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Associations of self-isolation, social support, and coping strategies with depression and suicidal ideation in U.S. young adults during the COVID-19 pandemic

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Conflict of interest

None

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ABSTRACT: *There have been concerns about the psychological impact of COVID-19-related stressors on young adults. However, there remains limited information regarding how psychosocial factors and coping strategies correlate with suicidal ideation in young adults during the pandemic. We studied a cross-sectional, observational online survey using a probability-based, nationally representative sample of U.S. young adults aged 18 to 29 (N = 1077). We performed weighted logistic regression to evaluate how self-isolation, social support, and coping strategies (exposures) were associated with depression and suicidal ideation (outcomes), adjusting for age, gender, race, educational level, and sexual orientation. The method of multiple imputation for addressing missing data was executed through chained equations. A total of 296 participants had depression, while 323 had suicidal ideation. Individuals who consistently self-isolated exhibited nearly threefold higher odds of depression compared to those without self-isolation. Social support was consistently protective against depression and suicidal ideation. Coping through positive reframing was protective against depression and suicidal ideation, whereas substance use, self-blame, and behavioral disengagement had the opposite impact. Providing social support may help prevent suicidal ideation among young adults during the pandemic. Interventions that focus on developing young adults' coping strategies, such as through positive reframing, are recommended to develop positive and healthy relationships. Healthcare providers should advise against substance use, self-blame, and behavioral disengagement.*

KEYWORDS: SARS-CoV-2; Physical Distancing; Alcohol Drinking; Depressive Disorder; Suicide

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INTRODUCTION

COVID-19 has become a global health threat since its emergence. In U.S., vaccination began at the end of 2020 (CDC, 2022). By March 2021, the CDC recommended that fully vaccinated individuals can gather without social distancing with other fully vaccinated individuals (CDC, 2022). However, with the emergence of the Delta variant in June, the eviction moratorium, which is a legal order that temporarily prevents landlords from evicting tenants for non-payment of rent or other lease violations, was extended until the end of July. (CDC, 2022). In August, in light of the surge of the Delta variant, self-isolation and social distancing remained important preventative measures against infection, and areas of substantial and high COVID-19 transmission were advised to impose an eviction moratorium (CDC, 2022). Additionally, individuals infected with the virus and those exposed to someone with COVID-19 were recommended to quarantine in 2021 (CDC, 2022).

In addition to its well-documented threat to physical health and life, there has been increasing concern about the impact of COVID-19 on mental health. A previous study showed evidence of substantial psychiatric comorbidity after COVID-19 infection (Taquet et al., 2021). Evidence also suggests that the pandemic has harmed mental health in the general population (Xiong et al., 2020). Multiple factors are suggested to have a detrimental impact on mental health during the pandemic, such as economic decline, unemployment, stigma, self-isolation and social distancing measures, and a general decrease in socialization and access to support from others. (Narita et al., 2023, 2022; Panchal et al., 2021; Robinson et al., 2022; Samji et al., 2022). Such stressors and how individuals respond to them might moderate the detrimental effect of the COVID-19 pandemic on mental health.

In the context of COVID-19's psychological impact, there remains limited information on how psychosocial factors and coping strategies correlate with suicidal ideation. One study showed a deleterious effect of subjective loneliness on suicidal ideation

but did not evaluate social isolation (Elbogen et al., 2021). A past report demonstrated the potential role of social support in preventing suicidal ideation (Gabarrell-Pascuet et al., 2021). To our knowledge, no study has evaluated how coping strategies relate to suicide during the COVID-19 pandemic. Overall, investigations on the association between suicidal outcomes and these factors during the COVID-19 pandemic are still scant (Farooq et al., 2021).

The National Center for Health Statistics showed that the suicide rate increased by 36% from 2000 to 2017 and was the second leading cause of death among young adults (Curtin and Heron, 2020). There have been concerns about the psychological impact of COVID-19-related stressors on young adults (Emery et al., 2021). The present study aimed to investigate whether self-isolation, social support, and coping strategies are associated with depression and suicidal ideation during the pandemic in a nationally representative sample of U.S. emerging adults ($N = 1077$). The data were collected in February 2021, when self-isolation was still considered an important preventive measure against infection. This was prior to the CDC's recommendation that fully vaccinated individuals can gather without social distancing. We hypothesized that self-isolation, social support, and a range of coping strategies would correlate with suicidal ideation and depression.

METHODS

Participants

The data used in the present study were obtained from the NSPR study, which was conducted in February 2021. The NSPSR study aimed to comprehensively examine poly-victimization and suicide-related outcomes in a nationally representative sample of young adults, providing valuable information on this under-researched demographic and uncovering possible protective factors that may counteract suicide among those at the greatest risk. The specifics of the sampling methodology are shown in a previous publication (DeVylder et al., 2022). We

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conducted a cross-sectional analysis of a probability-sampled, nationally representative online survey of young adults aged 18 to 29 in U.S. Institutional Review Boards of the sponsoring universities approved the study procedures.

A pre-determined target minimum sample size of 1,000 participants was initially recruited. The final recruited sample exceeded our minimum target and resulted in 1,077 young adults. A power analysis to compute achieved power for the given sample size (N = 1,077) was conducted using G*Power (Faul et al., 2009). Cohen's (1977) recommended effect sizes were used to assess achieved power: small ($f2$ = 0.02), medium ($f2$ = 0.15), and large effects ($f2$ = 0.35) (Cohen, 1977). Results suggest that statistical power to detect small, medium, and large effect sizes for this sample is adequate; that is, the power was 0.92 for small effects and exceeded 0.99 for medium and large effect sizes.

Depression

We evaluated depression in the past two weeks using the Patient Health Questionnaire-2 (PHQ-2), a validated depression screener (Kroenke et al., 2003). The PHQ-2 included the first two items of the PHQ-9 (Kroenke et al., 2001): (1) "Over the last 2 weeks, how often have you felt down, depressed or hopeless?" and (2) "Over the last 2 weeks, how often have you felt little interest or pleasure in doing things?". Each item was self-reported on four-point response options ranging from 0 (not at all) to 3 (nearly every day), with possible total scores ranging from 0 to 6. We used a PHQ-2 score of 3 as the cutpoint, as recommended by the validation study (Kroenke et al., 2003).

Suicidal ideation

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We evaluated suicidal ideation using the Columbia-Suicide Severity Rating Scale - Screener Self-Report Recent Version (C-SSRS) (Posner et al., 2011). The C-SSRS is designed to distinguish the domains of suicidal ideation and suicidal behavior. The first 5 out of 6 items evaluated suicidal ideation. The severity of ideation was evaluated on a 5-point ordinal scale in which 1 = wish to be dead, 2 = nonspecific active suicidal thoughts, 3 = suicidal thoughts with methods, 4 = suicidal intent, and 5 = suicidal intent with a plan. Endorsing any of them constituted the suicidal ideation variable.

Self-isolation

We evaluated self-isolation by asking: "To what extent are you currently self-isolating? By "self-isolating," we mean limiting your in-person contact with others who live outside of your household and your activities outside of your home." It was self-reported on four response options: "All of the time. I am staying at home nearly all of the time.", "Most of the time. I only leave home to buy food and other essentials.", "Some of the time. I reduce the amount of times I am in public spaces, social gatherings, or at work, or reduce the number of people I interact with (e.g., limiting social interaction to family members who live in my area).", and "None of the time. I do everything I normally do." We used these data as categorical variables.

Social support

We evaluated social support using the Multidimensional Scale of Perceived Social Support (MSPSS) Family and Friends subscales (Zimet et al., 1990), consisting of 4 items. We used 4-point response options ranging from 1 (strongly disagree) to 4 (strongly agree). For each subscale, these items were summed into scores ranging from 4 to 16. Family and Friends scores were summed into Total scores ranging from 8 to 32. Our data showed good/excellent

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internal consistency for each score (Total scores, $\alpha = 0.89$; Family scores, $\alpha = 0.88$; Friend scores, $\alpha = 0.91$). We used these data as continuous variables.

Coping strategies

We evaluated coping strategies using the Brief Coping Orientation to Problems Experienced (Brief COPE) (Carver, 1997). The present study used three positive subscales: Active Coping, Positive Reframing, and Religion, and three negative subscales: Substance Use, Self-blame, and Behavioral Disengagement. Each subscale consisted of 2 items. We used 4-point response options ranging from 0 (I don't do this at all) to 3 (I do this a lot). For each subscale, these items were summed into scores ranging from 0 to 6. We used these data as continuous variables.

Sociodemographic variables

We selected potential confounders based on subject-matter knowledge. We included age (18-20, 21-23, 24-26, or 27-29), gender (male, female, or trans/non-binary), race (White, Black, Latinx, Asian, or multiracial/other), educational level (no high school diploma, high school diploma/GED, some college, or college graduate), and sexual orientation (heterosexual or LGBTQ+).

Statistical analysis

A nationally representative sample of U.S. adults aged 18 to 29 was chosen from NORC's AmeriSpeak Panel, which includes sub-panels that oversample minorities to guarantee sufficient representation of these underrepresented populations (NORC at the University of Chicago, 2022). In order to mitigate potential biases in this study, several weighting techniques were employed. Initially, panel weights were calculated for all eligible

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respondents. Panel weighting variables included age, sex, census division, race, education, housing tenure, and household phone status. Subsequently, study-specific base sampling weights were derived through a combination of these panel weights and the probability of selection for each sampled panel member. Study-specific weighting variables included age, sex, census division, race, education, age*sex, age*race, and sex*race. To further reduce potential nonresponse bias, adjustments were made to account for survey non-respondents. Finally, the weights were calibrated to align with external population totals. We performed weighted logistic regression to evaluate how self-isolation (exposure, categorical variable) was associated with depression and suicidal ideation (outcomes, categorical variables). Both unadjusted and adjusted associations were evaluated through the utilization of weights. Adjusted models included age, gender, race, educational level, and sexual orientation. We applied the same method to analyze social support and coping strategies (exposures, continuous variables). As a sensitivity analysis, we evaluated depression and suicidal ideation using continuous variables and performed weighted regression, adjusting for the same covariates as in the prior analysis. This aimed to assess the potential impact of using different forms of measurement on the results.

Responses that did not conform to any of the available options were recorded as missing data. The method of multiple imputation for addressing missing data was executed through the utilization of chained equations via the mice R package (van Buuren and Groothuis-Oudshoorn, 2011). All relevant variables were incorporated in the creation of five imputed datasets. Subsequently, each imputed dataset was analyzed independently, and the results were then combined in accordance with Rubin's rules (Rubin, 1987).

RESULTS

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A total of 1077 young adults completed the survey, representing a survey completion response rate of 15.7% and a weighted household recruitment rate of 22.7%. The weighted sample characteristics are shown in Table 1. The proportion of female participants was 50.2%. A total of 296 participants had depression, while 323 had suicidal ideation. It was observed that those with depression and suicidal ideation were consistently overrepresented among females, individuals identifying as Latinx, and those within the LGBTQ community, as well as those with lower educational attainment, specifically those without a high school diploma. Additionally, among individuals with depression and suicidal ideation, there was a greater likelihood of using substance use and behavioral disengagement as coping strategies.

Table 2-4 presents an overview of the results obtained from a weighted logistic regression analysis, which aimed to investigate the association between self-isolation, social support, and coping strategies with depression and suicidal ideation. The adjusted model revealed a consistent association between self-isolation and depression, with the odds of depression becoming higher as the duration of self-isolation increased. Individuals who chose "some of the time" exhibited odds of depression 2.5 times higher compared to those who chose "none of the time," while those who chose "all of the time" exhibited odds nearly three times higher. However, no significant association was identified between self-isolation and suicidal ideation.

The adjusted models revealed that an overall increase in social support was consistently associated with a decrease in the odds of depression and suicidal ideation. Similar findings were obtained when social support from family and friends was examined individually.

With regard to positive coping strategies, it was found that positive reframing was consistently associated with a reduction in the odds of depression and suicidal ideation in the adjusted models. Active coping was found to be associated with a reduction in the odds of

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suicidal ideation, but not depression. No significant association was observed in religion. Conversely, negative coping strategies such as substance use were associated with an increase in the odds of depression and suicidal ideation. Similar results were obtained when examining self-blame and behavioral disengagement.

We conducted a sensitivity analysis to study how the results might change using continuous variables to assess depression and suicidal ideation. In short, the results did not substantially change in all outcomes. Details are shown in Table 1-3 in Supplementary Material.

DISCUSSION

As hypothesized, social support and several coping strategies of young adults were associated with suicidal ideation during the COVID-19 pandemic. This study is the first to show how coping strategies relate to suicidal ideation during the COVID-19 pandemic. Social support from family and friends had favorable results in reducing suicidal ideation. Active coping and positive reframing were protective against suicidal ideation, whereas substance use, self-blame, and behavioral disengagement had the opposite impact. While individuals who consistently self-isolated exhibited nearly threefold higher odds of depression compared to those without self-isolation, no significant association was observed between suicidal ideation and self-isolation. This null finding does not provide evidence of absence, considering that it slightly enhanced the odds of suicidal ideation, albeit non-significant. Still, the effect of self-isolation on suicidal ideation might not be substantial. There are several potential explanations for the inconsistency of these findings with a previous study linking social isolation to suicidal ideation before the COVID-19 pandemic (Calati et al., 2019). Participants might have considered self-isolation to be temporary during the COVID-19 pandemic. Depressed young adults may have readily addressed mental health services before experiencing suicidal

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ideation. Self-isolation might not have reflected young adults' experiences of social isolation, defined as the absence of a place in a community (Andersson, 1998). For instance, young adults may have been socially connected to other individuals through virtual platforms and experienced less social isolation, which should be examined in future studies. While the favorable results of social support on suicidal ideation align with a prior report (Gabarrell-Pascuet et al., 2021), we offer novel insights into the association between coping strategies and suicidal ideation within the context of COVID-19.

The employment of religious coping did not demonstrate any favorable or adverse correlation with suicidal thoughts, consistent with a previous systematic review (Lawrence et al., 2016). Conversely, the systematic review revealed a safeguarding impact of religion on suicide attempts. Moreover, a meta-analysis showed a protective effect of religion on suicide mortality (Wu et al., 2015). In view of the evidence demonstrating the association of religion with other mental health outcomes (Braam and Koenig, 2019; Oh et al., 2022), our findings could have differed had we utilized different research settings.

We used a nationally representative sample of U.S. young adults and found that the prevalence of suicidal ideation was 29.0%. A previous study using a non-probability-based general population sample from New York City and Baltimore suggested the prevalence of suicidal ideation as 11.2% (Narita et al., 2020b). COVID-19 has been harming mental health in the general population (Xiong et al., 2020), which may partly explain the higher prevalence in the present study. It is also possible that the prior study, which employed a yes/no response format, resulted in underreporting of suicidal ideation. Conversely, our study utilized the C-SSRS for evaluating suicidal ideation, potentially leading to a more accurate assessment.

The interpersonal theory of suicide suggests that the risk for suicidal outcomes consists of several social factors, including thwarted belongingness, perceived burdensomeness, and hopelessness (Van Orden et al., 2010). Epidemics or pandemics may

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increase the likelihood of individuals being impacted by these social factors. In fact, historical evidence suggests that suicide rates have risen during prior epidemics (Cheung et al., 2008; Wasserman, 1992). Further, in the 1918 Flu pandemic, suicide rates were predicted by the degree of social distancing (Stack and Rockett, 2021) relating to thwarted belongingness. Regarding our measurements, self-isolation may be associated with thwarted belongingness, while social support and coping strategies may be linked to perceived burdensomeness. Our findings, at least to some extent, align with the interpersonal theory of suicide in this context.

The present study has several limitations. First, we used a cross-sectional dataset; hence, the findings did not allow causal interpretation. For instance, depression or suicidal ideation might have affected one's coping behaviors or motivation to seek out social contact. Alternatively, the lack of coping strategies or social contact may indicate a less stressful situation; thus, reverse causation may be conceivable. Second, while we studied self-isolation, we did not evaluate subjective loneliness, which has detrimental effects on mental health (Bessaha et al., in press; Narita et al., 2021, 2020a). Adding analysis of this exposure might contextualize the effect of self-isolation. Third, while we analyzed each coping strategy individually, the combination of multiple strategies was not analyzed. For instance, it would be valuable to evaluate whether the effect of employing multiple positive coping strategies is additive. Fourth, The policies related to self-isolation in the U.S. in 2021 were diverse temporally and spatially, and these factors could not be accounted for. For example, self-isolation mandated by policy may have different impacts than self-isolation performed out of one's anxiety. Fifth, our assessment of depression using the PHQ-2 may have been limited as it only involves a narrow range of depression symptoms, which may differ from other more comprehensive scales. Additionally, the use of the PHQ-2 did not provide a measure of depression severity. Finally, it must be acknowledged that the current study is not without biases. The data utilized in this study is based on self-reported information, which may have

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been influenced by recall and social desirability biases, such as a reluctance to disclose a history of depression and suicidal ideation. However, it should be noted that the prevalence of these outcomes in this study is relatively high and thus less susceptible to under-reporting. Efforts were made to minimize selection bias through the development of weights and the implementation of multiple imputation for missing data. It should be acknowledged that confounding bias may have been present due to the lack of adjustment for potential confounders, such as adverse childhood experiences (Karcher et al., 2020; Stickley et al., 2020; Stickley et al., 2021), neighborhood environments (Fedina et al., 2021; Marsh et al., 2021; Narita et al., 2019), or physical injuries (Jenness et al., 2017; Stickley et al., 2020; Stickley et al., 2019), known to be associated with mental health.

CONCLUSIONS

Providing social support may help prevent suicidal ideation among young adults during the pandemic. For instance, outreach campaigns might help young adults who do not know where to go for services (Lu et al., 2022). Interventions that focus on developing young adults' coping strategies, such as through positive reframing, are recommended to develop positive and healthy relationships. Substance use, self-blame, and behavioral disengagement should be avoided.

RELEVANCE FOR CLINICAL PRACTICE

Our results contribute to the body of knowledge on the prevention of depression and suicidal ideation in young adults during the pandemic. Offering social support and implementing interventions that concentrate on developing coping strategies, such as positive reframing, may be beneficial. Healthcare providers should advise against substance use, self-blame, and behavioral disengagement.

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References

Andersson, L., 1998. Loneliness research and interventions: A review of the literature. Aging Ment. Health 2, 264–274. https://doi.org/10.1080/13607869856506

Bessaha, M.L., Mushonga, D., Fedina, L., DeVylder, J., n.d. Association between loneliness, mental health symptoms, and treatment use among emerging adults. Soc. Work Res.

Braam, A.W., Koenig, H.G., 2019. Religion, spirituality and depression in prospective studies: A systematic review. J. Affect. Disord. 257, 428–438. https://doi.org/10.1016/j.jad.2019.06.063

Calati, R., Ferrari, C., Brittner, M., Oasi, O., Olié, E., Carvalho, A.F., Courtet, P., 2019. Suicidal thoughts and behaviors and social isolation: A narrative review of the literature. J. Affect. Disord. 245, 653–667. https://doi.org/10.1016/j.jad.2018.11.022

Carver, C.S., 1997. You want to measure coping but your protocol's too long: consider the brief COPE. Int. J. Behav. Med. 4, 92–100. https://doi.org/10.1207/s15327558ijbm0401_6

CDC, 2022. CDC Museum COVID-19 Timeline [WWW Document]. Centers for Disease Control and Prevention. URL https://www.cdc.gov/museum/timeline/covid19.html (accessed 1.30.23).

Cheung, Y.T., Chau, P.H., Yip, P.S.F., 2008. A revisit on older adults suicides and Severe Acute Respiratory Syndrome (SARS) epidemic in Hong Kong. Int. J. Geriatr. Psychiatry 23, 1231–1238. https://doi.org/10.1002/gps.2056

Cohen, J., 1977. Statistical power analysis for the behavioral sciences, Rev. ed 474.

Curtin, S.C., Heron, M.P., 2020. Death rates due to suicide and homicide among persons aged 10–24: United States, 2000–2017 [WWW Document]. URL https://www.cdc.gov/nchs/products/databriefs/db352.htm (accessed 6.17.22).

DeVylder, J., Anglin, D., Munson, M.R., Nishida, A., Oh, H., Marsh, J., Narita, Z., Bareis, N., Fedina, L., 2022. Ethnoracial Variation in Risk for Psychotic Experiences. Schizophr. Bull. https://doi.org/10.1093/schbul/sbac171

Elbogen, E.B., Lanier, M., Blakey, S.M., Wagner, H.R., Tsai, J., 2021. Suicidal ideation and thoughts of self-harm during the COVID-19 pandemic: The role of COVID-19-related stress, social isolation, and financial strain. Depress. Anxiety. https://doi.org/10.1002/da.23162

Emery, R.L., Johnson, S.T., Simone, M., Loth, K.A., Berge, J.M., Neumark-Sztainer, D., 2021. Understanding the impact of the COVID-19 pandemic on stress, mood, and substance use among young adults in the greater Minneapolis-St. Paul area: Findings from project EAT. Soc. Sci. Med. 276, 113826. https://doi.org/10.1016/j.socscimed.2021.113826

Farooq, S., Tunmore, J., Wajid Ali, M., Ayub, M., 2021. Suicide, self-harm and suicidal ideation during COVID-19: A systematic review. Psychiatry Res. 306, 114228. https://doi.org/10.1016/j.psychres.2021.114228

Faul, F., Erdfelder, E., Buchner, A., Lang, A.-G., 2009. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav. Res. Methods 41, 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fedina, L., Mushonga, D.R., Bessaha, M.L., Jun, H.-J., Narita, Z., DeVylder, J., 2021. Moderating Effects of Perceived Neighborhood Factors on Intimate Partner Violence, Psychological Distress, and Suicide Risk. J. Interpers. Violence 36, 10546–10563. https://doi.org/10.1177/0886260519884687

Gabarrell-Pascuet, A., Félez-Nóbrega, M., Cristóbal-Narváez, P., Mortier, P., Vilagut, G., Olaya, B., Alonso, J., Haro, J.M., Domènech-Abella, J., 2021. The role of social support, detachment, and depressive and anxiety symptoms in suicidal thoughts and

Author Manuscript

behaviours during the Covid-19 lockdown: Potential pathways. Curr. Psychol. 1–12. https://doi.org/10.1007/s12144-021-02205-5

Jenness, J.L., Witt, C.E., Quistberg, D.A., Johnston, B.D., Rowhani-Rahbar, A., Mackelprang, J.L., McLaughlin, K.A., Vavilala, M.S., Rivara, F.P., 2017. Association of physical injury and mental health: Results from the national comorbidity survey- adolescent supplement. J. Psychiatr. Res. 92, 101–107. https://doi.org/10.1016/j.jpsychires.2017.03.022

Karcher, N.R., Niendam, T.A., Barch, D.M., 2020. Adverse childhood experiences and psychotic-like experiences are associated above and beyond shared correlates: Findings from the adolescent brain cognitive development study. Schizophr. Res. 222, 235–242. https://doi.org/10.1016/j.schres.2020.05.045

Kroenke, K., Spitzer, R.L., Williams, J.B., 2001. The PHQ-9: validity of a brief depression severity measure. J. Gen. Intern. Med. 16, 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Spitzer, R.L., Williams, J.B.W., 2003. The Patient Health Questionnaire-2: validity of a two-item depression screener. Med. Care 41, 1284–1292. https://doi.org/10.1097/01.MLR.0000093487.78664.3C

Lawrence, R.E., Oquendo, M.A., Stanley, B., 2016. Religion and Suicide Risk: A Systematic Review. Arch. Suicide Res. 20, 1–21. https://doi.org/10.1080/13811118.2015.1004494

Lu, W., Bessaha, M., Muñoz-Laboy, M., 2022. Examination of Young US Adults' Reasons for Not Seeking Mental Health Care for Depression, 2011-2019. JAMA Network Open 5, e2211393. https://doi.org/10.1001/jamanetworkopen.2022.11393

Marsh, J.J., Narita, Z., Zhai, F., Fedina, L., Schiffman, J., DeVylder, J., 2021. Violence exposure, psychotic experiences, and social disconnection in an urban community sample. Psychosis: Psychological, Social and Integrative Approaches No Pagination Specified-No Pagination Specified. https://doi.org/10.1080/17522439.2021.1907774

Narita, Z., Banawa, R., Zhou, S., DeVylder, J., Koyanagi, A., Oh, H., 2021. Loneliness and psychotic experiences among US university students: Findings from the Healthy Minds Study 2020. Psychiatry Res. 308, 114362. https://doi.org/10.1016/j.psychres.2021.114362

Narita, Z., Knowles, K., Fedina, L., Oh, H., Stickley, A., Kelleher, I., DeVylder, J., 2019. Neighborhood change and psychotic experiences in a general population sample. Schizophr. Res. https://doi.org/10.1016/j.schres.2019.11.036

Narita, Z., Okubo, R., Sasaki, Y., Takeda, K., Ohmagari, N., Yamaguchi, K., Morisaki, N., Sampei, M., Ishitsuka, K., Kojima, M., Nishimura, K., Inoue, M., Yamamoto, S., Konishi, M., Miyo, K., Mizoue, T., 2023. Association of COVID-19-related discrimination with subsequent depression and suicidal ideation in healthcare workers. J. Psychiatr. Res. 159, 153–158. https://doi.org/10.1016/j.jpsychires.2023.01.025

Narita, Z., Okubo, R., Sasaki, Y., Takeda, K., Takao, M., Komaki, H., Oi, H., Mizoue, T., Miyama, T., Kim, Y., 2022. COVID-19-related discrimination, PTSD symptoms, and psychological distress in healthcare workers. Int. J. Ment. Health Nurs. https://doi.org/10.1111/inm.13069

Narita, Z., Stickley, A., DeVylder, J., 2020a. Loneliness and psychotic experiences in a general population sample. Schizophr. Res. 218, 146–150. https://doi.org/10.1016/j.schres.2020.01.018

Narita, Z., Wilcox, H.C., DeVylder, J., 2020b. Psychotic experiences and suicidal outcomes in a general population sample. Schizophr. Res. 215, 223–228. https://doi.org/10.1016/j.schres.2019.10.024

NORC at the University of Chicago, 2022. AmeriSpeak [WWW Document]. URL https://amerispeak.norc.org/ (accessed 2.22.23).

Author Manuscript

Oh, H.Y., Davis, E.B., Klaunig, M., Narita, Z., Koyanagi, A., Karcher, N.R., 2022. Religiousness and psychotic experiences among young adult college students in the United States. Int. J. Soc. Psychiatry 207640221135849. https://doi.org/10.1177/00207640221135849

Panchal, N., Kamal, R., Feb 10, R.G.P., 2021, 2021. The Implications of COVID-19 for Mental Health and Substance Use. KFF. URL https://www.kff.org/coronavirus-covid-19/issue-brief/the-implications-of-covid-19-for-mental-health-and-substance-use/ (accessed 7.5.22).

Posner, K., Brown, G.K., Stanley, B., Brent, D.A., Yershova, K.V., Oquendo, M.A., Currier, G.W., Melvin, G.A., Greenhill, L., Shen, S., Mann, J.J., 2011. The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. Am. J. Psychiatry 168, 1266–1277. https://doi.org/10.1176/appi.ajp.2011.10111704

Robinson, E., Sutin, A.R., Daly, M., Jones, A., 2022. A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. J. Affect. Disord. 296, 567–576. https://doi.org/10.1016/j.jad.2021.09.098

Rubin, D.B., 1987. Multiple imputation for nonresponse in surveys. Wiley, New York.

Samji, H., Wu, J., Ladak, A., Vossen, C., Stewart, E., Dove, N., Long, D., Snell, G., 2022. Review: Mental health impacts of the COVID-19 pandemic on children and youth - a systematic review. Child Adolesc. Ment. Health 27, 173–189. https://doi.org/10.1111/camh.12501

Stack, S., Rockett, I.R.H., 2021. Social distancing predicts suicide rates: Analysis of the 1918 flu pandemic in 43 large cities, research note. Suicide Life Threat. Behav. 51, 833–835. https://doi.org/10.1111/sltb.12729

Stickley, A., Sumiyoshi, T., Narita, Z., Oh, H., DeVylder, J.E., Jacob, L., Koyanagi, A., 2020. Physical injury and psychotic experiences in 48 low- and middle-income countries. Psychol. Med. 50, 2751–2758. https://doi.org/10.1017/S0033291719002897

Stickley, A., Waldman, K., Koyanagi, A., DeVylder, J.E., Narita, Z., Sumiyoshi, T., Jacob, L., Oh, H., 2019. Psychotic experiences and accidents, injuries, and poisonings among adults in the United States. Psychiatry Res. 282, 112610. https://doi.org/10.1016/j.psychres.2019.112610

Stickley, A., Waldman, K., Sumiyoshi, T., Narita, Z., Shirama, A., Shin, J.I., Oh, H., 2021. Childhood physical neglect and psychotic experiences: Findings from the National Comorbidity Survey Replication. Early Interv. Psychiatry 15, 256–262. https://doi.org/10.1111/eip.12932

Stickley, Andrew, Waldman, K., Ueda, M., Koyanagi, A., Sumiyoshi, T., Narita, Z., Inoue, Y., DeVylder, J.E., Oh, H., 2020. Childhood neglect and suicidal behavior: Findings from the National Comorbidity Survey Replication. Child Abuse Negl. 103, 104400. https://doi.org/10.1016/j.chiabu.2020.104400

Taquet, M., Geddes, J.R., Husain, M., Luciano, S., Harrison, P.J., 2021. 6-month neurological and psychiatric outcomes in 236 379 survivors of COVID-19: a retrospective cohort study using electronic health records. Lancet Psychiatry 8, 416–427. https://doi.org/10.1016/S2215-0366(21)00084-5

van Buuren, S., Groothuis-Oudshoorn, K., 2011. mice: Multivariate Imputation by Chained Equations in R. J. Stat. Softw. 45, 1–67. https://doi.org/10.18637/jss.v045.i03

Van Orden, K.A., Witte, T.K., Cukrowicz, K.C., Braithwaite, S.R., Selby, E.A., Joiner, T.E., 2010. The interpersonal theory of suicide. Psychol. Rev. 117, 575–600. https://doi.org/10.1037/a0018697

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Wasserman, I.M., 1992. The impact of epidemic, war, prohibition and media on suicide: United States, 1910-1920. Suicide Life Threat. Behav. 22, 240–254.

Wu, A., Wang, J.-Y., Jia, C.-X., 2015. Religion and Completed Suicide: a Meta-Analysis. PLoS One 10, e0131715. https://doi.org/10.1371/journal.pone.0131715

Xiong, J., Lipsitz, O., Nasri, F., Lui, L.M.W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., McIntyre, R.S., 2020. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. J. Affect. Disord. 277, 55–64. https://doi.org/10.1016/j.jad.2020.08.001

Zimet, G.D., Powell, S.S., Farley, G.K., Werkman, S., Berkoff, K.A., 1990. Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. J. Pers. Assess. 55, 610–617. https://doi.org/10.1080/00223891.1990.9674095

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TABLE 1 Weighted sample characteristics

Variables	Total (n = 1077)	Depression[a]		Suicidal ideation[b]	
		Yes (n = 296)	No (n = 768)	Yes (n = 323)	No (n = 748)
Age					
18-20	74 (6.9)	15 (5.1)	58 (7.6)	13 (4.0)	60 (8.0)
21-23	368 (34.2)	105 (35.4)	258 (33.6)	117 (36.2)	250 (33.4)
24-26	333 (31.0)	90 (30.4)	240 (31.3)	111 (34.4)	221 (29.5)
27-29	302 (28.0)	86 (29.1)	212 (27.6)	82 (25.4)	218 (29.1)
Gender[c]					
Male	510 (47.3)	128 (43.2)	377 (49.1)	141 (43.7)	368 (49.2)
Female	541 (50.2)	158 (53.3)	376 (49.0)	167 (51.7)	371 (49.6)
Race					
White	573 (53.2)	153 (51.7)	420 (54.7)	181 (56.0)	391 (52.3)
Black	150 (13.9)	38 (12.8)	106 (13.8)	31 (9.6)	118 (15.8)
Latinx	244 (22.7)	75 (25.3)	165 (21.8)	81 (25.1)	162 (21.7)
Asian	40 (3.7)	16 (5.4)	24 (3.1)	15 (4.6)	24 (3.2)
Multiracial/other	70 (6.5)	14 (4.7)	54 (7.0)	15 (4.6)	53 (7.1)
Education					
No high school diploma	116 (10.8)	52 (17.6)	62 (8.1)	41 (12.7)	74 (9.9)
High school diploma/GED	310 (28.8)	98 (33.1)	207 (27.0)	97 (30.0)	211 (28.2)
Some college	381 (35.4)	96 (32.4)	281 (36.6)	118 (36.5)	261 (34.9)
BA or above	270 (25.1)	50 (16.9)	219 (28.5)	67 (20.7)	202 (27.0)
Sexual orientation					
Heterosexual	873 (81.1)	223 (75.3)	641 (83.5)	219 (67.8)	651 (87.0)
LGBTQ+	203 (18.8)	73 (24.7)	127 (16.5)	104 (32.2)	97 (123.0)
Self-isolation[d]					
None of the time	116 (10.8)	13 (4.4)	103 (13.4)	27 (8.4)	89 (11.9)
Some of the time	404 (37.5)	105 (35.5)	296 (38.5)	125 (38.7)	280 (37.4)
Most of the time	394 (36.6)	121 (40.1)	267 (35.9)	121 (37.5)	272 (36.4)
All of the time	148 (13.7)	51 (17.2)	95 (12.4)	46 (14.2)	100 (13.4)
MSPSS (social support)					
Total	23.7 (5.1)	21.9 (5.0)	24.4 (5.0)	22.2 (4.6)	24.3 (5.2)
Family	11.8 (2.9)	10.9 (3.0)	12.2 (2.8)	10.7 (2.8)	12.3 (2.9)
Friends	11.8 (3.0)	11.1 (3.2)	12.1 (2.9)	11.5 (2.8)	12.0 (3.1)
Brief COPE (coping strategies)					
Active coping	3.9 (1.5)	3.7 (1.5)	4.0 (1.5)	3.6 (1.4)	4.1 (1.5)
Positive reframing	3.5 (1.7)	3.1 (1.7)	3.6 (1.6)	3.2 (1.6)	3.6 (1.7)
Religion	2.3 (2.1)	2.3 (2.2)	2.4 (2.1)	2.1 (2.0)	2.4 (2.1)
Substance use	1.1 (1.6)	1.8 (2.0)	0.8 (1.3)	2.0 (1.9)	0.7 (1.3)
Self-blame	3.0 (1.7)	3.7 (1.7)	2.7 (1.7)	3.9 (1.6)	2.6 (1.7)
Behavioral disengagement	1.5 (1.4)	2.2 (1.6)	1.3 (1.3)	2.2 (1.5)	1.2 (1.3)

GED: general educational development; MSPSS: Multidimensional Scale of Perceived Social Support; COPE: Coping Orientation to Problems Experienced

[a] Missing data for 13 participants

[b] Missing data for 6 participants

[c] Missing data for 26 participants

[d] Missing data for 15 participants

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TABLE 2 Summary of weighted logistic regression evaluating how self-isolation was associated with depression and suicidal ideation.

	Depression		Suicidal ideation	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
None of the time	[Reference]	[Reference]	[Reference]	[Reference]
Some of the time	2.39** (1.33–4.30)	2.55** (1.40–4.62)	1.33 (0.88–2.03)	1.25 (0.81–1.92)
Most of the time	2.87*** (1.60–5.14)	2.86*** (1.58–5.16)	1.34 (0.88–2.04)	1.19 (0.77–1.83)
All of the time	3.19*** (1.73–5.90)	2.95** (1.59–5.48)	1.37 (0.86–2.21)	1.20 (0.74–1.95)

$* p < 0.05$.
$** p < 0.01$
$*** p < 0.001$

CI: confidence interval
Both unadjusted and adjusted associations were evaluated through the utilization of weights. Adjusted models included age, gender, race, educational level, and sexual orientation. Multiple imputation was conducted to impute missing data on the covariates and the outcomes.

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TABLE 3 Summary of weighted logistic regression evaluating how social support was associated with depression and suicidal ideation.

	Depression		Suicidal ideation	
	Unadjusted OR per unit change (95% CI)	Adjusted OR per unit change (95% CI)	Unadjusted OR per unit change (95% CI)	Adjusted OR per unit change (95% CI)
MSPSS				
Total	0.94*** (0.92–0.96)	0.95*** (0.93–0.97)	0.95*** (0.93–0.97)	0.95*** (0.93–0.97)
Family	0.91*** (0.88–0.94)	0.92*** (0.89–0.96)	0.89*** (0.86–0.93)	0.90*** (0.86–0.93)
Friends	0.93*** (0.89–0.96)	0.93*** (0.90–0.97)	0.97 (0.94–1.00)	0.96* (0.92–0.99)

$* p < 0.05$.
$** p < 0.01$
$*** p < 0.001$

CI: confidence interval; MSPSS: Multidimensional Scale of Perceived Social Support
Both unadjusted and adjusted associations were evaluated through the utilization of weights. Adjusted models included age, gender, race, educational level, and sexual orientation. Multiple imputation was conducted to impute missing data on the covariates and the outcomes.

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TABLE 4 Summary of weighted logistic regression evaluating how coping strategies were associated with depression, suicidal and ideation.

	Depression		Suicidal ideation	
	Unadjusted OR per unit change (95% CI)	Adjusted OR per unit change (95% CI)	Unadjusted OR per unit change (95% CI)	Adjusted OR per unit change (95% CI)
Brief COPE				
Active Coping	0.92* (0.85–0.99)	0.95 (0.88–1.03)	0.85*** (0.77–0.93)	0.88*** (0.82–0.95)
Positive Reframing	0.87*** (0.82–0.93)	0.87*** (0.82–0.93)	0.88*** (0.82–0.94)	0.89*** (0.83–0.95)
Religion	0.99 (0.94–1.05)	0.99 (0.93–1.04)	0.95 (0.90–1.00)	0.97 (0.92–1.03)
Substance Use	1.23*** (1.16–1.30)	1.21*** (1.14–1.28)	1.29*** (1.22–1.36)	1.26*** (1.19–1.33)
Self-blame	1.29*** (1.20–1.38)	1.27*** (1.18–1.36)	1.35*** (1.26–1.44)	1.31*** (1.23–1.40)
Behavioral Disengagement	1.31*** (1.23–1.40)	1.30*** (1.21–1.39)	1.32*** (1.24–1.41)	1.32*** (1.23–1.41)

$* p < 0.05$.
$** p < 0.01$
$*** p < 0.001$

CI: confidence interval; COPE: Coping Orientation to Problems Experienced
Both unadjusted and adjusted associations were evaluated through the utilization of weights. Adjusted models included age, gender, race, educational level, and sexual orientation. Multiple imputation was conducted to impute missing data on the covariates and the outcomes.

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