Research Trends

Real-Time Mental Health Crisis Response in the United States to COVID-19

Insights From a National Text-Based Platform

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Abstract. *Background:* Data are scarce on assessing the impact of the COVID-19 pandemic on young people. *Aim:* To examine changes in crisis text patterns in the United States during the pandemic compared to the prepandemic period. *Method:* Nonintrusive data from a national digital crisis texting platform were analyzed using an interrupted time series design. Poisson regression with repeated-measures examined help-seeking patterns for stress, anxiety, depression, suicidal thoughts, and other mental health concerns in the pandemic (March 13 to July 20, 2020) compared to the prepandemic period (March 13 to July 20, 2019). *Results:* An abrupt increase in national crisis response texts occurred during the pandemic for stress and anxiety, substance abuse, bereavement, isolation, and abuse compared to the prepandemic period. Similar trends of excess texts for isolation and abuse were reported among children (relative risk [RR]$_{abuse}$: 1.16, CI: 1.03, 1.31; RR$_{isolation}$: 1.15, CI: 1.09, 1.21) and adolescents (RR$_{abuse}$: 1.17, CI: 1.11, 1.24; RR$_{isolation}$: 1.08, CI: 1.05, 1.11), bereavement among Black (RR: 1.31, CI: 1.12, 1.54) and Hispanic (RR: 1.28, CI: 1.10, 1.49) texters, and isolation and bereavement in female (RR$_{isolation}$: 1.09, CI: 1.06, 1.11; RR$_{bereavement}$: 1.21, CI: 1.13, 1.28) or nonconforming youth (RR$_{isolation}$: 1.19, CI: 1.08, 1.32; RR$_{bereavement}$: 1.50, CI: 1.08, 2.09) texters. Conversely, the risks of reporting bullying, depression, relationship issues, and suicidal thoughts as reasons for texting were significantly lower during COVID-19. *Limitations:* Results may underestimate crisis support-seeking in some groups because demographic data were not captured on all texters. *Conclusion:* Findings illuminated the real-time crisis response of young people across the United States and can inform more responsive interventions to alleviate the mental health consequences brought on by the COVID-19 pandemic.

Keywords: COVID-19, crisis help-seeking, youth, digital intervention, quasi-experimental, mental health

The World Health Organization has expressed concern over the significant and largely underaddressed psychosocial consequences of the pandemic, as self-isolation and quarantine may increase loneliness, depression, insomnia, harmful alcohol and drug use, self-harm, and suicidal behavior (WHO, 2020a, 2020b). In a survey by the Center for Disease Control and Prevention (CDC) of US adults in June 2020, young adults, minorities, essential workers, and unpaid adult caregivers reported disproportionately worse mental health outcomes, increased substance use, and elevated suicidal ideation (Czeisler et al., 2020). Research from the Kaiser Family Foundation revealed that 45% of adults reported their mental health being negatively impacted by stress in response to the pandemic. Findings from the CDC reported similar levels of distress in two out of five Americans (Czeisler et al., 2020). To complicate matters, the COVID-19 pandemic is occurring against the backdrop of rising suicide rates in the United States (Hedegaard et al., 2020).

The *Lancet* recently published an urgent "call to action" for research monitoring and reporting on the pandemic's wide-ranging mental and emotional consequences (Holmes et al., 2020). Gaps in the current evidence base include longitudinal assessment of changes in population-level reports of anxiety, depression, self-harm, suicidal thoughts, and other mental health issues and the identification of supportive and preventive interventions. The objective of this novel study was to examine changes in crisis text volume during the pandemic compared to the prepandemic period. We obtained nonintrusive data on text conversations collected from a confidential and nationally available digital texting platform, Crisis Text Line (CTL), to answer the following research questions: (1) How do crisis text

patterns in the United States change during the pandemic compared to the prepandemic period? (2) How does crisis support-seeking change among vulnerable subgroups of texters during the pandemic compared to the prepandemic period? Findings from this study will illuminate the real-time digital crisis response of American children, adolescents, and young adults across the United States to increased social isolation and dramatic changes to "normal" daily routines, triggered during the pandemic.

Methods

Study Design

An interrupted time series design was employed to examine changes in national trends in daily help-seeking for mental health support and was compared for the prepandemic period (March 13 to July 20, 2019) and the pandemic period (March 13 to July 20, 2020; 130 days). On March 13, a national emergency was declared in the United States. The White House instituted national recommendations calling for 15 days to Slow the Spread, which was later extended to 30 days (Moreland et al., 2020). These measures were soon followed by a flurry of state-level "stay-at-home" orders to mitigate the impacts of COVID-19 in the United States. Therefore, we defined the "stay-at-home" period to include March 13 to May 13, 2020, to account for national and state-level orders. The "re-opening" phase encompassed May 14 to July 20, 2020 (Whitehouse, 2020; Kates et al., 2020). For this analysis, we defined the pandemic period as starting on March 13, 2020 (i.e., the conceptualized start date of the pandemic) and hypothesized that crisis response volume in young people would be significantly higher in the pandemic compared to the prepandemic period. We then conducted a sensitivity analysis to examine change in crisis response volume for two periods: (1) the "stay-at-home" period and (2) the reopening phase (see Table E3 in Electronic Supplementary Material 1 [ESM 1]).

CTL Data

CTL, a not-for-profit tech-enabled organization that offers free 24/7 text-based service for people in crisis, provided crisis text data for mental health support seeking. CTL is primarily used by young people and provides an anonymous text-based platform for crisis conversations in this age group. Since CTL's creation in August 2013, nearly 145 million messages have been exchanged between persons in crisis and trained crisis counselors. Crisis tags are assigned to each texting conversation by the responding crisis counselor and address a wide range of issues, including suicidal thoughts, self-harm, relationship, substance abuse, anxiety/stress, bullying, depression, gender/sexual identity, grief, and isolation/loneliness. More than one tag could be assigned to a crisis conversation, and co-occurrence among tags is shown in Table E2 in ESM 1.

Research to date has demonstrated that the pandemic is associated with a wide range of mental health responses in young people, including anxiety, depression, isolation, bereavement, self-harm, abuse, and substance abuse (Brown et al., 2020; Campbell 2020; Czeisler 2020; Leske et al., 2021; Luchetti et al., 2020). Primary variables of interest were daily crisis texts related to the following issues coded as binary variables (yes/no): stress and anxiety, depression, bereavement, self-harm (e.g., cutting, harming, and burning behavior), abuse, substance abuse, relationship issues, isolation, suicidal thoughts, and bullying (see Figure E1 in ESM 1). For the abuse tag, four tags were combined and included emotional, physical, sexual, and general unspecified abuse. We opted to characterize abuse this way because this was the noisiest issue tag and due to the subjective nature of tagging for this concern, abuse has been consistently labeled incorrectly. CTL assigned each texter an unique actor ID that was used to monitor changes in issue tags over time.

Potential Covariates

Age, gender identity, sexual orientation, social isolation, and race/ethnicity have been identified as important risk factors for mental health concerns in young people and were adjusted for in the analysis as potential confounders (Broman, 2012; Leigh-Hunt et al., 2017; Miranda-Mendizabal et al., 2019; Moore, 2018; Valentine & Shipherd, 2018). Prior evidence has linked infectious disease outbreaks to adverse mental health and social stress outcomes (e.g., Kamara et al., 2017; Lu et al., 2009). We included an independent variable that captured texts mentioning COVID-19 and whether a text conversation resulted in an active rescue. All crisis tags were conceptualized as normal risk with the exception of self-harm and suicidal thoughts, which were conceptualized as medium risks by the CTL service. If a CTL supervisor was unable to de-escalate and help a texter in crisis to disconnect from the means of harm and work toward a safety plan, an active rescue was initiated, which involved contact to emergency services. However, less than 1% of crisis conversations resulted in an active rescue.

The research was reviewed and approved by the university institutional review board (protocol number: 17763).

Statistical Analysis

Descriptive statistics were calculated for all demographic and mental health and well-being variables in the prepandemic and pandemic periods.

We applied Poisson regression with repeated-measures and constructed separate generalized estimating equation (GEE) models to examine changes in individual crisis concerns before and since the pandemic (i.e., intervention term: 1 = *pandemic period*, 0 = *prepandemic period*). Each model included a robust sandwich estimator term using a repeated-measures statement to adjust for clustering of individual texters who repeatedly engaged with the service and to account for within-subject comparison of the change in crisis text behavior over time (Liang and Zeger, 1986; Zou, 2004). An autoregressive working correlation structure was selected to account for time dependency for correlated text conversations for individual users. GEE was advantageous because it can handle missing data, was appropriate for repeated-measures multivariate analysis of variables at different time points, and accounted for intrasubject correlation of outcomes when variation in health outcomes over time was expected (Zou, 2004). Furthermore, because we were analyzing general trends in crisis-text help-seeking, the marginal mean model provided a population-averaged interpretation of how mean crisis response in the population changed over time in relation to important covariates (Fizmaurice et al., 2008). The link function was used to generate relative risks (RRs) and associated 95% CIs.

Bivariate analysis was used to examine differences in crisis concerns and associated texter characteristics at each time point under study. Covariates with $p < .05$ were kept in the final model to improve model fit. The fitted Poisson regression models were extended to examine interactions between exposure to the COVID-19 pandemic and age, gender identity, sexual identity, or race/ethnicity. We next examined whether and how texter demographics differed over time with respect to exposure to the pandemic (reference category = prepandemic period) by adding an "interaction term" between each covariate of interest (i.e., age, race/ethnicity, and gender identity). A separate model was performed for each interaction term. Finally, a sensitivity analysis comparing text volume before the pandemic with the "stay-at-home" phase and "reopening" phase was also performed. All analyses were carried out in SAS software version 9.4 (SAS Institute, Inc, Cary, NC).

Results

General Trends

Table 1 provides descriptive statistics on texter demographics and crisis response conversations for the prepandemic and COVID-19 pandemic periods. In general, only about two out of 10 users provided demographic characteristics. For texters who responded to the survey but who were missing responses to individual demographic characteristics, we included a "no response" or "preferred not to respond" option. A notable increase in crisis conversations was observed across racial/ethnic (e.g., Asian, Hispanic/Latinx, Black, and White texters) and gender (e.g., females) groups. For example, conversations among Hispanic/Latinx and White texters, as well as among female texters, were higher in the pandemic compared to the pre-COVID period. Results showed that text volume related to the following issue tags: Abuse, bereavement, isolation, stress and anxiety, and substance abuse increased during the pandemic period compared to the prepandemic period (Table 1, Figure 1). We also observed a parallel increase in new users engaging with the service during the pandemic period for those same mental health concerns, as well as self-harm. In particular, more Asian, Hispanic/Latinx, Black, and White texters started connecting with the service during the pandemic. One notable decline in texts for the concerns bullying, suicidal ideation, depression, relationship issues, and active rescues was observed during the early part of the 2020 COVID-19 outbreak.

Results on changes in crisis text volume before and since the COVID-19 outbreak from multivariable GEE models are presented in Table 2.

Changes in Crisis Concerns for the Pandemic Period Compared to Prepandemic Period

After adjusting for demographic factors in the model, we observed a significant increase in stress and anxiety-related texts in the COVID-19 pandemic period compared to prepandemic period.

Relative to the prepandemic period, the risk of a texter reporting depression declined during the pandemic (RR: 0.89, CI: 0.88, 0.90).

As a whole, crisis conversations for suicidal thoughts were significantly lower in the early part of the pandemic period (March to July) than in the prepandemic period (RR: 0.78, CI: 0.77, 0.80). However, an elevated risk of reporting suicidal thoughts (RR: 1.06, CI: 1.03, 1.09) was observed among texters during the 2020 stay-at-home orders compared to the reopening phase (Table S3).

Table 1. Descriptive characteristics of Crisis Text Line conversations and users before and after the COVID-19 pandemic

	Conversations[a] n (%)	Pre-COVID (March 13–July 20, 2019) n (%)	COVID-19 (March 13–July 20, 2020) n (%)	Users[b] n (%)	Pre-COVID (March 13–July 20, 2019) n (%)	COVID-19 (March 13–July 20, 2020) n (%)
Totals	186,278	91,983	94,295	92,051	51,371	49,837
Age, years						
≤13	23,039 (7.12)	11,553 (12.56)	11,486 (12.18)	10,365 (3.2)	5,799 (11.29)	5,711 (11.46)
14–24	107,294 (33.15)	53,867 (58.56)	53,427 (56.66)	54,008 (16.69)	30,639 (59.64)	29,045 (58.28)
25–44	36,859 (11.39)	17,749 (19.3)	19,110 (20.27)	18,798 (5.81)	10,306 (20.06)	10,062 (20.19)
45–64	9,329 (2.88)	4,220 (4.59)	5,109 (5.42)	4,691 (1.45)	2,358 (4.59)	2,681 (5.38)
65+	672 (0.21)	245 (0.27)	427 (0.45)	379 (0.12)	133 (0.26)	256 (0.51)
Not available	9,085 (2.81)	4,349 (4.73)	4,736 (5.02)	3,810 (1.18)	2,136 (4.16)	2082 (4.18)
Race/ethnicity						
American Indian/ Alaskan Native	5,291 (1.63)	2,726 (2.96)	2,565 (2.72)	2,744 (0.85)	1,555 (3.03)	1,454 (2.92)
Asian	8,641 (2.67)	3,914 (4.26)	4,727 (5.01)	4,240 (1.31)	2,133 (4.15)	2,533 (5.08)
Hispanic/Latinx	20,321 (6.28)	9,073 (9.86)	11,248 (11.93)	11,349 (3.51)	5,567 (10.84)	6,638 (13.32)
Black	15,910 (4.92)	7,672 (8.34)	8,238 (8.74)	8,303 (2.57)	4,389 (8.54)	4,639 (9.31)
White	80,909 (25)	38,990 (42.39)	41,919 (44.46)	39,384 (12.17)	21,537 (41.92)	22,096 (44.34)
Other	4,938 (1.53)	2,267 (2.46)	2,671 (2.83)	2,423 (0.75)	1,242 (2.42)	1,416 (2.84)
No response	39,452 (12.19)	22,462 (24.42)	16,990 (18.02)	18,974 (5.86)	12,551 (24.43)	8,299 (16.65)
Prefer not to say	10,816 (3.34)	4,879 (5.3)	5,937 (6.3)	4,634 (1.43)	2,397 (4.67)	2,762 (5.54)
Gender identity						
Female	113,143 (34.96)	53,347 (58)	59,796 (63.41)	57,642 (17.81)	30,339 (59.06)	33,028 (66.27)
Male	19,306 (5.97)	9,210 (10.01)	10,096 (10.71)	9,240 (2.86)	4,996 (9.73)	4,940 (9.91)
Nonbinary/trans	6,404 (1.98)	3,060 (3.33)	3,344 (3.55)	2,896 (0.89)	1,571 (3.06)	1,684 (3.38)
No response	36,177 (11.18)	21,057 (22.89)	15,120 (16.03)	17,435 (5.39)	11,804 (22.98)	7,369 (14.79)
Other	11,248 (3.48)	5,309 (5.77)	5,939 (6.3)	4,838 (1.49)	2,661 (5.18)	2,816 (5.65)
Sexual identity						
LGBTQ	4,056 (2.18)	2,109 (2.29)	1947 (2.06)	3,096 (1.66)	1,630 (3.17)	1,560 (3.13)
Mental health concerns						
Abuse	12,541 (6.73)	5,918 (6.43)	6,623 (7.02)	9,671 (5.19)	4,786 (9.32)	5,197 (10.43)
Active rescue	1,362 (0.73)	833 (0.91)	529 (0.56)	1,045 (0.56)	683 (1.33)	398 (0.8)
Bereavement	7,839 (4.21)	3,599 (3.91)	4,240 (4.5)	6,435 (3.45)	3,036 (5.91)	3,530 (7.08)
Bully	4,543 (2.44)	2,719 (2.96)	1824 (1.93)	3,833 (2.06)	2,294 (4.47)	1,592 (3.19)
Depressed	71,465 (38.36)	37,196 (40.44)	34,269 (36.34)	46,825 (25.14)	26,184 (50.97)	23,624 (47.4)
Isolated	42,119 (22.61)	19,475 (21.17)	22,644 (24.01)	30,554 (16.4)	15,283 (29.75)	16,772 (33.65)
Relationship	66,305 (35.59)	34,053 (37.02)	32,252 (34.2)	44,308 (23.79)	24,492 (47.68)	22,416 (44.98)
Self-harm	26,438 (14.19)	13,325 (14.49)	13,113 (13.91)	17,056 (9.16)	9,048 (17.61)	8,990 (18.04)
Stress and anxiety	69,877 (37.51)	32,059 (34.85)	37,818 (40.11)	44,786 (24.04)	22,925 (44.63)	24,836 (49.83)
Substance	3,672 (1.97)	1736 (1.89)	1936 (2.05)	3,046 (1.64)	1,503 (2.93)	1,608 (3.23)
Suicidal thoughts	50,208 (26.95)	28,113 (30.56)	22,095 (23.43)	30,068 (16.14)	17,930 (34.9)	14,145 (28.38)

Note. LGBTQ = lesbian, gay, bisexual, transgender, and queer; *n* = sample size; % = proportion. [a]Conversation total is defined by the total number of crisis text conversations recorded for the sample periods. [b]User is defined as the number of individual users who engaged with the service throughout the sample periods.
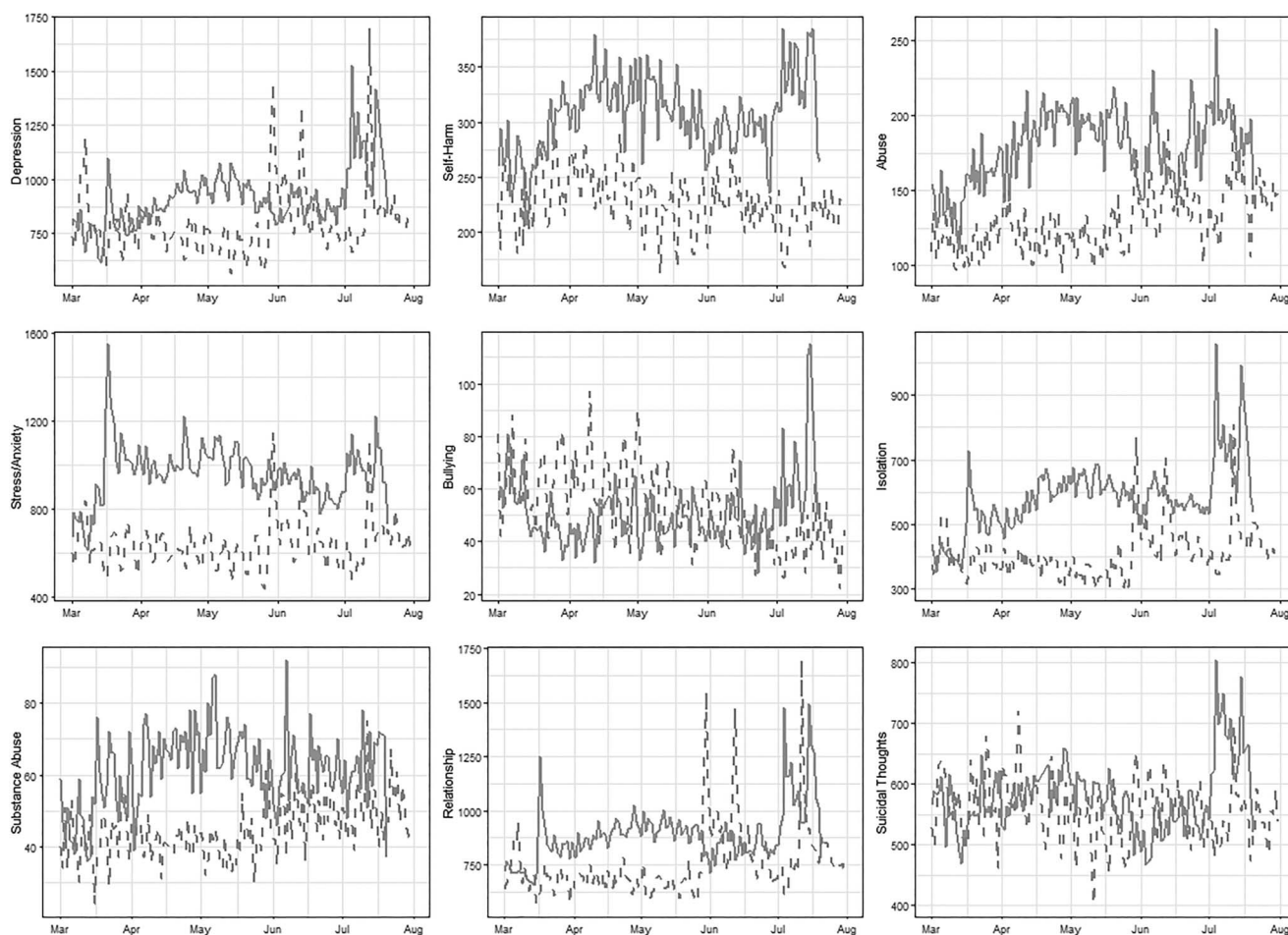
Figure 1. Time series of March 13 to July 20 for 2019 (dotted line) and 2020 (light gray) for crisis conversations relating to depression, stress/anxiety, substance abuse, self-harm, bullying, relationship, abuse, substance abuse, isolation, and suicidal thoughts.

Compared to the prepandemic time, the risk of reporting self-harm was not significantly different from the pandemic period.

In general, the risk of reporting bullying declined during the pandemic era across the United States compared to the prepandemic period (RR: 0.68, CI: 0.63, 0.72). This decline is largely because reports of bullying were much lower during the COVID-19 pandemic among children (13 years and younger), who were not in school at the time. The risk of reporting bullying among child texters was much higher in the prepandemic period.

The risk of engaging with CTL crisis services for abuse was significantly higher during the pandemic relative to the nonpandemic period (RR: 1.12, CI: 1.08, 1.17). When compared to the prepandemic period, the risk of substance abuse was higher in the pandemic period, particularly during the stay-at-home phase (RR: 1.17, CI: 1.05, 1.30; Table S3).

While texts for relationship issue were not higher in the COVID-19 pandemic period compared to prepandemic

period, results revealed that the pandemic was associated with a significant increase in reported feelings of isolation (RR: 1.07, CI: 1.05, 1.09). The risk of reporting bereavement was higher among texters during the COVID-19 pandemic compared to the year before the pandemic (RR: 1.07, CI: 1.05, 1.09).

Pandemic-Related Changes in Crisis Concerns for Vulnerable Subgroups

Table 3 shows how the risk of reporting selected mental health concerns changed in the pandemic compared to the prepandemic period for vulnerable age, race/ethnicity, or gender identity groups. The risk of reporting isolation and abuse was significantly higher following the pandemic for children (age 13 years or younger) and adolescents/young adults (age 14–24 years) in comparison to prepandemic reporting. Relative to the prepandemic period, the risk of reporting bereavement was 31% higher in Black (RR: 1.31,

Table 2. Results of the GEE analyses of the covariate-adjusted association between reported mental health concerns and the COVID-19 pandemic compared to the prepandemic period

	Stress and anxiety		Self-harm		Depressed		Abuse		Bullying	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
14–24 years of age	1.29	[1.25, 1.32]	0.77	[0.74, 0.80]	1.06	[1.04, 1.08]	1.10	1.02, 1.17	0.33	[0.31, 0.36]
25–44 years of age	1.45	[1.41, 1.50]	0.48	[0.45, 0.51]	1.06	[1.04, 1.09]	1.26	1.17, 1.37	0.15	[0.13, 0.17]
45–64 years of age	1.28	[1.22, 1.33]	0.26	[0.23, 0.30]	1.03	[1.00, 1.07]	1.34	1.20, 1.50	0.16	[0.12, 0.20]
65+ years of age	0.98	[0.84, 1.15]	0.07	[0.03, 0.14]	0.93	[0.81, 1.07]	0.74	0.49, 1.11	0.17	[0.08, 0.39]
No answer	1.21	[1.16, 1.27]	0.62	[0.57, 0.68]	0.99	[0.95, 1.03]	1.04	0.91, 1.18	0.58	[0.50, 0.67]
≤13 years of age	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
American Indian/Alaskan Native	0.96	[0.92, 1.00]	0.99	[0.92, 1.07]	1.03	[0.99, 1.07]	1.24	1.12, 1.38	1.24	[1.03, 1.49]
Asian	1.06	[1.03, 1.10]	0.67	[0.61, 0.72]	0.94	[0.91, 0.97]	1.06	0.96, 1.17	1.08	[0.92, 1.27]
Hispanic/Latinx	1.01	[0.98, 1.03]	0.81	[0.77, 0.85]	1.02	[1.00, 1.04]	0.97	0.91, 1.04	1.16	[1.05, 1.29]
Black	0.91	[0.89, 0.94]	0.70	[0.66, 0.75]	1.07	[1.05, 1.10]	0.96	0.89, 1.04	1.19	[1.05, 1.34]
Other	0.96	[0.91, 1.00]	0.78	[0.71, 0.85]	1.02	[0.98, 1.06]	1.21	1.06, 1.38	1.37	[1.15, 1.63]
No response	0.98	[0.93, 1.03]	0.89	[0.80, 1.00]	0.97	[0.92, 1.02]	1.04	0.88, 1.23	1.36	[1.10, 1.68]
Prefer not	0.98	[0.95, 1.02]	0.80	[0.74, 0.86]	0.98	[0.95, 1.01]	0.96	0.86, 1.07	1.04	[0.89, 1.22]
White	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
Female	1.08	[1.06, 1.11]	1.74	[1.62, 1.86]	0.99	[0.97, 1.02]	1.99	1.80, 2.19	0.89	[0.79, 1.00]
Nonbinary/trans	1.00	[0.96, 1.05]	2.12	[1.94, 2.33]	0.98	[0.94, 1.02]	1.96	1.69, 2.27	0.73	[0.60, 0.89]
No response	1.04	[0.98, 1.11]	1.64	[1.44, 1.87]	1.01	[0.96, 1.07]	1.78	1.48, 2.15	0.73	[0.57, 0.93]
Other	1.04	[1.00, 1.08]	1.94	[1.78, 2.11]	0.94	[0.91, 0.98]	2.08	1.82, 2.38	0.73	[0.61, 0.88]
Male	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
LGBTQ	0.91	[0.86, 0.95]	1.06	[0.98, 1.14]	0.88	[0.84, 0.91]	1.18	1.06, 1.32	2.11	[1.85, 2.41]
	1	(ref)	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	1.00, 1.00	1.00	[1.00, 1.00]
Active rescue	0.39	[0.35, 0.45]	0.95	[0.81, 1.10]	0.75	[0.69, 0.82]	0.91	0.74, 1.12	0.91	[0.64, 1.29]
	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
COVID-19	1.51	[1.48, 1.54]	0.81	[0.76, 0.85]	0.96	[0.94, 0.99]	0.67	0.62, 0.74	0.69	[0.58, 0.82]
	1	(ref)	1		1		1		1	
Isolated	0.97	[0.96, 0.98]	1.04	[1.01, 1.07]	1.60	[1.58, 1.62]	1.17	1.13, 1.22	1.62	[1.52, 1.73]
	1	(ref)	1		1		1		1	
Pandemic	1.08	[1.06, 1.09]	1.02	[0.99, 1.05]	0.89	[0.88, 0.90]	1.12	1.08, 1.17	0.68	[0.63, 0.72]
Prepandemic	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)

	Relationships		Substance abuse		Bereavement		Isolation		Suicidal thoughts	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
14–24 years of age	1.03	[1.00, 1.05]	1.76	[1.51, 2.05]	1.03	[0.94, 1.12]	1.05	[1.01, 1.08]	0.85	[0.82, 0.87]
25–44 years of age	1.00	[0.97, 1.02]	3.16	[2.69, 3.72]	1.44	[1.31, 1.58]	0.99	[0.95, 1.03]	0.76	[0.73, 0.79]
45–64 years of age	0.88	[0.84, 0.93]	3.39	[2.76, 4.16]	2.12	[1.88, 2.40]	1.02	[0.97, 1.08]	0.66	[0.61, 0.71]
65+ years of age	0.71	[0.60, 0.83]	1.81	[0.95, 3.43]	1.67	[1.17, 2.39]	1.01	[0.86, 1.18]	0.39	[0.28, 0.55]
No answer	1.01	[0.97, 1.06]	1.42	[1.09, 1.85]	1.14	[0.97, 1.33]	1.04	[0.98, 1.10]	0.77	[0.72, 0.82]
≤13 years of age	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
American Indian/Alaskan Native	1.06	[1.02, 1.11]	1.10	[0.89, 1.36]	1.39	[1.21, 1.59]	1.01	[0.95, 1.06]	0.99	[0.94, 1.05]
Asian	1.14	[1.10, 1.18]	0.70	[0.56, 0.87]	0.77	[0.66, 0.89]	1.00	[0.96, 1.06]	0.86	[0.82, 0.91]
Hispanic/Latinx	1.09	[1.06, 1.11]	0.91	[0.80, 1.04]	0.95	[0.87, 1.03]	1.05	[1.02, 1.08]	0.91	[0.88, 0.94]
Black	1.03	[1.00, 1.06]	0.73	[0.62, 0.86]	1.05	[0.96, 1.15]	1.10	[1.06, 1.14]	0.97	[0.94, 1.01]
Other	1.10	[1.05, 1.15]	0.95	[0.74, 1.24]	1.07	[0.91, 1.25]	1.08	[1.02, 1.15]	0.97	[0.91, 1.03]

(Continued on next page)

Table 2. (Continued)

	Stress and anxiety		Self-harm		Depressed		Abuse		Bullying	
	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI	RR	95% CI
No response	1.04	[0.98, 1.10]	0.69	[0.52, 0.92]	0.87	[0.72, 1.07]	1.01	[0.94, 1.08]	0.90	[0.83, 0.98]
Prefer not	1.00	[0.96, 1.04]	0.64	[0.53, 0.78]	0.95	[0.84, 1.07]	1.04	[1.00, 1.10]	0.93	[0.89, 0.99]
White	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
Female	1.02	[0.99, 1.05]	0.56	[0.50, 0.62]	1.25	[1.13, 1.37]	0.94	[0.91, 0.97]	0.92	[0.88, 0.95]
Nonbinary/trans	0.87	[0.83, 0.91]	0.61	[0.45, 0.83]	0.84	[0.70, 1.02]	0.84	[0.79, 0.89]	1.23	[1.16, 1.30]
No response	1.01	[0.94, 1.07]	0.88	[0.65, 1.20]	1.32	[1.06, 1.65]	0.94	[0.87, 1.02]	1.00	[0.92, 1.10]
Other	0.88	[0.85, 0.92]	0.72	[0.60, 0.87]	0.96	[0.82, 1.12]	0.86	[0.82, 0.91]	1.14	[1.08, 1.20]
Male	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
LGBTQ	1.30	[1.25, 1.34]	1.05	[0.81, 1.37]	0.77	[0.64, 0.92]	1.13	[1.07, 1.19]	1.02	[0.97, 1.07]
	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Active rescue	0.62	[0.56, 0.68]	3.16	[2.51, 3.97]	0.91	[0.70, 1.19]	0.72	[0.64, 0.82]	2.79	[2.70, 2.89]
	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
COVID-19	0.91	[0.88, 0.93]	0.87	[0.76, 1.00]	0.93	[0.85, 1.02]	1.53	[1.49, 1.58]	0.88	[0.85, 0.92]
	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
Isolated	1.47	[1.45, 1.48]	1.27	[1.18, 1.36]	1.57	[1.50, 1.65]	1.00		1.28	[1.25, 1.30]
	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)
Pandemic	0.92	[0.91, 0.94]	1.10	[1.02, 1.18]	1.13	[1.07, 1.19]	1.07	[1.05, 1.09]	0.78	[0.77, 0.80]
Prepandemic	1	(ref)	1	(ref)	1	(ref)	1	(ref)	1	(ref)

Note. GEE = generalized estimating equation; LGBTQ = lesbian, gay, bisexual, transgender, and queer; RR = relative risk; pandemic = study period (March 13, to May 13, 2020), prepandemic = study period (January 1, 2019).

CI: 1.12, 1.54), 28% higher among Hispanic (RR: 1.28, CI: 1.10, 1.49), and 13% higher for White (RR: 1.13, CI: 1.05, 1.22) texters. Female texters were 1.21 times more likely to text for bereavement and 1.09 times more likely to report feelings of isolation during COVID compared to the previous year. Similarly, nonconfirming young people were 50% more likely to report bereavement and 19% more likely to text for isolation during the pandemic when compared to the prepandemic period. These findings contrast with a lower risk of reporting depression across age, racial/ethnic, and gender identity groups and a lower risk of reporting bullying and suicidal thoughts for both age groups (i.e., children and adolescents/young adults) and across gender identity groups in response to COVID compared to the prepandemic period.

Discussion

Our novel quasi-experimental study is the first to leverage national help-seeking data from a digital texting platform to examine American youths' near real-time response to the unfolding COVID-19 pandemic. Results revealed that the risk of reporting stress and anxiety, substance abuse, bereavement, loneliness, and abuse was higher in the early part of the pandemic period compared to the prepandemic period (March to July 2020). The issuance of stay-at-home orders, in particular, was associated with significantly higher reports of abuse, substance abuse, feelings of isolation, stress/anxiety, and depression compared to the reopening phase. Findings also identified a significantly higher volume of texts reporting bereavement for Hispanic/Latinx, Black, female, and nonbinary/trans texters during COVID in relation to the prepandemic period. It is noteworthy that during the early part of the panedmic, the risk of reporting crisis concerns related to suicidal thoughts was significantly lower compared to the prepandemic period. Interestingly, the proportion of active rescues, an event in which local 911 and first responders are notified of a life-threatening crisis event, was much lower in the pandemic period. At first glance, although the findings regarding suicidal thoughts are surprising, it might suggest that additional factors are at play that delay, reduce, or even prevent the onset of these life-threatening suicidal crises or the need for active rescues via CTL. For example, the threat of death or illness due to COVID-19 might replace, albeit temporarily, a suicidal crisis. It might also be true that the threshold for instigating an active rescue has been raised due to the risks of being exposed to COVID-19. Whether we see an eventual uptick in suicidal crises and deaths related temporally or actually to COVID-19

Table 3. Results of how the RR and 95% CI for texts reporting each mental health concern in the pandemic compared to the prepandemic period for age, race/ethnicity, or gender identity groups

Demographics	COVID-19 Abuse +	COVID-19 Abuse −	Pre-COVID-19 Abuse +	Pre-COVID-19 Abuse −	Risk Ratio	95% CI
Age-related differences						
≤ 13 years	780	10,706	675	10,878	1.16	[1.03, 1.31]
14–24 years	3,775	49,652	3,314	50,553	1.17	[1.11, 1.24]
	Bully +	Bully −	Bully +	Bully −		
≤ 13 years	563	10,923	940	10,613	0.60	[0.54, 0.68]
14–24 years	905	52,522	1,372	52,495	0.68	[0.62, 0.75]
	Depressed +	Depressed −	Depressed +	Depressed −		
≤ 13 years	4,189	7,297	4,167	7,386	0.99	[0.95, 1.03]
14–24 years	20,013	33,414	21,801	32,066	0.91	[0.90, 0.93]
	Isolated +	Isolated −	Isolated +	Isolated −		
≤ 13 years	2,678	8,808	2,281	9,272	1.15	[1.09, 1.21]
14–24 years	13,051	40,376	11,539	42,328	1.08	[1.05, 1.11]
	Suicidal thought +	Suicidal thought −	Suicidal thought +	Suicidal thought −		
≤ 13 years	3,448	8,038	3,938	7,615	0.88	[0.84, 0.93]
14–24 years	12,822	40,605	16,514	37,353	0.80	[0.78, 0.82]
Racial/ethnic differences	Bereavement+	Bereavement −	Bereavement+	Bereavement −		
American Indian/Alaskan Native	1,100	1,626	143	2,583	1.11	[0.86, 1.43]
Asian	1,501	2,413	106	3,808	1.24	[0.92, 1.67]
Hispanic/Latinx	3,809	5,264	295	8,778	1.28	[1.10, 1.49]
Black	3,291	4,381	287	7,385	1.31	[1.12, 1.54]
Other	878	1,389	85	2,182	1.36	[1.02, 1.81]
White	15,697	23,293	1,559	37,431	1.13	[1.05, 1.22]
	Depressed +	Depressed −	Depressed +	Depressed −		
American Indian/Alaskan Native	972	1,593	1,100	1,626	0.93	[0.87, 1.00]
Asian	1,582	3,145	1,501	2,413	0.86	[0.81, 0.92]
Hispanic/Latinx	4,118	7,130	3,809	5,264	0.86	[0.83, 0.90]
Black	3,290	4,948	3,291	4,381	0.93	[0.89, 0.97]
Other	1,041	1,630	878	1,389	0.98	[0.92, 1.06]
White	15,225	26,694	15,697	23,293	0.89	[0.87, 0.91]
Sexual identity differences	Bereavement+	Bereavement −	Bereavement+	Bereavement −		
Female	2,924	56,872	2,123	51,224	1.21	[1.13, 1.28]
Nonbinary/trans	108	3,236	64	2,996	1.50	[1.08, 2.09]
Male	396	9,700	336	8,874	1.05	[0.89, 1.24]
	Depressed +	Depressed −	Depressed +	Depressed −		
Female	22,073	21,597	21,597	31,750	0.90	[0.89, 0.92]
Nonbinary/trans	1,221	1,133	1,133	1927	0.97	[0.90, 1.04]
Male	3,661	3,949	3,949	5,261	0.84	[0.81, 0.88]
	Isolated +	Isolated −	Isolated +	Isolated −		
Female	14,515	45,281	11,251	42,096	1.09	[1.06, 1.11]
Nonbinary/trans	755	2,589	552	2,508	1.19	[1.08, 1.32]
Male	2,545	7,551	2,142	7,068	1.01	[0.95, 1.08]
	Suicidal thought +	Suicidal thought −	Suicidal thought +	Suicidal thought −		
Female	13,510	46,286	15,726	37,621	0.78	[0.76, 0.80]
Nonbinary/trans	1,106	2,238	1,169	1891	0.87	[0.81, 0.94]
Male	2,327	7,769	3,005	6,205	0.73	[0.69, 0.78]

Note. RR = relative risk.

remains to be seen, especially since we are still amid the pandemic. Nonetheless, given the increases in suicide deaths after SARS-1 (Cheung et al., 2008) in Hong Kong, we should remain vigilant, especially since the scope of COVID-19 is exponentially worse.

Our results were corroborated by national studies in adults demonstrating higher rates of depression, anxiety, post-traumatic stress symptoms, loneliness, and isolation in response to the pandemic (Brooks et al., 2020; CDC, 2020), especially during the stay-at-home orders (Panchal et al., 2021; Tull et al., 2020). However, our findings revealed an increase in text volume for feelings of loneliness in contrast with a recent study showing a leveling off during the stay-at-home orders (Luchetti et al., 2020). We also observed an increased risk of reporting loneliness/ isolation among child and adolescent/young adult texters, as well as among female texters and texters self-identifying as nonbinary/trans. Some research has shown that individuals from marginalized sexual orientation groups face difficulties with mental health and well-being and may be particularly vulnerable to increased isolation and, in more severe cases, a higher risk of exposure to abuse in the home during the pandemic (Herman & O'Neill, 2020; Kussin-Shoptaw et al., 2017; Nuttbrock et al., 2010; Peng et al., 2019; Wang et al., 2020).

Prior research has demonstrated a high preponderance of adverse psychological effects following infectious disease outbreaks. For example, higher rates of psychiatric and post-traumatic morbidity were detected following the SARS-CoV-1 outbreak of 2003 (Lu et al., 2009; Mak et al., 2009; Sim et al., 2010), the Ebola outbreak of 2015 (Betancourt et al., 2016; Cénat et al., 2020; Kamara et al., 2017), and the Zika outbreak (Tucci et al., 2017). There are a number of external stressors that likely negatively impacted young people's mental health during this difficult time. Stressors included school closings, economic uncertainty, racism and incited social unrest, grief associated with the loss of a loved one to the virus, caregiver stress, prolonged social or home confinement, and related abuse or other relational stressors in the home (Guessoum et al., 2020).

For children and adolescents in our sample, the impact of school closures and economic uncertainty combined with systemic racism and other structural factors may largely be driving disparities in mental health risk for these groups (Purtle, 2020). Historically marginalized groups, like African Americans, Hispanics, and Asians, have underutilized mental health services in part due to reinforced stigma among peer networks and largely due to racial segregation and associated decreased access to mental health resources in their communities (Choi et al., 2019).

Abuse in children (age 13 years and younger) and young people (age 14–24 years) was higher during the pandemic outbreak compared to the prepandemic period. A rise in abusive behavior in the weeks after the initial outbreak began in the United States may have been brought on by financial insecurity, fear, unemployment, excessive alcohol use, parental burnout, or even feelings of isolation or loneliness (Brown et al., 2020; Campbell, 2020; Griffith, 2020; Usher et al., 2020).

Schools have long been recognized as a feasible, acceptable, and accessible context to address and effectively treat the diverse mental health needs among young people (Kirk et al., 2019). Indeed, findings from a recent national survey showed that a large proportion of adolescents receiving mental health services in a school setting were from low-income or racially and ethnically diverse households (Ali et al., 2019). Schools have also been at the forefront of mental health innovation during COVID-19, with increased capacity to serve youth remotely via telehealth (e.g., Holland et al., 2020), including those identified to be at increased risk for suicide (Jobes et al., 2019, 2020). At the same time, school closures and the transition to a virtual classroom during the pandemic likely resulted in disruptions to mental health services for this vulnerable group, especially for those with inadequate broadband or homes that lacked the necessary hardware, which may explain the elevated risk of some mental health outcomes during stay-at-home orders. Somewhat at odds with these data is the fact that crisis conversations related to bullying declined during the pandemic period. This might be attributable to fewer opportunities to be bullied by peers, at least while the schools were closed to many students. In addition, because we could not distinguish between in-person and cyber-bullying, the nature of this finding remains even less clear.

Strengths and Limitations

A significant advantage of this study is that our data captured the near real-time experience among young people to the pandemic without the traditional time lag incurred in the research process. The unobtrusive nature of these data paired with repeated-measures for text patterns is another important design feature, and as a result, findings were not negatively influenced by recall bias or research participation bias.

There is growing concern that the pandemic has complicated matters for young people with pre-existing mental health conditions. Based on the available data, we were unable to measure this phenomenon. Another limitation involved the anonymized nature of the data whereby only a small portion of texters provided sociodemographic details. However, we were still able to discern general national trends and acknowledged that results may be underestimating mental health concerns in some groups

because we were unable to capture important demographic data for all crisis text encounters. We also recognize that volunteer bias might even be at play. Participants in this study may not be fully representative of the general population, given their predisposition to seek mental health support during this stressful time. Finally, at the time of our analysis, we only had access to 2019/2020 CTL (March to July) data and were unable to include data on CTL users 3–5 years before the pandemic occurred.

Implications

There is a paucity of research on the mental health impacts of a global outbreak on young people. Data from this digital mental health texting platform can be harnessed to establish a large-scale longitudinal study of young people to measure changes in mental health risks before and throughout the many phases of the COVID-19 pandemic. The benefits of this may include low-cost data collection and passive surveillance, as well as the ability to assess causal inference and the effectiveness of these types of mental health support interventions. Further study is needed incorporating latent class analysis to derive profiles of risk and resilient mechanisms among texters representing various age, sex, and racial-ethnic groupings.

Given the variation in state-level timing of stay-at-home orders and reopening, a closer look at changes in mental health risks at the local or state level could be used to determine the precise impact of more localized community mitigation measures. Advanced geospatial analysis incorporating additional community-level factors not currently captured in the digital text-based platform would also contextualize the excess risks for many mental health outcomes we observed in this national ecologic analysis. For example, a geospatial analysis might incorporate available mental health resources and additional factors, including residential poverty, school closures, unemployment, racial and ethnic composition, and COVID-19 morbidity and mortality to better contextualize the data trends.

Conclusions

Our study is one of the first to monitor the short-term risk of mental health crisis response in children and young people in the United States throughout the early phases of the pandemic. Findings show that the pandemic was associated with increased reports (or complaints) of stress and anxiety, abuse, substance abuse, bereavement, and isolation among young people. Results can be used to inform more responsive psychological supportive

interventions to alleviate the mental health consequences in youth brought on by the COVID-19 pandemic.

Electronic Supplementary Material

The electronic supplementary material is available with the online version of the article at https://doi.org/10.1027/0227-5910/a000826

ESM 1. Tables showing difference in crisis conversations (Table E1), Jaccard similarity index (Table E2), and relative risk and 95% CI for mental health concerns (Table E3); figure showing time series of crisis tags (Figure E1)

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