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Short communication

Increased severity of mental health symptoms among adolescent inpatients during COVID-19

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ABSTRACT

Objective: Prior research suggests that the COVID-19 pandemic has been detrimental to adolescent mental health. However, no research has examined whether the pandemic is associated with increased symptom severity among high-risk youth, such as those hospitalized for a psychiatric crisis.

Method: Over a four-year period, upon admission to an adolescent psychiatric inpatient unit, youth completed measures of depression (Center for Epidemiologic Studies Depression Scale), feeling like a burden and lack of belongingness (Interpersonal Needs Questionnaire), trauma-related symptoms (Child Trauma Screen), suicidal thoughts and behaviors (Self-Injurious Thoughts and Behaviors Interview Self-Report Version). We compared the severity of these symptoms for patients admitted during the pandemic to the severity for patients admitted to the same unit in the three years before the pandemic.

Results: Across most symptoms, youth hospitalized during the pandemic reported increased severity compared to those hospitalized before the pandemic.

Conclusions: Adolescents requiring psychiatric hospitalization during the pandemic reported increased symptom severity compared to adolescents hospitalized on the same inpatient unit in the three years prior to the pandemic.

1. Introduction

Evidence suggests that adolescent mental health has been adversely affected by the coronavirus disease 2019 (COVID-19) pandemic [1–6]. Reviews suggest that depression and anxiety increased from before to during the pandemic among adolescents in the general population, as did other related outcomes, such as loneliness and stress [7]. Although necessary to contain the virus, such restrictions may have caused social isolation, disruption of community and school-based supports, and limited access to mental health services [8]. Given the closure of many mental health resources, it is important to understand the effect of the pandemic on vulnerable youth, such as those with a prior mental health condition or other high-risk youth. A small number of studies have found that adolescents with prior mental health conditions, such as those with eating pathology [9], may have experienced an exacerbation of symptoms. However, little research has examined the pandemic's impact on the mental health of high-risk youth, such as those recently hospitalized for a psychiatric crisis [10,11]. We examined whether adolescents who were hospitalized for psychiatric concerns during the first year of the pandemic showed more severe mental health symptoms (e.g., depression, feeling like a burden) compared to patients hospitalized during the three years before the pandemic.

2. Methods

Between April 2017 and April 2021, patients 12 to 19 years old (n = 1371; 93% < 18 years old) completed four self-report clinical assessments within two days of admission to an inpatient pediatric psychiatric unit in an urban hospital: the Center for Epidemiologic Studies Depression Scale for Children [12], the Interpersonal Needs Questionnaire [13], the Self-Injurious Thoughts and Behaviors Interview Self-Report Version [14], and the Child Trauma Screen [15]. Participants that completed any assessments were included in the study. To maintain consistency and not violate statistical assumptions of independence,
only data from patients’ first hospitalization were included. Demographic and length of stay data were extracted from the medical record. Race data were missing from 17.1% of the sample. The study was approved by the site institutional review board.

For each outcome, we compared the three years before and one year after March 13, 2020 (date the U.S. national COVID-19 emergency was declared) to test for changes from pre-pandemic-to-during the pandemic. To test for changes in demographics, we used t-tests and chi-square tests; for changes in clinical outcomes, we used linear, logistic and gamma regressions controlling for age and sex assigned at birth. We did not control for race due to the missing racial demographic data. However, to ensure that race did not influence the results, we ran separate models controlling for age, sex assigned at birth and race. To further test pandemic-related increases in symptoms, we compared the first year of the pandemic to the year prior to its onset. Statistical significance was defined by p values less than 0.05 after False Discovery Rate correction [16].

3. Results

Compared to the three years before the pandemic, the patient population was slightly but significantly younger, with more females assigned at birth in the pandemic year. There was a significant change in the racial makeup of patients, with more Black and Asian youth and fewer White youth after the pandemic. There was no change in the percentage of Hispanic patients (Table 1).

Average ratings across nearly all symptom variables were elevated during the pandemic, including depression, burdensomeness, lack of belongingness, intensity of suicidal ideation, the percentage of patients with a past month suicide attempt and the severity of trauma-related symptoms. (Table 1). Length of stay also significantly increased, with a median duration 6 days longer during the pandemic. The largest observed effect was for depression symptoms (Fig. 1). Although the intensity of suicidal ideation increased, the percentage of patients presenting with suicidal ideation (>90% in both periods) and lifetime traumatic experiences did not change during the pandemic. Models including race produced similar results except for the average intensity of suicidal ideation, which was no longer significant after controlling for race. Comparing pandemic year outcomes to those in the year prior produced similar results (e.g., Fig. 1).

4. Discussion

In this study, adolescents requiring psychiatric hospitalization during the pandemic reported increased severity of mental health symptoms, compared to similar patients over the previous three years. Although this is the first study to report on the effect of the pandemic on this population, the results are consistent with research showing worsening adolescent mental health during the pandemic [17–19].

Possible causes of the increased severity in this population are the stress of the pandemic, death of family members, and the loss of community, school or other social supports that provide early identification and interventions to mitigate psychiatric crises. The increases in burdensomeness and belongingness, risk factors for suicidal thoughts and behaviors in this population [20], suggest that patients felt more socially disconnected during the pandemic, perhaps due to coronavirus mitigation restrictions. If pandemic-level restrictions are reimposed, a top priority should be implementing ways to provide remote screening, to facilitate early detection, and remote interventions to prevent or at least decrease the degree of decompensation.

We note the following limitations: (1) symptoms were assessed via self-report (2) there may have been pandemic-related influences on the sample. For example, although the inpatient admission criteria did not change during the pandemic, emergency departments (EDs) may have increased their thresholds for hospitalization, resulting in only more severe cases being admitted. However, we know of no explicit policy changes where EDs altered criteria for inpatient referral. Alternatively, there was a dramatic drop in ED visits during the first several months of the pandemic [6], meaning only the most severe patients may have presented to EDs, which increased the severity on the inpatient unit.

| Table 1 |
| --- |
| Comparing demographic and clinical outcomes in the year after the onset of the pandemic (March 13, 2020) to the three years prior. |
| Variable | In the three years before pandemic onset (n = 1096) | In the year after the pandemic onset (n = 275) | Statistic (95% CI) |
| --- | --- | --- | --- |
| **Demographics** | | | |
| Age (SD) | 15.82 (1.66) | 15.13 (1.51) | −6.32* |
| Female % (N) | 71.98 (779) | 88.73 (317) | 35.24** |
| Hispanic % (N) | 7.46 (77) | 10.18 (28) | 1.24† |
| Race % (N) | 10.47** |
| Asian | 8.45 (76) | 9.96 (24) | 4.89 (44) | 9.96 (24) |
| Black or African American | 4.89 (44) | 9.96 (24) |
| Native American or Alaskan Native | <0.01 (1) | 0 (0) |
| White | 83.43 (750) | 78.00 (188) |
| Other | 3.11 (28) | 2.07 (5) |
| **Clinical Outcomes** | | | |
| Depression M (SD) | 35.32 (14.60) | 41.31 (12.95) | 5.53 (3.72–7.34) |
| Lack of belongingness M (SD) | 28.64 (12.66) | 31.01 (14.41) | 2.36 (0.63–4.1) |
| Burdensomeness M (SD) | 21.46 (12.68) | 26.09 (14.73) | 4.56 (2.81–6.31)† |
| Average intensity of suicidal ideation M (SD) | 1.86 (1.05) | 2.10 (1.11) | 0.21 (0.03–0.39)‡ |
| Intensity of suicidal ideation at worst point M (SD) | 3.26 (0.98) | 3.50 (0.89) | 0.21 (0.06–0.37)§ |
| Trauma-related symptoms M (SD) | 10.17 (5.13) | 11.90 (4.66) | 1.59 (0.9–2.29)† |
| Past month suicidal thoughts % (N) | 90.19 (827) | 93.42 (227) | 1.82 (0.97–3.43)§ |
| Past month suicide attempt % (N) | 60.69 (318) | 77.22 (139) | 1.96 (1.22–3.15)§ |
| Lifetime victim of physical abuse % (N) | 31.12 (300) | 33.20 (86) | 1.12 (0.82–1.51)§ |
| Lifetime victim of sexual abuse % (N) | 22.93 (221) | 27.41 (71) | 1.18 (0.85–1.64)§ |
| Lifetime witness to violence % (N) | 49.07 (473) | 51.74 (134) | 1.1 (0.83–1.46)‡ |
| Length of stay in days | 10 (7–16) | 16 (11–27) | 5.56 (2.63–8.50)§§ |

CI = Confidence interval; IQR = Interquartile range; † = t value from t-test; ‡ = t value from χ^2 test; § = Linear regression controlling for age and sex; §§ = Logistic regression controlling for age and sex; †§§ = Gamma regression controlling for age and sex; *p < .05 after correction with False Discovery Rate, + no longer significant after including race in the model.

Fig. 1. Monthly average depression ratings in four different years among inpatients within two days of admission to an adolescent psychiatric inpatient unit.
Although possible, symptoms severity in the current study was elevated throughout the entire first year of the pandemic, after youth ED visits had returned to pre-pandemic levels.

Overall, results suggest that self-reported symptom severity increased among adolescents requiring psychiatric hospitalization during the pandemic compared to adolescents hospitalized on the same inpatient unit in the three years prior to the pandemic.

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The authors have no conflicts of interest to disclose.

**CRediT authorship contribution statement**

Alexander J. Millner: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. Kelly L. Zurofski: Writing – original draft, Writing – review & editing. Victoria W. Joyce: Conceptualization, Methodology, Investigation, Supervision, Writing – review & editing. Flynn Kelly: Writing – original draft, Writing – review & editing. Ralph J. Buonopane: Conceptualization, Methodology, Investigation, Supervision, Writing – review & editing. Cassidy Richards: Writing – original draft, Writing – review & editing. Ralph J. Buonopane: Conceptualization, Methodology, Investigation, Supervision, Writing – original draft, Writing – review & editing.

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