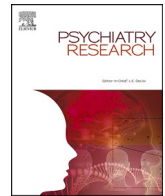




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Racial and demographic disparities in emergency department utilization for mental health concerns before and during the COVID-19 pandemic

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ARTICLE INFO

Keywords:

Depression
Anxiety
Substance use
Serious mental illness
Child behavior problems
Health disparities
Southeastern United States

ABSTRACT

This study investigated whether emergency department (ED) visits for mental health concerns increased during the COVID-19 pandemic, taking a health disparities lens. ED encounters from the only academic medical center in Mississippi were extracted from March-December 2019 and 2020, totaling 2,842 pediatric (ages 4–17) and 17,887 adult (ages 18–89) patients. Visits were coded based on primary ED diagnosis. For adults, there were fewer depression/anxiety ED visits during the pandemic, not moderated by any demographic factor, but no differences for serious mental illness or alcohol/substance use. For youth, there were significantly fewer ED visits for behavior problems during the pandemic among children in the lower socioeconomic status (SES) category; there were no differences for depression/anxiety. Regardless of year, adults in the lower SES category were more likely to visit the ED for mental health, Black adults were less likely to visit the ED for depression/anxiety or alcohol/substance use, and Black children were less likely to visit the ED for behavioral concerns. Results suggest that access to outpatient and telehealth services remains critical for mental health care during the pandemic and underline the importance of race- and SES-related factors in use of the ED for mental health concerns beyond the pandemic.

1. Introduction

Research suggests that the COVID-19 pandemic has negatively impacted the mental health of adults (Czeisler et al., 2021) and children (Clark et al., 2020). However, whether the presentation of mental health concerns at emergency department (ED) visits increased during the pandemic remains an open question, as limited research has yielded conflicting findings (e.g., Castro and Perlis 2020, Goldenberg and Parwani 2021, Hill et al. 2021). Considering that theory and research provide evidence that health disparities exist for individuals of lower socioeconomic status (SES) and minoritized groups, the pandemic may have negatively impacted these vulnerable groups at higher rates when compared to majority group individuals. As such, individuals from lower SES and/or minoritized groups are potentially at higher risk of experiencing mental health symptoms requiring ED visits (Liu and Modir, 2020), but questions also remain about the incidence of mental health

ED visits in the context of the COVID-19 pandemic in such populations.

Studies which have examined changes in mental health service utilization in adults in the context of the COVID-19 pandemic have yielded conflicting findings. One study found a decrease in the volume of documentation on psychiatric symptoms in outpatient and ED notes, which the authors suggest could reflect the cancellation of outpatient visits, reluctance of individuals to present to the ED, and clinicians conducting shorter interviews to reduce the risk of exposure (Castro and Perlis, 2020). Another study found a 26% decline in individuals presenting to psychiatric emergency services between late March and early May 2020 compared to the same time period in 2019, though this was lower than the 42% decline in overall ED visits (Goldenberg and Parwani, 2021). In contrast, one study found an increase in ED visits for suicide attempts and overdoses between March and October 2020 compared to the same months in 2019 (Holland et al., 2021). Furthermore, other research suggests the proportion of ED visits attributed to

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<https://doi.org/10.1016/j.psychres.2022.114442>

Received 20 June 2021; Received in revised form 6 February 2022; Accepted 11 February 2022

Available online 12 February 2022

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mental health concerns was higher in 2020 compared to 2019 (Stroeve et al., 2021). Another study found a decrease in SI-related encounters but an increase in alcohol-related encounters across diverse EDs in the Midwest (Smalley et al., 2021). Because research on whether mental health related ED visits for adults have changed during the COVID-19 pandemic has yielded conflicting results, further information is needed on contextual factors that may influence the likelihood of individuals seeking treatment for mental health concerns in the ED.

Moreover, questions remain about whether incidence of mental health ED visits have changed among youth during the COVID-19 pandemic. One study in which researchers administered a suicide assessment to all individuals aged 11 to 21 who presented to a pediatric ED between January and July 2020 compared to the same time period in 2019 found a higher rate of suicidal ideation (SI) in 2020 compared to 2019 (Hill et al., 2021). Similarly, research from the Centers for Disease Control found an increase in the proportion of children's mental health related ED visits between March and October 2020 compared to the same months in the previous year (Leeb et al., 2020).

Taken together, research to date has yielded inconsistent findings on whether mental health treatment seeking in the ED setting has changed during the COVID-19 pandemic. It is also important to consider that individuals from lower SES and/or minoritized groups may be at increased risk of negative mental health outcomes in the context of the COVID-19 pandemic due to a number of structural, socioeconomic, and sociopolitical forces (Kleinman, 2010). Individuals who identify as Black, American Indian or Alaskan Native, or Latinx are more likely to be frontline workers and are at greater risk of infection, hospitalization, and death compared to non-Hispanic, White individuals (Centers for Disease Control and Prevention (CDC), 2021). Individuals from minoritized groups may therefore be more likely to experience mental health difficulties, or experience higher levels of mental health concerns, during COVID-19 compared to White individuals. Preliminary findings also suggest adults with lower income are more likely to report symptoms of mental illness in the face of COVID-19 related restrictions compared to those with higher income (Zhu et al., 2021). Although fewer studies have examined the impact of COVID-19 on mental health outcomes for U.S. children from racial and ethnic minoritized groups, preliminary findings suggest the health, psychological, and financial effects of COVID-19 have disproportionately affected Black and Latinx families. For example, Waller et al. (2021) found that African-American/Black and Latinx/Hispanic participants in their study were more likely to experience COVID-19 related worries (e.g., having symptoms of COVID-19, passing COVID-19 to others, or dying of COVID-19). Thus, there is growing evidence that the COVID-19 pandemic has disproportionately affected the mental health of youth and adults from low SES and/or racial and ethnic minoritized groups, but further research is needed to understand whether these demographic variables moderate any changes in mental health-related ED visits.

Sociodemographic factors which differ in the Southeastern U.S. compared to other regions present unique challenges and barriers to care (Gennuso et al., 2016); thus, previous findings regarding mental health in the context of the COVID-19 pandemic may not generalize to this region of the country. Of note, Mississippi is the poorest state in the U.S., with the overall poverty rate estimated at 18.9% and child poverty rate estimated at 27.8% in 2020 (United Health Foundation, 2021). Moreover, approximately 37.8% of Mississippi's population identifies as Black or African American, compared to the national average of approximately 12.8% (U.S. Census Bureau, 2019). Research suggests Black Americans are less likely to seek out mental health services compared to non-Hispanic, White individuals (Alegria et al., 2008). Therefore, examining the moderating role of SES and race is vital to understanding mental health service utilization in Mississippi during the COVID-19 pandemic, and may speak to mental health disparities during the COVID-19 pandemic more broadly within the U.S.

The present study aims to investigate whether incidence of mental health ED visits (i.e., visits for depression and anxiety symptoms, severe

mental illness, and/or externalizing symptoms) increased during the COVID-19 pandemic in Mississippi for both adults and children. Additionally, the current study examined whether demographic factors (i.e., race, sex, age, and SES) moderated any changes by year, with particular focus on race and SES. We did not specify hypotheses a priori for two reasons. First, there is conflicting evidence from previous research examining incidence of mental health ED visits during the pandemic. Second, there is a lack of studies examining this question in the Southeastern United States. Summarily, we adopted an exploratory approach to our analyses.

2. Method

2.1. Data source

We retrospectively analyzed de-identified ED encounters from University of Mississippi Medical Center (UMMC), a public hospital system for both pediatric and adult populations that is the only academic medical center, only Level 1 trauma center, and the largest diagnostic, treatment, and referral system in the state. Data were pulled from UMMC's Patient Cohort Explorer (University of Mississippi Medical Center, Center for Informatics and Analytics, 2020), which contains de-identified data from the electronic health record, EPIC, for research and quality improvement purposes. Use of Patient Cohort Explorer data does not require IRB approval. Encounters were included in current analysis if they occurred in the emergency department of UMMC hospitals from March 1-December 31, 2019 and March 1-December 31, 2020. Exclusion criteria included age below 4 years old, as there is prior evidence for children presenting to the ED for mental health concerns at 4 years old (e.g., Cappelli et al. 2012). For patient-level analysis, duplicate encounters were also excluded. Specifically, if patients had multiple ED encounters within 3/1/2019–12/31/2019 or within 3/1/2020–12/31/2020, only their first encounter within-year was included. If patients had an ED encounter in both years, they were excluded from patient-level analysis.

Of 32,146 emergency department encounters that occurred during the date ranges, 2,388 were excluded due to age below 4, leaving 29,758 included encounters. Of 29,758 encounters, 3,820 were pediatric and 25,938 were adult. For patient-level analysis, a total of 978 pediatric duplicates were excluded, for a final sample of 2,842 pediatric patients. A total of 8,051 adult duplicate encounters were excluded, for a final sample of 17,887 adult patients. In the pediatric sample, ages ranged from 4 to 17 years ($M = 10.83$, $SD = 4.06$), and 55.3% were male and 44.7% female. Racial characteristics of the pediatric sample were 53.8% Black or African American, 38.6% White or Caucasian, 2.6% Other, 1.5% Multiracial, 0.7% Mississippi Band Choctaw Indian, 0.5% American Indian or Alaska Native, and 0.5% Asian, and 3.2% of the sample reported their ethnicity as Hispanic or Latino. Insurance types in the pediatric sample were 68.5% Medicaid or self-pay, and 31.5% all other types (Blue Cross Blue Shield, Commercial, Managed Care, Medicare, or Other). In the adult sample, ages ranged from 18 to 89 years ($M = 54.10$, $SD = 18.85$), and 56.1% were male and 43.9% female. Racial characteristics of the adult sample were 55.5% Black or African American, 40.4% White or Caucasian, 1.4% Other, 0.1% Multiracial, 0.2% Mississippi Band Choctaw Indian, 0.5% American Indian or Alaska Native, and 0.3% Asian, and 1.5% of the sample reported their ethnicity as Hispanic or Latino. Adult insurance types were 36.6% Medicaid or self-pay, and 63.4% all other types (Blue Cross Blue Shield, Commercial, Managed Care, Medicare, Medicare Advantage, Worker's Comp, or Other).

2.2. Variables

Data were coded based on primary diagnosis given for the ED encounter. Primary diagnosis had been determined by the medical provider treating the patient. For adults, depression and anxiety

diagnoses were coded “1,” alcohol and substance use diagnoses were coded “2,” and serious mental illness (SMI) diagnoses (bipolar-related disorders, schizophrenia-related disorders, and major depression with psychotic features) were coded “3.” All other primary diagnoses in the ED were coded “0.” For children, depression and anxiety diagnoses were coded “1” and conduct or behavior problem diagnoses were coded “2.” All other primary diagnoses were coded “0.” For children, disruptive mood dysregulation disorder, though classified as a depressive disorder in the DSM-5 (American Psychiatric Association, 2013), was included in the behavior problem category given its demonstrated overlaps with oppositional defiant disorder (Mayes et al., 2016). Patient demographic data was also pulled from the Patient Cohort Explorer for analyses, including sex, race/ethnicity, age, and insurance type. Insurance type was used as an indicator of socioeconomic status (SES; Casey et al., 2018).

2.3. Statistical analyses

Pediatric (ages 4–17) and adult (ages 18–89) data were analyzed separately. First, monthly rates of encounters for each psychiatric disorder group and all other ED encounters during the 2019 and 2020 months were computed. Rates are presented in figures with 2019 alongside 2020 to compare ED encounters during the COVID-19 pandemic to the same months in the prior year. Encounter rates include all visits made during the specified time period, meaning that some individuals may have multiple encounters.

Next, to conduct significance testing, only patient-level data was used (i.e., one encounter per individual). Chi-square analysis was used to test whether the frequency of patients in each psychiatric disorder class relative to all other ED diagnoses significantly differed by year. To test moderators and include covariates, hierarchical binary logistic regression was then used, testing year and demographic covariates as independent variables (Block 1) and then adding four two-way interactions between year and sex, race, age, and SES (Block 2). Five separate models were tested, with outcomes of adult depression/anxiety, adult alcohol/substance use, adult SMI, child depression/anxiety, and child behavior problems. Because the majority of patients identified their race as either Black/African-American or White, race and ethnicity were collapsed into one dichotomous variable indicating whether or not the patient is Non-Hispanic Black or African American (1) versus all other races (0). Patients with Medicaid or self-pay as their insurance were in the lower SES group (1), and patients with all other types of insurance were in the higher SES group (0). Results were considered statistically significant with $p < .05$, and odds ratios were reported as a measure of effect size.

3. Results

3.1. Prevalence of primary mental health encounters in the ED in 2019 and 2020

Overall, number of ED encounters decreased during the COVID-19 pandemic months (March-December 2020) relative to the same time period in 2019, from 13,190 in 2019 to 12,748 in 2020 for adults (a 3.4% decrease), and from 2073 in 2019 to 1747 in 2020 for children and adolescents (a 15.7% decrease). In the pediatric sample, 2.6% of visits in March-December 2019 and 2.0% of visits in March-December 2020 had a primary diagnosis of a depressive or anxiety related disorder, and 7.4% in 2019 and 2.9% in 2020 had a primary diagnosis of a behavior/conduct disorder. In the adult sample, 1.4% of visits in 2019 and 1.2% of visits in 2020 had a primary diagnosis of a depressive or anxiety related disorder, 1.9% in 2019 and 2.1% in 2020 for a substance or alcohol use disorder, and 2.8% in 2019 and 3.0% in 2020 for SMI. Frequency of encounters with primary diagnoses in the mental health categories by month and overall for March-December 2019 compared to 2020 are reported in Table 1. These results are also displayed as percentage of overall ED encounters in Fig. 1 (child) and Fig. 2 (adult).

Chi-square analyses to test bivariate differences (before covariates and interactions were added) at the patient level across March-December 2019 compared to March-December 2020 revealed no significant differences in 2020 versus 2019 for child depression/anxiety ($\chi^2 = 1.17, p = .28$), adult depression/anxiety ($\chi^2 = 2.16, p = .14$), adult alcohol/substance use ($\chi^2 = 0.68, p = .41$), and adult SMI ($\chi^2 = 0.28, p = .60$). However, a significant difference was observed for child behavior problem ED visits ($\chi^2 = 27.75, p < .001$), with significantly fewer diagnoses in 2020 compared to the same period in 2019.

3.2. Regression analysis testing differences by year and effects of demographic moderators

Binary logistic regression results are displayed in Tables 2 and 3. In Block 1 of each model, year (1 = 2020, 0 = 2019) and demographic covariates were entered. Demographic covariates consisted of sex (1 = female, 0 = male), age in years, race (Black or African-American = 1, all other = 0), and SES (Medicaid or self-pay insurance = 1, all other types = 0). To evaluate whether differences in year depended on patient demographic factors, in Block 2 of each model, four interactions were entered (year \times sex, year \times age, year \times race, and year \times SES). Outcome variables were dichotomized mental disorder categories (e.g., depression/anxiety diagnoses = 1, all other primary diagnoses = 0). Data for all months were evaluated in a single model for each diagnostic outcome variable. Odds ratios are presented in Tables 2 and 3 as measures of effect sizes.

For child depression/anxiety, the overall model was not significant in Block 1 (χ^2 (df = 5) = 10.57, $p = .06$) and addition of interactions in Block 2 was not a statistical improvement to the model (χ^2 (df = 4) = 2.995, $p = .559$). Therefore, neither model was interpreted. For child behavior problems, the overall model was significant in Block 1 (χ^2 (df = 5) = 126.99, $p < .001$, Nagelkerke $R^2 = 0.130$), and the addition of interactions in Block 2 was a statistical improvement (χ^2 (df = 4) = 16.63, $p = .002$, Nagelkerke $R^2 = 0.146$). The interaction between year and SES was significant in Block 2, and main effects of sex and age were significant such that younger child age and male sex were associated with greater likelihood of behavior problem ED visit regardless of year. The significant interaction between year and SES was probed by graphing the interaction (Fig. 3) and conducting follow-up tests, which demonstrated that there was a significant reduction in behavior problem ED visits in 2020 relative to 2019 for youth of lower SES (χ^2 (df = 1) = 35.72, $p < .001$), but rates were not significantly different across years for higher SES youth (χ^2 (df = 1) = 2.60, $p = .11$).¹

For adult depression/anxiety, the overall model was significant in Block 1 (χ^2 (df = 5) = 235.68, $p < .001$, Nagelkerke $R^2 = 0.103$) and addition of interactions in Block 2 showed only marginal significance in improving the model, (χ^2 (df = 4) = 8.80, $p = .07$). Therefore, Block 1 was interpreted as the final model. In Block 1, year, age, SES, and race had main effects, such that 2020 was associated with lower frequency of depression/anxiety ED diagnoses relative to 2019, when controlling for demographic covariates. Lower SES and younger age were associated with higher frequency, and Black or African American race with lower frequency of depression/anxiety ED visits across 2019 and 2020.

¹ Child analyses were also conducted with the race variable dichotomized as 1 = Black or African American, 0 = White (this removed other races from the sample, resulting in $n = 2616$). In these analyses, the depression/anxiety model was significant in Block 1 ($p = .035$), with female sex significantly associated with greater frequency of depression/anxiety diagnosis, but no other significant main effects. (Of note, female sex was also the only significant predictor when this test was conducted with the full sample, but the model had marginal significance ($p = .06$), so we did not interpret it.) In the externalizing model, results did not change except that race also had significant main effects in Block 2, such that Black children had significantly lower likelihood of visits to the ED for externalizing diagnosis when compared to only White youth, but not when compared to all other races, regardless of year.

Table 1
Frequency of emergency department mental health diagnoses compared to all other diagnoses for March–December 2019 and 2020.

		All other Diagnoses		Depression or Anxiety		Externalizing		Total	
		2019	2020	2019	2020	2019	2020	2019	2020
Child Sample	March	183	146	2	5	22	4	207	155
	April	176	104	5	1	11	2	192	107
	May	197	148	1	4	20	7	218	159
	June	156	180	3	1	8	5	167	186
	July	173	170	0	2	19	3	192	175
	August	186	170	5	4	8	9	199	183
	September	213	221	8	2	27	7	248	230
	October	214	188	13	3	22	9	249	200
	November	188	183	4	3	23	16	215	202
	December	175	138	3	3	8	9	186	150
	Total	1855	1648	44	28	168	71	2073	1747

		All other Diagnoses		Depression or Anxiety		Alcohol or Substance Use		SMI		Total	
		2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Adult Sample	March	1198	1083	13	14	27	28	39	39	1277	1164
	April	1198	1032	18	13	31	21	32	33	1279	1099
	May	1258	1197	17	18	31	32	25	36	1331	1283
	June	1197	1223	11	16	37	33	36	46	1281	1318
	July	1240	1192	17	18	31	34	39	41	1327	1285
	August	1248	1193	22	16	21	36	48	50	1339	1295
	September	1260	1211	21	12	30	43	44	55	1355	1321
	October	1247	1268	20	12	26	36	39	49	1332	1365
	November	1192	1203	21	12	27	36	30	37	1270	1288
	December	1307	1242	12	18	30	25	50	45	1399	1330
	Total	12,345	11,844	172	149	291	324	382	431	13,190	12,748

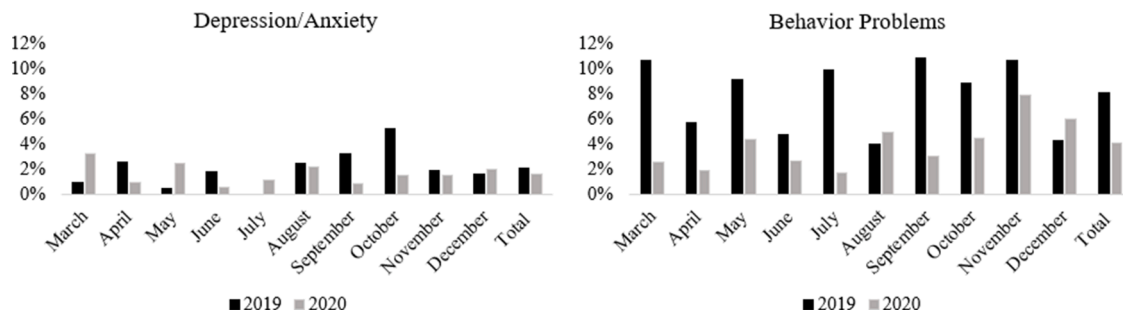


Fig. 1. Pediatric prevalence rates of ED encounters with depression or anxiety primary diagnoses and behavior problems primary diagnoses, March–December 2019 and 2020.

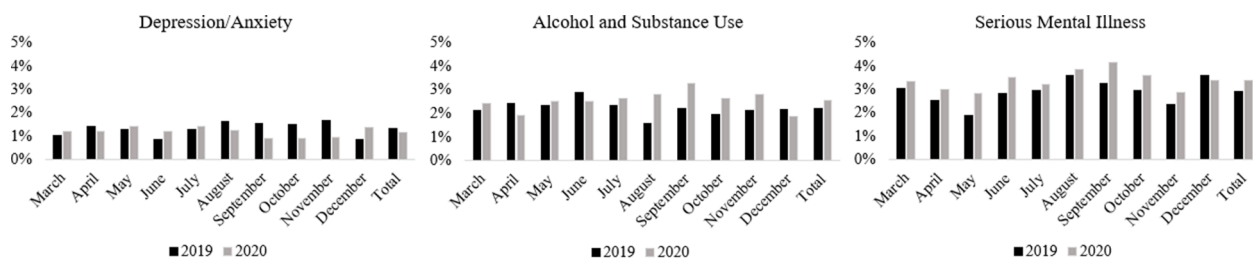


Fig. 2. Adult prevalence rates of ED encounters with depression or anxiety primary diagnoses, alcohol/substance use diagnoses, and serious mental illness diagnoses, March–December 2019 and 2020.

For adult alcohol and substance use, the overall model was significant in Block 1 (χ^2 (df = 5) = 233.20, $p < .001$, Nagelkerke $R^2 = 0.074$). The addition of interactions in Block 2 was not a statistical improvement (χ^2 (df = 4) = 1.16, $p = .884$); therefore, Block 1 was the final model interpreted. SES, sex, race, and age had significant main effects on likelihood of alcohol/substance use ED encounter across both years such that younger age, male sex, and lower SES were associated with greater likelihood and Black or African American race with lower likelihood of substance or alcohol use-related ED visit in both 2019 and 2020.

For adult SMI, the overall model was significant in Block 1 (χ^2 (df = 5) = 399.99, $p < .001$, Nagelkerke $R^2 = 0.098$). The addition of

interactions in Block 2 was not a statistical improvement (χ^2 (df = 4) = 3.59, $p = .464$); therefore, Block 1 was the final model interpreted. SES and age had significant main effects on SMI ED visits regardless of year, such that lower SES and younger age were associated with higher proportions of SMI diagnoses.²

² Adult analyses were also conducted with the race variable dichotomized as 0 = White, 1 = Black or African American (resulting in a smaller sample of $n = 17,118$); results did not change.

Table 2
Logistic regression testing interactions between demographic characteristics and year in predicting mental health ED visits among pediatric sample (4–17 years old).

	Depression/Anxiety ^a			Behavior Problems ^b		
	B (SE)	p	Odds Ratio	B (SE)	p	Odds Ratio
Block 1						
Year (2020)	−0.33 (0.26)	.21	.71	−0.95 (0.20)	<0.001	.39
Sex (Female)	.63 (0.26)	.02	1.87	−0.95 (0.20)	<0.001	.39
Age	.02 (0.03)	.58	1.02	−0.08 (0.02)	<0.001	.92
Black or African American	−0.19 (0.27)	.47	.83	−0.50 (0.18)	.005	.61
SES (Medicaid)	−0.31 (0.27)	.25	.73	1.77 (0.30)	<0.001	5.89
Block 2						
Year (2020)	−0.72 (0.57)	.21	.49	1.19 (0.62)	.06	3.29
Sex (Female)	.33 (0.32)	.30	1.39	−0.88 (0.23)	<0.001	.42
Age	.02 (0.04)	.66	1.02	−0.08 (0.03)	.002	.92
Black or African American	−0.002 (0.34)	.996	.998	−0.32 (0.21)	.13	.73
SES (Medicaid)	−0.39 (0.35)	.26	.68	2.68 (0.52)	<0.001	14.52
Year x Sex	.80 (0.55)	.15	2.23	−0.33 (0.46)	.48	.72
Year x Age	.003 (0.27)	.99	1.00	−0.06 (0.20)	.77	.94
Year x Black or African American	−0.47 (0.55)	.39	.63	−0.76 (0.42)	.07	.47
Year x SES	.19 (0.55)	.74	1.20	−1.97 (0.65)	.003	.14

Note. Year: 0 = 2019, 1 = 2020; Sex: 0 = Male, 1 = Female; Black or African American: 0 = all other races, 1 = Non-Hispanic Black or African American; SES: 0 = all other insurance types, 1 = Medicaid or self-pay; Age = continuous in years.

^aNeither model (Block 1 or Block 2) was significant for the model predicting depression/anxiety diagnoses, so neither model was interpreted.

^bBlock 2 added significant variance over Block 1 in the model predicting behavior problem diagnoses, so Block 2 was used as the final model.

4. Discussion

We explored whether an unexpected societal stressor (the COVID-19 pandemic) would increase vulnerability to adverse mental health symptoms as operationalized by visits to the ED for mental health symptoms. Further, we posited that the COVID-19 pandemic may disproportionately affect marginalized groups by way of exacerbating inequalities and related access to mental health resources, particularly with accumulating evidence that the pandemic has had more negative effects for the mental health of people of color and of lower income families. Therefore, we tested how demographic factors (age, sex, race, and SES) affected change in mental health-related emergency visits in the state of Mississippi from 2019 to 2020.

In terms of effects by year in the adult sample, representing possible COVID-19 pandemic impact on adult mental health visits to the ED, there was a significant difference in 2020, during the pandemic, for adult depression/anxiety ED visits, which were reduced in 2020 versus the same months in 2019. It is possible that this outcome occurred because the adult patients who use the ED as a safety net stayed away due to social-distancing policies or reluctance to visit the ED during the pandemic to reduce viral exposure (Castro and Perlis, 2020) or found alternate resources (e.g., telehealth). However, we identified no differences in ED visits related to SMI or substance/alcohol use between years 2019 and 2020. Preliminary data suggest that adults with SMI continued

to receive mental health services, including professional psychological support and crisis services (in person or telehealth) throughout the pandemic, which may help interpret our finding (Karantonis et al., 2021). Although we might expect an increase in ED visits related to substance/alcohol use, we note that lockdowns potentially curtailed socializing-related use, disrupted supply chains for drugs and opioid prescriptions as well as added financial strain, resulting in possible decreased use of substances. On the other hand, it is possible that some patients may have died from overdose in social isolation without ever being able to reach the ED (Pines et al., 2021).

Within and outside of Mississippi, intersectional attention to race and mental health, as well as SES and mental health, can help highlight the perceptions of vulnerable and minoritized groups. Bolstering this observation, we found that regardless of year, adults in the lower SES group were more likely than individuals in the higher SES group to present at the ED for depression/anxiety, alcohol and substance use, and SMI related symptoms. It may be the case that individuals with lower income continued to seek care in the ED during the pandemic since no other options appeared available to them (Schriger et al., 2020). These same individuals also tend to experience stress on a chronic basis which may not have outperformed the stress introduced by the pandemic. Hence, they may not have exhibited change across years. Strikingly, the emergence and gradual establishment of telehealth may have continued to present difficulties for those from low-income households. Considering that these particular results were confined to adult populations, it is possible that some adults experienced difficulty adjusting to technology as a mode of mental health intervention. It is also possible that individuals from such households did not have access to telehealth-compatible devices or access to reliable internet, prompting seeking mental health services at the ED (Wang et al., 2020).

Although SES has been associated with race/ethnicity, including in Mississippi (Center for Policy Research and Planning, 2008), we observed a different pattern of results with race across the years 2019 and 2020. Specifically, Non-Hispanic Black or African American adults were less likely than adults of other races to present to the ED for depression/anxiety and alcohol/substance use related symptoms, regardless of year. There was no main effect of race on likelihood of SMI-related ED visits. It is notable that these findings remained consistent across years even in the context of the COVID-19 pandemic, which involved higher hospitalization rates and deaths among Black individuals relative to other racial groups. Such experiences can result in collective emotional distress, amplified against the backdrop of structural inequities and intergenerational racial traumas (Karaca-Mandic et al., 2021; Liu and Modir, 2020; Novacek et al., 2020). From this conceptual standpoint, we might expect Black individuals to present with more psychological symptoms associated with COVID-19 impact (Kapilashrami and Bhui, 2020; Novacek et al., 2020) and therefore to have a higher representation among mental health ED visits during 2020 relative to 2019. However, present data align with previous evidence that African Americans (McGuire and Miranda, 2008), and particularly African Americans in the South relative to other regions of the U.S. (Turner et al., 2019), report lower mental health treatment seeking compared to Non-Hispanic White individuals. It is imperative to consider the many reasons that may underlie this. For example, there is evidence to suggest that individuals from low-SES Black communities (e.g., those along the Black Belt or Mississippi lower delta region) demonstrate preference for faith-based methods of coping, express uncertainty about whether and when it is appropriate to seek professional help, and in general, want to avoid the threat of confidentiality breach that comes from being part of tightly-knit, small communities (Haynes, 2010). In addition, Black individuals living in rural areas of the state have further distance to the ED; this factor combined with few mental health providers in their local community, and concerns about confidentiality in local centers, may also lead to a tendency toward other methods of coping and/or reluctance to seek professional mental health support in general. In their examination of perceptions of mental health

Table 3

Logistic regression testing interactions between demographic characteristics and year in predicting mental health ED visits among adult sample (ages 18–89).

	Depression/Anxiety ^a			Alcohol or Substance Use ^b			Serious Mental Illness ^c		
	B (SE)	p	Odds Ratio	B (SE)	p	Odds Ratio	B (SE)	p	Odds Ratio
Block 1									
Year (2020)	−0.27 (0.14)	.047	.76	.07 (0.11)	.53	1.07	.01 (0.09)	.93	1.01
Sex (Female)	.20 (0.14)	.14	1.22	−0.70 (0.12)	<0.001	.50	−0.03 (0.09)	.73	.97
Age	−0.05 (0.01)	<0.001	.95	−0.02 (0.00)	<0.001	.98	−0.04 (0.00)	<0.001	.96
Black or African American	−0.72 (0.14)	<0.001	.49	−0.63 (0.11)	<0.001	.53	.06 (0.10)	.51	1.07
SES (Medicaid)	.34 (0.15)	.02	1.40	1.12 (0.13)	<0.001	3.06	.59 (0.10)	<0.001	1.81
Block 2									
Year (2020)	−0.65 (0.30)	.03	.52	−0.06 (0.22)	.78	.94	.28 (0.21)	.19	1.32
Sex (Female)	.35 (0.18)	.05	1.41	−0.80 (0.18)	<0.001	.45	.06 (0.13)	.17	1.06
Age	−0.05 (0.01)	<0.001	.95	−0.02 (0.01)	<0.001	.98	−0.04 (0.004)	<0.001	.96
Black or African American	−0.85 (0.18)	<0.001	.43	−0.69 (0.16)	<0.001	.50	.19 (0.14)	.17	1.21
SES (Medicaid)	.07 (0.19)	.71	1.07	1.07 (0.19)	<0.001	2.92	.68 (0.15)	<0.001	1.97
Year x Sex	−0.35 (0.27)	.20	.70	.19 (0.25)	.46	1.20	−0.18 (0.19)	.33	.83
Year x Age	.02 (0.17)	.92	1.02	.08 (0.13)	.55	1.08	−0.09 (0.12)	.43	.91
Year x Black or African American	.31 (0.28)	.26	1.37	.12 (0.22)	.60	1.13	−0.25 (0.19)	.19	.78
Year x SES	.65 (0.30)	.03	1.92	.19 (0.25)	.46	1.10	−0.17 (0.21)	.42	.85

Note. Year: 0 = 2019, 1 = 2020; Sex: 0 = Male, 1 = Female; Black or African American: 0 = all other races, 1 = Non-Hispanic Black or African American; SES: 0 = all other insurance types, 1 = Medicaid or self-pay; Age = continuous in years.

^{a,b,c}Block 2 did not add significant variance over Block 1, so only Block 1 was interpreted.

services among Black Americans, Gaston et al. (2016) found that notable factors included internalized stigma about mental health or mental health treatment; cultural and family norms for treatment seeking; cultural perceptions regarding the need to deal with problems on one’s own or within one’s family or community; and use of other forms of coping (including religious coping). Critically, their findings also emphasized that past experiences of discrimination and racism when seeking treatment play a significant role in disparities in service use (Gaston et al., 2016). It is possible that the impacts of the COVID-19 pandemic on Black communities further underscored feelings of disenfranchisement from the healthcare system and led to continued medical distrust (Gamble, 1993). Finally, given higher rates of COVID-19 severe illness and death among individuals from racial minority groups in the U.S. (CDC, 2021), there may have been greater hesitancy to visit the ED in person, given risk of exposure, among Black individuals even in the presence of heightened mental health distress. Summarily, these effects may have contributed to null findings in terms of year by race interactions, as well as lower frequency across both years in depression/anxiety and alcohol/substance use ED visits for Black adults, despite the added emotional distress likely experienced by Black communities in Mississippi during the pandemic.

In the child population, neither year nor any demographic factors significantly predicted incidence of depression or anxiety ED visits, as the model was not significant. It is worth noting, however, that when the analyses were re-run in a subsample that included only Black and White

youth, the model was significant and female sex predicted greater frequency of depression/anxiety ED visits. Nevertheless, in both analyses we did not find evidence of differences in depression/anxiety ED visits among youth in Mississippi during the pandemic compared to the prior year. Our findings diverge from prevailing media stories and research literature which have shown an increase in depressive and anxious tendencies in children associated with COVID-19 (e.g., Bignardi et al., 2021, Hawes et al. 2020). It is possible that our results may be more representative of Mississippi relative to other parts of the U.S. In this regard, a recent study by Whitney and Peterson (2019) showed that across all states, Mississippi was in the top quartile for mental health disorder prevalence in children, and also in the top quartile for the prevalence of children with a mental health disorder who did not receive related treatment. It is also possible that there was an increase in depression and anxiety concerns overall but that more individuals sought out telehealth or other outpatient services rather than being evaluated in the ED, or did not come to the ED due to concerns about virus transmission. There is also evidence to suggest that internalizing problems did not increase, or even decreased, for some children during parts of the pandemic (e.g. Penner et al. 2021). This outcome may also be due to the heterogeneous representation of anxiety (e.g., social anxiety may have decreased, while general anxiety may have increased). Our examination of the data did not allow us to determine changes in specific aspects of anxiety (Barendse et al., 2021). Finally, the removal of stressors characteristic of in-person school settings (e.g., bullying, academic work pressure) may have helped mitigate depressive and/or anxious responses for some youth (Widnall et al., 2020).

We found that compared to 2019, there was a significant reduction in externalizing ED visits only for children from lower-SES households in 2020. These findings may be related to parental and family dynamics. Warm parenting practices as well as establishment of family routine and structure and overall better family functioning have been shown to be protective factors for child mental health during the pandemic (Bentuto et al., 2021; Orgilés et al., 2020; Waller et al., 2021), including among samples of youth from low SES backgrounds in particular (Penner et al., 2021). Therefore, it is possible that for some families, increased time at home during the pandemic led to improvements in parenting practices or family relationships, or to decreased behavior problems due to increased monitoring and time at home. The present medical record data from the ED lacked information on these family-level factors. We also speculate that the transition to virtual learning during the pandemic may have led to a less overt presentation of behavioral problems that could otherwise instantiate concern and

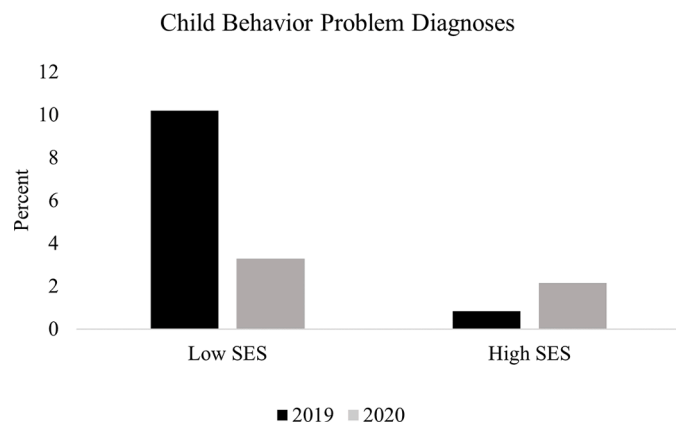


Fig. 3. Interaction between SES and year for child behavior problem diagnoses in the ED.

referral (e.g., lack of teacher reports suggesting behaviors are problematic) or may have removed bullying or other peer interactions that may escalate behavior problems to the point of presentation in the ED. These factors may have been particularly true for youth from lower SES backgrounds if they remained in virtual learning longer than higher SES youth. In Mississippi, there was variation district-by-district in whether school was conducted in-person, virtually, or hybrid particularly during fall 2020: data from another study in the state showed that 62–68% of children attended in-person school or childcare during fall 2020 (Hobbs et al., 2020). Whether children were attending school in person or virtually may have been confounded with SES to ultimately impact ED presentation for behavior problems. This question should be examined further in future research that measured child school format during the pandemic. Overall, this particular finding suggests that lower SES parents may have borne additional stress during the pandemic in managing behavior problems at home that would have typically been referred to the ED, or that social distancing changes in families and schooling due to the pandemic helped to reduce factors leading to behavior problems or behavior referrals to the ED among youth from lower SES households.

This study has several limitations. We did not examine demographic predictors of mental health ED visits during different phases of the pandemic due to low frequency counts in some months for mental health diagnoses in the child sample; this may have helped to contextualize our results further. Along these lines, we could not account for geographic variation or rurality due to the use of de-identified data; examining these factors may have more accurately explained how access to only the ED setting might play a role in seeking mental health care treatment. Another limitation related to our use of de-identified chart data is that we lacked specific SES data such as educational attainment or income, and therefore used insurance type as a proxy of SES. Casey and colleagues (2018) validated the use of medical assistance versus other insurance types as an “imperfect” proxy for SES, underscoring that no single measure can adequately capture all domains of SES, and that insurance is more easily captured from the health record. Nevertheless, this represents a limitation given that it is possible that some individuals who were labeled self-pay may not have been financially insecure, and that some individuals with private insurance had lower SES. We also lacked information on parental/family dynamics and school setting, which would have added explanatory power to our child-population findings. Future studies should assess the role of these different variables. Finally, our study ED site may not generalize to other sites, especially given its unique position as the only academic medical center and only level 1 trauma center in the state, and our data do not account for mental health outpatient visits that were occurring, including by telehealth, in the state during the COVID-19 pandemic. Despite these considerations, this study sheds light on a region that has been consistently neglected for complicated reasons, including its high poverty rate and troubled history with slavery and associated structural racism.

In conclusion, this study adds to existing evidence on changes in mental health ED visits during the COVID-19 pandemic and contributes uniquely to this evidence base by a) assessing both pediatric and adult mental health ED visits across one state medical center, b) using a health disparities lens by investigating demographic moderators and main effects, and c) utilizing data from the Southeastern U.S., an area which has lacked coverage in previous research on this topic. Investigations in the adult population suggested a lower frequency of depressive/anxiety ED visits in 2020 compared to 2019. There were no unique COVID-19-related differences in ED visits for SMI and substance use among adults. The decline in adult depression/anxiety ED visits during the pandemic points to the utility of other forms of treatment, including outpatient and tele-mental health services. Results also emphasize the considerable influence of SES- and race-related factors beyond the pandemic. Regardless of year, there was a higher frequency of depression/anxiety, substance/alcohol use, and SMI visits among adults from low-SES backgrounds (Medicaid or self-pay insurance status) relative to high SES (all other insurance types), underlining not only the link

between financial stress and risk for mental health problems, but also that the ED is often where lower SES individuals, and those without insurance, access mental health care. This highlights the importance of the ED as a source of mental health care and also reinforces the critical need for increased access to other forms of psychiatric care, regardless of insurance status or income. In addition, there was a lower frequency of depression/anxiety and alcohol/substance use visits among adults who identified as Black relative to other races regardless of year, and a lower frequency of externalizing ED visits among child patients who identified as Black relative to White children. This finding highlights structural and systemic factors, such as previous experiences of discrimination in healthcare settings, as well as cultural factors, such as internalized stigma about mental illness or preference for other forms of coping, that likely affect utilization of the ED for mental health symptoms among Black individuals. Investigations in the child population suggested no change in depression and anxiety ED visits during the COVID-19 pandemic. However, the significant reduction that was observed in externalizing ED visits only for children from lower-SES households in 2020, compared to 2019, was noteworthy and should be explored further in future studies. More research on the longitudinal impacts associated with COVID-19 and mental health symptoms in both adult and child populations is warranted, particularly given the unique SES and racial demographic characteristics in Mississippi representative of marginalized populations, and pandemic mental health should continue to be examined through a health disparities lens.

CRediT authorship contribution statement

Francesca Penner: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Aishwarya Rajesh:** Conceptualization, Writing – original draft, Writing – review & editing. **Kerry L. Kinney:** Conceptualization, Writing – original draft, Writing – review & editing. **Kara L. Mabus:** Conceptualization, Writing – original draft. **Kimberly G. Barajas:** Conceptualization, Writing – original draft. **Kevin R. McKenna:** Conceptualization, Writing – original draft. **Crystal S. Lim:** Conceptualization, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare no conflicts of interest.

Acknowledgements

Francesca Penner received funding from NIMH T32 MH018268.

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