

ORIGINAL ARTICLE

Predictors of non-fatal suicide attempts among Veterans Health Administration (VHA) patients who experienced military sexual trauma

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Funding information

U.S. Department of Veterans Affairs

Abstract

Objective: Military sexual trauma (MST) has been identified as a risk factor for suicidal behavior. To inform suicide prevention efforts within the Veterans Health Administration (VHA), this study evaluates predictors of non-fatal suicide attempts (NFSAs) among VHA patients who experienced MST.

Methods: For VHA patients in fiscal year (FY) 2019 who previously screened positive for a history of MST, documented NFSAs were assessed. Using multivariable logistic regression, demographic, clinical, and VHA care utilization predictors of NFSAs were assessed.

Results: Of the 212,215 VHA patients who screened positive for MST prior to FY 2019 and for whom complete race, service connection, and rurality information was available, 1742 (0.8%) had a documented NFSA in FY 2019. In multivariable logistic regression analyses, total physical and mental health morbidities were not associated with NFSAs. Predictors of a documented NFSAs included specific mental health diagnoses [adjusted odds ratio (aOR) range: 1.28–1.94], receipt of psychotropic medication prescriptions (aOR range: 1.23–2.69) and having a prior year emergency department visit (aOR = 1.32) or inpatient psychiatric admission (aOR = 2.15).

Conclusions: Among VHA patients who experienced MST, specific mental health conditions may increase risk of NFSAs, even after adjustment for overall mental health morbidity. Additionally, indicators of severity of mental health difficulties such as receipt of psychotropic medication prescriptions and inpatient psychiatric admissions are also associated with increased risk above and beyond risk associated with diagnoses. Findings highlight targets for suicide prevention initiatives among this vulnerable group within VHA and may help identify patients who would benefit from additional support.

KEYWORDS

military sexual trauma, suicide attempt, Veterans

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INTRODUCTION

Military sexual trauma (MST) is the term used by the Veterans Health Administration (VHA) to refer to sexual assault or sexual harassment experienced by a service member during military service. When screened by a VHA healthcare provider, 32.4% of women and 1.9% of men report having experienced MST (United States Department of Veterans Affairs, Office of Mental Health and Suicide prevention, 2020). These gender differences are robust and may reflect contextual vulnerability of female Veterans in a male-dominated occupation or fear of disclosure among male Veterans; however, shared features include higher levels of psychiatric comorbidity and experiences of childhood sexual trauma (Nichter et al., 2022). MST experiences have been linked to several mental health conditions in Veteran and VHA patient populations, including post-traumatic stress disorder (PTSD), depression and other mood disorders, anxiety disorders, and substance use disorders (Kimerling et al., 2007; Klingensmith et al., 2014; Sumner et al., 2021). Additionally, MST experiences have been associated with physical health conditions including chronic pain, gastrointestinal problems, liver disease, and chronic pulmonary disease as well as obesity, weight loss, and hypothyroidism in women and HIV/AIDS in men (Kimerling et al., 2007; Sumner et al., 2021). Acknowledging both the prevalence and health impacts of MST in the Veteran population, VHA policy mandates that all former service members seen for VA health care are screened for MST and that treatment for any related health condition is provided free of charge (Department of Veterans Affairs Veterans Health Administration, 2018; Kimerling et al., 2007).

VHA patients who have screened positive for MST have been found to be at increased risk of suicide mortality relative to those who have not experienced MST, even after adjustment for demographic, medical, and psychiatric factors (Kimerling et al., 2016). Experiences of MST have also been associated with non-fatal suicide attempts (NFSAs) in Veterans and VHA patients (Kimerling et al., 2007; Klingensmith et al., 2014; Monteith et al., 2019; Pavao et al., 2013); VHA patients with a history of MST were at increased risk of suicide and intentional self-inflicted injury (Kimerling et al., 2007). In a nationally representative sample of Veterans, a history of MST was associated with elevated rates of prior NFSAs (aOR = 2.78), even after adjustment for demographic and military characteristics (Klingensmith et al., 2014). This link appears to be robust across settings; in a cohort of women Veterans seeking reproductive care in VA, Monteith et al. (2023) found that a history of assaultive MST was uniquely associated with both past-month suicide attempt and overall post-military suicide attempts. For homeless VHA patients, a history

of MST was associated with increased odds of suicide and intentional self-inflicted injury (Pavao et al., 2013). Importantly, results from Nichter et al. (2022), as well as other recent studies (Monteith et al., 2019, 2023), have shown that rates of MST recorded within the past 5 years are often higher than previously reported, and recommendations from the literature have expanded to include identifying a broad range of factors related to MST that increase suicide risk. This is especially relevant given the inconsistent predictive link between lifetime suicide attempt and suicidal thoughts (Wastler et al., 2022). Taken together, this work demonstrates that a history of MST can serve as a risk factor for suicidal behavior, including NFSAs, but more work is required to determine whether specific subgroups of Veterans who experienced MST may be at particularly elevated risk.

Although many studies document predictors for NFSAs in the Veteran and VHA patient populations, less is known about predictors of NFSAs among VHA patients who experienced MST. Understanding these factors can support care enhancement efforts targeting vulnerable subgroups. In a sample of 112 Veterans with histories of MST, predictors of post-MST NFSAs included pre-MST suicide attempts and post-traumatic maladaptive cognitions about self (e.g., I am a weak person; nothing good can happen to me anymore) (Foa et al., 1999; Monteith et al., 2019). With respect to MST type, a recent study of women Veterans seeking reproductive care in VA found that while both military sexual harassment and military sexual assault were linked to suicidal ideation following military separation, only assaultive-type MST was associated with post-separation suicide attempt (Monteith et al., 2023). With respect to mental health conditions, a study of Operation Enduring Freedom/Operation Iraqi Freedom Veterans with histories of MST receiving VHA care found that risk of suicide and intentional self-inflicted injury was highest among those with comorbid PTSD and depressive disorder diagnoses (Livingston et al., 2020). Importantly, other mental health conditions, including substance use disorders and personality disorders, have been linked to increased rates of NFSAs in Veterans (Hein, Cooper, & McCarthy, 2022; Tsai & Cao, 2019). It is also important to consider the impact of healthcare system-related factors, as there is also evidence that outpatient care engagement can be protective against NFSAs (Hein, Cooper, & McCarthy, 2022; Stanley et al., 2015). Finally, in a recent meta-analysis of predictors suicidal ideation and attempts in Veterans who experienced MST, Livingston et al. (2023) identified small effect size increases in suicidal ideation and attempts for women (vs. men) and married Veterans (vs. not married). Importantly, they note that these factors are likely part of a larger network of risk factors for suicide. These studies provide valuable insights

into vulnerable subgroups but further work utilizing more generalizable samples is warranted.

The present study aims to inform VHA clinical and operational practices and address gaps in the literature by (United States Department of Veterans Affairs, Office of Mental Health and Suicide prevention, 2020) reporting the prevalence of documented NFSAs among a national cohort of VHA patients who screened positive for a history of MST (Nichter et al., 2022); assessing for unadjusted demographic, clinical, and VHA care engagement differences between VHA patients who experienced MST with and without a documented NFSAs; and (Kimerling et al., 2007) modeling predictors of documented NFSAs among VHA patients with a history of MST. These analyses will assess whether there are subgroups of VHA patients who experienced MST who are at elevated risk of NFSAs and may benefit from additional assessment and support.

METHODS

Population

Using administrative data sources, MST screening history prior to FY 2019 was assessed. All former service members seen for care in VHA are screened by a clinical provider for experiences of MST. This VHA universal MST screening consists of two items. An affirmative response to either item is considered a positive screen for MST; negative responses to both items are considered a negative screen (Kimerling et al., 2016). Analyses focused on the subset of patients with a positive screen for MST prior to FY 2019 ($N=228,322$). Of this subset of patients, the population of VHA patients who used VHA during fiscal year (FY) 2019 did not die during FY 2019 and had complete race, service connection, and rurality information was identified ($N=212,215$).

Demographic variables

Demographic characteristics included gender, age (18–54 years, 55 years and older), race (mutually exclusive categories: White, non-White), ethnicity (Hispanic, non-Hispanic), and marital status (currently married, not currently married). Homelessness was indicated by receipt of an International Classification of Diseases 10th Revision (ICD-10) diagnosis code for homelessness (Z59.0) or by receipt of outpatient care in a VHA homeless clinic. Military service-connected disability rating was based on VHA enrollment data during the period of interest and categorized by the level of service-connected disability assigned

to each patient (0%–60%, 70%–100%). Rurality of home zip code was categorized as rural or urban per US Census-derived Rural Urban Commuting Area (RUCA) codes (West et al., 2010).

Clinical characteristics

Mental health diagnoses were assessed for FY 2019 based on the presence of diagnoses assigned within VHA care encounters for multiple conditions: serious mental illness (SMI; schizophrenia, bipolar disorder, other psychoses), post-traumatic stress disorder (PTSD), substance use disorder (SUD), generalized anxiety disorder (GAD), depressive disorder, personality disorder, and other mental health disorders (e.g., attention deficit disorder and acute stress reaction; Table A1).

Prior year (FY 2018) receipt of a disruptive behavioral flag (BDF) (Weinberger et al., 2018) indicating physical or verbal aggression, and prior year receipt of a high risk for suicide flag (HRF) (Department of Veterans Affairs Veterans Health Administration, 2008, 2012; Hein, Peltzman, et al., 2022) were also assessed. Elixhauser medical morbidity score (Elixhauser et al., 1998) was generated for each patient, with each patient assigned a level of medical morbidity based on their number of serious medical condition diagnoses (0–2/3+) in the prior year. A mental health comorbidity score (Shiner et al., 2021) was generated in a manner that mirrored the creation of the Elixhauser medical morbidity score, with each patient assigned a number based on number of major mental health diagnostic categories they had received (0/1–2/3+) in the prior year.

VHA care utilization

VHA utilization was assessed in FY 2018, the year prior to the index period. Measures were created to reflect each patient's receipt of emergency department visits (none/1+), inpatient psychiatric admissions (none/1+), outpatient mental health encounters (none/1+), and [primary care encounters (0–1/2+)]. Psychotropic medication prescription status during FY 2019 was also assessed for antidepressants, mood stabilizers, antipsychotics, and benzodiazepines.

Suicide attempts

As in previous assessments of VHA data, documentation of a NFSAs in FY 2019 was assessed per diagnosis codes (T14.91, T36-T65 or T71 ending in 2A, 2D, 2XA, or 2XD,

X71-X82, excluding all codes ending in “S”) and suicidal behavior records reported by providers in internal VHA reporting templates (Hein, Peltzman, et al., 2022).

Data analysis

Descriptive demographic, clinical, and VHA care utilization information for patients was generated. In bivariate analyses, chi-square tests and relative probabilities were used to test for differences in proportions between those with and without NFSAs during FY 2019. Multivariable logistic regression was used to assess the adjusted odds of a documented NFSAs for each of the demographic, clinical, and VHA treatment predictors while controlling for all others in the model. To capture the impact of suicide deaths, we also estimated a second multivariate logistic model to assess the adjusted odds of a documented NFSAs or suicide death. HRFs are often received in the context of a documented suicide attempt (Hein, Peltzman, et al., 2022) and were omitted from the regression model. As in previous assessments of VHA data (Nelson et al., 2022), both statistical significance and practical significance, conceptualized as odds ratios greater than 1.2 or less than 0.80, were considered to determine whether a relationship was practically meaningful. Only results that meet both standards of significance are presented.

RESULTS

Of the 212,215 VHA patients who had a positive screen for MST prior to FY 2019, 1742 (0.8%) had a documented NFSAs in FY 2019. Among VHA patients with MST, there were 3041 deaths in FY 2019, 90 of which were suicide deaths. As this evaluation examined NFSAs, these 3041 patients were excluded from the study population of interest. However, to ensure that we did not artificially bias our results by excluding suicide decedents, we estimated a separate model that included Veterans who died by suicide. Results, presented in-text below, were unchanged by including suicide decedents.

For the NFSAs-only model, in unadjusted bivariate analyses, VHA patients who experienced MST and had a documented NFSAs were more likely to be younger [relative probability (RP) for age 18 to 54 = 1.39, $\chi^2 = 252.7$], homeless (RP = 4.46, $\chi^2 = 1831.5$), and less likely to be married (RP = 0.76, $\chi^2 = 61.8$) or live in a rural area (RP = 0.76, $\chi^2 = 40.7$) than those without an NFSAs. Those with an NFSAs were also more likely to have received a diagnosis of SMI (RP = 2.84, $\chi^2 = 784.6$), PTSD (RP = 1.69, $\chi^2 = 682.7$), SUD (RP = 3.37, $\chi^2 = 1683.5$), GAD (RP = 1.80, $\chi^2 = 374.1$), depressive disorder (RP = 1.65, $\chi^2 = 558.9$), personality

disorder (RP = 5.94, $\chi^2 = 2121.9$), or other mental health disorder (RP = 2.00, $\chi^2 = 302.6$); to have higher levels of medical comorbidity (RP for Elixhauser 3+ = 1.58, $\chi^2 = 303.6$); to have higher levels of mental health comorbidity (RP for 3+ categories = 1.96, $\chi^2 = 1125.1$); to have received a behavioral risk flag (RP = 6.45, $\chi^2 = 224.1$) or a suicide risk flag (RP = 15.03, $\chi^2 = 6327.4$); to have been prescribed antidepressants (RP = 1.65, $\chi^2 = 840.6$), mood stabilizers (RP = 2.11, $\chi^2 = 909.4$), antipsychotics (RP = 3.33, $\chi^2 = 1815.8$), or benzodiazepines (RP = 1.97, $\chi^2 = 194.6$); and to have received a prior year emergency department visit (RP = 2.02, $\chi^2 = 674.4$), inpatient psychiatric admission (RP = 9.80, $\chi^2 = 3717.3$), or outpatient mental health encounter (RP = 1.66, $\chi^2 = 785.8$) (Table 1).

In multivariable logistic regression analyses, increased NFSAs risk was associated with younger age (aOR = 1.77); homelessness (aOR = 2.65); receipt of a diagnosis of PTSD (aOR = 1.35), SUD (aOR = 1.70), depressive disorder (aOR = 1.28), or personality disorder (aOR = 1.94); receipt of a prescription for antidepressants (aOR = 2.69), mood stabilizers (aOR = 1.65), antipsychotics (aOR = 2.16) or benzodiazepines (aOR = 1.23); having a prior year emergency department visit (aOR = 1.32) or inpatient psychiatric admission. Other measures of interest were not found to be related to NFSAs risk (aOR = 2.15, Table 2).

For the second model including suicide decedents (see Table 3), of the 90 patients that died by suicide, 38 patients were excluded from the model due to missing values for Race or Service Connection status. Thus, the final model included an additional 52 Veterans who died by suicide. Results from this expanded model mirrored results from the model based on those who experienced NFSAs alone. In this multivariate regression model, increased NFSAs risk was associated with younger age (aOR = 1.80); homelessness (aOR = 2.65); receipt of a diagnosis of PTSD (aOR = 1.35), SUD (aOR = 1.68), depressive disorder (aOR = 1.28), or personality disorder (aOR = 1.97); receipt of a prescription for antidepressants (aOR = 2.51), mood stabilizers (aOR = 1.63), antipsychotics (aOR = 2.16), or benzodiazepines (aOR = 1.23); having a prior year emergency department visit (aOR = 1.29) or inpatient psychiatric admission (aOR = 2.13). Other measures of interest were not found to be related to suicide attempt risk.

DISCUSSION

Previous research on Veterans and VHA patients who have a history of MST has shown that they are at increased risk of suicide. While this research has identified specific contributors to suicide risk within smaller samples of MST survivors, there have not been any large-scale evaluations of risk factors associated with NFSAs risk.

TABLE 1 Characteristics of VHA patients who experienced MST by non-fatal suicide attempt status.

Patient characteristics during the 1-year time period ending in FY19Q4	Patients with MST				Relative probability	χ^2
	Non-fatal suicide attempt		No non-fatal suicide attempt			
	1742 <i>N</i>	0.8% %	210,473 <i>N</i>	99.2% %		
Demographics						
Gender						
Female	1011	58.0	130,874	62.2	0.93	12.6
Male	731	42.0	79,599	37.8	1.11	
Age in years						
18–54	1182	67.9	102,575	48.7	1.39	252.7*
55+ years	560	32.1	107,898	51.3	0.63	
Race^a						
White	1247	71.6	145,060	68.9	1.04	5.7
Non-white	495	28.4	65,413	31.1	0.91	
Hispanic	149	8.6	14,363	6.8	1.25	8.1
Currently married	504	28.9	80,222	38.1	0.76	61.8*
Homelessness risk	647	37.1	17,529	8.3	4.46	1831.5*
Percent service connected						
0%–60%	936	53.7	127,668	60.7	0.89	34.7*
70%–100%	806	46.3	82,805	39.3	1.18	
Rurality						
Urban	1364	78.3	150,201	71.4	1.10	40.7*
Rural	378	21.7	60,272	28.6	0.76	
Clinical characteristics, prior year						
SMI	592	34.0	25,190	12.0	2.84	784.6*
PTSD	1330	76.3	94,833	45.1	1.69	682.7*
SUD	878	50.4	31,436	14.9	3.37	1683.5*
General anxiety disorder	792	45.5	53,071	25.2	1.80	374.1*
Depression	1244	71.4	90,962	43.2	1.65	558.9*
Personality disorder	514	29.5	10,457	5.0	5.94	2121.9*
Other mental health	520	29.9	31,358	14.9	2.00	302.6*
Prior year behavioral risk flag	51	2.9	955	0.5	6.45	224.1*
Prior year suicide risk flag	531	30.5	4269	2.0	15.03	6327.4*
Medical comorbidity (Elixhauser, no psychoses)						
0–2 comorbidities	801	46.0	138,056	65.6	0.70	303.6*
3+ comorbidities	941	54.0	71,817	34.1	1.58	
Mental health comorbidity						
Low (0 conditions)	69	4.0	47,423	22.5	0.18	1125.1*
Medium (1–2 conditions)	272	15.6	76,824	36.5	0.43	
High (3+ MH conditions)	1401	80.4	86,226	41.0	1.96	
Treatment receipt/clinical outcomes						
Proportion of patients with 1+						
Antidepressant	1541	88.5	113,016	53.7	1.65	840.6*

(Continues)

TABLE 1 (Continued)

Patient characteristics during the 1-year time period ending in FY19Q4	Patients with MST				Relative probability	χ^2
	Non-fatal suicide attempt		No non-fatal suicide attempt			
	1742 N	0.8% %	210,473 N	99.2% %		
Mood stabilizer	1103	63.3	63,119	30.0	2.11	909.4*
Antipsychotic	951	54.6	34,455	16.4	3.33	1815.8*
Benzodiazepine	367	21.1	22,458	10.7	1.97	194.6*
Number of visits in the prior year						
1+ ER Visit	967	55.5	57,946	27.5	2.02	674.4*
1+ IP Psychiatric admission	493	28.3	6080	2.9	9.80	3717.3*
2+ Primary care (reference: 0–1)	1303	74.8	148,587	70.6	1.06	14.7
1+ Outpatient mental health	1482	85.1	108,127	51.4	1.66	785.8*

Note: Green shading indicating relative probability >1.2 or <0.8.

^aBlack Veterans ($n = 58,132$) were combined with small numbers of Asian or Pacific Islander ($n = 4832$) and American Indian or Alaska Native ($n = 2944$) in the "non-White" race category due to low numbers that precluded meaningful interpretation across each individual group.

* $p < 0.0001$.

The present assessment of a national cohort of VHA patients who screened positive for MST found significant differences in group characteristics between patients with and without NFSAs during the evaluation period. Patients who had NFSAs were more likely to be younger, unmarried, homeless, and living in urban settings than patients who did not have NFSAs. Those with a NFSAs were also more likely to have elevated medical and mental health morbidity, to have received specific mental health diagnoses, and to have been prescribed psychotropic medications. Patients with a NFSAs also were more likely to have prior year behavioral and suicide risk flags and to have a history of high-intensity service utilization. Group differences across many of these characteristics were striking. Patients with a NFSAs were more than 4 times as likely to be homeless, nearly 3 times as likely to receive a diagnosis of SMI, nearly 4 times as likely to receive a diagnosis of SUD, nearly 6 times as likely to receive a diagnosis of a personality disorder, nearly twice as likely to have elevated levels of mental health morbidity, and nearly 10 times as likely to have a recent history of psychiatric admission. Except for urban residence and prior year behavioral flags, all these factors have been linked to increased suicide risk in previous research on the general Veteran population (e.g., Department of Veterans Affairs Veterans Health Administration, 2008, 2012; Tsai & Cao, 2019; Weinberger et al., 2018) and reflect an extension of these findings to the specific population of Veterans who experienced MST.

In multivariate analyses, increased suicide attempt risk was found to be associated with the presence of diagnoses of PTSD, SUD, depressive disorder, and

personality disorders. This is consistent with prior research that found comorbid PTSD and depressive disorder were associated with increased risk of suicide and self-inflicted injury among VHA patients with a positive MST screen (Livingston et al., 2020). Mental health diagnoses and comorbidity have also been associated with suicide risk in the broader VHA patient population (McCarthy et al., 2015; Department of Veterans Affairs, Veterans Health Administration, Office of Mental Health and Suicide Prevention, 2021). It is important to note that in our sample, the overall rates of these disorders in the NFSAs group were largely higher than what has been observed in non-MST samples (McCarthy et al., 2015; Zivin et al., 2007). Elevated suicide attempt risk was also associated with receipt of high-intensity mental health treatment and receipt of psychotropic medication over and above the impact of mental health diagnoses. Notably, in this study, overall mental health morbidity was not associated with elevated risk of NFSAs, suggesting NFSAs risk may not be due to the cumulative effects of multiple categories of mental health conditions but rather to condition-specific risk factors among those who have experienced MST. This may suggest condition-specific (e.g., PTSD, major depression) contributors to suicide risk, as opposed to a more general cumulative impact across all mental health conditions. Together, this suggests that VHA patients who experienced MST and have specific mental health diagnoses (e.g., PTSD and SUD) and receive high-intensity care may be at particularly elevated risk of NFSAs.

Notably, the prevalence of NFSAs in the present sample (0.8%) was lower than in some previous studies.

TABLE 2 Predictors of non-fatal suicide attempt among patients who experienced MST ($N=212,215$).

Predictor	Estimate	Standard error	Odds ratio	95%	
				Confidence limits	
SMI diagnosis, prior year	0.0309	0.07	1.03	0.90	1.18
Female gender	-0.1362	0.05	0.87	0.79	0.97
Age (18–54 vs. 55+ years)	0.5738	0.06	1.77	1.59	1.99
Race (Non-white vs. White) ^a	-0.2925	0.06	0.75	0.67	0.84
Hispanic	0.0647	0.10	1.07	0.88	1.30
Currently married	0.0670	0.05	1.07	0.98	1.17
Homelessness	0.9760	0.06	2.65	2.34	3.01
Service connected (70%–100% vs. 0%–60%)	0.0828	0.05	1.09	0.99	1.20
Urban (vs. Rural)	0.1292	0.07	1.14	1.00	1.30
PTSD diagnosis, prior year	0.2995	0.07	1.35	1.18	1.54
SUD diagnosis, prior year	0.5303	0.06	1.70	1.50	1.93
General Anxiety Disorder diagnosis, prior year	0.0083	0.05	1.01	0.92	1.11
Depression diagnosis, prior year	0.2445	0.08	1.28	1.10	1.49
Personality disorder diagnosis, prior year	0.6612	0.05	1.94	1.74	2.15
Other Mental Health diagnosis, prior year	0.0790	0.05	1.08	0.99	1.19
Behavioral risk flag, prior year	0.1150	0.16	1.12	0.83	1.52
Medical severity score, prior year (3+ vs. 0–2)	-0.1717	0.05	0.84	0.76	0.93
Mental health comorbidity, prior year (1–2 vs. 0)	-0.0331	0.15	0.97	0.72	1.29
Mental health comorbidity, prior year (3+ vs. 0)	0.0559	0.16	1.06	0.77	1.45
Antidepressant receipt	0.9897	0.08	2.69	2.28	3.17
Mood stabilizer receipt	0.5006	0.06	1.65	1.48	1.84
Antipsychotic receipt	0.7722	0.05	2.16	1.97	2.38
Benzodiazepine receipt	0.2034	0.06	1.23	1.09	1.38
ER Visit, prior year (1+ vs. 0)	0.2772	0.06	1.32	1.18	1.47
IP Psychiatric admission, prior year (1+ vs. 0)	0.7640	0.08	2.15	1.83	2.52
Primary Care visits, prior year (2+ vs. 0–1)	-0.1764	0.06	0.84	0.75	0.93
OPMH visit, prior year (1+ vs. 0)	-0.017	0.08	0.98	0.84	1.15

Note: Green shading indicating odds ratio >1.2 or <0.8.

^aSmall numbers of Black, Asian or Pacific Islander (API), American Indian or Alaska Native (AIAN), and multiracial Veterans were combined in the “non-White” race category due to low numbers that precluded meaningful interpretation across each individual group.

Monteith et al. (2019) reported that 40.7% of Veterans who experienced MST reported post-MST NFSAs, but the period of observation was any time after the MST, instead of a single year, and their convenience sample of 112 Veterans living in the Mountain West may not be generalizable. Similarly, work by Livingston et al. (2020) documented that 3.71% of their sample of OEF/OIF

Veterans reported a NFSAs over at least a five-year follow-up period. However, McCarthy et al. (2015) reported a rate of 0.2% for past 12-month suicide attempt, suggesting that differences may be attributable to sample characteristics, span of evaluation, or use of documented NFSAs as opposed to self-report. As such, while it appears to be important to monitor suicide risk for

TABLE 3 Predictors of suicide attempt (fatal and non-fatal) among patients who experienced MST ($N=212,267$).

Predictor	Estimate	Standard error	Odds ratio	95%	
				Confidence limits	
SMI diagnosis, prior year	0.0419	0.07	1.04	0.91	1.19
Female gender	-0.1496	0.05	0.86	0.78	0.95
Age (18–54 vs. 55+ years)	0.5856	0.06	1.80	1.60	2.01
Race (Non-white vs. White) ^a	-0.3058	0.06	0.74	0.66	0.82
Hispanic	0.0407	0.10	1.04	0.85	1.27
Currently married	0.0726	0.05	1.08	0.98	1.18
Homelessness	0.9742	0.06	2.65	2.34	3.00
Service connected (70%–100% vs. 0%–60%)	0.1097	0.05	1.12	1.01	1.23
Urban (vs. rural)	0.1326	0.07	1.14	1.00	1.30
PTSD diagnosis, prior year	0.299	0.07	1.35	1.18	1.54
SUD diagnosis, prior year	0.5178	0.06	1.68	1.48	1.90
General Anxiety Disorder diagnosis, prior year	0.0175	0.05	1.02	0.92	1.12
Depression diagnosis, prior year	0.2469	0.08	1.28	1.10	1.49
Personality disorder diagnosis, prior year	0.6761	0.05	1.97	1.78	2.18
Other Mental Health diagnosis, prior year	0.0824	0.05	1.09	0.99	1.19
Behavioral risk flag, prior year	0.1139	0.16	1.12	0.82	1.53
Medical Severity Score, prior year (3+ vs. 0–2)	-0.1626	0.05	0.85	0.76	0.94
Mental Health Comorbidity, prior year (1–2 vs. 0)	-0.0441	0.14	0.96	0.72	1.27
Mental Health Comorbidity, prior year (3+ vs. 0)	0.0264	0.16	1.03	0.75	1.41
Antidepressant receipt	0.9185	0.08	2.51	2.13	2.94
Mood stabilizer receipt	0.4868	0.05	1.63	1.46	1.81
Antipsychotic receipt	0.7693	0.05	2.16	1.97	2.37
Benzodiazepine receipt	0.2075	0.06	1.23	1.10	1.38
ER Visit, prior year (1+ vs. 0)	0.253	0.06	1.29	1.15	1.44
IP Psychiatric admission, prior year (1+ vs. 0)	0.7568	0.08	2.13	1.82	2.49
Primary Care visits, prior year (2+ vs. 0–1)	-0.1858	0.06	0.83	0.74	0.93
OPMH visit, prior year (1+ vs. 0)	0.0232	0.08	1.02	0.87	1.20

Note: Green shading indicating relative probability > 1.2 or < 0.8.

^aSmall numbers of Black, Asian or Pacific Islander (API), American Indian or Alaska Native (AIAN), and multiracial Veterans were combined in the “non-White” race category due to low numbers that precluded meaningful interpretation across each individual group.

Veterans who have experienced MST, we did not observe significantly greater rates of NFSAs in our single-year study than have been found in previous investigations not limited to Veterans who have experienced MST.

There were several notable null results with potential implications for suicide prevention efforts for patients who experienced MST. First, documented NFSAs did not

differ by gender. This is contrary to previous work on the gender paradox in suicide, in which women are more likely to engage in suicidal behavior yet have lower suicide mortality (Canetto & Sakinofsky, 1998; Livingston et al., 2023). This paradox has been noted in the Veteran population (Hein, Cooper, & McCarthy, 2022; Hein, Peltzman, et al., 2022) but may reflect gender differences

in non-fatal suicide attempt documentation. Work by Kimerling et al. (2016) indicated that while the absolute effects of MST on suicide mortality were greater among women than men, survival curves suggested that MST may negate the protective effect of female gender on suicide mortality risk. Specifically, women with MST showed similar risk of death by suicide over time as the general population of male VHA users (Kimerling et al., 2016). The present work provides further indication that the relation between gender and suicide risk may show different patterns among MST survivors. It is also important to note that we did not stratify analyses by gender, so it may be that while there was no difference in NFSAs by gender, predictors of NFSAs may differ by gender.

Second, NFSAs risk did not differ by service connection. This is contrary to prior work indicating that service connection is a protective factor against suicidal behavior (Desai et al., 2005; Zivin et al., 2007). Typically, service connection increases access to VA health services and comes with compensation payments that bolster and stabilize income; this may reduce suicide risk (Nelson et al., 2022). However, it is VHA policy that service connection is not required to receive free treatment for any MST-related mental or physical health conditions. That risk did not differ across service connection in the present study emphasizes the value of ensuring access to care in vulnerable populations. Finally, model results between the NFSAs model and the second model including suicide decedents were almost identical. This is potentially due to the relatively small number of suicide decedents (90 total, 52 included in the model due to missing demographic information) compared to the overall sample, though it is also possible that these groups are not meaningfully different with respect to clinical and demographic predictors of a suicide attempt risk. Future matched cohort studies with larger sample sizes, conducted over multiple years, may be able to explore these questions more fully.

Implications

Study findings indicate that among VHA patients who experienced MST, mental health conditions may exacerbate risk of NFSAs. Likely indicators of mental health severity, including receipt of psychotropic medication prescriptions, inpatient psychiatric admissions, and emergency department visits were also associated with increased risk of NFSAs. It is noteworthy that risk factors for NFSAs in patients who screened positive for MST are similar to those in the general VHA patient population (Department of Veterans Affairs Veterans Health

Administration, 2008). This suggests that VHA providers can continue to effectively evaluate risk for NFSAs in patients who experienced MST using established VHA assessment methods and protocols. The finding in this study of elevated NFSAs risk among patients who have specific mental health diagnoses (PTSD, SUD, depressive disorder, and personality disorders) reinforces the importance of VHA's policies promoting expansive access to MST-related care and highlights the value of universal screening. VHA patients who experienced MST are generally provided treatment within the care setting matched to their individual healthcare needs; the present work provides further support for VHA's efforts to ensure broad access to diagnosis-specific treatment for MST survivors, including but not limited to treatment for MST-related PTSD. Additionally, elevated NFSAs risk associated with homelessness indicates the importance of addressing issues associated with homelessness. Together, these findings provide direction for continuing suicide prevention interventions within VHA for patients who experienced MST.

Limitations

The current work has several limitations. First, NFSAs assessment was limited to VHA documentation; VHA patients may have disclosed suicide attempts to non-VHA providers or not disclosed them at all. Additionally, because MST exposure is assessed using a dichotomous variable based on information from administrative patient records, we were unable to compare harassment vs. assaultive-only MST. Recent studies using smaller administrative data samples have shown the value of separating out assaultive vs. harassment-type MST (Monteith et al., 2023), which may add important nuance to future evaluations on this topic. Second, assessment of several important factors including race, sexual identity, gender identity, and socioeconomic status was either limited or unavailable based on administrative data, precluding meaningful interpretation. Third, the analyses examined single factors, as opposed to multiple factors or their interactions, which may be less robust in predicting suicide risk. Additionally, some factors may be associated in ways that are not directly captured by our approach, including increased detection opportunities for mental health and medical concerns which emerge through higher levels of participation in care. In particular, the lack of available information on overall mental health severity or condition-specific severity limits interpretation of the impact of mental health conditions on NFSAs for those who experienced MST. In future work, it may be important to examine the impact of combinations of psychiatric disorders,

including those identified in this evaluation as predicting NFSAs (e.g., PTSD + SUD, PTSD + Personality Disorders). Also, our evaluation of psychotropic medication receipt during the same period as NFSAs does not allow for clarity related to the temporality of these factors. Despite these limitations, the current work informs targets for suicide prevention initiatives to enhance care provided to VHA patients who experienced MST.

CONCLUSIONS

VHA patients who experienced MST who have specific mental health conditions are at elevated risk of NFSAs. Additionally, VHA patients with histories of MST who are younger and have indicators of homelessness are also at elevated risk. Several demographic variables were unrelated, including gender and service connection. Together, these findings provide insights as to potential targets for continuing suicide prevention initiatives for VHA patients who experienced MST.

ACKNOWLEDGEMENTS

The work presented in this manuscript was conducted as part of ongoing operations work in the VA Office of Mental Health and Suicide Prevention (OMHSP) and was funded by OMHSP. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the VA.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

The VHA data that supports the findings of this study are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

This project was part of ongoing VHA quality improvement and evaluation analyses and was exempt from Institutional Review Board approval.

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How to cite this article: Hein, T. C., Austin, K., Grau, P. P., Keith, J. A., Claes, N. J., & Bowersox, N. W. (2024). Predictors of non-fatal suicide attempts among Veterans Health Administration (VHA) patients who experienced military sexual trauma. *Suicide and Life-Threatening Behavior*, 00, 1–12. <https://doi.org/10.1111/sltb.13038>

APPENDIX

TABLE A1 International Classification of Diseases 10th Revision (ICD-10) diagnosis codes.

Diagnosis	ICD-10 codes
Serious mental illness	F06.0, F06.2, F20.0, F20.1, F20.2, F20.3, F20.5, F20.81, F20.89, F20.9, F22., F23., F24., F25.0, F25.1, F25.8, F25.9, F28., F29., F30.10, F30.11, F30.12, F30.13, F30.2, F30.3, F30.4, F30.8, F30.9, F31.0, F31.10, F31.11, F31.12, F31.13, F31.2, F31.30, F31.31, F31.32, F31.4, F31.5, F31.60, F31.61, F31.62, F31.63, F31.64, F31.70, F31.71, F31.72, F31.73, F31.74, F31.75, F31.76, F31.77, F31.78, F31.8, F31.89, F31.9, F53
Post-traumatic stress disorder	F43.10, F43.11, F43.12

(Continues)

TABLE A1 (Continued)

Diagnosis	ICD-10 codes
Substance use disorder	F10.27, F19.97, F10.10, F10.11, F10.120, F10.121, F10.129, F10.14, F10.150, F10.151, F10.159, F10.180, F10.181, F10.182, F10.188, F10.19, F10.20, F10.21, F10.220, F10.221, F10.229, F10.230, F10.231, F10.232, F10.239, F10.24, F10.250, F10.251, F10.259, F10.26, F10.280, F10.281, F10.282, F10.288, F10.29, F10.920, F10.921, F10.929, F10.94, F10.950, F10.951, F10.959, F10.96, F10.97, F10.980, F10.981, F10.982, F10.988, F10.99, F11.10, F11.11, F11.120, F11.121, F11.122, F11.129, F11.14, F11.150, F11.151, F11.159, F11.181, F11.182, F11.188, F11.19, F11.20, F11.21, F11.220, F11.221, F11.222, F11.229, F11.23, F11.24, F11.250, F11.251, F11.259, F11.281, F11.282, F11.288, F11.29, F11.90, F11.920, F11.921, F11.922, F11.929, F11.93, F11.94, F11.950, F11.951, F11.959, F11.981, F11.982, F11.988, F11.99, F12.10, F12.11, F12.120, F12.121, F12.122, F12.129, F12.150, F12.151, F12.159, F12.180, F12.188, F12.19, F12.20, F12.21, F12.220, F12.221, F12.222, F12.229, F12.250, F12.251, F12.259, F12.280, F12.288, F12.29, F12.90, F12.920, F12.921, F12.922, F12.929, F12.950, F12.951, F12.959, F12.980, F12.988, F12.99, F13.10, F13.11, F13.120, F13.121, F13.129, F13.14, F13.150, F13.151, F13.159, F13.180, F13.181, F13.182, F13.188, F13.19, F13.20, F13.21, F13.220, F13.221, F13.229, F13.230, F13.231, F13.232, F13.239, F13.24, F13.250, F13.251, F13.259, F13.26, F13.27, F13.280, F13.281, F13.282, F13.288, F13.29, F13.90, F13.920, F13.921, F13.929, F13.930, F13.931, F13.932, F13.939, F13.94, F13.950, F13.951, F13.959, F13.96, F13.97, F13.980, F13.981, F13.982, F13.988, F13.99, F14.10, F14.11, F14.120, F14.121, F14.122, F14.129, F14.14, F14.150, F14.151, F14.159, F14.180, F14.181, F14.182, F14.188, F14.19, F14.20, F14.21, F14.220, F14.221, F14.222, F14.229, F14.23, F14.24, F14.250, F14.251, F14.259, F14.280, F14.281, F14.282, F14.288, F14.29, F14.90, F14.920, F14.921, F14.922, F14.929, F14.94, F14.950, F14.951, F14.959, F14.980, F14.981, F14.982, F14.988, F14.99, F15.10, F15.11, F15.120, F15.121, F15.122, F15.129, F15.14, F15.150, F15.151, F15.159, F15.180, F15.181, F15.182, F15.188, F15.19, F15.20, F15.21, F15.220, F15.221, F15.222, F15.229, F15.23, F15.24, F15.250, F15.251, F15.259, F15.280, F15.281, F15.282, F15.288, F15.29, F15.90, F15.920, F15.921, F15.922, F15.929, F15.93, F15.94, F15.950, F15.951, F15.959, F15.980, F15.981, F15.982, F15.988, F15.99, F16.10, F16.11, F16.120, F16.121, F16.122, F16.129, F16.14, F16.150, F16.151, F16.159, F16.180, F16.183, F16.188, F16.19, F16.20, F16.21, F16.220, F16.221, F16.229, F16.24, F16.250, F16.251, F16.259, F16.280, F16.283, F16.288, F16.29, F16.90, F16.920, F16.921, F16.929, F16.94, F16.950, F16.951, F16.959, F16.980, F16.983, F16.988, F16.99, F18.10, F18.11, F18.120, F18.121, F18.129, F18.14, F18.150, F18.151, F18.159, F18.17, F18.180, F18.188, F18.19, F18.20, F18.21, F18.220, F18.221, F18.229, F18.24, F18.250, F18.251, F18.259, F18.27, F18.280, F18.288, F18.29, F18.90, F18.920, F18.921, F18.929, F18.94, F18.950, F18.951, F18.959, F18.97, F18.980, F18.988, F18.99, F19.10, F19.11, F19.120, F19.121, F19.122, F19.129, F19.14, F19.150, F19.151, F19.159, F19.16, F19.17, F19.180, F19.181, F19.182, F19.188, F19.19, F19.20, F19.21, F19.220, F19.221, F19.222, F19.229, F19.230, F19.231, F19.232, F19.239, F19.24, F19.250, F19.251, F19.259, F19.26, F19.27, F19.280, F19.281, F19.282, F19.288, F19.29, F19.90, F19.920, F19.921, F19.922, F19.929, F19.930, F19.931, F19.932, F19.939, F19.94, F19.950, F19.951, F19.959, F19.96, F19.980, F19.981, F19.982, F19.988, F19.99
Generalized anxiety disorder	F41.1
Depressive disorder	F32.0, F32.1, F32.2, F32.3, F32.4, F32.5, F32.9, F33.0, F33.1, F33.2, F33.3, F33.40, F33.41, F33.42, F33.9, F06.31, F06.32, F32.8, F32.81, F32.89, F33.8, F34.1
Personality disorder	F21., F60.0, F60.1, F60.2, F60.3, F60.4, F60.5, F60.6, F60.7, F60.81, F60.89, F60.9, F68.8, F69.
Other mental health disorders	F43.0, F43.20, F43.2, F43.22, F43.23, F43.24, F43.25, F43.29, F43.8, F43.9, F44.0, F44.1, F44.2, F44.4, F44.5, F44.6, F44.7, F44.81, F44.89, F44.9, F45.0, F45.1, F45.22, F45.8, F45.9, F48.1, F50.00, F50.01, F50.02, F50.2, F50.8, F50.81, F50.89, F50.9, F63.0, F63.1, F63.2, F63.3, F63.81, F63.89, F63.9, F68.10, F68.11, F68.12, F68.13, F90.0, F90.1, F90.2, F90.8, F90.9, F91.0, F91.1, F91.2, F91.3, F91.8, F91.9, R45.7
Suicide attempt	T14.91, T36-T65 or T71 ending in 2A, 2D, 2XA, or 2XD, X71-X82 Note: all excluding codes ending in "S"