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Journal of Psychiatric Research 155 (2022) 443–450

Contents lists available at ScienceDirect

Journal of Psychiatric Research

journal homepage: www.elsevier.com/locate/jpsychires

Substance use, racial/ethnic identity, and suicidal ideation during COVID-19 lockdown in an international adult sample

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ARTICLE INFO

Keywords:
COVID-19
Suicidal ideation
Racial disparities
Substance use
International

ABSTRACT

Although research has examined disparities in suicidal ideation across multiple groups, few investigations have analyzed such disparities in the context of COVID-19 pandemic. Furthermore, there is limited research on differences within and across countries, further limiting the extent to which meaningful comparisons can be made. Therefore, this study examines risk and protective factors of suicidal ideation during COVID-19 lockdown in adults across five countries. Adults (N = 2,509) from the United States, Italy, Spain, Saudi Arabia, and India completed a survey to measure suicidal ideation, recent drug use, and sociodemographic factors. Prevalence of suicidal ideation was assessed using simple and multivariable logistic regression models, and severity of suicidal ideation was analyzed via a multinomial multivariable logistic regression. Cohen's d statistics were reported for all analyses to report effect size. In the United States subsample, racial/ethnic minorities endorsed a significantly greater prevalence of suicidal ideation compared to their White peers (aOR = 2.31, 95% CI: 1.26–4.27, d = 0.46). However, no significant racial differences in suicidal ideation were found in other countries. Past 90-day illicit drug use was associated with greater prevalence (aOR = 1.38, 95% CI: 1.06–1.80, d = 0.18) and severity (aRRR = 2.17, 95% CI: 1.33–3.53, (aRRR = 0.43) of suicidal ideation during COVID-19 lockdown. This study further highlights the social disparities that exist in suicidal ideation during COVID-19 lockdown in international samples, for which greater medical and mental health interventions are critical. As such, targeted multicomponent interventions that address substance use are important for reducing the rising prevalence and severity of COVID-related suicidal ideation.

The COVID-19 pandemic has drastically impacted the lives of millions worldwide. As feared, multiple studies have reported poorer mental wellbeing during the pandemic (Ammar et al., 2020; Antiporta et al., 2021; Boldrini et al., 2021; Bu et al., 2020; Czeisler et al., 2020; Hubbard et al., 2021; Newby et al., 2020; Proto and Quintana-Domeque, 2021). Increases in anxiety and depression have been especially prevalent during COVID-19 (Ammar et al., 2020; Proto and Quintana-Domeque, 2021). This is particularly concerning as even mild and moderate depression scores can contribute to significant increases in suicide ideation (Cukrowicz et al., 2011). Furthermore, depressive symptomatology has not only been associated, but also shown to be a predictor in suicidal ideation, an important precursor to suicide completion (Arria et al., 2009; Fitzpatrick et al., 2020; Konick and Gutierrez, 2005).

With more than 700,000 suicides reported globally in 2018 (World Health Organization, 2021), it is crucial that research guides early prevention strategies that mitigate harm. Early pandemic studies suggest no significant changes in suicide rates for the early months of the pandemic (Appleby et al., 2021; Faust et al., 2021; Qin and Mehlum, 2021). However, data is limited, and the ongoing nature of the pandemic hinder long term effects from being known. Closer analyzation of pandemic suicide rates suggests potential increases for certain groups. In US-based samples, racial disparities in suicidality have been especially prevalent between Black and White Americans (Bray et al., 2021). Furthermore, Eguchi et al. (2021) found increased rates of completed suicides among Japanese women compared to men, regardless of age. Although these investigations are a small sample of the existing literature of suicidality during COVID-19, the trends highlight the need for empirical research in suicidality within and across populations.

Moreover, significant increases in substance use during the COVID 19 pandemic have also been reported in prior studies. A notable study by Taylor et al. (2021) revealed that individuals who reported increases in

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https://doi.org/10.1016/j.jpsychires.2022.09.026
Received 14 May 2022; Received in revised form 16 August 2022; Accepted 16 September 2022
Available online 21 September 2022

recreational drug use during the pandemic showed hazardously high increases in usage compared to non-pandemic conditions. Previous literature has also shown a positive association between suicide ideation and substance use (Breet et al., 2018). Furthermore, the usage of illegal drugs can further increase the odds for suicide ideation compared to legal substances (Brener et al., 1999). Altogether, the COVID-19 pandemic has led to increases in psychological distress and substance use, two major components linked to elevated suicide ideation.

Analysis from a social determinants of health framework further highlights disproportionalities in physiological distress for certain groups during the pandemic. In the United Kingdom, Black, Asian, and other ethnic minority men report higher average increases in mental distress than White British men during COVID-19 compared to pre-pandemic years (Proto and Quintana-Domeque, 2021). In the United States, Latinx/Hispanic and non-Hispanic Black individuals are suffering from poorer mental health outcomes, increased substance use, and elevated suicidal ideation during the pandemic (Czeisler et al., 2020). Additionally, Black, Native American, and Latinx/Hispanic adults reported significantly greater percentages of suicidality relative to White individuals (Fitzpatrick et al., 2020).

Racial disparities are just one of many social determinants of health leading to disproportionalities seen in suicide ideation elevation. Multiple studies suggest that younger individuals between the ages of 18–30 are reporting substantially higher rates of psychological distress than other age groups (Antiporta et al., 2021; Bu et al., 2020; Czeisler et al., 2020; Hubbard et al., 2021). One study even reported older age as being a protective factor for depressive symptoms (González-Sanguino et al., 2020). Women across the globe have also reported higher rates of mental distress during the pandemic compared to men (Antiporta et al., 2021; Bu et al., 2020; Hubbard et al., 2021; Oreffice and Quintana-Domeque, 2021; Proto and Quintana-Domeque, 2021). Recent data from Japan shows that suicide rates during July to November of 2020 have increased for woman in all age cohorts above 18 but only the 20–29 and 80+ age group in men (Eguchi et al., 2021). Unfortunately, research considering both gender and sexual minorities during the pandemic is lacking.

Economically, the pandemic has resulted in massive declines ranging from lost hours to high rates of unemployment. Employment loss led to food insecurity for some individuals which was reported to be positively and significantly associated with suicidality during the pandemic (Fitzpatrick et al., 2020). Globally, low income, low education, and being in the unemployed group all reported poorer mental wellbeing during the pandemic compared to their respective counterparts (Antiporta et al., 2021; Bu et al., 2020; Czeisler et al., 2020). Lastly, urbanicity is a key factor to consider. However, the data in this area is inconclusive depending on the country analyzed (Liu et al., 2021).

Despite suicide rates not showing massive changes, there are many factors causing higher psychological distress leading to elevations in suicide ideation during the pandemic, especially in certain groups. By identifying these groups, targeted prevention strategies should be used to mitigate harm. We acknowledge that the capacity for medical providers to comprehensively address social determinants of health that influence suicidal ideation may vary widely across countries. However, a broad goal of this study is to provide such evidence to support their clinical decisions regarding intervention development and implementation in their cultural contexts. Therefore, this article highlights the influence of social determinants of health on elevated suicide ideation levels during the COVID-19 pandemic. Data has been collected by surveying individuals from five different countries during July–August 2020 about their mental wellbeing during the pandemic. We hypothesize the following: (a) Racial/ethnic minorities will experience elevated odds and severity of acute suicidal ideation during COVID-19 compared to White respondents controlling for sociodemographic predictors; and (b) Past 90-day illicit drug use will be significantly associated with acute suicidal ideation odds and severity during COVID-19, controlling for sociodemographic predictors. Secondarily, we examined the extent to which sociodemographic factors such as gender, sexual orientation, urbanicity, education, and employment were associated with the presence and severity of suicidal ideation during COVID-19.

1. Materials and methods

The Michigan State University Institutional Review Board determined the study was exempt from review, and study procedures were carried out in accordance with the latest version of the Declaration of Helsinki. Participants included 2,482 noninstitutionalized adults aged 18 and older from the United States, Italy, Spain, Saudi Arabia, and India who provided informed consent to participate after receiving information on the study goals and participant protections. Procedures for the study recruitment and implementation are described elsewhere (Anderson-Carpenter and Tacy, 2022). Briefly, Participants were recruited via Qualtrics and completed a 20-min survey from July–August 2020, all responses were anonymous to ensure confidentiality and data reliability. At the beginning of the study, participants were allowed to select their language of preference between English, Italian, Spanish, Arabic, and Hindi. To ensure the accuracy of translated materials, the survey and informed consent forms were translated into each language and back-translated into English.

1.1. Measures

Severity of acute suicidal ideation was assessed from a single-item measure from the Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001): “Over the past 2 weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?” Response options ranged from “not at all” (coded 0) to “nearly every day” (coded 3) and were treated categorically. Prevalence of acute suicidal ideation was dummy coded based on the previously described item such that any response other than “not at all” was coded as endorsing suicidal ideation (coded 1). Illicit past 90-day substance use was measured using the Drug Abuse Screening Test (DAST-10) (Skinner, 1982) item: “In the past 12 months, have you used drugs other than those required for medical reasons?” and coded as yes (coded 1) or no (coded 0).

COVID-related traumatic stress was measured using the Impact of Event Scale (IES-6) (Thoresen et al., 2010). Responses for each Likert-type item were summed for a composite score. Response options for sexual orientation were heterosexual, lesbian, gay, and bisexual + which we used to classify individuals who identified as bisexual, pansexual, or another sexual orientation. Gender was categorized as cisgender men and cisgender women. Because only 27 participants identified as transgender or gender diverse, they were omitted from the analysis. Other predictors included age in years, educational attainment employment status, urbanicity (urban, suburban, rural), and country of residence. Because race is a social construct that is understood differently across locales and cultures, we dichotomized race/ethnicity as White and racial/ethnic minority (i.e., adults who do not identify as White).

1.2. Data analysis

The full data set is available through the Open Science Foundation (https://osf.io/gdy3z/). We analyzed the data using Stata/SE version 17 (StataCorp, College Station, TX). We implemented a three-stage analytic plan to describe the sample and test our hypotheses. First, we used descriptive statistics to delineate the distribution of sociodemographic characteristics. Second, we conducted simple and multivariable logistic regression analyses to obtain the crude (OR) and adjusted (aOR) odds ratios, along with 95% confidence intervals (CI) of reporting odds of suicidal ideation by sociodemographic predictor.

We also calculated and reported Cohen’s *d* effect sizes using Chinn’s

(2000) formula, $d = \frac{\ln(OR)}{1.81}$. To measure severity of suicidal ideation, we conducted a multinomial multivariable logistic regression with no suicidal ideation as the base outcome. In the model, we included only those predictors that showed statistical significance in at least one of the multivariable logistic regression models. For the multinomial regression, we examined adjusted relative risk ratios (aRRR), 95% CI, and Cohen's d effect sizes. For readability, we reported only the statistically significant results in the text and table. Statistical significance was established at $\alpha < 0.05$.

2. Results

The mean age of our sample was 37.1 years (SD = 13.03), and it was evenly split between men (50.4%) and women (49.6%) (see Table 1). Approximately 48.5% of respondents identified as White, and the remaining 51.5% identified as POC. The geographic distribution revealed an even split between the countries, with Italy, Spain, and Saudi Arabia each representing 19.9% of the total sample. Approximately 20.2% of the remaining sample were from India and the remaining 20.0% were from the United States. Furthermore, a majority (56.8%) of the sample lived in urban areas, and almost one-fifth (19.6%) dwelled in rural locations. An overwhelming majority of the respondents identified as heterosexual (84.8%) and reported some type of employment (full time: 57.0%; part-time: 17.9%; other employment: 4.8%). Approximately 15.8% of the sample were unemployed, and almost one-fourth (24.5%) attained a high school education or less. Finally, 29.0% of respondents reported using any illicit drugs within the past 90 days of the study, corresponding to illicit drug use during COVID-19.

Table 1
Sociodemographic characteristics (N = 2,482).

Predictor	*n*	%
Age in years, *M* (SD)	37.1 (13.0)	–
Depression score, *M* (SD)	9.1 (6.5)	–
Anxiety score, *M* (SD)	7.0 (5.6)	–
Traumatic stress score, *M* (SD)	3.4 (1.2)	–
Gender		
Men	1,251	50.4
Women	1,231	49.6
Race/ethnicity		
White	1,180	48.5
Racial/ethnic minority	1,251	51.5
Country		
United States	497	20.0
Italy	495	19.9
Spain	495	19.9
Saudi Arabia	495	19.9
India	500	20.2
Sexual orientation		
Heterosexual	2,006	84.8
Lesbian or gay	85	3.6
Bisexual	148	6.3
Pansexual or other	127	5.4
Education		
Postgraduate	687	27.9
College graduate	781	31.7
Some college	392	15.9
High school or less	605	24.5
Employment status		
Full-time	1,390	57.0
Part-time	437	17.9
Unemployed	386	15.8
Retired	110	4.5
Other employment	116	4.8
Urbanicity		
Urban	1,401	56.8
Suburban	581	23.6
Rural	484	19.6
Past 90-day illicit drug use		
No	1,763	71.0
Yes	719	29.0
Suicidal ideation		
No	1,497	60.3
At least once	985	39.7

Note. Percentages may not add to 100% due to rounding.

2.1. Prevalence risk of acute suicidal ideation

Table 2 describes adjusted (aOR) odds ratios of suicidal ideation in the past 14 days by sociodemographic predictors for the overall sample and stratified by country. Although the overall sample did not show racial/ethnic differences in suicidal ideation, stratified analyses found that among US respondents, POC endorsed more than two-fold greater odds of experiencing suicidal ideation compared to their White peers (aOR = 2.31, 95% CI: 1.26–4.27, d = 0.46). Thus, our first hypothesis was supported only for the US subsample. We found evidence to support our second hypothesis in that past 90-day illicit drug use was significantly associated with suicidal ideation during COVID-19 in the overall sample (aOR = 1.38, 95% CI: 1.06–1.80, d = 0.18). Both the United States (aOR = 1.93, 95% CI: 1.09–3.40, d = 0.36) and Indian (aOR = 1.93, 95% CI: 1.03–3.62, d = 0.36) subgroups also reported significantly greater odds of suicidal ideation compared to non-drug users, with larger effect sizes compared to the overall sample. Higher anxiety (aOR = 1.04, 95% CI: 1.00–1.38, d = 0.02) and depression (aOR = 1.37, 95% CI: 1.32–1.43, d = 0.17) scores were associated with past 14-day suicidal ideation. Although depression was associated with greater odds of suicidal ideation in each country, only respondents in Saudi Arabia with greater anxiety scores endorsed greater odds of suicidal ideation (aOR = 1.26, 95% CI: 1.12–1.43, d = 0.13). COVID-related posttraumatic stress was associated with lesser odds of suicidal ideation in the overall sample (aOR = 0.96, 95% CI: 0.93–0.98, d = −0.02) and the Italian subgroup (aOR = 0.89, 95% CI: 0.83–0.95, d = −0.06), although the effects were negligible.

Older age was associated with lesser odds of suicidal ideation (aOR = 0.97, 95% CI: 0.96–0.99, d = −0.02), with comparable results in the United States, Italy, and Saudi Arabia. There was also a significant gender effect, such that women endorsed lesser odds of experiencing suicidal ideation during the COVID-19 pandemic compared to men (aOR = 0.51, 95% CI: 0.40–0.66, d = −0.37). Lesser odds of suicidal ideation among women were also noted in the American (aOR = 0.44, 95% CI: 0.23–0.83, d = −0.45) and Italian subgroups (aOR = 0.36, 95% CI: 0.20–0.65, d = −0.56). Sexual minorities did not report significantly greater odds of suicidal ideation during COVID compared to their heterosexual peers overall. However, lesbian and gay adults in Saudi Arabia (aOR = 5.62, 95% CI: 1.14–27.79, d = 0.95) and bisexual + adults in India (aOR = 2.03, 95% CI: 1.13–3.65, d = 0.39) reported significantly greater odds compared to heterosexuals in their country.

Adults who obtained a high school education or less (aOR = 0.62, 95% CI: 0.43–0.90, d = 0.26), as well as those who completed some college (aOR = 0.64, 95% CI: 0.44, 0.95, d = −0.25), reported significantly lesser odds of experiencing suicidal ideation compared to those with a postgraduate degree. Similar findings with larger effects were noted among Americans (aOR = 0.30, 95% CI: 0.12–0.77, d = −0.67) and Indians (aOR = 0.23, 95% CI: 0.05–0.97, d = −0.81) with some college completed, as well as Spaniards with a high school diploma or less (aOR = 0.44, 95% CI: 0.20–0.97, d = −0.45). Although respondents living in rural areas reported significantly lesser odds of suicidal ideation relative to their urban-dwelling peers in the full sample (aOR = 0.68, 95% CI: 0.49–0.95, d = −0.21), comparable results were not found in subgroup analyses.

2.2. Severity of suicidal ideation

In the adjusted multinomial logistic regression model (Table 3), POC endorsed a significantly greater adjusted relative risk of experiencing suicidal ideation for several days per week (aRRR = 1.69, 95% CI: 1.03–2.77, daRRR = 0.29). Respondents who used illicit drugs within the past 90 days reported a significantly greater relative risk of

Table 2
Multivariable logistic regression of acute suicidal ideation during COVID-19 lockdown.

Predictor	Total		United States		Italy		Spain		Saudi Arabia		India	
	aOR (95% CI)	d_{aOR}	aOR (95% CI)	d_{aOR}	aOR (95% CI)	d_{aOR}	aOR (95% CI)	d_{aOR}	aOR (95% CI)	d_{aOR}	aOR (95% CI)	d_{aOR}
Age	**0.97*** (0.96, 0.99)**	**−0.02**	**0.97* (0.95, 0.99)**	**−0.02**	**0.97* (0.94, 1.00)**	**−0.02**	1.00 (0.98, 1.03)	0.00	**0.95*** (0.92, 0.99)**	**−0.03**	0.98 (0.95, 1.01)	−0.01
Depression	**1.37*** (1.32, 1.42)**	**0.17**	**1.37*** (1.27, 1.48)**	**0.17**	**1.39*** (1.27, 1.52)**	**0.17**	**1.42*** (1.30, 1.55)**	**0.19**	**1.38*** (1.24, 1.54)**	**0.18**	**1.41*** (1.29, 1.53)**	**0.19**
Anxiety	**1.04* (1.00, 1.08)**	**0.02**	0.99 (0.92, 1.07)	−0.01	1.07 (0.98, 1.16)	0.04	1.00 (0.93, 1.08)	0.00	**1.26*** (1.12, 1.43)**	**0.13**	1.00 (0.92, 1.08)	0.00
Traumatic stress	**0.96** (0.93, 0.98)**	**−0.02**	0.96 (0.90, 1.01)	−0.02	**0.89** (0.83, 0.95)**	**−0.06**	0.96 (0.91, 1.01)	−0.02	0.95 (0.88,1.03)	−0.03	0.99 (0.93, 1.05)	−0.01
Past 90-day illicit drug use												
No	–	–	–	–	–	–	–	–	–	–	–	–
Yes	**1.38* (1.06, 1.80)**	**0.18**	**1.93* (1.09, 3.40)**	**0.36**	1.26 (0.67, 2.37)	0.13	0.96 (0.56, 1.66)	−0.02	0.51 (0.19, 1.37)	−0.37	**1.93* (1.03, 3.62)**	**0.36**
Gender												
Men	–	–	–	–	–	–	–	–	–	–	–	–
Women	**0.51*** (0.40, 0.66)**	**−0.37**	**0.44* (0.23, 0.83)**	**−0.45**	**0.36** (0.20, 0.65)**	**−0.56**	0.61 (0.36, 1.04)	−0.27	0.52 (0.24, 1.12)	−0.36	0.81 (0.44, 1.49)	−0.12
Race/ethnicity												
White	–	–	–	–	–	–	–	–	–	–	–	–
Racial/ethnic minority	1.18 (0.92, 1.53)	0.09	**2.31** (1.26, 4.27)**	**0.46**	2.10 (0.71, 6.15)	0.41	0.79 (0.41, 1.53)	−0.13	0.52 (0.11, 2.40)	−0.36	14.53 (0.03, 6084.54)	1.48
Sexual orientation												
Heterosexual	–	–	–	–	–	–	–	–	–	–	–	–
Lesbian or gay	1.62 (0.85, 3.07)	0.27	2.21 (0.53, 9.20)	0.44	0.89 (0.14, 5.86)	−0.06	0.71 (0.18, 2.77)	−0.19	**5.62* (1.14, 27.79)**	**0.95**	0.78 (0.14, 4.29)	−0.14
Bisexual+	1.23 (0.88, 1.71)	0.11	0.86 (0.38, 1.96)	−0.08	2.56 (0.78, 8.43)	0.52	1.09 (0.48, 2.50)	0.05	0.76 (0.29, 1.98)	−0.15	**2.03* (1.13, 3.65)**	**0.39**
Education												
Postgraduate	–	–	–	–	–	–	–	–	–	–	–	–
College graduate	0.91 (0.67, 1.23)	−0.05	0.43 (0.18, 1.03)	−0.47	0.72 (0.35, 1.47)	−0.18	1.13 (0.56, 2.27)	0.07	0.82 (0.34, 2.00)	−0.11	0.91 (0.50, 1.65)	−0.05
Some college	**0.64* (0.44, 0.95)**	**−0.25**	**0.30* (0.12, 0.77)**	**−0.67**	1.36 (0.56, 3.31)	0.17	0.71 (0.34, 1.51)	−0.19	3.25 (0.81, 13.01)	0.65	**0.23* (0.05, 0.97)**	**−0.81**
High school or less	**0.62* (0.43, 0.90)**	**−0.26**	0.43 (0.18, 1.07)	−0.47	1.12 (0.48, 2.58)	0.06	**0.44* (0.20, 0.97)**	**−0.45**	0.79 (0.23, 2.77)	−0.13	2.10 (0.56, 7.87)	0.41
Employment status												
Full-time	–	–	–	–	–	–	–	–	–	–	–	–
Part-time	1.01 (0.73, 1.39)	0.01	0.84 (0.38, 1.87)	−0.10	1.21 (0.56, 2.60)	0.11	1.22 (0.60, 2.47)	0.11	0.33 (0.11, 1.05)	−0.61	1.22 (0.60, 2.51)	0.11
Unemployed	0.78 (0.55, 1.12)	−0.14	0.56 (0.24, 1.30)	−0.32	1.37 (0.57, 3.28)	0.17	0.99 (0.50, 1.96)	−0.01	0.81 (0.27, 2.46)	−0.12	0.85 (0.36, 2.00)	−0.09
Retired	0.57 (0.27, 1.19)	−0.31	0.42 (0.09, 1.91)	−0.48	1.04 (0.24, 4.46)	0.02	0.78 (0.14, 4.37)	−0.14	0.53 (0.07, 4.02)	−0.35	0.78 (0.03, 20.00)	−0.14
Other employment	0.66 (0.37, 1.18)	−0.23	0.53 (0.13, 2.17)	−0.35	0.85 (0.29, 2.53)	−0.09	0.81 (0.28, 2.37)	−0.12	0.42 (0.06, 3.04)	−0.48	1.36 (0.24, 7.72)	0.17
Urbanicity												
Urban	–	–	–	–	–	–	–	–	–	–	–	–
Suburban	0.91 (0.68, 1.22)	−0.05	0.82 (0.43, 1.55)	−0.11	1.60 (0.82, 3.16)	0.26	0.88 (0.50, 1.54)	−0.07	0.35 (0.11, 1.07)	−0.58	0.97 (0.46, 2.02)	−0.02
Rural	**0.68* (0.49, 0.95)**	**−0.21**	0.59 (0.27, 1.31)	−0.29	0.66 (0.34, 1.27)	−0.23	0.76 (0.38, 1.55)	−0.15	0.89 (0.10, 3.29)	−0.06	0.74 (0.33, 1.63)	−0.17

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

endorsing suicidal ideation for more than three days per week relative to no suicidal ideation (aRRR = 1.72, 95% CI: 1.21–2.46, daRRR = 0.30). Significant effects were observed for experiencing suicidal ideation nearly every day for recent illicit drug use relative to no suicidal ideation (aRRR = 2.17, 95% CI: 1.33–3.53, daRRR = 0.43). Consistent with the results from Table 2, we found evidence to support our second hypothesis with some support for our first.

In addition, we found greater relative risks for suicidal ideation among Spanish respondents. In our Spanish subsample, the relative risks increased with greater severity relative to not experiencing suicidal ideation. Furthermore, the effect sizes remained small to moderate (several days: d = 0.24; more than three days per week: d = 0.31; nearly every day: d = 0.57). Greater severity was also observed in the Italian and Indian subsamples. Italian respondents endorsed almost two-fold adjusted relative risk of experiencing suicidal ideation for several days per week compared to no suicidal ideation (aRRR = 1.76, 95% CI:

Table 3
Multinomial multivariable logistic regression of severity of suicidal ideation during COVID-19 lockdown.

Predictor	Several days vs. None		More than 3 days vs. None		Nearly every day vs. None	
	aRRR (95% CI)	d_{aRRR}	aRRR (95% CI)	d_{aRRR}	aRRR (95% CI)	d_{aRRR}
Age	**0.98*** (0.96, 0.99)**	**−0.01**	**0.97*** (0.96, 0.99)**	**−0.02**	**0.95*** (0.93, 0.97)**	**−0.03**
Depression	**1.26*** (1.22, 1.31)**	**0.13**	**1.57*** (1.49, 1.65)**	**0.25**	**1.93*** (1.79, 2.07)**	**0.36**
Anxiety	**1.04* (1.00, 1.08)**	**0.02**	1.05 (0.99, 1.10)	0.03	1.05 (1.00, 1.13)	0.03
Traumatic stress	**0.97* (0.94, 0.99)**	**−0.03**	**0.95** (0.92, 0.99)**	**−0.03**	0.97 (0.92, 1.01)	−0.02
Past 90-day illicit drug use						
No	–		–		–	
Yes	**1.35* (1.01, 1.80)**	**0.17**	**1.72** (1.21, 2.46)**	**0.30**	**2.17** (1.33, 3.53)**	**0.43**
Gender						
Men	–		–		–	
Women	**0.57*** (0.44, 0.74)**	**−0.31**	**0.39*** (0.27, 0.55)**	**−0.52**	**0.31*** (0.19, 0.52)**	**−0.65**
Country						
United States	–		–		–	
Italy	**1.76* (1.14, 2.73)**	**0.31**	1.66 (0.91, 3.02)	0.28	1.47 (0.59, 3.71)	0.21
Spain	**1.55* (1.04, 2.33)**	**0.24**	**1.75* (1.03, 2.99)**	**0.31**	**2.81** (1.34, 5.88)**	**0.57**
Saudi Arabia	0.93 (0.57, 1.51)	−0.04	1.60 (0.86, 2.96)	0.26	1.71 (0.72, 4.06)	0.30
India	1.31 (0.81, 2.12)	0.15	1.65 (0.90, 3.03)	0.28	**2.69* (1.18, 6.17)**	**0.55**
Race/ethnicity						
White	–		–		–	
Racial/ethnic minority	1.37 (0.93, 2.01)	0.17	**1.69* (1.03, 2.77)**	**0.29**	1.24 (0.63, 2.41)	0.12
Sexual orientation						
Heterosexual	–		–		–	
Lesbian or gay	1.53 (0.77, 3.05)	0.23	1.67 (0.71, 3.93)	0.28	**3.49* (1.23, 9.90)**	**0.69**
Bisexual+	1.24 (0.87, 1.76)	0.12	1.18 (0.76, 1.85)	0.09	1.42 (0.79, 2.58)	0.19
Education						
Postgraduate	–		–		–	
College graduate	1.10 (0.79, 1.53)	−0.21	0.70 (0.46, 1.06)	−0.2	0.65 (0.35, 1.19)	−0.24
Some college	0.86 (0.57, 1.31)	−0.21	0.34*** (0.19, 0.61)	**−0.60**	0.54 (0.25, 1.18)	−0.34
High school or less	0.73 (0.50, 1.06)	−0.21	**0.38*** (0.23, 0.63)**	**−0.53**	0.56 (0.28, 1.13)	−0.32
Urbanicity						
Urban	–		–		–	
Suburban	0.79 (0.58, 1.08)	−0.12	1.26 (0.84, 1.88)	0.13	0.75 (0.42, 1.36)	−0.16
Rural	**0.60** (0.42, 0.86)**	**−0.49**	0.75 (0.47, 1.21)	−0.16	**0.43* (0.21, 0.85)**	**−0.47**

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

1.14–2.73, daRRR = 0.31). On the other hand, Indian adults reported almost 2.7 times greater relative risk of suicidal ideation nearly every day compared to no ideation (aRRR = 2.69, 95% CI: 1.18–6.17, daRRR = 0.55). Sexual minorities—specifically lesbian women and gay men—reported a significantly greater adjusted relative risk of experiencing suicidal ideation nearly every day compared to no ideation (aRRR = 3.49, 95% CI: 1.23–9.90, daRRR = 0.69).

Our results also revealed protective factors against the severity of suicidal ideation. Women endorsed significantly lesser adjusted relative risks experiencing suicidal ideation nearly every day compared to no suicidal ideation (aRRR = 0.31, 95% CI: 0.19–0.52, daRRR = −0.68). Similarly, rural residents had lesser relative risk of suicidal ideation nearly every day relative to no suicidal ideation (aRRR = 0.43, 95% CI: 0.21–0.85, daRRR = −0.47), and having less than a bachelor's degree was associated with lesser relative risk of suicidal ideation.

3. Discussion

In this study, we investigated whether a racial/ethnic minority identity and past 90-day illicit drug use were associated with odds and severity of suicidal ideation in an international sample of adults during the COVID-19 lockdown. Our results showed that racial/ethnic minorities in the United States endorsed significantly greater prevalence odds and severity of suicidal ideation compared to their White counterparts. However, the results were significant for only the US subsample. Our overall findings for racial/ethnic differences may be at least partially explained by the fact that racial/ethnic identity is a social construction that is influenced by factors such as culture and historical context. Thus, the diverse cultures represented in our sample may play a substantial role in participants' racial/ethnic identity. For example, individuals in Saudi Arabia and India may have a strong national identity that supersedes other constructions of race/ethnicity. In such cases, respondents may be more likely to identify as Saudi or Indian as opposed to White, Black, or other racial/ethnic identities.

Our findings regarding the US subgroup contradict other investigations with US samples; for example, Daly and Robinson (2021) found that all sampled racial/ethnic groups experienced significantly lower levels of psychological distress from April and July 2020. Their findings suggest that US adults, regardless of racial/ethnic identity, experienced similar levels of psychological distress. Furthermore, Graham et al. (2022) noted that Black respondents not only reported better life satisfaction, optimism, and mental health outcomes during the pandemic than their White peers. Although those studies did not examine suicidal ideation as a specific outcome, their findings suggest that factors, such as coping and resilience, may be critical intervention points for improving mental health outcomes.

Nevertheless, our results are consistent with other recent investigations using US and UK samples (Bray et al., 2021; Czeisler et al., 2020; Fitzpatrick et al., 2020; Proto and Quintana-Domeque, 2021) which have documented disparities in psychological distress and suicidality among Black and other racial/ethnic groups compared to their White peers. Numerous studies have demonstrated that factors such as overt racial discrimination and racial microaggressions (Paradies et al., 2015; Quinn et al., 2020; Rosario-Williams et al., 2022; Shi et al., 2022), socioeconomic inequalities (Lo and Cheng, 2018; Williams, 2018), and medical mistrust (Hammond, 2010; Powell et al., 2019) have contributed significantly to greater risks of suicidality, particularly among racial/ethnic minority groups in the United States. The substantially greater relative risk of suicidality among racial/ethnic minorities highlights the critical need of culturally responsive suicide prevention services for this population, particularly given that disparities in mental health by race/ethnicity in the United States have been demonstrated in the emerging COVID-19 literature. Taken together, the evidence suggests that multiple influencing factors of psychological distress may exist

within and across racial/ethnic groups during the pandemic, and that racial/ethnic identity may mitigate risk of suicidality in the face of other stressors.

We also found evidence to support our second hypothesis that recent (i.e., past 90-day) illicit drug use was significantly associated with the prevalence and severity of suicidal ideation during COVID lockdown. Numerous studies have also demonstrated the deleterious effects of substance use on mental health, with some scholars (Breet et al., 2018) finding that substance use is significantly associated with suicidal ideation, regardless of substance type, substance use dimension, or dimension of suicidality (e.g., suicidal ideation, suicide attempt, suicide completion). Other studies have found the link between substance use and suicidality to hold even during the COVID-19 pandemic; in one study (Banerjee et al., 2021), a biopsychosocial approach to understanding psychiatric vulnerability during COVID-19 found that substance use, particularly when combined with other factors, can increase the risk of suicidality. Similarly, Balestrieri et al. (2021) found a substantially greater increase in psychiatric hospital admissions due to substance use disorder during the COVID-19 pandemic compared to the year prior. Overall, our results suggest that substance use prevalence and severity may be critical areas of possible intervention to when addressing COVID-related suicidal ideation.

It is worth noting that there was no significant difference in odds of suicidal ideation among Saudi Arabian and Spanish adults who used illicit drugs and those who did not. This finding may be due to several reasons. The religious and cultural norms of Saudi Arabia provide substantial negative consequences for substance use in Saudi Arabia, which may prevent some respondents for disclosing their substance use status. Additionally, Saudi Arabia and surrounding countries face other challenges such as armed conflict and national security that require greater prioritization. The potential underreporting of illicit drug use may have limited our ability to detect between-group differences in suicidal ideation risk for this subgroup.

Although the scientific literature does not report extensive psychosocial interventions to address substance use in Saudi Arabia, it must be noted that much progress has been made over the past several years. For example, the Saudi Center for Studies and Research on Drug Prevention became a certified regional training center for substance abuse prevention (ArabNews.com, 2017). Additionally, Saudi Arabia has created substance use treatment hospitals across the country that address substance use disorders in a multiphase, biopsychosocial approach (Bassiony, 2013). These, and similar efforts, are indicative of Saudi Arabia's efforts to mitigate the negative impact of substance use among its residents. In Spain, the approach to substance use may be different from other counties in that it takes a more intentional approach in integrating harm reduction strategies that have been shown some promise in addressing symptoms of psychological distress (Fulton et al., 2011; Picchio et al., 2020).

In addition to finding evidence to support our primary hypotheses, several additional significant findings are worth noting. We found that older age was significantly associated with lesser odds of prevalence and severity of suicidal ideation relative to younger adults. This result is consistent with recent findings indicating that younger adults experienced greater risk of suicidal ideation compared to their older counterparts (Czeisler et al., 2020). Similarly, other scholars have found that younger adults in both Peru and the United Kingdom endorsed significantly greater odds of experiencing loneliness and depressive symptoms, which may be an influencing factor of future suicidality (Antiporta et al., 2021; Bu et al., 2020). Our results, when contextualized with existing literature, highlight the critical need for mental health interventions that target COVID-related suicide risk in cross-cultural contexts, particularly for younger adults.

Overall, sexual minority adults did not experience disparately greater odds of suicidal ideation during the COVID-19 lockdown compared to their heterosexual peers. However, lesbian and gay adults in Saudi Arabia, as well as bisexual + adults in India, reported significantly greater odds of suicidal ideation compared to their heterosexual counterparts with large and medium effect sizes, respectively. Although the nonsignificance in prevalence in the overall sample may be due to other factors (e.g., race/ethnicity, age, gender), it is noteworthy that sexual minorities in Saudi Arabia and India experienced greater disparities than their heterosexual peers. We also found that lesbian and gay adults endorsed significantly greater odds of experiencing suicidal ideation almost every day during COVID-19 lockdown compared to heterosexual peers. Despite the dearth of literature examining sexual minority disparities in suicidality in Saudi Arabian and Indian samples, reports from other sexual minority samples suggest that sexual minority adults experience greater suicide risk due to multiple factors (del Río-González et al., 2021; Nystedt et al., 2019; Suran, 2021). For sexual minority adults, syndemic factors such as stigmatizing and oppressive interpersonal and legislative acts, inadequate access to mental health services, and the politicization of public health may further exacerbate the existing disparities in suicidality risk (Gibb et al., 2020).

Although Italian and Spanish respondents reported significantly greater prevalence of suicidal ideation risk compared to their American peers, only Spaniards endorsed increasing severity. Scholars have suggested the prevalence of suicidal ideation to be approximately 9.9% in some Spanish subgroups and has been documented as a major cause of death since 2008 (Blasco et al., 2019; Sáiz and Bobes, 2014), and several challenges have been noted in addressing suicidality in Spain. At one level, there is a lack of comprehensive suicide prevention programs and training for care professionals (Muñoz-Sánchez et al., 2018; Sáiz and Bobes, 2014), which can exacerbate existing disparities in access to care for individuals at greatest risk of suicidality. At another level, Spain experienced prolonged restrictions and lockdown, as well as multiple wave recurrences of COVID-19 and its variants (de la Torre-Luque et al., in press). These ecological conditions may have yielded not only a significantly greater prevalence in the odds of suicidal ideation compared to Americans in our sample, but also a greater severity of suicidal ideation among Spaniards.

We did not find significant associations regarding educational attainment in all countries, there are several null findings that are worth noting given their effect sizes. For instance, Saudi Arabians who completed some college and Indians who completed high school or less showed elevated odds of suicidal ideation relative to their peers with postgraduate degrees. Educational attainment is an indicator of socioeconomic status, and individuals with greater education levels often obtain employment that provides increased financial flexibility. During COVID-19, adults in Saudi Arabia and India may have experienced economic challenges that exacerbated psychological stress, despite the risk not rising to the level of statistical significance.

4. Limitations and conclusions

This study is not without its limitations. The cross-sectional design prohibits causal inference, and other dimensions of suicidality such as suicide attempts were not assessed. As noted previously, the dichotomization of race/ethnicity substantially limits our ability to draw further inferences about specific racial/ethnic disparities in suicidal ideation during COVID-19 lockdown. Therefore, the finding should be interpreted with extreme caution. Furthermore, our focus on suicidal ideation limits our ability to make inferences on other dimensions of suicidality, such as suicide attempts and completions. The retrospective nature of the study might introduce recall bias, although recall times ranged from 2 weeks to 12 months across measures. Online recruiting methods may have further limited the potential sample characteristics, as participants were required to have Internet access. In addition, we did not assess additional predictors such as household size, income, and marital status due to potential international privacy concerns.

Despite the limitations, this study is the first to our knowledge that examines suicidal ideation risk during COVID-19 lockdown with an international sample. The results highlight existing racial disparities in

suicidal ideation during the COVID-19 pandemic, for which grater mental health and medical services are needed. The significant association between past 90-day illicit drug use and suicidal ideation further suggests that multicomponent mental health interventions that include substance use prevention and treatment may be necessary to minimize acute suicidal ideation related to the pandemic.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author statement

Deeshpaul S. Jadir: Conceptualization, Methodology, Formal analysis, Roles/Writing – Original Draft, Writing – Review & Editing. **Kaston D. Anderson-Carpenter:** Supervision, Methodology, Formal analysis, Roles/Writing – Original Draft, Writing – Review & Editing.

Declaration of competing interest

The authors declare no known conflicts of interest.

Acknowledgements

We would like to formally thank and acknowledge the peer reviewers of this paper, whose insights and support helped make this work possible.

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