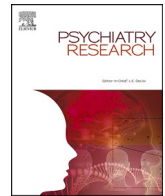




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## Suicidal ideation during COVID-19: The contribution of unique and cumulative stressors

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### ABSTRACT

The link between large-scale disasters and population-level risk of suicide remains unclear. The present study sought to investigate suicidal ideation (SI) in relation to COVID-19 related stress, including material and social stress, in a predominantly low-SES ethno-racially diverse sample in New York City during a peak in COVID-19 cases in April 2020. Using binary logistic regressions of data collected with self-report surveys, we found that individuals who identified as Asian, as well as those with high total, material, and social stress levels, and persons without access to primary care providers had significantly higher adjusted odds of SI. These results indicate the specific burden faced by Asian participants due to increases in targeted racism, the importance of cumulative stress and specific stressor type, as well as the role of healthcare access on SI during the pandemic. Such findings suggest the need for specific interventions that target individuals who may be at higher risk of suicide after large-scale traumatic events and during the ongoing pandemic.

### 1. Introduction

Suicidal ideation (SI), or the act of contemplating suicidal behaviors, has been shown to increase during acute personal crises (Danesh and Kimball, 2016; Economou et al., 2013; Harmer et al., 2021). However, the evidence about patterns of SI in the context of population-level disasters and economic crises is mixed across studies (Economou et al., 2013; Ettman et al., 2020; Isabel et al., 2017; Jafari et al., 2020; Kessler et al., 2008; Matsubayashi et al., 2013; Reifels et al., 2018). There are many reasons for this inconsistency across the literature, but it is likely that risk of SI is informed by a range of individual-level experiences and that it is variability in those experiences that shape different patterns of population-level risks in different contexts (Córdoba-Doña et al., 2016; Hong et al., 2011; Miret et al., 2014).

The COVID-19 pandemic has adversely affected the economic and social lives of whole populations (Godinić et al., 2020; Rudenstine et al., 2020; 2021; 2022). Material and financial security, availability of social supports, and accessibility of healthcare access have psychological consequences and may be associated with SI in this context (Carvalho

Aguiar Melo and de Sousa Soares, 2020; Godinić et al., 2020; Rudenstine et al., 2020). Early research has documented the relationships between such pandemic-induced effects and increased SI for subsets of the population (Conejero et al., 2020; Elbogen et al., 2021). These studies have documented the effects of social distancing on increases in suicidality, particularly for vulnerable subsets of the population, such as older adults and individuals with ongoing economic insecurity (Conejero et al., 2020; Elbogen et al., 2021; Ettman et al., 2020). Nonetheless, there have yet to be studies that have assessed the relation among SI and cumulative stress levels that also take into account important demographic variables and healthcare access during the pandemic.

Three dimensions of stressors are known to be associated with increases in SI more broadly, many of which have increased during the pandemic (Córdoba-Doña et al., 2016; Hong et al., 2011; Miret et al., 2014; Morganstein and Ursano, 2020; Rosellini et al., 2014). First, stressors that affect material and economic variables, such as increases in housing, financial, and food insecurity, as well as losses to employment and income, are established risks for increased suicidality (Clay et al., 2018; Lowe et al., 2016; Morganstein and Ursano, 2020; Rukundo

The data that support the findings of this study are available from the corresponding author, SR, upon reasonable request.

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et al., 2019; Sherbuk et al., 2020). Economic insecurities and losses have been shown to contribute to feelings of hopelessness and despair, which are in turn associated with SI (Amagai et al., 2014; Haw et al., 2015; Mendonca and Holden, 1996; Miret et al., 2014; Steeg et al., 2016). Second, social stressors such as increased isolation, grief, and interpersonal fighting, contribute to increased SI (Carvalho Aguiar Melo and de Sousa Soares, 2020; Ekanayake et al., 2013; Molyneaux et al., 2020). While social supports can provide necessary psychological safety, the losses of such support networks, as well as the stress of interpersonal conflict, in turn increase the detrimental psychological effects of stressors (Morano et al., 1993; Rosellini et al., 2014). Third, accessing vital resources is protective for both physical survival and psychological well-being during disasters (Adams et al., 2006; Subramaney et al., 2020).

The variable impact of such stress exposure has been understood through a variety of theories. One of which, the conservation of resources theory, posits that stress negatively affects individuals through resource loss, and emphasizes the importance of resource acquisition and maintenance in the context of stressors that threaten them (Hobfoll, 2001, 2011). This theory has been used to understand differences in the psychological consequences of COVID-19 between men and women, with women in a comparatively resource loss position and thus experiencing greater increases in distress (Peck, 2021). Research has demonstrated the increased burden on women who work, are pregnant or are experiencing post-partum depression, those in caretaking roles, and those experiencing interpersonal violence, during the pandemic (Almeida et al., 2020; Hessami et al., 2020; Power, 2020; UN Secretary-General's Policy Brief, n.d.). There have yet to be analyses of pandemic-related suicidality within a predominantly women sample.

The most crucial resources for psychological wellbeing within disaster contexts often vary depending on the nature of the crisis. In this vein, healthcare access has been foundational for well-being during COVID-19 (Subramaney et al., 2020). Healthcare providers often help to navigate the larger healthcare systems and provide essential guidance on how to best prevent illness and intervene when sick (Nelson and Adams, 2020). Primary care providers (PCP) are crucial for aiding individuals in illness prevention, in helping with care once exposed to illness, and in serving as a conduit for other specialist physicians or more targeted medical care for specific conditions (Macinko et al., 2003; Marshall et al., 2006; Wellstood et al., 2006).

Considering the immense health risks and uncertainties associated with COVID-19 infection, access to PCPs and their associated benefits is crucial (Baral et al., 2021). In addition, also considering the widespread disparities in healthcare access, and particularly in lack of access to primary health care providers, it is plausible that a lack of access to healthcare is a stressor that may be associated with SI in the context of COVID-19 (Manuel, 2018; Olsen et al., 2017), but this connection has not yet been well recognized, and thus also not addressed.

### 1.1. The current study

The current study sought to investigate correlates of SI in a low-income urban subpopulation during an initial peak in viral transmission. April 2020 brought sudden lockdowns, social distancing, and grave economic consequences (Fairlie et al., 2020; Saltzman et al., 2020; Yang et al., 2021). The present analyses used a sample of urban adults enrolled in at least one course at the largest public university in [edited for blind review] to investigate several of the more common disaster-related correlates of suicidal ideation in order to better inform understandings of suicidality during COVID-19, and to best identify those most vulnerable to SI.

## 2. Methods

### 2.1. Procedure

The present study ( $N = 2364$ ) uses a cross-sectional correlational survey design. Data were collected through Qualtrics self-report surveys sent out via an email blast with stated research criteria to everyone who attends at least one university course at [edited for blind review] in early April 2020. This study was approved by the Institutional Review Board at [edited for blind review]. All participants were at least 18 years of age and consented to participation by clicking on the emailed link and completing the survey.

### 2.2. Participants

The ethno-racial group membership of our sample was assessed with five exclusive categories and frequencies were as follows: 27.9% of participants were non-Latinx white, 14.8% were non-Latinx Black, 21.9% were Latinx, 24.4% were non-Latinx Asian, and 1.5% were non-Latinx Other (including American Indian, Alaskan Native, Native Hawaiian, other Pacific Islander, and/or multiracial). The majority of our sample endorsed being female (71.7%), 27.0% endorsed being male, and 1.3% endorsed another gender, including transgender and non-binary. A majority of our sample reported low socioeconomic statuses (SES; 64.6%), and 35.4% reported high SES. Our SES index was created with six different factors: educational attainment (high school, college, graduate school), household income (an income of \$65,000 or higher was used as a cutoff for the higher SES category), household savings (\$10,000 or higher was used as cutoff for high SES), individual income (\$35,000 or higher was used as a cutoff for high SES), individual savings (\$5000 was used as the cutoff for high SES), and health insurance (ranging from no insurance which was scored lowest, public, and private insurance, scored highest), and was split along the median to create dichotomous high vs. low categories.

### 2.3. Measures

#### 2.3.1. Suicidal ideation

SI was measured with item 9 of the PHQ-9, a clinically-validated measurement tool for assessing depressive symptoms (Kroenke et al., 2001). The item prompts for "thoughts that you would be better off dead or hurting yourself in some way," and is rated on a 4-point scale, from "not at all" to "nearly every day." In order to dichotomize SI into yes vs. no categories, any response above a "not at all," was included as "yes." This item has been used to assess for SI in previously established research studies (Altura et al., 2016; Louzon et al., 2016; Rossom et al., 2017).

#### 2.3.2. Covid-19 related stressors

Thirteen stressors were used to assess COVID-19 related stress. The six material stressors were: not being able to get food due to shortages, not being able to get supplies due to shortages, losing a job, a member of your household losing a job, having financial problems, and having difficulty paying rent. The five social stressors were: seeing friends in person less, seeing family in person less, death of someone close to you due to COVID-19, family or relationship problems, and feeling alone. Two additional independent stressors: being forced to leave campus and having difficulty finding childcare for your kids were also included. Both stressor categories were split into binary high vs. low levels at each of their respective means. The mean scores for both material and social stressors were split at the closest integers of 2. Total stressor scores were sums for each category as well as an additional two stressors: being forced to leave campus and challenges finding childcare. Total stress was dichotomized into high vs. low with scores of 4 and above constituting high stress levels, which is in accordance with previous dichotomizations of the present scale for use in this population, in order to

aid clarity regarding logistic regression, odds ratio, results and allow for comprehensive analyses of the probable diagnoses based on stress level (Rudenstine et al., 2021, 2022). These specific stressors are based off of previous assessments of disaster-related stress (Boardman et al., 2001; Galea et al., 2008). This specific stressor index has been used within the context of COVID-19 mental health research and to assess the psychological impact of the pandemic within a predominantly low-SES university student sample (Abdalla et al., 2021; Ettman et al., 2020; Ettman et al., 2021; Rudenstine et al., 2020). The Cronbach's alpha for this index in our sample was adequate ( $\alpha=0.65$ ).

### 2.3.3. Healthcare provider access

Access to a PCP was assessed with an item that asked, "do you have a health care provider (for example a doctor or a nurse) who you see at least once a year for medical care?" Responses were rated on a dichotomous scale as "yes" or "no". Majority of our sample endorsed having a PCP (80.4%), and 19.6% endorsed not having PCP access.

### 2.3.4. Data analysis

We first assessed demographic characteristics with frequencies of age, ethnoracial group membership, gender, SES, access to PCP, and binary levels of total stress, as well as material and social stress. We then conducted a binary logistic regression that assessed for adjusted odds of SI endorsement by ethnoracial group, gender category, SES level, total stress level, social and material stress levels, and access to PCP.

## 3. Results

Table 1 shows demographic characteristics and prevalence of SI, access to PCP, and stressor frequencies. The preliminary responses for item 9 of the PHQ-9, with its original 4-point rating scale, were as follows: 80.0% endorsed no SI, 13.4% endorsed experiencing SI on "several days," 3.4% endorsed experiencing SI on "more than half the days," and 3.3% endorsed "nearly every day." As shown in Table 1, 20% of our sample endorsed any level of suicidal ideation, 19.4% reported not having PCP access, 82.6% had high levels of total stress, 21.6% endorsed high levels of social stress, and 26.4% endorsed high levels of material stress.

Table 2 shows binary logistic regression results that assessed for adjusted odds of SI endorsement. As compared to male participants, female participants did not have significantly different odds of SI endorsement. Participants who identified as another gender (nonbinary or transgender) yielded significantly higher odds of SI as compared to male participants, OR= 2.9, [1.2–6.8], however, given the extremely small sample size for these participants ( $n = 30$ ), such results are likely skewed and unrepresentative, and are thus not presented in Table 2. Participants who were non-Latinx Asian had double the odds of SI as compared to white participants, OR= 2.0, [1.4–2.9]. Participants with high total stress levels, OR= 1.9, [1.5–2.4], high material stress levels, OR= 2.3, [1.8–3.0], and high social stress levels, OR= 1.5, [1.2–1.9], had higher odds of endorsement of SI as compared to those with low levels. Lastly, participants without healthcare providers had greater odds of SI endorsement as compared to those with access to providers, OR= 1.6, [1.2–2.1].

## 4. Discussion

There is a wealth of research that has documented a variable trajectory of suicidality during the pandemic, with shifting rates of suicidal ideation and attempts (John et al., 2020). However, previous research has also demonstrated increases in suicidality for university student samples before the pandemic. The documented endorsement rate of 20% for suicidal ideation among university students, coincides with published increases in suicidal ideation within student populations over the previous decade, from 5.8% in 2007 to 10.8% in 2017 (Mental Health - Household Pulse Survey - COVID-19, 2022; Xiao et al., 2021).

**Table 1**  
Demographic characteristics.

Variable	N	%
<b>Total</b>	2364	100
<b>Age</b>		
18–24	1468	62.8
25–34	559	23.1
35–44	176	7.5
45–54	87	3.7
55–64	37	1.6
65 or older	9	0.4
<b>Ethno-racial group</b>		
Latinx	640	21.9
Non-Latinx Asian	498	24.4
Non-Latinx Black	303	14.8
Non-Latinx Indigenous	31	1.5
Non-Latinx white	570	27.9
<b>Gender</b>		
Female	1685	71.7
Male	634	27.0
Other	30	1.3
<b>Socioeconomic status</b>		
Low	1232	64.6
High	676	35.4
<b>Suicidal Ideation</b>		
Yes	472	20.0
No	1885	80.0
<b>Healthcare provider</b>		
Has a primary care provider	1856	80.6
Does not have a primary care provider	448	19.4
<b>Stressors</b>		
<b>Total</b>		
Low	501	17.2
High	2417	82.6
<b>Social</b>		
Low	2287	78.4
High	631	21.6
<b>Material</b>		
Low	2147	73.6
High	771	26.4

Note: Suicidal ideation defined by responding "several days," "more than half the days," or "nearly every day" in response to the question, "How often have they been bothered by the following over the past 2 weeks?... Thoughts that you would be better off dead, or thoughts of hurting yourself in some way?" Material stressors: not being able to get food due to shortages, not being able to get supplies due to shortages, losing a job, a member of your household losing a job, having financial problems, and having difficulty paying rent. Social stressors: seeing friends in person less, seeing family in person less, death of someone close to you due to COVID-19, family or relationship problems, and feeling alone. Material and social stressor categories were split into binary high vs. low levels at each of their respective means. Total stressor scores were sums for each category as well as an additional two stressors: being forced to leave campus and challenges finding childcare. Total stress was dichotomized into high vs. low with scores of 4 and above constituting high stress level.

Our logistic regression results yielded three main correlates of suicidal ideation among low-income urban students during COVID-19. First, we found that individuals who endorsed higher levels of total cumulative stress, as well as higher levels of both social stress and material stress types, had higher odds of suicidal ideation, as compared to those with lower levels of each of these factors. Cumulative stress, or exposure to co-occurring stressors, has often been conceptualized with aggregate scores and indices that assess multiple stressors (Burroughs Peña et al., 2019; Mann et al., 2021; Slavich and Shields, 2018). Our findings suggest the importance of cumulative stress on psychological health during COVID-19, and are in accordance with previous literature demonstrating the overall importance of such stress in disaster contexts (Cerdá et al., 2013; Lock et al., 2012; Lowe et al., 2016; Sandifer and Walker, 2018). Additionally, the importance of material stress on SI during the pandemic can be understood in the context of previous literature that highlights the role of income, employment, and socioeconomic status on mental health and on SI in particular (Clay et al.,

**Table 2**  
Odds of suicidal ideation by demographics, stressors, and access to primary care provider.

Variable	$\beta$	SE	OR	95% CI (LL-UL)
<b>Ethno-racial group membership</b>				
Non-Latinx White (Ref.)	–	–	–	–
Non-Latinx Black	.12	.23	1.1	0.7–1.8
Non-Latinx Asian	.71	.19	2.0***	1.4–2.9
Latinx	.16	.17	1.2	0.8–1.6
non-latinx other (including american indian, alaskan native, native hawaiian, other pacific islander, and/or multiracial).	.40	.32	1.5	0.8–2.8
<b>socioeconomic status</b>				
Low	.06	.13	1.1	0.8–1.4
High (Ref.)	–	–	–	–
<b>Total stress level</b>				
Low (<5 stressors) (Ref.)	–	–	–	–
High (5+ stressors)	.64	.13	1.9***	1.5–2.4
<b>Social stress level</b>				
Low (<3 stressors) (Ref.)	–	–	–	–
High (3+ stressors)	.84	.13	2.3***	1.8–3.0
<b>Material stress level</b>				
Low (<3 stressors) (Ref.)	–	–	–	–
High (3+ stressors)	.40	.12	1.5**	1.2–1.9
<b>Primary care provider</b>				
Does not have a primary care provider	.47	.15	1.6**	1.2–2.1
Has a primary care provider (Ref.)	–	–	–	–

Note:  $N = 2364$ . Models controlled for demographic characteristics (i.e., gender, age, race, ethnicity). Thirteen total COVID-19-related stressors were assessed. Total stress level scores were categorized as low (1–4) and high (5+). Five social stressors were assessed: seeing friends in person less, seeing family in person less, death of someone close to you due to COVID-19, family or relationship problems, and feeling alone, and levels were split at the mean of 2, with low (0–2) and high (2+). Six material stressors were assessed: not being able to get food due to shortages, not being able to get supplies due to shortages, losing a job, a member of your household losing a job, having financial problems, and having difficulty paying rent, and levels were split at the mean of 2, with low (0–2) and high (2+). A socioeconomic status (SES) index was created with six different factors: educational attainment, household income, household savings, individual income, individual savings, and health insurance, and high vs. low was split along the median of 4.

\*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ .

2018; Lowe et al., 2016; Morganstein and Ursano, 2020; Rukundo et al., 2019; Sherbuk et al., 2020). COVID-19 related losses in employment and finances can thus be understood as risks for suicidality (Ando and Furuchi, 2021; Inoue et al., 2020).

Second, individuals who identified ethno-racially as non-Latinx Asian had significantly higher odds of suicidal ideation as compared to white participants. This finding can be understood within the context of increases in discrimination, racism, and hate crimes targeted against Asian individuals in the US (Chen et al., 2020; Lee and Waters, 2021; Wu et al., 2021). Myths regarding the origins of COVID-19 evoked anti-Chinese sentiments and fed racist violence that has expanded and targeted Asian residents of various ethnicities and nationalities (“Covid-19 Fueling Anti-Asian Racism and Xenophobia Worldwide,” 2020; News, n.d.; Press, 2021; Reny and Barreto, 2020; Tessler et al., 2020). Established research has demonstrated the psychological toll of experiencing racism, both on a direct level while being the victim of hate crimes, as well as more broadly witnessing the targeting of one’s own ethno-racial group (Bryant-Davis and Ocampo, 2005; Craig-Henderson and Sloan, 2003; Okazaki, 2009). Such experiences have been notably linked to increased SI (Castle et al., 2011; Leong et al., 2007; Wong et al., 2011).

Third, our results demonstrated the importance of having a primary care provider (PCP), with participants who did not have a PCP endorsing higher odds of SI. PCPs serve as important conduits through which to navigate the larger healthcare system (Axén and Lindström, 2002; Macinko et al., 2003). Additionally, given the health risks, anxieties, and

uncertainties, regarding COVID-19 infection, the role of a PCP in serving as a source of guidance and comfort during the pandemic cannot be understated (Mughal et al., 2021; Nelson and Adams, 2020). PCPs have positive effects on physical health outcomes, and are foundational for mental health in that they screen for the most severe forms of distress (Mughal et al., 2021; Nelson and Adams, 2020; Saini et al., 2010).

These findings occurred within the context of the present sample, particularly a majority-women sample. Previous analyses have documented the increased psychological toll faced by women during the pandemic, due to greater demands and reduced resources (Almeida et al., 2020; Hessami et al., 2020; Power, 2020; UN Secretary-General’s Policy Brief, n.d.). Thus, the present results highlight correlates for suicidality for women during the pandemic and therefore provide important information for this vulnerable population.

The present study has a few limitations that are necessary to note. First, given that our sample was a low-SES sample, was majority women, and that data was collected at one time point at an initial COVID-19 peak in New York City, findings may not be generalizable to other populations, other periods of the pandemic, or other geographical locations. Second, our cross-sectional data usage precludes our ability to establish causality and rule out reverse causal relationships. Third, our reliance on self-report data may introduce bias, where results are biased towards or away from suicidal ideation rates. However, the use of a single item from self-report measures to assess suicidal ideation is common practice, and have been found to have an advantage over clinician-interview assessments due to their standardization (Altura et al., 2016; Louzon et al., 2016; Rossom et al., 2017; Yigletu et al., 2004).

Notwithstanding these limitations, our findings highlight the importance of identifying correlates of suicidal ideation during COVID-19, specifically for lower-income urban populations. All of the significant correlates identified in our analyses highlight the role of social variables and determinants on well-being. Racism, social and material stressors, and access to care, all highlight the role that societal factors have on mental health. As the pandemic’s onset upended much about American social and economic life, its effects continued to reverberate within the economy, the healthcare system, and giving license to racism within the US, for many months hence, contributing to the increased risk of SI in the population (Chen et al., 2020; Lee and Waters, 2021; Mughal et al., 2021; Rudenstine et al., 2020). Future research should build off of present findings by investigating various forms and levels of suicidality using multi-item suicidality measures, as well as exploring changes in correlates for suicidal ideation over time, as the pandemic and its associated stressors shift. Subsequent investigations should also more directly study the impact of anti-Asian racism during the pandemic in order to measure the relationships between racism and suicidality within the present population. Such research is necessary to ensure that individuals and their communities are able to live safely, prosperously, and healthily, particularly during a crisis, thus serving as a form of psychological intervention that safeguards psychological safety and that can help reduce risk of suicide.

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#### CRediT authorship contribution statement

**Sasha Rudenstine:** Conceptualization, Methodology, Investigation, Writing – original draft. **Talia Schulder:** Methodology, Investigation, Writing – original draft. **Krish J. Bhatt:** Methodology, Formal analysis, Investigation, Writing – original draft. **Kat McNeal:** Formal analysis, Investigation, Writing – original draft. **Catherine K. Ettman:** Conceptualization, Writing – review & editing. **Sandro Galea:** Conceptualization, Writing – review & editing.

#### Declaration of Competing Interest

The authors have no conflicts of interest to report.

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