), and seniors (age of ≥65 years). Psychiatric visits were categorized using the clinician-assigned primary International Classification of Diseases-10 diagnosis (Supplemental Table 1, available online at http://www.mcpiqojournal.org), allowing the inclusion of patients with psychiatric disease even in the absence of psychiatrist consultations or visits to dedicated psychiatric facilities, neither of which may be available in many areas. If multiple clinicians consulted on a patient in the ED, the final diagnosis list was determined by the attending ED clinician. On presentation to the ED, patients self-reported their race and ethnic group as part of a demographic profile.

Variables

The primary end point was mean daily visits after the beginning of the pandemic, which was normalized with respect to the mean daily visits before the pandemic and by month. This was labeled as relative mean daily visit (RMDV), where a value of 1 indicated no change from before the pandemic and a value of <1 indicated a decline from before the pandemic. Visits were trended across the study period as a monthly count. Visits were counted on the basis of demographic groups, including age group, sex, race ethnicity, and ED site. Race and ethnicity were assessed as factors associated with disparities in mental health during the study period.

Statistical Methods

The visits between psychiatric and nonpsychiatric diagnosis were compared using a 2-tailed t-test. Observed visits during the pandemic were compared against an expected count during the pandemic using a negative binomial regression based on visits before the pandemic with fixed effects for a month. Total ED visit count was controlled for in the regression as an exposure variable. Epidemiologic outbreak detection was used to determine sustained increases in psychiatric ED visits, as described in a prior study,[16] with a reference value set at 1.5 times the 95th percentile of residuals in 2019.

RESULTS

A total of 874,536 visits across 22 EDs were included in the study (Table 1). The study population was 83.4% non-Hispanic White, 5.3% non-Hispanic Black, and 5.9% Hispanic. Other racial and ethnic minorities, including Asians, Pacific Islanders, or Native Americans, participated in 2.2% of all visits. The latter were analyzed as a group given their low frequency. There were roughly equal numbers of visits by men and women. Psychiatric ED visits comprised 4.3% of total visits. Most psychiatric ED visits had a primary diagnosis of mood, anxiety, or substance-related disorders. Midwestern sites accounted for 80% of all ED visits and 81% of psychiatric visits. Phoenix and Jacksonville had older patients with a lower frequency of pediatric visits

TABLE. Baseline Characteristics Across 22 Emergency Departments in the Midwest, Southeast, and Southwest United States From January 1, 2019 to April 22, 2021[a]

ED visit characteristics	Total counts
Total ED visits	874536
Location, n (%)	
Rochester, MN	164096 (18.8)
Rural MN, WI	539141 (61.6)
Phoenix, AZ	96257 (11.0)
Jacksonville, FL	75015 (8.6)
Male, n (%)	407083 (46.5)
Age (y) mean (IQR)	47.2 (27-69)
Race, n (%)	
Asian and other minorities	19573 (2.2)
Hispanic	51654 (5.9)
Non-Hispanic	
Black	46300 (5.3)
White	729348 (83.4)
Unknown	27661 (3.2)
Total psychiatric visits, n (%)[b]	37288 (4.3)
Anxiety/mood, n (%)[b]	12346 (33.1)
Psychotic, n (%)[b]	609 (1.6)
Substance-related, n (%)[b]	13723 (36.8)
Suicidality, n (%)[b]	9065 (24.3)
Other, n (%)[b]	1545 (4.1)

[a]AZ, Arizona; ED, emergency department; FL, Florida; IQR, interquartile range; MN, Minnesota; WI, Wisconsin.
[b]Percentage relative to total psychiatric visits.

(Supplemental Table 2, available online at http://www.mcpiqojournal.org). All ED sites had a similar frequency of psychiatric visits from White patients, ranging between 78% and 83% (Supplemental Table 3, available online at http://www.mcpiqojournal.org).

ED visits declined during the first 2 months of the pandemic and subsequently rebounded (Figure 1A) across all ED sites (Supplemental Figure 1, available online at http://www.mcpiqojournal.org). Psychiatric visits declined (RMDV, 0.91; 95% CI, 0.89-0.93). Nonpsychiatric visits declined significantly more (RMDV, 0.83; 95% CI, 0.81-8.4; $P<.0001$, Figure 1B). This trend was not observed in Phoenix, where psychiatric visits had a greater decline (RMDV, 0.82; 95% CI, 0.74-0.90) than nonpsychiatric visits (RMDV, 0.97; 95% CI, 0.95-0.99; $P<.0001$) (Supplemental Figure 2, available online at http://www.mcpiqojournal.org).

White patients had a smaller decline in psychiatric visits (RMDV, 0.88; 95% CI, 0.86-0.90) than nonpsychiatric visits (RMDV, 0.83; 95% CI, 0.81-0.84; $P<.0001$). Psychiatric visits increased significantly in Black patients (RMDV, 1.12; 95% CI, 1.04-1.19) but not in Hispanic patients (RMDV, 1.07; 95% CI, 1.00-1.15) or among other racial or ethnic minority groups (RMDV, 1.06; 95% CI, 0.91-1.18). Nonpsychiatric visits among these minority groups decreased during the pandemic, similar to White patients. Comparison of the distributions of recurrent ED visits showed that most visits are unique and recurrent visits follow similar frequencies across racial and ethnic groups for both psychiatric and nonpsychiatric visits (Supplemental Figure 3, available online at http://www.mcpiqojournal.org).

Psychiatric visits exhibited a smaller decline than nonpsychiatric visits across patient demographics by age, group, and sex. Psychiatric visits in men better matched prepandemic volumes (RMDV, 0.94; 95% CI, 0.92-0.97) than in women (RMDV, 0.87; 95% CI, 0.85-0.90). In all age groups, psychiatric visits returned to near prepandemic levels; however, the pediatric population had the greatest difference between psychiatric (RMDV, 0.88; 95% CI, 0.82-0.93) and nonpsychiatric (RMDV, 0.61; 95% CI, 0.59-0.63) visits. The vast majority of pediatric visits were from Rochester, Minnesota, and surrounding EDs in rural Minnesota and Wisconsin (Supplemental Table 2).

Psychiatric ED visits were trended by demographic groups and compared with expected values based on a regression trained on visit counts in 2019. In most demographic groups, there existed periods of positive residuals when observed visits outperformed expectation. A cumulative sum algorithm using residuals was used to identify a threshold, above which alerts are indicated for a potential outbreak in psychiatric ED visits. Outbreak analysis of psychiatric ED visits for the entire cohort revealed outbreaks in May, June, and September of 2020, and March of 2021 (Figure 2). The longest continuous outbreak was observed among Black patients from June 2020 to November 2020. Male patients experienced a total of 6 months of outbreak during the pandemic, whereas female patients

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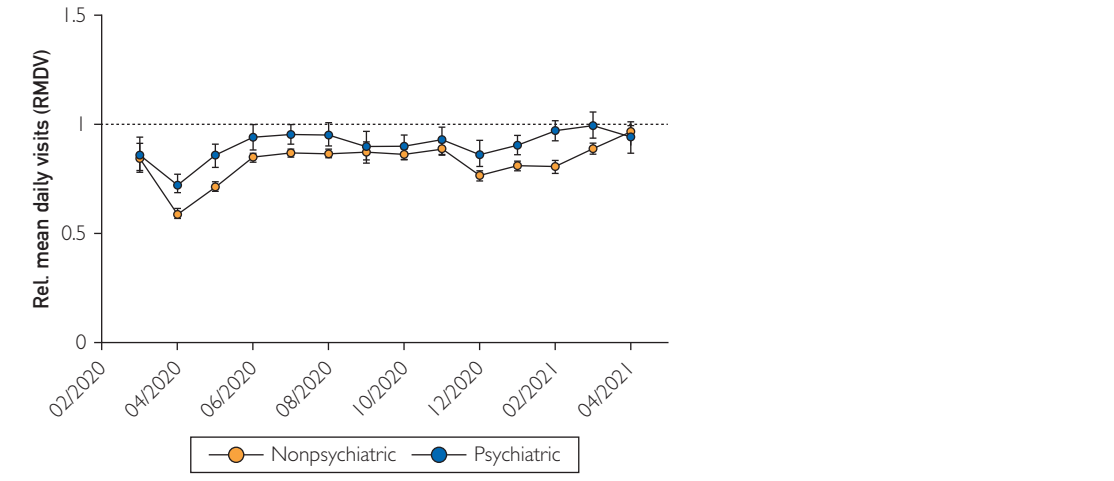

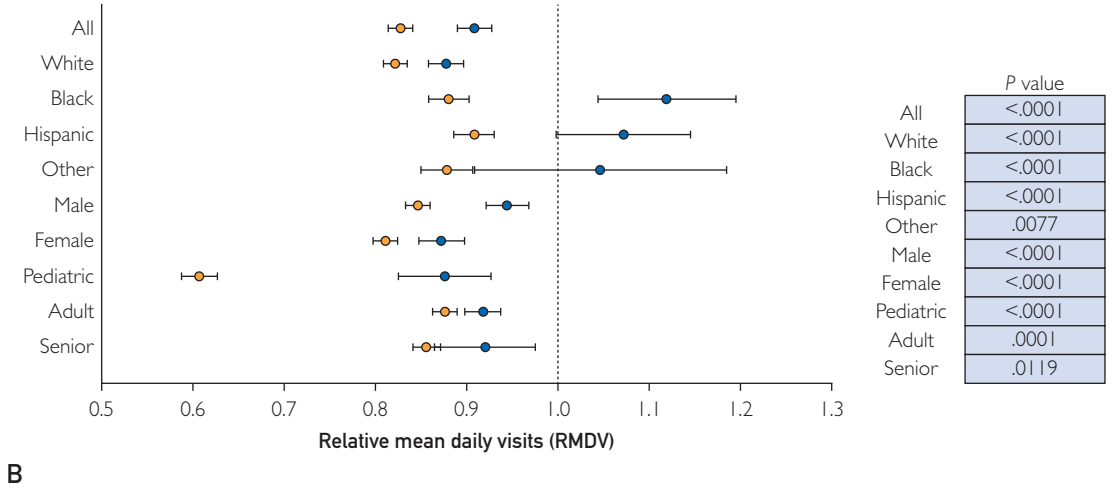

	P value
All	<.0001
White	<.0001
Black	<.0001
Hispanic	<.0001
Other	.0077
Male	<.0001
Female	<.0001
Pediatric	<.0001
Adult	.0001
Senior	.0119

FIGURE 1. Relative mean daily visits (RMDVs) across all emergency department sites. The mean psychiatric and nonpsychiatric daily visits during the pandemic are normalized with their respective mean visits before the pandemic. The pandemic start date is defined as March 1, 2020. A, Relative mean daily visits trended by month during the pandemic. B, Relative mean daily visits for each demographic group over the entire pandemic interval. Errors bars correspond to a 95% confidence interval based on a 2-tailed t-test. *P* values between psychiatric and nonpsychiatric visits for each demographic seen in the table.

experienced no outbreaks. Outbreaks between age groups occurred in a staggered manner, where outbreaks occurred in adults in May 2020 and June 2020, outbreaks occurred in seniors in September 2020, and outbreaks occurred in pediatric patients in February 2021 and March 2021.

DISCUSSION

Within a large health system of 22 urban, suburban, and rural EDs, the volume of nonpsychiatric and psychiatric ED visits decreased as COVID-19 cases began to appear and had not yet returned to prepandemic levels at the end of the study period. The magnitude of decline was significantly lower for psychiatric visits than for nonpsychiatric visits. This finding of disproportionate psychiatric emergencies is important for current and future pandemic preparedness.

An important finding of the study was that psychiatric visits among Black patients were disproportionately high. Although the outbreak analysis for the entire cohort

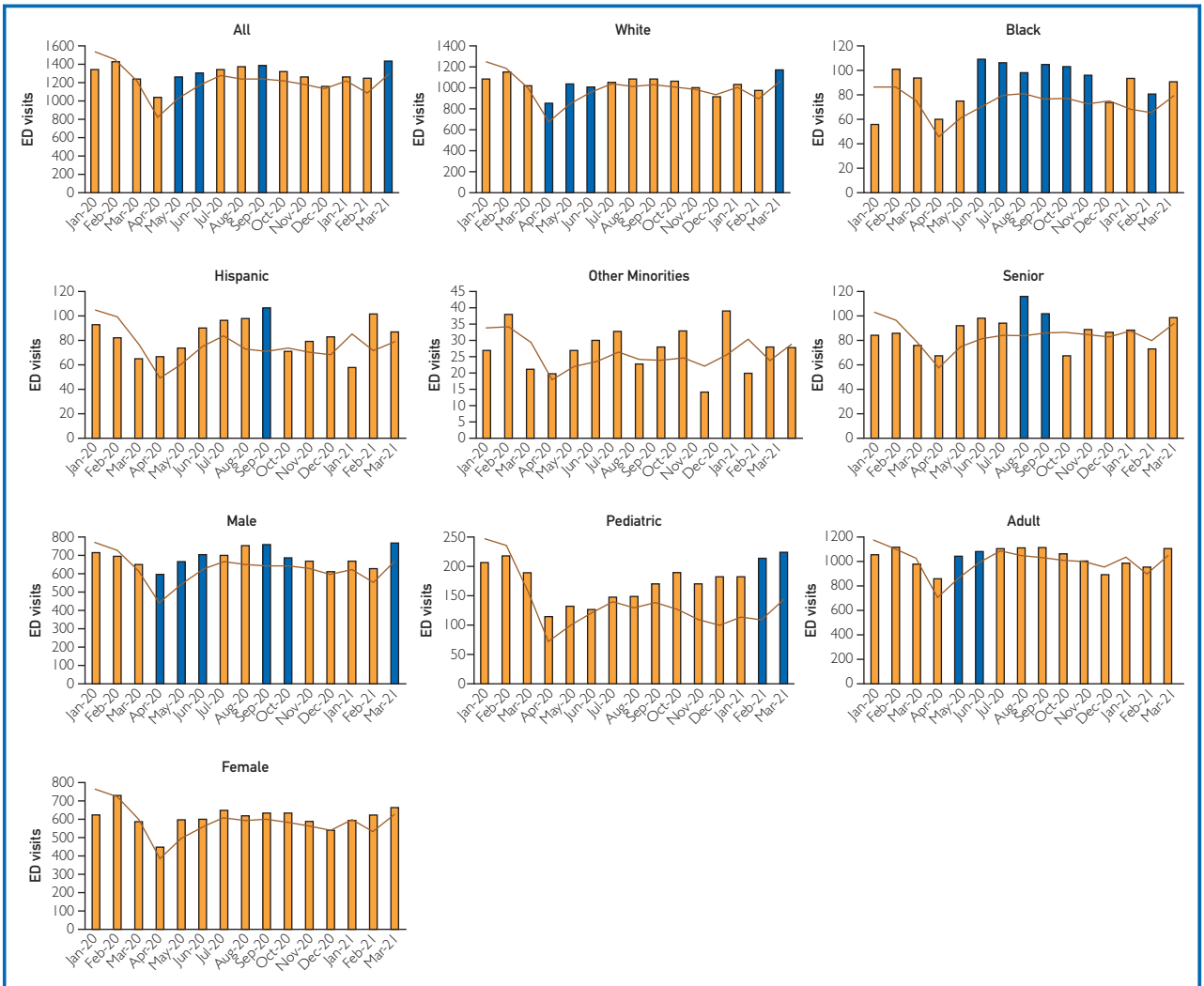

FIGURE 2. Outbreak detection analysis for psychiatric visits. Emergency department (ED) data from 2019 were used to predict psychiatric ED visits per month from January 2020 to March 2021 (red line) compared with observed visits (bars). A cumulative sum algorithm based on residuals was used to identify months with a potential outbreak of psychiatric ED visits (labeled black).

exhibited a 2 month period of sustained increase in psychiatric visits early in the pandemic, outbreaks of psychiatric ED visits among Black patients were triggered for 6 continuous months, ending in November 2020. Structural factors led to disproportionately high incidence, hospitalization, and death rates from COVID-19 among the US Black population.[14] Similarly, pandemic-associated environmental and socioeconomic factors framed by structural racism likely contributed to the disparities in ED psychiatric visits. Co-occurring nonpandemic factors may have also contributed to the observed inequities. For example, survey data have demonstrated an increase in anger and sadness among Black participants after the murder of George Floyd and subsequent protests, which correlated with feelings of depression and anxiety.[17] These effects were most pronounced in Minnesota, which is the site for most of the patient encounters in the current study. Our findings provide important context for future pandemic planning through a health equity lens.

Although a statistically significant increase was not observed in psychiatric visits among

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Hispanic patients or other racial or ethnic minority groups, the point estimates suggest that these patient populations may also have been disproportionately affected by the pandemic relative to White patients. Future studies with larger proportions of racial/ethnic minority patients are needed to confirm this finding.

ED visit outbreaks among pediatric patients peaked later than adults. These results corroborate previous observations, where pediatric visits for suicide attempts increased as the pandemic progressed[18] and may be related to increasing societal isolation and uncertainty and loss of caregivers.[19]

Male patients experienced a smaller decrease is psychiatric ED visits than female patients, and only male patients met the definition of psychiatric outbreaks. Few studies have explored sex-based differences in psychiatric emergencies during the pandemic, and this finding should be confirmed in future research.

Limitations

Sampling bias introduced from a single health care enterprise may limit generalizability of the findings. Changes in psychiatric ED visits during the pandemic were site-specific, and findings were largely driven by the Midwestern sites. Although the demographic characteristics of patient visits at Midwest sites (contributing 80% of ED visits in the study) reflected surrounding community demographics, the age and racial/ethnic diversity of patient visits at the Southern sites were less consistent with their respective community demographics. Additionally, psychiatric care in non-ED contexts was not included in the present study.

CONCLUSION

In this multisite study, we found that ED visits declined during the pandemic; however, psychiatric visits declined lesser than nonpsychiatric visits. Psychiatric ED visits by Black patients increased in frequency. The outbreak analysis among Black patients suggested that pandemic and nonpandemic structural factors should be addressed in future pandemic planning. Our results also corroborate the growing evidence for a mental health crisis in children and adolescents during the later stages of the pandemic and emphasize the need for greater mental health support in this population.

POTENTIAL COMPETING INTERESTS

The authors report no competing interests.

SUPPLEMENTAL ONLINE MATERIAL

Supplemental material can be found online at http://www.mcpiqojournal.org. Supplemental material attached to journal articles has not been edited, and the authors take responsibility for the accuracy of all data.

Abbreviations and Acronyms: **COVID-19**, coronavirus disease 2019; **ED**, emergency department; **RMDV**, relative mean daily visit

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