Prevalence, Correlates, and Treatment of Suicidal Behavior in US Military Veterans:

Results From the 2019–2020 National Health and Resilience in Veterans Study

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ABSTRACT

Objective: US military veterans have high rates of suicide relative to civilians. However, little is known about the prevalence and correlates of suicidal behaviors in the general US veteran population.

Methods: Data were from the National Health and Resilience in Veterans Study, a representative survey of US veterans conducted in 2019–2020 (n = 4,069). Analyses (1) estimated the prevalence of current suicidal ideation, lifetime suicide plans, and lifetime suicide attempts; (2) identified associated sociodemographic, military, *DSM-5* psychiatric, and other risk correlates; and (3) examined mental health treatment utilization among veterans with suicidal ideation, suicide plans, or suicide attempts.

Results: The prevalence of current suicidal ideation, lifetime suicide plans, and lifetime suicide attempts was 9.0%, 7.3%, and 3.9%, respectively. Suicidal behaviors were most prevalent among veterans aged 18–44 years, with 18.2%, 19.3%, and 11.1%, respectively, endorsing suicidal ideation, suicide plans, and suicide attempts. Major depressive disorder (MDD), age, posttraumatic stress disorder, and adverse childhood experiences (ACEs) emerged as the strongest correlates of suicidal ideation and suicide plans, while MDD, age, alcohol use disorder, and ACEs were the strongest correlates of suicide attempts. Only 35.5% of veterans with current suicidal ideation were engaged in mental health treatment, with veterans who used the US Veterans Administration (VA) as their primary source of health care more than twice as likely as VA non-users to be engaged in such treatment (54.7% vs 23.8%).

Conclusions: Suicidal behaviors are highly prevalent among US veterans, particularly among young veterans. Results suggest that nearly two-thirds of veterans with current suicidal ideation are not engaged in mental health treatment, signaling the need for enhanced suicide prevention and outreach efforts.

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Suicide is a significant public health problem among military veterans in the United States. According to the most current national data from the US Veterans Administration (VA), veteran suicide is at its highest recorded rate in US history, surging approximately 30% between 2010 and 2018.[1] Given the rising incidence of suicide among veterans, the Executive Office of the President recently introduced the President's Roadmap to Empower Veterans and End the National Tragedy of Suicide (PREVENTS) in 2019, which aimed to develop a national research strategy to accelerate the progress of suicide prevention in the United States. Among its several goals, the PREVENTS Initiative issued a national "call to action" for researchers and policy makers to better understand the factors that increase veterans' vulnerability for suicide and to improve access to and participation in mental health treatment for veterans at high risk for suicide.[1] This study aims to respond to this call to action by providing contemporaneous, population-based data about the prevalence, correlates, and treatment of suicidal behavior among a nationally representative sample of veterans in the United States.

A significant body of literature has characterized the prevalence and correlates associated with suicidal behavior (eg, suicidal thoughts, plans, and attempts) among veterans. Collectively, this work suggests that the prevalence of suicide-related outcomes varies considerably depending on a host of methodological factors, such as the timeframe and specific population studied (eg, age group). Recent prevalence estimates range from 6.0% to 15.0% for past-2-week suicidal ideation,[2–5] 5.9%–13.7% for lifetime suicide planning,[6–8] and 1.7%–9.5% for lifetime suicide attempt.[5,9,10] Research has also identified a broad range of sociodemographic, military, psychiatric, and other risk variables associated with suicidality among veterans. With regard to sociodemographic characteristics, female sex,[3,7,11] White race,[6,7] lower education,[6,10] and lower socioeconomic status[5] are linked with increased suicidality. With regard to military variables, there has been mixed evidence about the contribution of enlistment status and combat exposure to suicidal behavior, with some research

Clinical Points

- Younger veterans are at particularly high risk for suicidal behavior. Nearly 1 in 5 veterans aged 18–44 years reported contemplating suicide in the past 2 weeks as well as having a lifetime suicide plan. One in 10 veterans aged 18–44 years has attempted suicide.
- Two-thirds of veterans in the United States with current suicidal ideation are not engaged in any form of mental health treatment.
- Among veterans with recent suicidal ideation, veterans who reported the VA as their primary source of health care were more than twice as likely to be currently engaged in mental health treatment compared to VA non-users.

showing elevated risk,[2,5,7,12,13] but other studies finding weak or nonsignificant associations.[2,14–16] With regard to psychiatric conditions, considerable evidence suggests that depression, posttraumatic stress disorder (PTSD), anxiety, and substance use disorders are robust risk factors for suicidal ideation and attempts.[12,17,18] Finally, adverse childhood experiences (ACEs),[19,20] traumatic brain injury (TBI),[21] physical health difficulties,[5,6] and lifetime trauma burden[4,5] may confer additional risk for suicide-related outcomes, above and beyond sociodemographic, military, and psychiatric factors.

Although there has been considerable effort to characterize the prevalence and correlates of suicidal behavior among veterans, prior studies are limited in 3 notable ways. First, most existing studies of veterans used VA health care information, yet nearly three-quarters of veterans in the United States do not receive health care through the VA, and prior research has found significant differences between veterans who do and do not utilize VA health care.[22] For example, recent evidence suggests veterans who utilize VA services have higher rates of psychopathology, greater combat exposure, and more medical comorbidities.[22,23]

Second, nearly all research on correlates of suicidal behavior among veterans has utilized treatment-seeking samples, which may not provide an accurate estimate of the magnitude of these associations in the general US veteran population. Thus, to date, little is known about the prevalence and correlates of suicidal behavior in the general US veteran population. Such data are essential to informing the population-based burden of suicidal behavior; development of targeted prevention, detection, and intervention strategies; and resource allocation.

Third, scarce research has examined the prevalence of mental health treatment utilization among veterans with current and lifetime suicidal behavior. Only one known study[24] has examined treatment utilization among a sample of veterans with current suicidal ideation. Results of this 2011 study of a nationally representative sample of US veterans found that 63.9% of veterans endorsing suicidal ideation were not currently engaged in any type of mental health treatment. Given the significant effort that the VA and other health care agencies have put toward raising suicide awareness over the last decade, there is a pressing need to determine whether new programs and policies (eg, enhanced screening measures) have influenced patterns of treatment utilization.

To address the aforementioned gaps in the literature, we analyzed data from the National Health and Resilience in Veterans Study (NHRVS), a representative survey of US veterans with the following 3 aims: (*a*) estimate the prevalence of current suicidal ideation, lifetime suicide planning, and suicide attempts; (*b*) identify sociodemographic, military, psychiatric, and empirically derived risk variables most strongly associated with suicidal behavior; and (*c*) examine mental health treatment utilization among veterans with current and lifetime suicidal behavior.

METHOD

Data were from the 2019–2020 National Health and Resilience in Veterans Study (NHRVS), a nationally representative study of 4,069 US veterans. Mean age of participants was 62.2 years (SD = 15.7; range, 22–99 years; 90.2% male). Participants were 78.0% non-Hispanic White, 11.2% non-Hispanic Black, 6.6% Hispanic, and 4.2% other, mixed race. A total of 47.0% served in the Army, 20.2% in the Navy, 18.7% in the Air Force, 5.8% in the Marines, and 8.3% in the National Guard, Reserves, or Coast Guard; 35.0% were combat veterans; and the mean number of years of service was 4.4 (SD = 1.9; range, 1–8). In the total sample, 343 veterans (weighted percentage: 10.2%) reported a lifetime history of homelessness.

The sampling methodology of the NHRVS has been described elsewhere.[25] Veterans completed an anonymous, web-based survey. The NHRVS sample was drawn from KnowledgePanel, a panel of more than 50,000 households maintained by Ipsos, a research firm. KnowledgePanel is a probability-based survey panel of a 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. KnowledgePanel recruitment uses sampling frames that include both listed and unlisted telephone numbers, telephone and non-telephone households, and cell-phone–only households as well as households without Internet access. In the recruitment process, KnowledgePanel employed an initial screening question that confirmed veteran status ("Have you ever served on active duty in the US Armed Forces, Military Reserves, or National Guard?"). Veterans completed screening questionnaires to assess for lifetime probable depression, PTSD, alcohol use disorder, and drug use disorder according to *DSM-5* criteria.

To permit generalizability of results to the entire US veteran population, Ipsos computed post-stratification weights using the following benchmark distributions of US veterans from the most recent (August 2019) Current Veteran Population Supplemental Survey of the Census Bureau's American Community Survey: sex, race/ethnicity,

Table 1. Study Measures

Variable	Assessment
Sociodemographic characteristics	Age (continuous), sex (male, female), marital status (married or partnered, divorced/separated, never married), race (non-Hispanic White, non-Hispanic Black, Hispanic, other), education (college graduate or more, some college or less), household income (< $60,000, ≥ $60,000)
Military characteristics	Military branch (Army, Air Force, Navy, Marine Corps, other), enlistment status (enlisted, drafted, commissioned), number of deployments (1, 2, ≥ 3)
Current suicidal ideation	Two items adapted from the PHQ-9 item 9,[26] which asked participants to report suicidal ideation during the prior 2 weeks. Per prior work,[5,27] participants screened positive for current ideation if they responded "several days" or more frequently to at least one of the following questions: "How often have you been bothered by thoughts that you might be better off dead?" and "How often have you been bothered by thoughts of hurting yourself in some way?" Prior research[28] has found the PHQ-9 to be a valid and reliable screening tool for suicidal ideation with high concordance to longer psychiatric diagnostic interviews
Lifetime suicide plans	Endorsement of either of two items was considered a positive screen: "I have had a plan at least once to kill myself but did not try to do it" and "I have had a plan at least once to kill myself and really wanted to die"
Lifetime suicide attempts	Endorsement of either of two items was considered a positive screen: "I have attempted to kill myself, but did not want to die" and "I have attempted to kill myself, and really hoped to die"
Lifetime PTSD	The Posttraumatic Stress Disorder Checklist for *DSM-5*[29] (range, 0–80). A cutoff score of ≥ 33 was used to indicate a probable diagnosis. PTSD symptoms were assessed in relation to their "worst" traumatic event endorsed on the LEC-5[30]
Lifetime MDD	Major Depressive Disorder module from the *DSM-5* version of the MINI[31]
Lifetime AUD	Alcohol Use Disorder module from the *DSM-5* version of the MINI[31]
Lifetime DUD	Drug Use Disorder module from the *DSM-5* version of the MINI[31]
ACES	Adverse Childhood Experiences Scale,[32] which assesses for 7 types of childhood maltreatment (eg, physical abuse, emotional neglect), occurring between birth and age 18 years. Items were summed for a total score, with higher scores indicating greater maltreatment
Lifetime trauma exposure	Score on the LEC-5[33]
Lifetime concussion/ TBI	VA TBI Screening Tool,[34] an empirically-validated self-report measure of potential TBI-causing events (eg, blast/ explosions, vehicle crash) and post-concussive symptoms (eg, loss/alteration of consciousness). Endorsement of all 4 TBI-screening items was indicative of a positive lifetime TBI screen
Physical health problems	Sum of number of medical conditions endorsed in response to question: "Has a doctor or health care professional ever told you that you have any of the following medical conditions?" (eg, arthritis, cancer, diabetes, heart disease, asthma, kidney disease). Range, 0–24 conditions
Disability status	Veterans self-reported whether they needed help from another person to perform ADL (ie, bathing, dressing) or IADL (ie, handling finances). A positive response on either item, scored dichotomously, was indicative of disability
VA health care utilization	Item which asked, "Is the VA your main source of health care?"
Current mental health treatment	Current treatment utilization was assessed by two items asking, "Are you currently receiving psychotherapy or counseling for a psychiatric or emotional problem?" and "Are you currently taking prescription medication for a psychiatric or emotional problem?" A positive response on either item, scored dichotomously, was indicative of current mental health treatment utilization
Lifetime mental health treatment	Lifetime treatment utilization was assessed using an item that asked, "Have you ever received mental health treatment (eg, prescription medication or psychotherapy for a psychiatric or emotional problem)?"

Abbreviations: ACE = adverse childhood experience, ADL = activities of daily living, AUD = alcohol use disorder, DUD = drug use disorder, IADL = instrumental activities of daily living, LEC-5 = Life-Events Checklist for *DSM-5*, MDD = major depressive disorder, MINI = Mini-International Neuropsychiatric Interview, PHQ-9 = Patient Health Questionnaire-9, PTSD = posttraumatic stress disorder, TBI = traumatic brain injury, VA = Veterans Administration.

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. Missing data (< 3%), which were missing completely at random as per the Little missing completely at random (MCAR) test, were multiply imputed using chained equations. Participants provided informed consent, and the study was approved by the Human Subjects Subcommittee of the VA Connecticut Healthcare System.

Assessments

Table 1 presents the measures analyzed in the current study.

Data Analysis

Analyses proceeded in 5 steps. First, descriptive statistics were computed to estimate the prevalence of current suicidal ideation, lifetime suicide planning, and lifetime suicide attempt. Second, χ^2 analyses were conducted to examine omnibus differences in suicidal behavior by sex, age, and health care status. Third, multivariable binary logistic regression analyses were conducted to identify variables independently associated with current ideation, lifetime planning, and lifetime attempts; independent variables included psychiatric and substance use disorders (lifetime PTSD, major depressive disorder [MDD], alcohol use disorder [AUD], and drug use disorder [DUD]), ACEs, lifetime trauma exposure, lifetime concussion/TBI, physical health problems, and disability status. Empirically derived covariates[7,34] included age, sex, race/ethnicity, marital status, educational status, household income, military branch, enlistment status, and number of deployments. Fourth, to determine the relative contribution of each correlate to the model-explained variance (R^2), relative importance analyses[35] were conducted using the R statistical package[36]; this analysis decomposes the total variance explained

Table 2. Prevalence of Suicidal Behavior in the US Veteran Population[a]

	Total sample (N = 4,069)								
	Current ideation			Lifetime plan			Lifetime attempt		
Variable	n	%	95% CI	n	%	95% CI	n	%	95% CI
Total	313	9.0	8.1–9.9	258	7.3	6.5–8.1	136	3.9	3.3–4.5
Sex									
Men	263	8.9	8.0–9.9	189	6.9	6.1–7.8	89	3.3	2.7–3.9
Women	50	10.4	7.6–13.9	69	15.2*	11.6–19.3	47	9.4*	6.7–12.7
Age group, y[b]									
18–44	50	18.2*	15.4–21.3	52	19.3*	16.2–22.7	33	11.1*	8.8–13.8
45–64	135	11.1*	9.5–12.9	122	10.3*	8.7–12.1	68	4.5*	3.5–5.7
≥ 65	128	4.6	3.7–5.6	84	2.4	1.8–3.2	35	1.1	0.7–1.7

[a]Percentages are weighted. The prevalence of plans ($\chi^2_1 = 31.10$, $P < .001$) and attempts ($\chi^2_1 = 35.39$, $P < .001$) was significantly higher among female veterans. The prevalence of ideation ($\chi^2_2 = 123.22$, $P < .001$), plans ($\chi^2_1 = 202.89$, $P < .001$), and attempts ($\chi^2_1 = 134.81$, $P < .001$) also differed as a function of age, with veterans aged 18–44 years having significantly higher rates of these behaviors relative to those aged 45–64 years, who had significantly higher rates of these behaviors relative to those aged ≥ 65 years.
[b]Reference group is compared to those aged ≥ 65 years.
*Significant at the $P < .01$ level, determined by use of a Bonferroni-corrected 2-sided test. Weighted prevalence estimates are within the NHRVS subsample of veterans with current suicide ideation, lifetime suicide plan, and lifetime suicide attempt(s).
Abbreviation: NHRVS = National Health and Resilience in Veterans Study.

in regression models into proportional contributions while taking into consideration intercorrelations among independent variables, thus quantifying the relative importance of these variables in predicting outcomes. Fifth, descriptive statistics were computed to estimate the prevalence of mental health treatment utilization among veterans with suicidal behavior.

RESULTS

Table 2 presents the prevalence of current and lifetime suicidal behavior. The weighted prevalences of current suicidal ideation, lifetime suicide planning, and lifetime suicide attempt were 9.0%, 7.3%, and 3.9%, respectively. Using population benchmarks of US veterans based on the August 2019 Veteran Supplement of the US Census Bureau Current Population Survey, the total US veteran population is 18,377,665. Thus, our prevalence estimates suggest that 1,653,990 veterans have current suicidal ideation, 1,341,570 had planned suicide, and 716,729 had attempted suicide in their lifetimes. The prevalences of suicide planning and attempts were significantly higher among female veterans. The prevalences of suicide ideation, planning, and attempts also differed as a function of age, with veterans aged 18–44 years having significantly higher rates of these behaviors relative to those aged 45–64 years, who had significantly higher rates of these behaviors relative to those aged ≥ 65 years.

Table 3 displays the results of multivariable analyses. Veterans aged 18–44 years had significantly greater odds of ideation (OR = 2.12; 95% CI, 1.40–3.20), planning (OR = 3.20; 95% CI, 1.99–5.17), and attempts (OR = 4.71; 95% CI, 2.37–9.33) relative to those aged ≥ 65 years. Likewise, veterans aged 45–64 years had higher odds of ideation (OR = 2.14; 95% CI, 1.52–3.01), planning (OR = 2.36; 95% CI, 1.56–3.57), and attempts (OR = 2.87; 95% CI, 1.53–5.34) relative to those aged ≥ 65 years. Male veterans had decreased odds of ideation relative to female veterans (OR = 0.52; 95% CI, 0.34–0.81). Non-Hispanic Black veterans had decreased odds of ideation (OR = 0.54; 95% CI, 0.34–0.86) and planning (OR = 0.36; 95% CI, 0.20–0.66) relative to Non-Hispanic White veterans. Veterans who had never been married were at higher odds of lifetime suicide planning relative to married/partnered veterans (OR = 2.56; 95% CI, 1.58–4.13). Lifetime MDD was associated with increased odds of ideation (OR = 2.41; 95% CI, 1.77–3.27), planning (OR = 6.28; 95% CI, 4.52–8.71), and attempts (OR = 2.71; 95% CI, 1.75–4.21). Lifetime PTSD was associated with increased odds of ideation (OR = 2.78; 95% CI, 2.01–3.85) and planning (OR = 1.63; 95% CI, 1.13–2.35). Lifetime DUD was associated with increased odds of ideation (OR = 1.47; 95% CI, 1.06–2.04) and planning (OR = 1.67; 95% CI, 1.15–2.43), while lifetime AUD was associated with attempts (OR = 2.73; 95% CI, 1.74–4.29). ACEs were associated with increased odds of ideation (OR = 1.08; 95% CI, 1.02–1.14), planning (OR = 1.19; 95% CI, 1.12–1.27), and attempts (OR = 1.22; 95% CI, 1.12–1.31). Lifetime trauma exposure was associated with elevated odds of attempts (OR = 1.03; 95% CI, 1.01–1.04). Lifetime concussion/TBI was associated with heightened odds of ideation (OR = 1.49; 95% CI, 1.05–2.11) and attempts (OR = 1.69; 95% CI, 1.06–2.67). Disabled status was associated with increased odds of suicide attempts (OR = 1.70; 95% CI, 1.07–2.68) and suicidal ideation (OR = 1.70; 95% CI, 1.24–2.33).

Results of relative importance analyses examining the contribution of all variables in the multivariable model to ideation, planning, and attempts are displayed in Figure 1. The total variance in current ideation accounted for by all variables was 25.2%. Lifetime MDD, lifetime PTSD, disability, age, and ACEs explained the majority of variance in current ideation. The total variance in lifetime planning accounted for by all variables was 34.7%. Lifetime MDD, age, ACEs, and lifetime PTSD explained the majority of variance in lifetime planning. The total variance in lifetime attempts accounted for by all variables was 30.9%. Lifetime MDD, age,

Table 3. Results of Multivariable Analyses of Sociodemographic, Military, Psychiatric, and Risk Variables Associated With Suicidal Behavior in the US Veteran Population (Total Sample, N = 4,069)

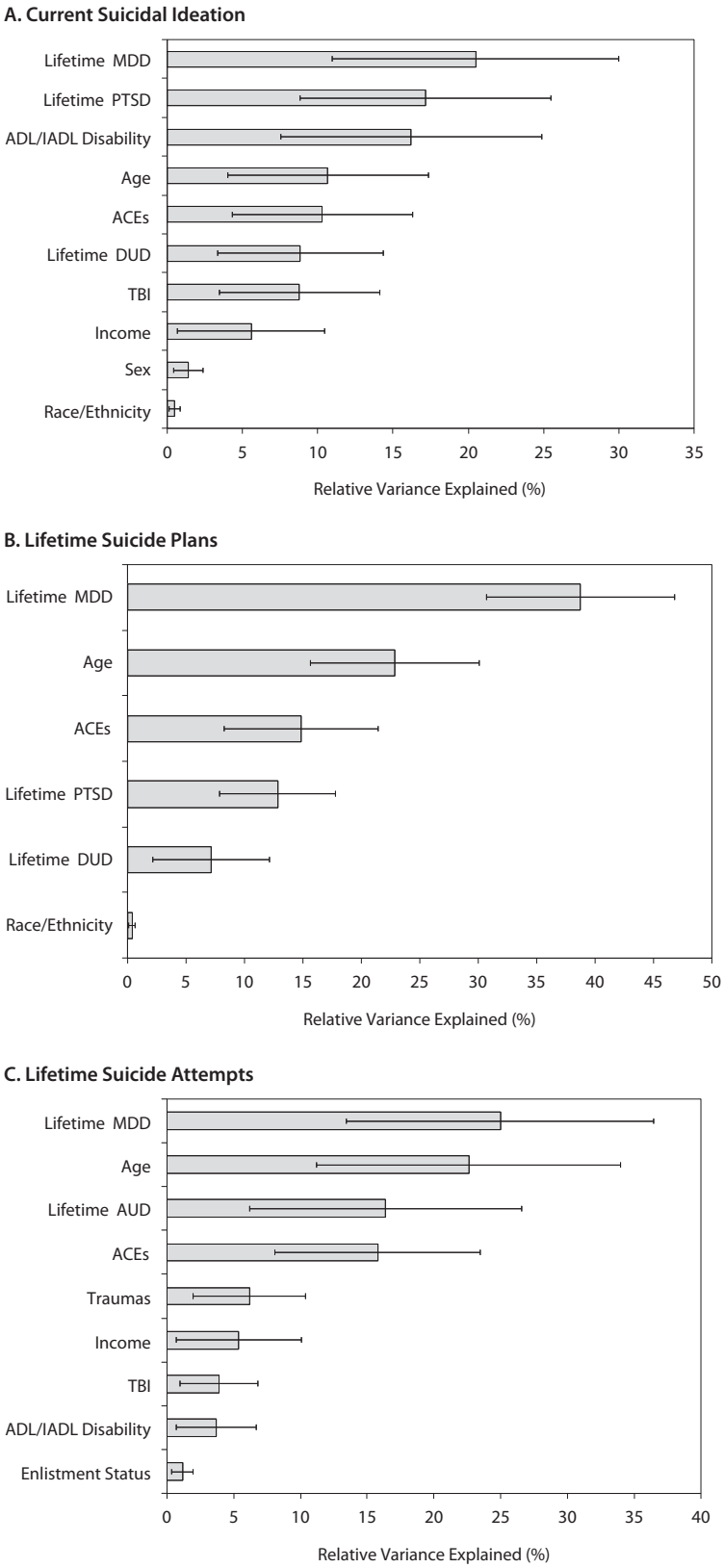
	Odds ratio (95% CI)		
Variable	Ideation	Plan	Attempt
Sociodemographic			
Age group, y			
18–44	2.12 (1.40–3.20)***	3.20 (1.99–5.17)***	4.71 (2.37–9.33)***
45–64	2.14 (1.52–3.01)***	2.36 (1.56–3.57)***	2.87 (1.53–5.34)**
≥ 65	1 [Reference]	1 [Reference]	1 [Reference]
Sex			
Female	1 [Reference]	1 [Reference]	1 [Reference]
Male	0.52 (0.34–0.81)**	1.01 (0.66–1.54)	1.62 (0.99–2.66)
Race/ethnicity			
Non-Hispanic White	1 [Reference]	1 [Reference]	1 [Reference]
Non-Hispanic Black	0.54 (0.34–0.86)**	0.36 (0.20–0.66)**	1.13 (0.64–1.99)
Hispanic	0.82 (0.52–1.34)	0.81 (0.48–1.37)	0.57 (0.28–1.15)
Other	0.32 (0.40–1.30)	1.11 0(.62–1.96)	0.53 (0.21–1.30)
Marital status			
Married or partnered	1 [Reference]	1 [Reference]	1 [Reference]
Divorced/separated	0.92 (0.67–1.27)	1.20 (0.82–1.75)	1.04 (0.65–1.64)
Never married	1.18 (0.76–1.84)	2.56 (1.58–4.13)**	1.18 (0.64–2.19)
Education			
College graduate or more	1 [Reference]	1 [Reference]	1 [Reference]
Some college or less	1.05 (0.76–1.45)	0.84 (0.58–1.19)	0.78 (0.49–1.23)
Household income			
≥ $60,000	1 [Reference]	1 [Reference]	1 [Reference]
< $60,000	1.48 (1.11–1.97)**	0.89 (0.63–1.25)	1.70 (1.11–2.59)*
Military			
Branch of military			
Army	1 [Reference]	1 [Reference]	1 [Reference]
Air Force	1.30 (0.92–1.84)	0.88 (0.58–1.33)	1.12 (.64–1.95)
Navy	0.78 (0.55–1.11)	0.65 (0.43–0.97)*	0.75 (.44–1.30)
Marine Corps	0.77 (0.45–1.33)	0.78 (0.44–1.41)	1.25 (.63–2.49)
Other	0.60 (0.34–1.05)	0.47 (0.26–0.85)*	0.84 (.41–1.70)
Enlistment status			
Enlisted	1 [Reference]	1 [Reference]	1 [Reference]
Drafted	0.94 (0.53–1.64)	0.33 (0.11–0.95)	1.75 (0.65–4.73)
Commissioned	0.77 (0.44–1.36)	1.24 (0.73–2.12)	0.24 (0.07–0.87)*
No. of deployments			
1	1 [Reference]	1 [Reference]	1 [Reference]
2	1.24 (.90–1.73)	1.03 (0.71–1.50)	0.89 (0.53–1.48)
≥ 3	1.38 (.96–1.98)	1.07 (0.70–1.65)	1.36 (0.79–2.34)
Psychiatric			
Lifetime MDD	2.41 (1.77–3.27)***	6.28 (4.52–8.71)***	2.71 (1.75–4.21)***
Lifetime PTSD	2.78 (2.01–3.85)***	1.63 (1.13–2.35)**	0.97 (0.60–1.55)
Lifetime AUD	1.15 (0.87–1.52)	1.06 (0.77–1.47)	2.73 (1.74–4.29)***
Lifetime DUD	1.47 (1.06–2.04)*	1.67 (1.15–2.43)**	1.09 (0.70–1.70)
Other			
ACES score	1.08 (1.02–1.14)**	1.19 (1.12–1.27)***	1.22 (1.12–1.31)***
LEC-5 score	0.98 (0.97–1.00)	1.01 (0.99–1.02)	1.03 (1.01–1.04)**
Concussion/TBI	1.49 (1.05–2.11)*	1.25 (0.82–1.88)	1.69 (1.06–2.67)*
Physical health problems	0.30 (1.02–1.09)	0.99 (0.91–1.07)	0.98 (0.89–1.08)
Disability status	1.70 (1.24–2.33)***	1.16 (0.78–1.72)	1.70 (1.07–2.68)*

*Significant at the $P < .05$ level, determined by use of a 2-sided test.
**Significant at the $P < .01$ level, determined by use of a 2-sided test.
***Significant at the $P < .001$ level, determined by use of a 2-sided test.
Abbreviations: ACES = Adverse Childhood Experiences Scale, AUD = alcohol use disorder, DUD = drug use disorder, LEC-5 = Life-Events Checklist for *DSM-5*, MDD = major depressive disorder, PTSD = posttraumatic stress disorder, TBI = traumatic brain injury.

lifetime AUD, and ACEs explained the majority of variance in lifetime attempts.

Table 4 presents the prevalence of treatment utilization among veterans with suicidal behavior. The prevalences of lifetime mental health care utilization among veterans with current ideation, lifetime planning, and lifetime attempts were 52.2%, 61.8%, and 69.0%, respectively. The prevalences of current treatment utilization among veterans with current ideation, lifetime planning, and lifetime attempts were 35.5%, 38.5%, and 43.0%, respectively. Bivariate analysis revealed that treatment utilization was significantly higher among veterans with suicidal behavior who reported the VA as their primary source of health care. Specifically, with the exception of lifetime treatment not differing between suicide attempters who did and did not use VA services, VA users had significantly higher rates of lifetime treatment,

Figure 1. Results of Relative Importance Analysis of Significant Correlates of (A) Current Suicidal Ideation, (B) Lifetime Suicide Plans, and (C) Lifetime Suicide Attempts[a]



[a]Error bars represent 95% confidence intervals.
Abbreviations: ACEs = adverse childhood experiences, ADL = activities of daily living, AUD = alcohol use disorder, DUD = drug use disorder, IADL = instrumental activities of daily living, MDD = major depressive disorder, PTSD = posttraumatic stress disorder, TBI = traumatic brain injury.

Table 4. Mental Health Treatment Utilization Among US Veterans With Suicidal Behavior[a]

	Current ideation			Lifetime plan			Lifetime attempt		
Variable	n	%	χ^2_1	n	%	χ^2_1	n	%	χ^2_1
Full sample (N = 4,069)			…			…			…
Lifetime treatment	160	52.2	…	162	61.8	…	106	69.0	…
Current treatment	104	35.5	…	98	38.5	…	64	43.0	…
Current pharmacotherapy	93	32.0	…	57	33.8	…	57	38.2	…
Current psychotherapy	72	25.4	…	87	21.3	…	42	25.5	…
VA users (n = 836)	109	38.0	…	98	36.4	…	57	45.9	…
Lifetime treatment	101	72.7	…	86	79.6	…	52	72.2	…
Current treatment	76	54.7	…	58	53.7	…	40	55.6	…
Current pharmacotherapy	69	49.6	…	50	46.7	…	37	51.4	…
Current psychotherapy	65	52.9	…	44	41.1	…	24	33.3	…
VA non-users[b] (n = 3,233)	204	62.0	…	160	63.6	…	79	54.1	…
Lifetime treatment	90	39.6	37.66*	97	51.6*	22.84	57	67.1	0.49
Current treatment	54	23.8	35.91*	57	30.2*	16.06	28	32.6	8.45*
Current pharmacotherapy	48	21.1	32.19*	50	26.6*	12.33	23	27.1	9.77*
Current psychotherapy	28	12.3	54.63*	19	10.1*	39.36	16	18.8	4.32*

[a]Percentages are weighted.
[b]χ^2 analysis examined omnibus differences between VA users and non-users.
*Significant at the < .05 level, determined by use of a 2-sided test. Weighted prevalence estimates are within the NHRVS subsample of veterans with current suicide ideation, lifetime suicide plan, and lifetime suicide attempt(s).
Abbreviations: NHRVS = National Health and Resilience in Veterans Study, VA = Veterans Administration.

current treatment, current pharmacotherapy use, and current psychotherapy use.

DISCUSSION

This study of a contemporary, population-based sample of US military veterans found that the prevalences of current suicidal ideation, lifetime suicide planning, and lifetime suicide attempts were 9.0%, 7.3%, and 3.9%, respectively. These estimates are broadly consistent with those of previous studies of similarly aged veterans in the general population. For example, Smith et al[4] and Fanning and Pietrzak[5] estimated the past-2-week and lifetime prevalence of suicidal ideation and suicide attempt to be 8.7% and 2.6%, respectively. The prevalence of suicidal behavior was significantly higher among younger veterans, consistent with literature demonstrating that peak risk for suicidality among service members typically occurs during early and midadulthood.[1,37] Among veterans aged 18–44 years, rates of suicidal ideation, planning, and attempts were 18.2%, 19.3%, and 11.1%, respectively. For comparison, in a diverse sample of 3,233 Iraq/Afghanistan-era veterans (mean age = 37.3 years), Kimbrel and colleagues[10] found the prevalences of current ideation and lifetime attempt to be 9.9% and 9.0%, respectively. Thus, although current findings suggest that the prevalence of suicidal behavior in the overall sample roughly approximates that of earlier work, the observed prevalence of suicidal behavior among younger veterans was substantially higher relative to prevalences in previously published epidemiologic reports.[3,6,10,11] Indeed, it is striking that we found that nearly 2 in 10 US veterans aged 18–44 years endorsed past-2-week suicidal ideation and having a lifetime suicide plan, while more than 1 in 10 reported a prior suicide attempt.

Consistent with prior research,[4,5] age was independently associated with suicidal behavior in the multivariable models, even after accounting for other sociodemographic, military, and psychiatric variables. Relative to veterans aged ≥ 65 years, veterans aged 18–44 years were approximately twice as likely to report current ideation, 3 times more likely to endorse a lifetime suicide plan, and 5 times more likely to report a prior suicide attempt. This finding may be explained, at least in part, by the fact that studies have found a negative correlation between age and impulsivity,[38] suggesting that veterans display a heightened propensity for risk-taking behavior (eg, suicidality, substance abuse) earlier in life.[39] The developmental period between late adolescence and early adulthood is also characterized by relational instabilities and recurrent changes in career plans, which have been linked to elevated risk for suicidal behavior.[40] It is noteworthy that current findings regarding differential risk of suicidal behavior by age mirror the most recent national veteran suicide data, which showed that veterans aged 18–34 years had the highest suicide mortality rate, increasing by 76% from 2005 to 2017.[1]

Psychiatric morbidities emerged as some of the strongest correlates of suicidal behavior. In particular, lifetime MDD explained the most variance in suicide-related outcomes relative to all other variables in the multivariable models. These findings accord with those from prior studies, which have found that MDD is one of the most robust predictors of suicidality among service members relative to other psychopathology.[3,7,17] For example, data from the Army STARRS project[7] found that MDD and intermittent explosive disorder were the only post-enlistment–onset disorders (of 12) associated with increased risk for suicide attempts. The ideation-to-action framework holds that distinct processes and predictors account for the development of suicidal

ideation, suicide planning, and suicide attempts.[41] In support of this theory, findings from the current study revealed that lifetime PTSD was a significant correlate of ideation and planning; however, it was unrelated to attempts. In contrast, lifetime MDD and AUD emerged as robust correlates of suicide attempts. These results converge with a growing body of evidence which indicate that different factors may drive veterans to ideate, plan, and attempt suicide,[41,42] and additional research is critically needed to examine the factors that best differentiate between these groups among veteran samples.

ACEs were additionally among the variables accounting for the greatest amount of variance in suicidal behavior. Specifically, results indicated that each additional ACE significantly increased the odds of suicidal ideation, planning, and attempts, even after adjusting for the effects of lifetime PTSD/MDD, AUD/DUD, cumulative trauma exposure, and sociodemographic characteristics. These results are consistent with prior literature demonstrating a "dose-response" relationship between cumulative childhood adversity and risk for suicidality among veterans.[20] For example, a study of OEF/OIF veterans[20] found that each 1-point increase on the ACE Questionnaire corresponded with a 23% and 24% increase in risk of suicidal ideation and attempts, respectively. Adversity early in life, such as childhood abuse and neglect, is associated with a host of adverse neurobiological (eg, limbic system dysregulation),[43] psychological (eg, greater impulsivity),[38] and social sequelae (eg, insecure attachment bonds),[44] which may operate both independently and synergistically to amplify risk for suicidality among veterans.[45]

A significant contribution of the current study is that it is one of the first to examine mental health treatment utilization among veterans with suicidal behavior in a population-based sample. We found that only 35.5% of veterans who endorsed current suicidal ideation reported being engaged in any form of current mental health treatment. These results are nearly identical to those reported from an independent, nationally representative study of veterans conducted in 2011,[24] with parallel sampling methodology to the current study, which found that 36.1% of veterans with current suicidal ideation were actively engaged in mental health treatment. Treatment utilization was markedly higher among veterans with suicidal behavior who reported the VA as their primary source of health care. For example, among veterans with current suicidal ideation, 52.9% of VA users reported being engaged in current psychotherapy, compared to 12.3% of VA non-users ($\chi^2_1 = 219.96$, $P = .001$). Post hoc analyses revealed that higher levels of treatment utilization among VA users remained constant, even after stringent adjustment for PTSD, MDD, AUD, DUD, ACEs, lifetime trauma burden, and sociodemographic characteristics (OR = 3.2; 95% CI, 1.7–5.9). These results suggest that despite significant outreach efforts by health care agencies over the past decade, a considerable proportion of US veterans most at risk for suicide may be underserved by the mental health treatment system, particularly veterans receiving health care services outside of the VA, which serves a more psychiatrically ill segment of the veteran population.[22]

The present findings should be considered in light of several limitations. First, the prevalence estimates of suicidal behavior presented in this study are likely an underestimate, given that research suggests that subjects are less likely to report stigmatized behaviors,[46] and the present sample did not include institutionalized veterans, who have higher rates of suicicality.[47] Second, the cross-sectional design of the NHRVS precludes causal interpretation of observed associations. Third, self-report measures were used rather than diagnostic interviews, which introduces the potential for bias. Fourth, concussion/TBI was assessed using the dichotomous VA TBI Screening Tool (VATBIST).[34] Although the VATMIST is a valid measure[34] of TBI exposure, it did not allow for examination of the association between frequency and severity of TBI exposure and suicidality. Finally, treatment utilization was assessed using a measure that asked about formal involvement in psychopharmacologic and psychotherapeutic intervention. However, veterans may have pursued psychological support through other informal avenues, such as a faith or community leader.

These limitations notwithstanding, results of this study have several important implications for prevention and treatment. To date, a significant limitation of the extant suicide prevention literature is that despite having identified a vast number of risk factors for suicidal behavior among service members and veterans,[1,37] little is known from representative studies about the relative importance of these factors to suicide-related outcomes. The current study extends prior research by providing a population-based characterization of the association between 18 empirically established risk factors[37] and suicidal behavior among US veterans. Results revealed that 4 factors—age, lifetime MDD, lifetime PTSD, and ACEs—accounted for 58.1% and 89.1% of the explained variance in current suicidal ideation and lifetime planning, respectively. In contrast, we found that age, lifetime MDD and AUD, and ACEs accounted for the preponderance of the explained variance in lifetime suicide attempts (72.2%). These findings underscore the importance for future research to better understand how to treat complex comorbidities, such as PTSD/MDD and PTSD/MDD/AUD to mitigate suicide risk, particularly among young veterans. Indeed, prior clinical trial data have demonstrated that evidence-based treatments for PTSD[48,49] (ie, prolonged exposure therapy and cognitive processing therapy) and MDD[50] (ie, cognitive-behavioral therapy) are effective at decreasing suicidal ideation and risk for future suicide attempts; however, PTSD/MDD/AUD comorbidity is associated with worse treatment outcomes,[51,52] and younger veterans are significantly more likely to drop out of treatment than older veterans.[53] Finally, there is a dire need to test whether integrating brief suicide-specific interventions (ie, crisis-response planning) into existing trauma-focused treatments[54] may enhance their effectiveness for reducing risk for suicidal behavior among military service members, veterans, and other at-risk populations.

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Potential conflicts of interest: **Dr Pietrzak** is a Scientific Consultant to Cogstate, Ltd, for work unrelated to the current project. **Dr Stein** has previously served as a consultant for Actelion, Dart Neuroscience, Healthcare Management Technologies, Janssen, Oxeia Biopharmaceuticals, Pfizer, Resilience Therapeutics, and Tonix Pharmaceuticals outside the submitted work. **Drs Nichter**, **Norman**, **Haller**, **Straus**, and **Hill** have no conflicts of interest to declare.

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