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Suicide Ideation and Attempts in a Pediatric Emergency Department Before and During COVID-19

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Table of Contents Summary: This study examined rates of positive suicide-risk screens in a pediatric Emergency Department from January-July 2020, as compared with similar screens conducted between January-July 2019.

What's Known on This Subject: Despite prominent attention to the potential mental health consequences of COVID-related stressors, to date, little data has demonstrated increased rates of suicide-related behaviors among youth during the COVID-19 pandemic.

What This Study Adds: This study identified increased rates of youth suicide ideation and suicide attempts during the COVID-19 pandemic, as compared with 2019 rates. Increases in suicide ideation and suicide attempts appear to correspond to times of increased COVID-related concerns within the community.

Contributors Statement: Dr. Hill conceptualized and conducted the analysis, drafted the initial manuscript, and revised the manuscript. Drs. Kurian, Saxena, Rufino, and Williams and Ms. Saxena reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Abstract

Objectives. Recent studies have identified elevated rates of mental health concerns during the COVID-19 pandemic. This study sought to evaluate whether youth reported greater frequency of suicide-related behaviors during the 2020 COVID-19 pandemic, as compared with data from 2019. We hypothesized that rates of suicide-related behaviors would be elevated between the months of March and July 2020, as compared with 2019, corresponding to the onset of the COVID-19 pandemic.

Method. Routine suicide risk screening was completed with youth ages 11-21 in a pediatric Emergency Department. Electronic health records data for suicide risk screens completed between January-July 2019 and January-July 2020 were evaluated. A total of 9,092 completed screens were examined (mean age 14.72 years, 47.7% Hispanic/Latinx, 26.7% non-Hispanic White, 18.7% non-Hispanic Black).

Results. Analyses compared rates of positive suicide risk screens for January-July 2020 with corresponding rates from January-July 2019. Results indicated a significantly higher rate of suicide ideation in March and July 2020 and higher rates of suicide attempts in February, March, April, and July 2020, as compared with the same months in 2019. Demographic characteristics (sex, race/ethnicity) were not associated with increased rates of suicide-related behaviors during this period.

Conclusions. Results indicated that rates of suicide ideation and attempts were higher during some months of 2020, as compared with 2019, but were not universally higher across this period. Months with significantly higher rates of suicide-related behaviors appear to correspond to times when COVID-related stressors and community responses were heightened, indicating that youth experienced elevated distress during these periods.

Suicide is the 2nd leading cause of death among children and adolescents, ages 10-17, in the United States and suicide rates have increased in the age group over the past 20 years.[1] These statistics coincide with recent literature that revealed a 92% increase in annual Emergency Department (ED) visits for suicide ideation and attempts for children, without a statistically significant increase in overall ED visits.[2] Additionally, youth suicide related behaviors result in 4 to 5 emergency department visits per year for every 1,000 youth, ages 15-19 years[3], costing an estimated $15.5 billion, annually.[4]

Multiple reports have identified elevated rates of mental health concerns during the COVID-19 pandemic (e.g., [5-7]). In a recent study of U.S. adults, more than 40% of respondents reported adverse mental health or increased substance use in June, 2020.[8] Furthermore, research shows that participants in shelter in place or lockdown due to COVID-19 experienced increasing rates of suicide ideation as months passed, whereas participants not under these COVID restrictions did not.[9] Resultingly, experts in the field are publishing resources aimed specifically at treating suicide with the Collaborative Assessment and Management of Suicidality (CAMS)[10] and safety planning[11] through the lens of the COVID-19 pandemic. Among adolescents, greater levels of negative COVID experiences were associated with increased depressive symptoms and anxiety.[12] However, while many have speculated about the impacts of the COVID-19 pandemic on youth and adults,[13-14] few studies have provided empirical data demonstrating elevated rates of mental health concerns during this period.[15-161] In fact, recent studies have reported that the rates of death by suicide in children and adults have not changed since the onset of the pandemic.[17-18]

The goal of the present study was to examine rates of suicide ideation and attempts reported during routine suicide risk screening in a pediatric Emergency Department. Changes in rates of positive suicide risk screens are reported, comparing rates of positive screens from January to July 2020 with that same period in 2019. Potential demographic differences are evaluated, to determine whether specific demographic groups were disproportionately impacted by the COVID pandemic with respect to suicide-related behaviors.

Method

Participants and Procedures

Data were drawn from the electronic health record of a large pediatric emergency department in a major metropolitan area in Texas. Youth aged 11 and older who presented to the emergency department within any of three connected pediatric hospitals, for any presenting complaint, were asked to complete the screening version of the Columbia-Suicide Severity Rating Scale[19] via an electronic tablet. Exclusion criteria included: Patient or legal guardian refusal, unresponsive upon arrival due to medical condition, or intellectual disability that precluded the ability to read and respond to the questions. All positive suicide risk screens were addressed via standard hospital protocols, including an assessment of suicide risk and appropriate safety steps to ameliorate suicide risk prior to discharge. This research was approved by the appropriate Institutional Review Board.

The present study examines data from January-July of 2019 and January-July of 2020. A total of 18,247 youth aged 11 to 21 years were seen in the Emergency Department, of whom 12,827 completed the suicide risk screen, see Figure 1. Participants had a mean age of 14.52 years (*SD* = 2.22; with 88.8% aged 11-17 years). Respondents self-identified as: 59.0% female (*n* = 7,570) and 41.0% male (*n* = 5,257), 47.5% Hispanic/Latinx (*n* = 6,091), 26.8% non-Hispanic White (*n* = 3,433), 19.1% non-Hispanic Black or African American (*n* = 2,455), 2.6% non-Hispanic Asian (*n* = 338), 0.1% American Indian or Alaskan Native (*n* = 16), 0.1% Native Hawaiian or Pacific Islander (*n* = 12), and 1.2% multiracial (*n* = 153). Demographic data were unavailable for 2.6% of the respondents (*n* = 329). Overall, 3.5% (n = 454) of participants reported a chief complaint of suicidal thoughts or behaviors at the time of their visit.

Measures

The seven-item screening version of the Columbia-Suicide Severity Rating Scale (C-SSRS) was used to screen for suicide risk.[20] The C-SSRS uses the Columbia Classification Algorithm of Suicide Assessment for categorizing suicide-related phenomena.[21] The C-SSRS has excellent documented reliability and predictive validity in both youth and adults.[19-22] Youth were asked to complete two items assessing passive and active suicide ideation in the prior month. If active suicide ideation was present, three additional items were presented, further assessing the severity of suicide ideation (method, intent, and plan). All youth also responded to a single item assessing lifetime suicide attempt history. If a positive suicide attempt history was noted, youth were also asked to identify whether any suicide attempt had occurred within the previous three months. All items are asked using *yes* and *no* response options. Screens were provided in both English and Spanish.

Data Analyses

Data were evaluated using SPSS version 26. Data were first cleaned, to remove cases that did not meet inclusion criteria or those with missing data on the C-SSRS screen. A search for duplicate patients in any given month was conducted, none were identified. Suicide risk screens were then scored according to two algorithms: *Recent suicide ideation* was defined as a positive ("*yes"*) response to any of the items assessing past-month suicide ideation, excluding suicide attempt items. *Recent suicide attempt* was defined as a positive ("*yes"*) response to item 7, assessing suicide attempts in the previous 3 months, excluding suicide ideation items. Descriptive statistics were calculated followed by a series of Chi-square difference tests to examine the difference in rates of suicide ideation and attempts in the months pre- and post-

COVID-19. Finally, binary logistic regressions were utilized to examine demographic differences associated with positive screens. Due to the exploratory nature of the study, power analyses were not conducted.

Results

Prevalence of Suicide Related Behaviors, 2019-2020

Across the entire study period, 15.8% (n = 2,033) reported past month suicide ideation, and 4.3% (n = 554) reported a recent suicide attempt (past 3 months). Rates of positive screens for recent suicide ideation and suicide attempts, by month and year, are reported in Table 1. Chi-squared difference tests identified significant differences in the rate of recent suicide ideation in March and July 2020, as compared with those same months in 2019. The odds of recent suicide ideation were 1.60 times higher in March 2020, compared with March 2019, and 1.45 times higher in July 2020 than July 2019.

For recent suicide attempts, chi-squared difference tests identified significant differences in the rate of suicide attempts in February, March, April, and July 2020, as compared with those same months in 2019. The odds of a recent suicide attempt were 1.58, 2.34, 1.75, and 1.77 times higher in February, March, April, and July 2020, compared with those same months in 2019, respectively. Figure 2 displays rates of positive screens, by month and year.

Demographic Characteristics Associated with Positive Screens

To evaluate whether specific demographic subgroups were disproportionately impacted, two logistic regression models were examined to evaluate the effects of sex and race/ethnicity on the likelihood of a positive suicide risk screen. Results are presented in Table 2. Data for March-

July was evaluated in a single model, with any recent suicide ideation as the outcome. For sex, the first step of the model contained year and sex as predictors of the likelihood of recent suicide ideation. The overall model was statistically significant, χ^2 (2) = 155.22, $p < .001$, Nagelkerke R-square = .029. Both variables were statistically significant predictors, indicating that recent suicide ideation was more frequent in 2020 and among females. In the second step, the interaction term was added to the model. This second step was not a statistical improvement in the model, χ^2 (1) = 0.76, $p = .38$, and the interaction between year and sex was not statistically significant, indicating that neither sex reported a greater increase in likelihood of recent suicide ideation from 2019 to 2020.

In the second model race and ethnicity was evaluated, categorized as non-Hispanic White, non-Hispanic Black/African American, and Hispanic/Latinx, with non-Hispanic White as the reference group. The first step of the model contained year and race/ethnicity as predictors of the likelihood of recent suicide ideation. The overall model was statistically significant, χ^2 (3) = 23.48, $p < .001$, Nagelkerke R-square = .005. Both variables were statistically significant predictors, indicating that recent suicide ideation was more frequent in 2020 and less frequent among Hispanic/Latinx youth (as compared with non-Hispanic White youth). In the second step, the interaction term was added to the model. This second step was not a statistical improvement in the model, χ^2 (2) = 1.40, $p = .50$, and the interaction between year and race/ethnicity was not statistically significant, indicating that no racial/ethnic group reported a greater increase in likelihood of recent suicide ideation from 2019 to 2020. A similar pattern of results was found for both sex and race/ethnicity when recent suicide attempts was the outcome variable (see Table 2).

Discussion

This study evaluated whether rates of youth suicide-related behaviors have been elevated during the COVID-19 pandemic, by examining rates of positive suicide risk screens administered as routine screening in a pediatric Emergency Department. Comparison of the rate of positive suicide screens for recent suicide ideation revealed significantly increased rates of ideation in March and July of 2020, as compared with screening rates in March and July of 2019. Similarly, positive screens for recent suicide attempts were higher in February, March, April, and July 2020 than those same months in 2019. Of note, the number of ED visits was substantially reduced during the COVID-19 pandemic. Consequently, direct comparison of rates across years should be made with caution.

Rates of positive suicide risk screens were not uniformly higher after the outbreak of the COVID-19 pandemic in the United States in March 2020, as indicated by the lack of statistically significant differences in rates of positive screens, particularly in May and June. There appears to have been an early increase in suicide-related behaviors between February and April 2020. This timeframe corresponds to the onset of the pandemic in the United States, including initial stay-at-home orders and social distancing efforts that went into effect in March as well as early outbreaks in some parts of the United States. However, in May 2020, the state of Texas began to lift COVID-19 restrictions, which may have also reduced fears and concerns regarding COVID-19, allowed youth to resume interrupted schedules, and increased social contacts/reduced social isolation. In June, Texas saw a resurgence of COVID-19 cases[23], which triggered the re-introduction of COVID-19 restrictions across a number of public sectors in early July as well as renewed efforts to increase social distancing. The data indicate that at this same time, rates of positive screens for suicide-related behaviors also increased. Thus, one possible explanation of

the data is that the variability in the statistical results appears to follow the historical context of COVID cases, particularly with regard to the general level of community fear or isolation due to school cancellations/social distancing efforts in the region where data collection occurred.

Limitations and Future Directions

The results of this study should be considered in the context of the study limitations. Critically, this study is unable to make concrete causal influences, as historical factors other than the COVID-19 pandemic occurred between 2019 and 2020. Consequently, while the pattern of the data indicates a possible association between rates of positive suicide risk screens and COVID-19-related social and cultural changes, this study was not able to evaluate the potential impacts of other historical sociopolitical events. Additionally, hospital pediatric Emergency Department patient volumes were reduced during the COVID-19 pandemic, which may have introduced bias into the sample, which we were unable to discern. Furthermore, data indicate that 40% of suicidal adolescents visit an ED in the year prior to their death[24], indicating that ED patients constitute a high risk population. Thus, the rates of suicide ideation and suicide attempts reported here may not be reflective of the true rates within the population. Further, given the reduced rate of ED visits during the pandemic, it is possible that only the most severe cases came to the ED, resulting in elevated rates of suicide ideation and attempt due to the increased overall severity of cases. Data are also drawn from a single hospital system and single screening methodology, and so results may not generalize to other regions or screening programs. In particular, as results appeared to follow localized patterns of COVID response, additional research is needed to determine if these results replicate in other regions, where localized COVID response patterns differed.

Additional research is also needed to evaluate unique risk and protective factors that may be associated with suicide risk in the context of a global pandemic.[25] The present study was not able to evaluate individual effects of pandemic-related fears/stresses, social distancing and other preventive measures (e.g., cancelling in-person classes, distance learning, isolation from peers), and stay-at-home or mask orders on suicide-related behaviors. Future efforts should aim to evaluate which aspects of the pandemic and pandemic responses have the greatest impact on youth suicide-related behaviors, in order to identify potential avenues for countering the increased suicide risk.[26]

Conclusions

Rates of positive suicide risk screens for youth seeking care in a pediatric Emergency Department during the 2020 COVID-19 pandemic were statistically elevated, as compared with the same period the year prior. These data indicate that the effects of the pandemic, broadly defined, may be associated with increased rates of suicide ideation among youth, ages 11-21. Future research should evaluate how various social, emotion, behavioral, and cultural factors may be associated with increased rates of suicide-related behavior during a global pandemic.

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Table 1. Percentage of Screens Positive for Any Suicide-Related Behaviors and Recent Suicide Attempts

Month	2019	2020	X^2 (df)	*p*	Odds Ratio
		Recent Suicide Ideation			
January	16.0% (*n* = 92)	14.6% (*n* = 143)	0.569 (1)	.45	0.90
February	15.7% (*n* = 188)	15.4% (*n* = 152)	0.031 (1)	.86	0.98
March	14.3% (*n* = 189)	21.1% (*n* = 167)	16.069 (1)	< .001	1.60
April	16.3% (*n* = 213)	16.5% (*n* = 82)	0.012 (1)	.91	1.02
May	16.1% (*n* = 200)	17.3% (*n* = 106)	0.412 (1)	.52	1.09
June	14.8% (*n* = 146)	18.2% (*n* = 131)	3.579 (1)	.06	1.28
July	11.9% (*n* = 106)	16.3% (*n* = 118)	6.734 (1)	.009	1.45
		Recent Suicide Attempts			
January	4.0% (*n* = 22)	3.7% (*n* = 36)	0.024 (1)	.72	0.91
February	3.3% (*n* = 40)	5.2% (*n* = 51)	4.540 (1)	.03	1.58
March	3.3% (*n* = 43)	7.3% (*n* = 58)	17.910 (1)	< .001	2.34
April	3.3% (*n* = 43)	5.6% (*n* = 28)	5.227 (1)	.02	1.75
May	4.0% (*n* = 50)	4.7% (*n* = 29)	0.506 (1)	.48	1.18
June	3.7% (*n* = 37)	5.3% (*n* = 38)	2.331 (1)	.13	1.43
July	3.7% (*n* = 33)	6.4% (*n* = 46)	6.144 (1)	.01	1.77

Table 2. Demographic Characteristics Associated with Positive Screens

	Recent Suicide Ideation			Recent Suicide Attempt		
Predictor	B	S.E.	*p*	B	S.E.	*p*
	Model 1			Model 1		
	Block 1: X^2 (2) = 155.22, $p < .001$, $R^2 = .029$			Block 1: X^2 (2) = 77.79, $p < .001$, $R^2 = .028$		
Year	-0.22	0.06	< .001	-0.51	0.10	< .001
Sex (Female)	0.72	0.06	< .001	0.80	0.12	< .001
	Block 2: X^2 (1) = 0.76, $p = .38$, $R^2 = .029$			Block 2: X^2 (1) = 0.73, $p = .39$, $R^2 = .028$		
Year	-0.14	0.11	.21	-0.36	0.21	.08
Sex (Female)	0.79	0.10	< .001	0.91	0.18	< .001
Sex (Female) x Year	-0.11	0.14	.38	-0.20	0.24	.39
	Model 2			Model 2		
	Block 1: X^2 (3) = 23.48, $p < .001$, $R^2 = .005$			Block 1: X^2 (3) = 43.46, $p < .001$, $R^2 = .017$		
Year	-0.24	0.06	< .001	-0.57	0.11	< .001
African American/Black	-0.01	0.08	.93	0.09	0.14	.55
Hispanic	-0.17	0.07	.01	-0.38	0.13	.002
	Block 2: X^2 (2) = 1.40, $p = .50$, $R^2 = .005$			Block 2: X^2 (2) = 1.54, $p = .46$, $R^2 = .018$		
Year	-0.18	0.11	.10	-0.74	0.19	< .001
African American/Black	0.11	0.13	.42	0.02	0.20	.94
Hispanic	-0.15	0.11	.17	-0.54	0.18	.002
African American/Black x Year	-0.19	0.17	.26	0.14	0.29	.62
Hispanic x Year	-0.04	0.14	.80	0.31	0.25	.22

Note. For race/ethnicity, comparator is non-Hispanic white youth; for sex, comparator is males.

Figure 1. Patients Screened in the Pediatric Emergency Department, January – July 2019/2020

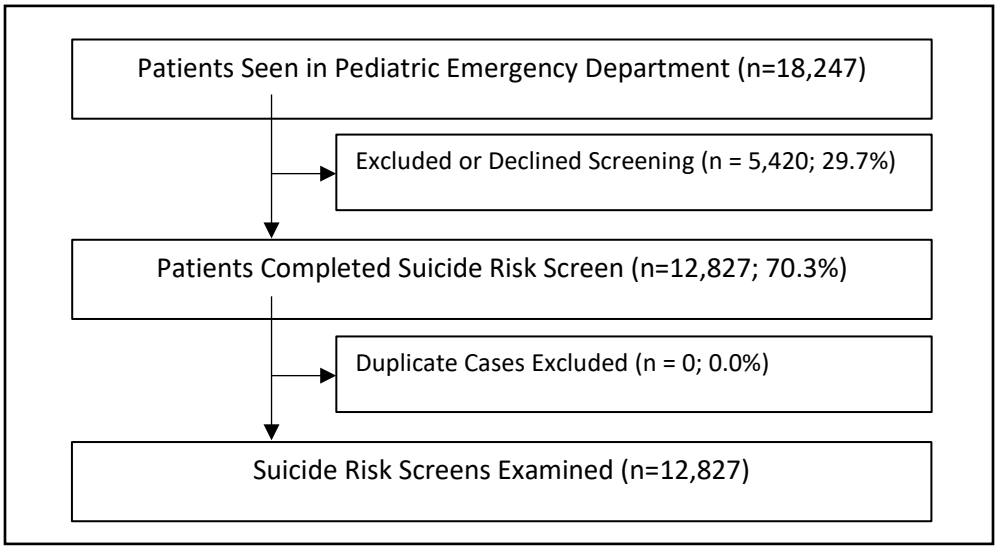
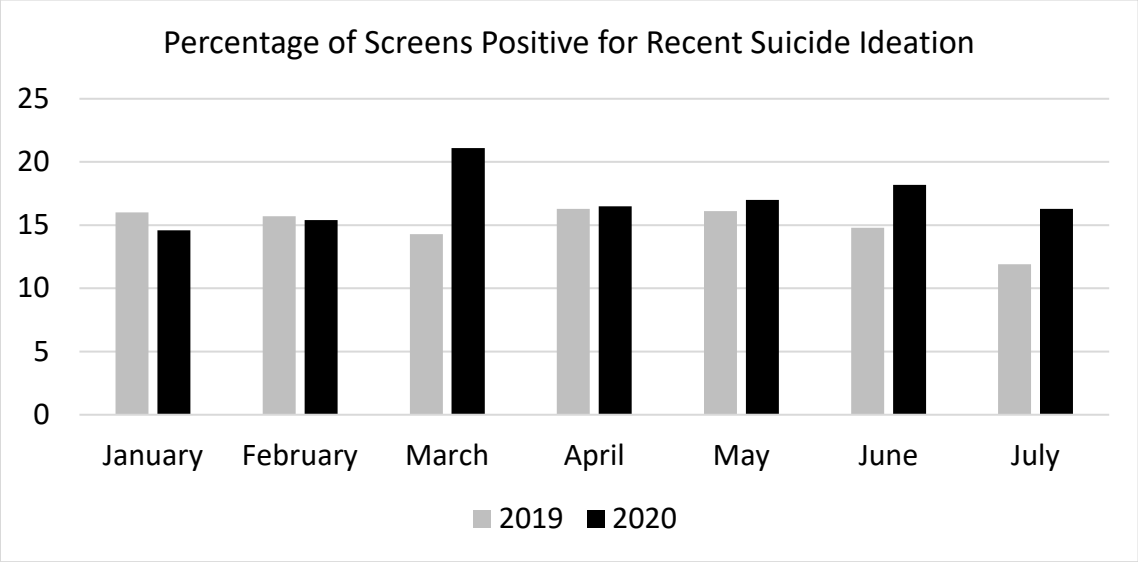
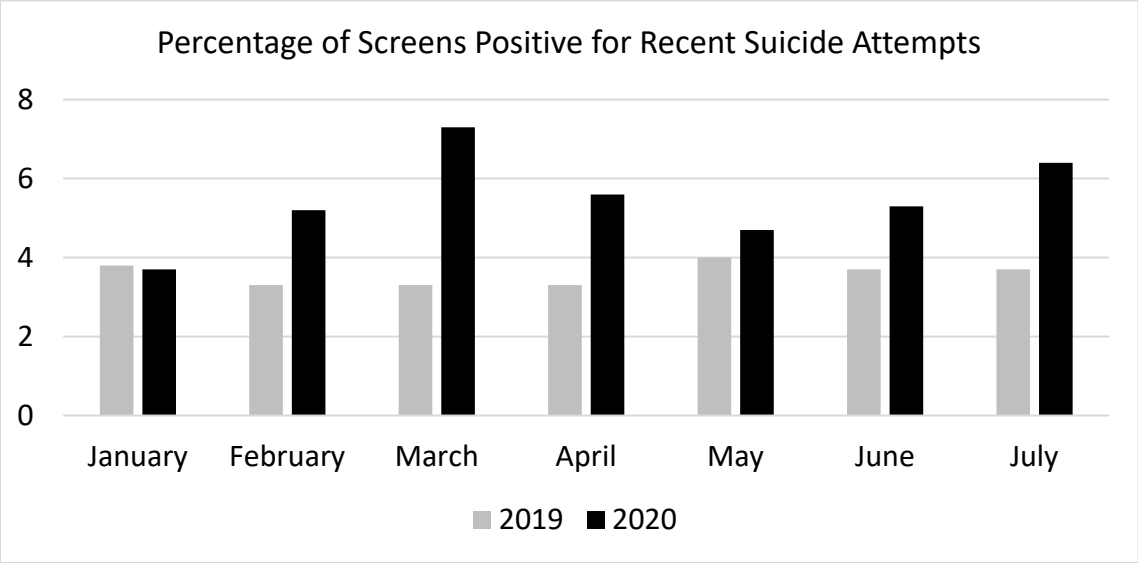


Figure 2. Rates of Positive Screens for Suicide Ideation and Attempt, January-July





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