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# Factors Associated With Remission of Suicidal Ideation During the COVID-19 Pandemic: A Population-Based, Longitudinal Study in US Military Veterans

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The COVID-19 pandemic, first declared a global public health emergency by the World Health Organization (WHO) on January 30, 2020,<sup>1</sup> has resulted in profound social and economic hardship and over 5 million deaths worldwide as of October 2021.<sup>2</sup> Scholars have forecast a secondary crisis of mental illness and suicidality extending far beyond those sickened by the virus<sup>3-6</sup> as individuals struggle to cope with financial losses, fear of infection, uncertainty about the future, and unprecedented disruptions to their daily lives. However, it is difficult to accurately anticipate the mental health repercussions of COVID-19 without accounting for protective or mitigating factors that may confer resilience to adversity or promote remission of suicidal ideation (SI). Indeed, nearly 2 years since the WHO's declaration, early data suggest that the COVID-19 pandemic has wrought heterogeneous mental health impacts<sup>7,8</sup> and that the projected increase in suicidality has borne out in some populations more than in others.<sup>9-11</sup>

In their review of mental health sequelae following ecological disasters, Morganstein and Ursano<sup>12</sup> suggested that suicidal thoughts and behaviors tend to diminish in the early

aftermath, likely reflecting the buoying effect of community support and human capacity for posttraumatic growth,<sup>13</sup> before gradually increasing in later months and years as these protective factors erode. Consistent with this conceptualization, a review of global population-level studies found evidence of considerable resilience to the psychological effects of lockdown during COVID-19 and no evidence of increased suicide rates.<sup>10</sup> However, conflicting evidence suggests that rates of suicidal ideation and behavior have indeed increased during the pandemic, but perhaps unevenly across time and subpopulations.<sup>8</sup> For example, a study conducted in Japan<sup>7</sup> found a decline in suicide rates in the first 5 months of the pandemic, followed by an above-average increase in suicide in the subsequent 5 months, particularly among women, adolescents, and children. This is consistent with meta-analytic reviews of prior infectious disease outbreaks<sup>14</sup> that indicate that certain populations (eg, older adults, disenfranchised or low-income individuals, those with preexisting psychiatric conditions) may be more vulnerable to increases in suicidality during this time than others.

One population vulnerable to increased suicide rates is US military veterans, whose rates of mental illness and suicide far exceed those of the general population. Despite their vulnerability, however, a recent longitudinal study of 3,078 US veterans assessed both prior to and during the pandemic found that SI decreased from pre- to peri-pandemic.<sup>15</sup> Further, a substantial proportion of veterans in this cohort demonstrated resilience to COVID-19-related increases in psychological distress, and this was predicted by adaptive psychosocial factors such as pre-pandemic social connectedness and secure attachment style.<sup>16</sup> Despite accumulating evidence of psychological resilience and decreases in SI during the pandemic, no known study has longitudinally examined factors associated with remission of SI. In the current study, we compared veterans with and without remission of SI during the pandemic (defined as endorsement of SI before but not during the pandemic) on pre- and peri-pandemic clinical and psychosocial characteristics to identify factors related to remission of SI.

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*J Clin Psychiatry* 2022;83(4):21br14341

**To cite:** Herzog S, Nichter B, Hill ML, et al. Factors associated with remission of suicidal ideation during the COVID-19 pandemic: a population-based, longitudinal study in US military veterans. *J Clin Psychiatry*. 2022;83(4):21br14341.

**To share:** <https://doi.org/10.4088/JCP.21br14341>

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## METHODS

### Sample

The National Health and Resilience in Veterans Study (NHRVS) is a nationally representative survey of US veterans.

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A total of 4,069 veterans completed a Wave 1 pre-pandemic (median completion date: November 21, 2019) survey prior to the first documented COVID-19 case in the US, and 3,078 completed a Wave 2 peri-pandemic follow-up assessment 1 year later (median completion date: November 14, 2020). A total of 7,860 veterans were invited to participate in the study, and 4,069 completed Wave 1 (51.8% participation rate); of these 4,069 veterans, 3,929 (96.6%) remained in the survey panel when the follow-up survey was launched and 3,078 completed the follow-up survey (78.3% participation rate and 75.6% of the baseline cohort). All participants provided informed consent, and the study was approved by the Human Subjects Subcommittee of the VA Connecticut Healthcare System.

The NHRVS sample was drawn from KnowledgePanel, a research panel of more than 50,000 households that is maintained by Ipsos, a survey research firm. KnowledgePanel is a probability-based, online non-volunteer access survey panel of a nationally representative sample of US adults that covers approximately 98% of US households. Panel members are recruited through national random samples, originally by telephone and now almost entirely by postal mail. Households are provided with access to the Internet and computer hardware if needed. KnowledgePanel recruitment uses dual sampling frames that include both listed and unlisted telephone numbers, telephone and non-telephone households, and cell-phone-only households, as well as households with and without Internet access.

To permit generalizability of study results to the entire population of US veterans, the Ipsos statistical team computed post-stratification weights using the following benchmark distributions of US military veterans from the most recent (August 2019) Current Veteran Population Supplemental Survey of the US Census Bureau's American Community Survey<sup>17</sup>: age, gender, race/ethnicity, Census region, metropolitan status, education, household income, branch of service, and years in service. An iterative proportional fitting (raking) procedure was used to produce the final post-stratification weights.

Veterans who endorsed past-year SI at the pre-pandemic assessment but denied SI at the peri-pandemic follow-up were characterized as remitted, while veterans who denied pre-pandemic SI but reported SI at follow-up were characterized as having new-onset SI. Veterans who endorsed SI at both assessments were characterized as having persistent SI.

### Assessments

Details regarding assessment instruments are provided in Table 1 (assessment references included in Supplementary Material).

### Data Analysis

Baseline characteristics of SI courses were compared with bivariate tests (Table 2), and variables associated with SI groups at the  $P < .05$  level were entered into a multinomial logistic regression with backward elimination estimation to identify pre- and peri-pandemic factors associated with (1)

remitted SI vs new-onset SI and (2) remitted SI vs persistent SI. Relative importance analyses were conducted to compare the relative variance explained (RVE) in remitted SI by each significant variable.

## RESULTS

The prevalence of remitted SI, new-onset SI, and persistent SI was 5.2%, 2.3%, and 5.5%, respectively. Of the 2,746 veterans without SI at the pre-pandemic assessment, 82 (2.6%) developed SI during the pandemic. Of the 285 veterans with pre-pandemic SI, 134 (48.6%) denied SI during the pandemic.

### Remitted SI vs New-Onset SI

Relative to veterans with new-onset SI, remitted veterans reported less exacerbation of psychological distress during the pandemic (RVEs = 55.5%), were less likely to report a prior suicide attempt (RVE = 17.2%) and reported greater increases in social support (RVE = 12.7%). They also reported fewer COVID-19 disease-related worries (RVE = 6.0%), more adverse childhood experiences (RVE = 5.8%), greater pre-pandemic social support (RVE = 2.0%), and lower likelihood of knowing someone infected with COVID-19 (RVE = 0.9%).

### Remitted SI vs Persistent SI

Relative to veterans with persistent SI, remitted veterans scored higher on measures of pre-pandemic purpose in life (RVE = 36.0%) and reported greater increases in purpose in life during the pandemic (RVEs = 20.3%). They also reported lower stress resulting from pandemic-related social distancing (RVE = 14.9%) and more pre-pandemic potentially traumatic events (RVE = 12.6%), were less likely to be a combat veteran (RVE = 9.6%), and reported greater pre- to peri-pandemic increases in perceived resilience (RVE = 6.6%). See Table 3 for odds ratios of group comparisons.

## DISCUSSION

This population-based prospective cohort study examined factors associated with remission of SI during the COVID-19 pandemic in US military veterans. SI remission—defined as endorsement of SI prior to but not during pandemic—was nearly 19 times more prevalent than peri-pandemic new-onset SI (48.6% vs 2.6%). This is consistent with prior work in non-veteran samples<sup>10</sup> indicating stable or decreasing SI during the early stages of the pandemic and suggests that, contrary to expectations, SI remission during the pandemic is prevalent even in vulnerable populations such as military veterans.

Several variables distinguished veterans with remitted SI from veterans with persistent or new-onset SI. Pre-pandemic purpose in life accounted for the largest proportion of explained variance in SI remission relative to persistent SI (36.0%, OR = 1.84, 95% CI = 1.41–2.41), while pre- to peri-pandemic increases in purpose in life and perceived resilience accounted for a collective 27% of explained

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**Table 1. Study Measures**

Suicidal behaviors	
Past-year suicidal ideation	Past-year SI was assessed at pre-pandemic and peri-pandemic waves via endorsement of item 2 of the Suicide Behaviors Questionnaire-Revised (SBQ-R): "How often have you thought about killing yourself in the past year?" Response options range from "rarely" (1 time) to "very often" (5+ times)
Past-year suicide plan and attempt	Past-year suicide plan or attempt was assessed at the peri-pandemic assessment via endorsement of item 1 of the SBQ-R: "In the past year, have you ever thought about or attempted to kill yourself?" Response options indicating suicide plan or attempt included: "I have had a plan at least once to kill myself but did not try to do it," "I have had a plan at least once to kill myself and really wanted to die," "I have attempted to kill myself, but did not want to die," and "I have attempted to kill myself, and really hoped to die"
Sociodemographic characteristics	
	The following characteristics were assessed: age (continuous), sex (male/female), race/ethnicity (white/nonwhite), education (college graduate or higher, up to high school diploma), marital status (married or living with partner/not partnered), household income (less than \$60,000/\$60,000 or more), combat veteran status, years of military service
Pre-pandemic risk factors	
Adverse childhood experiences	Adverse Childhood Experiences Questionnaire total score
Number of lifetime potential traumas	Life Events Checklist for <i>DSM-5</i> (LEC-5) total score
Current PTSD and/or MDD	A score of $\geq 33$ on PTSD Checklist for <i>DSM-5</i> , which assesses PTSD symptoms in relation to the "worst" criterion A trauma on the LEC-5, indicated probable present of PTSD. Current MDD was screened for using the Patient Health Questionnaire-2. Veterans who met screening criteria for either disorder were coded positive for current PTSD/MDD
Current generalized anxiety disorder	Current generalized anxiety was screened for using the Patient Health Questionnaire-4
Current AUD and/or DUD	Current AUD/DUD was assessed using the Alcohol Use Disorders Identification Test and Screen of Drug Use. A score $\geq 8$ ( $\alpha=0.85$ ) is indicative of probable current AUD. A response of $\geq 7$ days to the question, "How many days in the past 12 months have you used drugs other than alcohol?" or $\geq 2$ days to the question, "How many days in the past 12 months have you used drugs more than you meant to?" was classified as a positive DUD screen. A positive screen for either disorder was coded positive for current AUD/DUD
Loneliness	UCLA Loneliness Scale total score
Suicide attempt history	Endorsement of either of 2 responses to item 2 of the Suicide Behaviors Questionnaire-Revised: "I have attempted to kill myself, but did not want to die" or "I have attempted to kill myself, and really hoped to die"
Current mental health treatment	Endorsement of current receipt of psychotropic medication and/or psychotherapy or counseling
Cognitive functioning	Medical Outcomes Study Cognitive Functioning Scale
Trait impulsivity	Barratt Impulsiveness Scale-Brief total score
Physical health difficulties	Factor score composed of (1) the sum of medical conditions in response to the question, "Has a doctor or healthcare professional ever told you that you have any of the following medical conditions: arthritis, cancer, etc?" (2) score on Brief Symptom Inventory-Somatization subscale, and (3) endorsement of disability with activities of daily living and instrumental activities of daily living
Social network size	Response to the following question: "About how many close friends and relatives do you have (people you feel at ease with and can talk to about what is on your mind)?"
Perceived social support	Medical Outcome Study Social Support Scale-5
Religion/spirituality	Factor score containing scores from the Duke University Religion Index
Adaptive psychosocial traits	A composite score of adaptive psychosocial traits was used to assess dispositional attitudes and capacities for coping that are associated with more positive mental health outcomes, including qualities such as resilience; a sense of life purpose; dispositional gratitude, optimism, and curiosity/exploration; and perceived community integration. Resilience was measured using the Connor-Davidson Resilience Scale, a 10-item scale with items such as "I am able to adapt when changes occur," measured on a scale from 1 ("not at all") to 5 ("nearly true all the time"); the Purpose in Life Test, Short Form, a 4-item scale, was used to index sense of meaning and purposefulness in life, assessed on a scale from 1 ("no goals/purpose/progress/meaning") to 7 ("very clear goals/purpose/progress/meaning"). Dispositional gratitude, optimism, and curiosity were each assessed using single 7-point Likert scale items adapted from the Gratitude Questionnaire, the Life Orientation Test-Revised, and the Curiosity and Exploration Inventory-II, respectively. Sense of community integration and acceptance was assessed with a single item, "I feel well integrated in my community"
Pandemic-related factors	
COVID-19 infection stressors	Endorsement of personal prior COVID-19 infection or someone in the household or outside the household who contracted COVID-19 or knowing someone who died of COVID-19, on a COVID-19 exposure measure developed by the National Center for PTSD
COVID-19 pandemic stressors	Coronavirus Health Impact Survey (CRISIS), which assessed for COVID-19-related disease worries, social restriction stress, financial stress, and relationship difficulties during the pandemic. The CRISIS has been psychometrically validated to have high reliability and construct validity
Potentially traumatic events during pandemic	Count of potentially traumatic events in the past year assessed using the Life Events Checklist for <i>DSM-5</i>
COVID-19 related PTSD symptoms	Score on a 4-item measure of COVID-19 pandemic-related PTSD symptoms
Change in psychosocial risk factors from pre- to peri-pandemic	Pre- to peri-pandemic changes in severity of MDD/GAD/PTSD symptoms, loneliness, adaptive psychosocial traits, and perceived social support
Abbreviations: ADL = activities of daily living, AUD = alcohol use disorder, AUDIT = Alcohol Use Disorders Identification Test, COVID-19 = coronavirus disease 2019, DUD = drug use disorder, GAD = generalized anxiety disorder, MDD = major depressive disorder, PTSD = posttraumatic stress disorder.	

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**Table 2. Sociodemographic, Military, Trauma, and Clinical Characteristics by Suicidal Ideation Course During the COVID-19 Pandemic**

	Weighted mean (SD) or n (weighted %)				<i>F</i> / $\chi^2$	<i>P</i>	Pairwise contrasts
	1 No SI, n=2,664 (87.0%)	2 Remitted SI, n=134 (5.2%)	3 New-onset SI, n=82 (2.3%)	4 Persistent SI, n=151 (5.5%)			
Suicidal behaviors during pandemic					1,499.16	<.001	
No suicide plan or attempt	2,657 (99.8%)	131 (95.4%)	55 (66.7%)	58 (36.7%)			1 > 2 > 3 > 4
Suicide plan during pandemic	4 (0.1%)	3 (4.6%)	25 (30.4%)	90 (60.1%)			4 > 3 > 2 > 1
Suicide attempt during pandemic	3 (0.1%)	0 (0%)	2 (2.9%)	3 (3.2%)			3,4 > 1,2
Sociodemographic and military factors							
Age, y	64.5 (14.3)	54.2 (13.3)	57.2 (14.8)	53.1 (13.9)	59.20	<.001	1 > 2,3,4
Male sex	2,397 (92.3%)	110 (89.5%)	70 (91.4%)	119 (83.9%)	15.16	<.001	1 > 4
White, non-Hispanic race/ethnicity	2,207 (79.1%)	114 (83.0%)	67 (82.9%)	122 (79.0%)	1.87	0.60	–
College graduate or higher	1,213 (33.7%)	62 (35.9%)	42 (39.1%)	69 (37.3%)	1.86	0.60	–
Married/partnered	1,942 (74.5%)	86 (67.3%)	59 (70.0%)	106 (74.7%)	4.54	0.21	–
Annual household income \$60,000+	1,612 (60.8%)	84 (64.1%)	45 (49.3%)	82 (58.0%)	4.96	0.17	–
10+ years of military service	961 (36.2%)	58 (49.7%)	35 (43.5%)	61 (42.9%)	14.45	0.002	2 > 1
Pre-pandemic risk factors							
Adverse childhood experiences	1.2 (1.8)	2.6 (2.5)	1.7 (1.9)	2.9 (2.5)	66.20	<.001	4,2 > 1,3
Combat exposure	894 (34.5%)	45 (37.3%)	31 (38.6%)	66 (46.6%)	10.34	0.016	4 > 1
Lifetime potentially traumatic events	8.4 (7.9)	13.6 (10.8)	10.3 (8.1)	11.7 (8.6)	28.31	<.001	2,4 > 1
Health-related factors							
Current MDD, GAD, or PTSD	178 (7.7%)	44 (38.2%)	22 (31.9%)	70 (43.5%)	322.67	<.001	2,3,4 > 1
Current AUD or DUD	330 (14.2%)	35 (29.5%)	23 (33.3%)	43 (34.2%)	77.94	<.001	2,3,4 > 1
Loneliness	4.3 (1.6)	5.9 (1.9)	5.9 (1.9)	6.6 (1.9)	153.50	<.001	4 > 2,3 > 1
Lifetime suicide attempt	49 (2.3%)	10 (8.5%)	14 (22.9%)	22 (12.3%)	133.75	<.001	3,4 > 2 > 1
Current mental health treatment	192 (7.3%)	39 (32.0%)	25 (36.2%)	60 (39.1%)	278.69	<.001	2,3,4 > 1
Cognitive functioning	92.3 (12.4)	80.3 (17.4)	85.5 (15.4)	74.5 (25.3)	118.87	<.001	1 > 2,3 > 4
Trait impulsivity	14.1 (3.7)	17.1 (4.8)	15.9 (3.8)	17.5 (5.0)	68.64	<.001	2,3,4 > 1
Physical health difficulties	–0.1 (0.9)	0.5 (1.2)	0.3 (1.4)	0.6 (1.4)	41.13	<.001	1 > 2,3,4
Pre-pandemic protective factors							
Adaptive psychosocial traits	0.2 (0.9)	–0.6 (1.0)	–0.7 (1.2)	–1.0 (1.1)	132.49	<.001	1 > 2,3 > 4
Social network size	8.8 (11.4)	4.5 (5.5)	4.7 (3.1)	3.6 (4.6)	20.56	<.001	1 > 2,3,4
Perceived social support	19.3 (4.8)	16.8 (5.8)	15.3 (5.2)	15.7 (5.1)	50.75	<.001	1 > 2,3,4
Religiosity/spirituality	0.0 (1.0)	–0.3 (0.8)	–0.3 (1.0)	–0.3 (1.0)	10.73	<.001	1 > 2,3,4
Pandemic-related variables							
Infected with COVID-19	178 (7.4%)	18 (13.2%)	15 (19.4%)	14 (9.3%)	18.52	<.001	3 > 1
Household member infected with COVID-19	154 (6.9%)	13 (10.6%)	6 (6.1%)	18 (14.2%)	14.30	0.003	4 > 1
Non-household member infected with COVID-19	1,071 (39.9%)	71 (51.0%)	45 (57.4%)	78 (51.6%)	22.01	<.001	2,3,4 > 1
Know someone who died of COVID-19	153 (5.6%)	8 (3.9%)	6 (7.1%)	6 (4.9%)	1.27	0.74	–
COVID-19–related disease worries	0 (1.0)	–0.1 (1.0)	0.2 (1.0)	0.0 (1.0)	1.57	0.19	–
COVID-19–related social restriction stress	0 (1.0)	0 (1.0)	0.1 (1.3)	0.2 (1.0)	4.34	0.005	4 > 1
COVID-19–related socioeconomic stress	0 (1.0)	0 (1.0)	0.4 (1.6)	0.4 (1.3)	12.30	<.001	3,4 > 1,2
COVID-19–related relationship difficulties	0 (1.0)	0 (0.7)	0.5 (1.0)	0.2 (1.0)	8.63	<.001	3 > 1
Potentially traumatic events during pandemic	0.8 (1.7)	1.3 (2.2)	1.3 (1.7)	1.7 (2.0)	14.95	<.001	2,4 > 1
COVID-19–related PTSD symptoms	305 (11.7%)	24 (16.8%)	20 (20.3%)	36 (21.1%)	18.20	<.001	4 > 1
Pre- to peri-pandemic change variables							
Increase in psychological distress	0 (0.6)	–0.3 (1.0)	0.4 (0.9)	0 (1.0)	20.96	<.001	3 > 1,4 > 2
Decrease in loneliness	–0.1 (1.3)	–0.6 (1.6)	0 (1.7)	–0.2 (1.5)	9.73	<.001	2 > 1,3
Increase in adaptive psychosocial traits	–0.1 (0.7)	0.3 (0.8)	0.1 (1.0)	0 (0.9)	14.27	<.001	2 > 1,4
Increase in perceived social support	0 (1.0)	0.3 (1.1)	0.0 (0.9)	0 (0.8)	3.84	0.009	2 > 1

Abbreviations: AUD = alcohol use disorder, COVID-19 = coronavirus disease 2019, DUD = drug use disorder, GAD = generalized anxiety disorder, MDD = major depressive disorder, PTSD = posttraumatic stress disorder, SI = suicidal ideation.

variance (OR = 2.28, 95% CI = 1.58–3.29). Purpose in life has been linked to healthy coping behaviors and reduced stress reactivity<sup>18</sup> and may help confer remission of SI by encouraging more adaptive regulation of negative emotions. Lower distress related to social distancing restrictions was also associated with SI remission relative to persistent SI, albeit with a smaller effect (OR = 0.67, 95% CI = 0.50–0.88). Potentially, lower distress may reflect more effective coping, or higher distress tolerance, in the remitted group. Alternatively, veterans with remitted SI may have been better able to maintain interpersonal connections during

periods of social distancing. Notably, the aforementioned factors associated with SI remission—social connectedness and purpose in life—have been found to be integral to fostering general psychological well-being, resilience, and adaptability<sup>19</sup> and may be modifiable using psychological interventions and skills-based training.<sup>20,21</sup>

Several prominent risk factors for suicidal thoughts and behaviors were not predictive of a lower likelihood of SI remission, including psychiatric diagnosis (major depressive disorder, generalized anxiety disorder, posttraumatic stress disorder, alcohol/substance use disorders). Null effects for

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**Table 3. Results of Multinomial Logistic Regression Analyses of Resilient vs New-Onset and Persistent SI Courses During the COVID-19 Pandemic**

	Adjusted odds ratio (95% CI) <sup>a</sup>	
	Remitted SI vs new-onset SI	Remitted SI vs persistent SI
Pre-pandemic risk factors		
Adverse childhood experiences	1.26 (1.02–1.57)*	—
Combat exposure	—	0.57 (0.34–0.95)*
Lifetime potentially traumatic events	—	1.04 (1.01–1.07)**
Lifetime suicide attempt	0.11 (0.03–0.43)**	—
Pre-pandemic protective factors		
Adaptive psychosocial traits	—	1.84 (1.41–2.41)***
Perceived social support	1.11 (1.02–1.21)*	—
Pandemic-related variables		
Non-household member infected with COVID-19	0.36 (0.16–0.80)*	—
COVID-19–related disease worries	0.64 (0.43–0.96)*	—
COVID-19–related social restriction stress	—	0.67 (0.50–0.88)**
Pre- to peri-pandemic change variables		
Increase in psychological distress	0.41 (0.26–0.63)***	—
Increase in adaptive psychosocial traits	—	2.28 (1.58–3.29)***
Increase in perceived social support	1.10 (1.00–1.21)*	—

<sup>a</sup>Cells with dashes denote variables that did not significantly contribute variance to the model.

\*  $P < .05$ . \*\*  $P < .01$ . \*\*\*  $P < .001$ .

Abbreviations: COVID-19 = coronavirus disease 2019, SI = suicidal ideation.

psychopathology may reflect the fact that the 3 SI groups did not differ from each other in their rates of psychiatric diagnoses. Nonetheless, veterans with remitted SI reported less exacerbation of psychological distress during the pandemic relative to veterans who developed SI (OR = 0.41, 95% CI = 0.26–0.63), and this explained the largest proportion of variance in SI remission relative to new-onset SI (RVE 55%). These findings suggest that clinical monitoring and intervention for intensification of distress may help promote SI remission during times of crisis and that worsening of mental health status during this period may be a significant risk factor for SI.

Limitations of this study include the relative homogeneity of the sample with respect to gender, race, ethnicity, and

shared military experience, which restricts the degree to which data can be generalized to more diverse samples. Additionally, the limited number of follow-up assessments prevent a more granular depiction of shifts in SI during the COVID-19 pandemic. Nevertheless, our findings highlight the potential clinical utility of monitoring changes in psychological distress during the pandemic, as well as enhancing adaptive characteristics such as purpose in life and perceived resilience to help mitigate SI. Ongoing assessment of pandemic-related mental health sequelae in veterans and other at-risk populations is necessary to understand the continued impact of protective factors on suicide-related outcomes as the COVID-19 pandemic progresses.

**Published online:** June 27, 2022.

**Relevant financial relationships:** None.

**Funding/support:** The National Health and Resilience in Veterans Study is supported by the US Department of Veterans Affairs National Center for Posttraumatic Stress Disorder.

**Role of the sponsor:** The funding source had no role in the design, analysis, interpretation, or publication of this study.

**Supplementary material:** Available at Psychiatrist.com.

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# THE JOURNAL OF CLINICAL PSYCHIATRY

THE OFFICIAL JOURNAL OF THE AMERICAN SOCIETY OF CLINICAL PSYCHOPHARMACOLOGY

## Supplementary Material

**Brief Report Title:** Factors Associated With Remission of Suicidal Ideation During the COVID-19 Pandemic: A Population-Based, Longitudinal Study in US Military Veterans

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**DOI Number:** 10.4088/JCP.21br14341

### List of Supplementary Material for the brief report

1. [Table 1](#)
2. [References](#)

### Disclaimer

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Supplementary Table 1. *Study Measures (With Reference List)*

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**Suicidal behaviors**

Past-year suicidal ideation Past-year SI was assessed at pre-pandemic and peri-pandemic waves via endorsement of Item 2 of the Suicide Behaviors Questionnaire-Revised (SBQ-R)<sup>[1]</sup>: “How often have you thought about killing yourself in the past year?” Response options range from ‘rarely’ (1 time) to ‘very often’ (5+ times).

Past-year suicide plan and attempt Past-year suicide plan or attempt was assessed at the peri-pandemic assessment via endorsement of Item 1 of the SBQ-R<sup>[1]</sup>: “In the past year, have you ever thought about or attempted to kill yourself?” Response options indicating suicide plan or attempt included: “I have had a plan at least once to kill myself but did not try to do it,” “I have had a plan at least once to kill myself and really wanted to die,” “I have attempted to kill myself, but did not want to die,” and “I have attempted to kill myself, and really hoped to die.”

**Sociodemographic characteristics**

The following characteristics were assessed: age (continuous), sex (male/female), race/ethnicity (white/non-white), education (college graduate or higher, up to high school diploma), marital status (married or living with partner/not partnered), household income (less than \$60,000/\$60,000 or more), combat veteran status, years of military service.

**Pre-pandemic risk factors**

Adverse childhood experiences Adverse Childhood Experiences Questionnaire total score<sup>[2]</sup>.

Number of lifetime potential traumas Life Events Checklist for DSM-5 total score<sup>[3]</sup>.

Current PTSD and/or MDD A score of  $\geq 33$  on PTSD Checklist for DSM-5<sup>[4]</sup>, which assesses PTSD symptoms in relation to the “worst” Criterion A trauma on the LEC-5, indicated probable present of PTSD. Current MDD was screened for using the Patient Health Questionnaire-2<sup>[5]</sup>. Veterans who met screening criteria for either disorder were coded positive for current PTSD/MDD.



Current Generalized Anxiety Disorder	Current generalized anxiety was screened for using the Patient Health Questionnaire-4 <sup>[6]</sup> .
Current AUD and/or DUD	Current AUD/DUD was assessed using the Alcohol Use Disorders Identification Test (AUDIT) <sup>[7]</sup> and Screen of Drug Use <sup>[8]</sup> . A score $\geq 8$ ( $\alpha=0.85$ ) is indicative of probable current AUD <sup>[9]</sup> . A response of $\geq 7$ days to the question, “how many days in the past 12 months have you used drugs other than alcohol,” or $\geq 2$ days to the question, “how many days in the past 12 months have you used drugs more than you meant to,” was classified as a positive DUD screen. A positive screen for either disorder was coded positive for current AUD/DUD.
Loneliness	UCLA Loneliness Scale total score <sup>[10]</sup> .
Suicide attempt history	Endorsement of either of two responses to Item 2 of the Suicide Behaviors Questionnaire-Revised (SBQ-R) <sup>[11]</sup> : “I have attempted to kill myself, but did not want to die,” or “I have attempted to kill myself, and really hoped to die.”
Current mental health treatment	Endorsement of current receipt of psychotropic medication and/or psychotherapy or counseling.
Cognitive functioning	Medical Outcomes Study Cognitive Functioning Scale <sup>[11]</sup> .
Trait impulsivity	Barratt Impulsiveness Scale-Brief <sup>[12]</sup> total score.
Physical health difficulties	Factor score comprised of 1) the sum of medical conditions in response to the question, “has a doctor or healthcare professional ever told you that you have any of the following medical conditions: arthritis, cancer, etc.,” 2) score on Brief Symptom Inventory-Somatization subscale <sup>[13]</sup> , and 3) endorsement of disability with activities of daily living and instrumental activities of daily living.
Social network size	Response to the following question: “About how many close friends and relatives do you have (people you feel at ease with and can talk to about what is on your mind)?”
Perceived social support	Medical Outcome Study Social Support Scale-5 <sup>[14]</sup> .

Religion/spirituality

Factor score containing scores from the Duke University Religion Index<sup>[15]</sup>.

Adaptive psychosocial traits

A composite score of adaptive psychosocial traits<sup>[16-17]</sup> was used to assess dispositional attitudes and capacities for coping that are associated with more positive mental health outcomes, including qualities such as resilience; a sense of life purpose; dispositional gratitude, optimism, and curiosity/exploration; and perceived community integration. Resilience was measured using the Connor-Davidson Resilience Scale<sup>[18]</sup>, a 10-item scale with items such as “I am able to adapt when changes occur,” measured on a scale from 1 (“not at all”) to 5 (“nearly true all the time”); The Purpose in Life Test, Short Form<sup>[19]</sup>, a 4-item scale, was used to index sense of meaning and purposefulness in life, assessed on a scale from 1 (“no goals/purpose/progress/meaning”) to 7 (“very clear goals/purpose/progress/meaning”);). Dispositional gratitude, optimism, and curiosity were each assessed using single 7-point Likert scale items adapted from the Gratitude Questionnaire (GQ-6)<sup>[20]</sup> the Life Orientation Test-Revised (LOTS-R)<sup>[21]</sup>, and the Curiosity and Exploration Inventory-II (CEI-II0)<sup>[22]</sup> respectively. Sense of community integration and acceptance was assessed with a single item, “I feel well integrated in my community.”

### **Pandemic-related Factors**

COVID-19 infection stressors

Endorsement of personal prior COVID-19 infection or someone in the household or outside the household who contracted COVID-19 or knowing someone who died of COVID-19, on a COVID-19 exposure measure developed by the National Center for PTSD.

COVID-19 pandemic stressors

Coronavirus Health Impact Survey (CRISIS)<sup>[23]</sup>, which assessed for COVID-19-related disease worries, social restriction stress, financial stress, and relationship difficulties during the pandemic. The CRISIS has been psychometrically validated to have high reliability and construct validity.

Potentially traumatic events during pandemic	Count of potentially traumatic events in the past year assessed using the Life Events Checklist for DSM-5 <sup>[3]</sup> .
COVID-19 related PTSD symptoms	Score on a 4-item measure of COVID-19 pandemic-related PTSD symptoms.
Change in psychosocial risk factors from pre- to peri-pandemic	Pre- to peri-pandemic changes in severity of MDD/GAD/PTSD symptoms, loneliness, adaptive psychosocial traits, and perceived social support.

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Abbreviations: ADL, activities of daily living; AUD, alcohol use disorder; AUDIT, Alcohol Use Disorders Identification Test; COVID-19, coronavirus disease 2019; DUD, drug use disorder; MDD, Major depressive disorder; PTSD, Posttraumatic stress disorder.

*See next page for references.*

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