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An Exploration of Differences in Veteran Suicidality

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Abstract

Suicide is an important issue of public health, with Veteran suicide being a somewhat unique sub-populous at high risk. This research aims to explore the factors involved in Veteran suicidality that may raise or lower one's risk. This analysis was conducted with the National Survey for Drug Use and Health (NSDUH) 2020 (N=1173) dataset through use of Binary Logistic Regression (BLR). The analysis showed that having a Major Depressive Episode (MDE) in the past year was the greatest predictor of increased suicidality, while marriage was the strongest buffer by decreasing the likelihood of suicidality increasing. Being a War on Terror Veteran (2001 or later) was shown to be a strong predictor of increased suicidality even after controlling for other significant factors, showing that Veterans from this category were just over twice as likely to express suicidality in the past year when compared to their pre-War on Terror Veteran counterparts. Additional predictors that bordered the line of significance were educational attainment (as a buffer), sexuality (as a predictor), and substance abuse disorders (as a predictor).

Word Count: 174

Keywords: Suicidality, Veterans, War on Terror, NSDUH

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

APA	American Psychological Association
AUD	Alcohol Use Disorder
BLR	Binary Logistic Regression
CUD	Cannabis Use Disorder
IPTS	Interpersonal Theory of Suicide
MDE	Major Depressive Episode
NSDUH	National Survey for Drug Use and Health
PTSD	Post-Traumatic Stress Disorder
RoFIPT	Ratio of Family Income to Poverty Threshold
SAMHSA	Substance Abuse & Mental Health Services Administration
SES	Socioeconomic Status
SI	Suicidal Ideation
SMI	Serious Mental Illness
SPSS	Statistical Product and Service Solutions
SUD	Substance Use Disorder
VHA	Veteran Health Administration

Introduction

Suicide is the 12th leading cause of death in the United States, which represents a public health problem (American Foundation for Suicide Prevention 2019). In addition to the impact that suicide has on individuals and families, suicide is costly for society, with an estimated cost of $70 billion per year. While pervasive across all segments of society (CDC, 2021), suicide among U.S. Military Veterans has risen over the past 10 years (U.S. Department of Veterans Affairs Office of Mental Health and Suicide Prevention 2021). This indicates a possible increase in rates of suicide for those Veterans serving more recently in the War on Terror (2001 and later). Theoretically, suicide has been examined through multiple typologies (Barbieri 2013; Bryan and Rudd 2016; David Klonsky and May 2015; Van Orden et al. 2010; Wray, Colen, and Pescosolido 2011), and has been a core topic of interest for sociologists, starting with Durkheim's early study on suicide that opened the door to exploring suicide as more than an individual act, one with measurable social elements (Durkheim 2005).

In considering the high risk and rates of suicidality among Veterans (U.S. Department of Veterans Affairs Office of Mental Health and Suicide Prevention 2021) there are three main questions that guide this research: 1) Under what circumstances do Veteran's levels of suicidality increase? 2) Do Veterans who served after September 2001 have a higher risk of suicidality than those who served prior to this date? 3.) Do sociodemographic characteristics, mental healthcare, and drug use affect suicidality? The intent of this research is to identify and discuss the associated factors of Veteran suicide risk. A better understanding of Veteran suicidality may assist clinicians and researchers to develop Veteran specific suicide models which may help mitigate suicide risk within the Veteran community.

Literature Review

An estimated 700,000 people die worldwide by suicide each year worldwide (World Health Organization n.d.). In the United States there are approximately 47,500 deaths by suicide per year as of 2019 (CDC 2021). Veterans make up an approximate 18-20% of this national suicide total, even though Veterans make up only 10% of the total population (Hargarten et al. 2013). This leaves suicide as both a global and national issue worth investing resources and time into so that we might find more effective solutions for future prevention efforts.

Suicidality is defined by the American Psychological Association (APA) as "The risk of suicide, usually indicated by suicidal ideation or intent, especially as evident in the presence of a well-elaborated suicidal plan" (APA 2020). There are several theoretical frameworks to view suicide through, such as the commonly used Interpersonal Theory of Suicide (IPTS) which has been tested more frequently than many other models. Studies that have used this model support the notion that the normal perceptions of burdensomeness, belongingness, and capability line up within the IPTS as anticipated (Drabenstott 2019). However, other research specific to combat veterans experiencing PTSD did not have the anticipated increase in suicide based on acquired capability as a factor, while the other two IPTS factors of burdensomeness and belongingness acted as expected within the IPTS framework (Bryan et al. 2013). This model led to some of the factors selected for this specific research based on these NSDUH data.

For example a 2015 study conducted for the Department of Veterans Affairs shows a hopeful trend in predictive modeling of suicide risk by utilizing patient's medical records and outcomes (alive or deceased by suicide over 1 year) to determine which factors from within Veteran Health Administration (VHA) clinical records show an increased risk of suicide over time (McCarthy et al. 2015). This example shows some promise in the ability to find which factors are good indicators of whether a Veteran will be high-risk or not. The question this research would like to address is one of differences between Veterans. What factors increase suicidality within the Veteran sub-populous? It is hoped to gain a further understanding, across the United States, of Veteran mental health and in doing so, to create a more recent, Veteran specific contribution to our understanding of Suicidality and those factors which can indicate higher risk of suicide.

By utilizing the Substance Abuse and Mental Health Services Administration (SAMHSA) data from the National Survey for Drug Use and Health (NSDUH) to look at data in the United States for the year 2020, I will conduct an updated examination as to the correlates of suicidality in a contemporary cohort of U.S. Veterans who have served on active duty at some point in their careers, as to which people were more or less likely to be suicidal. As indicated above, major factors commonly associated with suicide rates are those of: sex, race, age, socioeconomic status (SES) (income, education, employment), sexual orientation, marital status, criminal record, combat duty, health, and mental health outcomes such as substance use, mental disorder, and mental healthcare use. (Andrés, Halicioglu, and Yamamura 2011; Berchenko, Tolstasheva, and Iakushkin 2012; Berman 2014; Pollock et al. 2016; Shin et al. 2013). These studies each delve into the various depths of suicide rates in a community subset which gives some insight into common indicators of suicide risk. Specifically, a robust body of research that

Post-Traumatic Stress Disorder (PTSD) is usually associated with Veteran suicide (Arenson et al. 2018; Pietrzak et al. 2011; Sher, Braquehais, and Casas 2012; Walser et al. 2015).

Correlates of Veteran suicidality

Sociodemographic

Research indicates that, young, low education, and unemployed, men *and* women were at a much higher risk for suicidal attempts (Kim et al. 2016). Other literature suggests women are more likely to attempt suicide and men are more likely to complete the act (Callanan and Davis 2012). Additional research has found that sexual and gender minorities are a particularly high risk group for suicide in adolescence (Wofford 2017). For example, those who openly identify as LGBTQ+, those who are of younger age (18-26) and those who identify as female are at higher risk of suicide (Cochran et al. 2013). As such, multivariate research on suicide (especially for Veterans) usually controls for sexual identity given the associated risk factors for suicidality (Kimbrel et al. 2016).

Racialized or minoritized status has also been found to be associated with suicidality (Lorenzo-Luaces and Phillips 2014). For example, research that examined racial differences between suicidal ideation and attempts has found that non-Hispanic and Hispanic White people experienced greater ideations than their non-Hispanic Black counterparts, though suicide attempts did not appear to vary significantly between racial groups (Lorenzo-Luaces and Phillips 2014). Another factor that tends to go alongside race as a potential indicator is age. A study on suicide rates among cohorts examined generational differences (such as a person's age during specific historical events), which indicate a trend in more recent generations (those born post-1945) having higher rates of suicide in the middle age range, while their more elderly

counterparts (the “silent generation” 1915 to 1945) have traditionally had the highest rates of suicide in old age (Phillips 2014).

Marriage is usually deemed to be helpful in reducing the levels of suicidality and is used as a control factor in most studies involving mental health and depression (May et al. 2015; Nichter et al. 2020; Pietrzak et al. 2011; White et al. 2012). Employment status has been thought to have relation to suicidality, with most studies suggesting that those who are unemployed are at higher risk for suicidal ideation or attempts (Kim et al. 2016). However, in a longitudinal study in Sweden, researchers found that the immediate effects of unemployment on suicide rates did not appear to have any significance when other factors were controlled for, though those with long term unemployment were at a moderately high risk for suicide compared to their shorter unemployment counterparts (Garcy and Vagerö 2013). In Canada, a research team suggests that the government should increase efforts to improve access to mental healthcare (Lesage et al. 2017).

Comprehensive research comparing both psychiatric and socioeconomic factors have found both to be associated with increased risk of suicide, suggesting that suicidality is 4-5 times higher for psychiatric correlates than for sociodemographic factors (Li et al. 2011). An item of interest between Socioeconomic Status (SES), typically comprised of education, income, wealth and occupational prestige, has also been found to be associated with suicidality (Pan, Stewart, and Chang 2013). The researchers found that SES, measured by the Ratio of Family Income to the Poverty Threshold (RoFIPT) was inversely associated with both suicidal ideations and suicide attempts, with one modifier being that those who have mental health disorders are at a much greater risk for suicide as it relates to income than those who were not previously diagnosed with mental health disorders (Pan et al. 2013). Education is another factor that should

be considered as the literature currently states that those without a college degree are at a higher risk for suicidal ideation, more specifically, that those who graduate high school and finish some college are at the highest risk (Liu et al. 2019; Walser et al. 2015).

Mental Health

Mental health and associated conditions have been found to be associated with suicidality. A Veteran specific study found indication that Cannabis Use Disorder (CUD) was significantly associated with an increase in both suicidal and non-suicidal self-harm (Kimbrel et al. 2018). Alcohol use was strongly linked to suicide in a Romanian study, while the sample was small, there were indications of several key risk factors from an analysis of medical records (Moga, Burtea, and Ifteni 2014). Substance Use Disorder (SUD) as a whole is associated with suicidality, and as such is a good measure to control for (Arenson et al. 2018; Nichter et al. 2020; Pietrzak et al. 2011). Research in this realm has also examined the association between drug laws and suicidality, for example, a study from the U.S. that examined the relationship between marijuana legalization and suicide rates between states that did legalize and those that did not, found that those states that did legalize had an approximate 10% decrease in suicides (Anderson, Rees, and Sabia 2014).

A robust body of research has found that mental health and illness to be highly associated with suicide and suicidality. Both Major Depressive Episodes (MDE) and mental health care (e.g., inpatient, outpatient, prescriptions, etc.) have been found to be significant predictors of suicide. With a study on pathways to mental healthcare showing that those forced into treatment had worse outcomes than those who voluntarily entered (Alang and McAlpine 2019). Though in research on Veterans it was shown that three out of every five with suicidal ideation in the past year were not currently in treatment (Nichter et al. 2020). Veterans who have PTSD with

comorbid depression tend to be some of the highest risk patients for suicidal ideation based on cross-sectional research (Kimbrel et al. 2016). Whereas a study on Veterans Affairs (VA) patients showed that those with psychiatric inpatient stays over the past year were at high risk for suicide attempts (Zivin et al. 2007).

Other Correlates

Other factors such as criminal record/arrest and serving in a combat zone are added to explore multiple avenues. Having served in a combat zone specifically is a very Veteran specific factor to look at, and some studies suggest it may have to do with and increase in PTSD rates and the "self-medication" many Veterans do with alcohol and cannabis (Kimbrel et al. 2018; Nichter et al. 2020; Pietrzak et al. 2011). Criminal record/arrest are less commonly studied aspects of depression and mental health, but they have been shown to have some impact therein (Johnson et al. 2019; White et al. 2012).

Theoretical Framework

This research fits into portions of the Interpersonal and Military Transition models of suicide. Whereas the IPTS is a broad frame work based on feelings of belongingness and burdensomeness, with the acquired capability a violence, all three together are considered the precursors for suicide under this model (Castro and Kintzle 2014). While the Military Transition Model considers the circumstances that may lead to those feelings, directly with those military members transitioning from service into the civilian world again. This research acknowledges the factors that may occur and lead to these feelings of belongingness and burdensomeness, while examining Veterans of the War on Terror as compared to previous cohorts. While this research does not directly utilize the IPTS or Military Transition frameworks, it does relate

closely to the by examining translatable factors of suicidality. Given this body of research, I seek to examine the correlates of suicidality in a recent cohort of US Veterans, using the SAMHSA data set from 2020.

Methods

Data and Methods -NSDUH overview

The National Survey for Drug Use and Health (NSDUH) is an annual survey administered by the United States Federal Government since 1971(SAMHSA 2020). It is an independent multistage area probability sample (since 2014) within each state and D.C. that collect data on the non-institutionalized, civilian populous aged 12 and older (SAMHSA 2022). The NSDUH was designed to specifically measure: sociodemographics (age, race, sex, and SES), the use of illegal drugs, misuse of prescription drugs, alcohol use disorder, cannabis use disorder, substance use disorder, major depressive episode (past year), serious psychological distress indicator (past year), and mental health care. These data provide estimates of substance use and mental illness at the national, state, and substate levels. NSDUH data also help to identify the extent of substance use and mental illness among different subgroups, estimate trends over time, and determine the need for treatment services (SAMHSA 2022).

Sample

The NSDUH is representative of persons aged 12 and over in the civilian noninstitutionalized population of the United States (in each state and the District of Columbia (D.C.)). The survey covers residents of households (including those living in houses, townhouses, apartments, and condominiums), persons in noninstitutional group quarters (including those in shelters, boarding houses, college dormitories, migratory work camps, and

halfway houses), and civilians living on military bases. A potential limitation is lay in the fact that persons excluded from the survey include people experiencing homelessness who do not use shelters, active military personnel, and residents of institutional group quarters such as jails, nursing homes, mental institutions, and long-term care hospitals (SAMHSA, 2022).

The data for my analysis are based on the information collected from the 2020 NSDUH. Data were collected through face-to-face surveys conducted by professional interviewers (SAMHSA, 2020). There was little to no missing data for the variables used for my analysis. There were only 387 service members removed from this analysis for failing to fill in survey questions bringing the total from 1560 to 1173. These numbers are from the starting count of 32,893 people who filled out the survey which was then filtered to service members through the questions ("Have you ever been in the United States Armed Forces") and ("Have you ever served on active duty in the United States Armed Forces or Reserve components? Active duty does not include training for the Reserves or National Guard, but does include activation, for example, for a national emergency or military conflict").

I selected this dataset due to its country-wide scope, the relevance and recency of these data, the ease of access to this set, and because the sample very closely matches estimates of the national population giving these data more generalizability than some more specialized sets. The study's designers specifically sought to obtain a representative sample for the United States of America. The major limitation of this study is that it does not include institutionalized populations, which could limit the ability of these data to identify potential causes within those actively institutionalized populations.

The goals of this project are to expand the research on Veteran suicidality by highlighting the sociodemographic and mental health correlates of Veteran suicidality in a recent cohort of

Veterans. Based on the extant literature in this area, I will examine the associations between Veteran suicidality and the correlates below. My analytic sample includes 1,173 respondents, all of whom answered all included in this analysis.

Dependent Variables

The dependent or outcome variable in my analysis is that of Suicidality which is measured in this case by the responses "1=Yes" or "0=No" to the following question: "At any time in the past 12 months, that is from [Current Date] up to and including today, did you seriously think about trying to kill yourself"? While there were four other questions related to suicide, many had missing responses, this question was answered by all in my analytic sample. Suicidality for the purposes of this study, defined as serious thoughts of suicide, can be a good (though not all-encompassing) indicator of suicidal ideation (Fehling and Selby 2021).

Independent Variables

The primary independent variable used in my analysis is that of whether a service member (Veteran) in the United States Armed Forces served after 2001 when the War on Terror began. Respondents were asked "When did you serve on active duty in the United States Armed Forces of Reserve components" Responses include Vietnam War era (pre-1961) through the War on Terror (2001-current). For use in this analysis, I dichotomized the responses as 1 – serving in the War on Terror (2001-current) or 0 (all other previous wars/periods). All 1173 respondents completed this part of the survey.

Demographic and socioeconomic status variables. Demographic variables in my analysis include *sex* (1=female, 0=male), *age* (1=18-34, 2=35-49, 3=50 and Older), *race* (1=white, 2=black, 3=other, 4=hispanic), *education* (0=associates degree or less, 1=college graduate or

higher), *family income* (0=$30,000 or more, 1=$29,999 or less), *employment* (1=employed, 0=unemployed), *marital status* (0=not married, 1=married), *household size* (0=2 or more people, 1=1 person), *sexual orientation* (0=heterosexual, 1=gay, lesbian, or bisexual), *ever on combat duty* (0=no, 1=yes), and *ever arrested* (0=no, 1=yes). For multivariate analyses, the variables race, and age were dichotomized based on both the literature and distribution of respondents. Race was dichotomized as white (1) and non-white (0) as previous research on race and suicidality suggest that those who identify as white have higher rates of suicide than those who do not (Lorenzo-Luaces and Phillips 2014; May and Klonsky 2016). *Age* too was dichotomized 1 (mid-age 35-40) and 0 (all else). This was done due to emerging research showing that the trend of suicidality is increasing among those who are mid age (Phillips 2014).

Overall health was formulated by taking the self-rated health question: "Would you say your health in general is excellent, very good, good, fair, or poor?" and dichotomizing the responses as 1 (fair/poor health) and 0 (excellent, very good, and good).

In order to measure drug use disorder, respondents were asked eleven questions pertaining to *alcohol use disorder (AUD)*, *marijuana use disorder (CUD)*, and *other drug use disorder*. In the original data set, respondents were asked 11 substance use questions for each drug use disorder which all had the following response categories: (1) Used more often than intended, or unable to keep set limits on; (2) Inability to cutdown or stop use if wanted; (3) Spent a great deal of time over a period of a month or more getting, using, or getting over the effects of; (4) Had a strong urge to use; (5) Serious problems at home, work, or school caused by using, such as neglecting their children, missing work or school, doing a poor job at work or school, or losing a job, or dropping out of school; (6) Problems with family or friends that were probably caused by using and continued to use even though you thought using caused these problems; (7)

Use reduced or eliminated involvement or participation in important activities; (8) Used regularly and then did something that might have put you in physical danger; (9) Continued to use even though it was causing problems with emotions, nerves, mental health, or physical problems; (10) Needed to use more than before to get desired effects or noticed that same amount of use had less effect than before; and (11) Reported experiencing withdrawal symptoms (specific to each drug). These responses were recoded in the original data set to reflect individual substance use disorders (SUDs). These were each coded where (0=no, 1=yes). Two original categories were kept in their original form (*alcohol use disorder* and *marijuana use disorder*) while the remaining categories of use disorder (*cocaine*, *heroin*, *inhalant*, *sedative*, *stimulant*, *methamphetamine*, *pain reliever*, and *tranquilizer*) were recoded into a new variable of *other drug use disorder*. This variable was an additive calculation initially, showing that some respondents fell into multiple categories, for clean regression all responses where weighed the same where (0=no, 1=yes) all responses >=1 were coded as 1. This category should be considered with that caution in mind.

Mental health (MH) treatment characteristics include *inpatient MH treatment (past year)*, *outpatient MH treatment (past year)*, *prescription for MH (past year)*, and *other MH treatment (past year)*. Respondents were asked: (1) “During the past 12 months, have you stayed overnight or longer in a hospital or other facility to receive treatment or counseling for any problem you were having with your emotions, nerves, or mental health? Please do not include treatment for alcohol or drug use.”, (2) “During the past 12 months, did you receive any outpatient treatment or counseling for any problem you were having with your emotions, nerves, or mental health at any of the places listed below? Please do not include treatment for alcohol or drug use”, (3) “During the past 12 months, did you take any prescription medication that was prescribed for

you to treat a mental or emotional condition". Responses to these three questions were coded as 1 (yes) and 0 (no). The variable *other MH treatment (past year)* is a combination of the previous three questions where (0=no if *inpatient* AND *outpatient* AND *prescription*=0, 1=yes if *inpatient* OR *outpatient* OR *prescription*=1).

Mental health (MH) characteristics included *major depressive episode (MDE) (past year)* and *serious psychological distress indicator (SMI) (past year)*. The *MDE (past year)* and *SMI (past year)* were coded as (0=no, 1=yes) and were created in response to two screening questionnaires.

All variable frequencies of this population sample can be viewed in **Table 1**.

Table 1. Descriptive Statistics for All Variables

		N	**%**
Thoughts of Suicide in the Past Year	No	1112	94.80%
	Yes	61	5.20%
Served Active Duty in the U.S. Military 2001 or Later	No	739	63.00%
	Yes	434	37.00%
Sex	Male	1022	87.13%
	Female	151	12.87%
Race	White	947	80.73%
	Black	77	6.56%
	Hispanic	74	6.31%
	Other	75	6.39%
Age	18-34	169	14.41%
	35-49	315	26.85%
	50 and Older	689	58.74%
Education	Associate Degree or Less	639	54.48%

		N	%
	College Graduate or Higher	534	45.52%
Family Income	$30,000 or More	1046	89.17%
	$29,999 or Less	127	10.83%
Employment Status	Unemployed	536	45.70%
	Employed	637	54.30%
Ever Arrested and Booked	No	919	78.35%
	Yes	254	21.65%
Ever in a Combat Zone	No	682	58.10%
	Yes	491	41.90%
Marital Status	Not Married	384	32.74%
	Married	789	67.26%
Number of Household Members	2 or More People	985	83.97%
	1 Person	188	16.03%
Sexual Orientation	Heterosexual	1123	95.74%
	Gay, Lesbian, or Bisexual	50	4.26%
Overall Health	Good - Excellent	1001	85.34%
	Fair - Poor	172	14.66%
Alcohol Use Disorder in Past Year	No	1066	90.88%
	Yes	107	9.12%
Marijuana Use Disorder in Past Year	No	1132	96.50%
	Yes	41	3.50%
Other Drug Use Disorder in Past Year	No	1152	98.21%
	Yes	21	1.79%
Inpatient Treatment for Mental Health in Past Year	No	1164	99.23%
	Yes	9	0.77%
Outpatient Treatment for Mental Health in Past Year	No	1049	89.43%
	Yes	124	10.57%
Prescription for Mental Health Treatment in Past Year	No	1020	86.96%
	Yes	153	13.04%
	No	978	83.38%

		N	%
Other Treatment for Mental Health in Past Year	Yes	195	16.62%
Major Depressive Episode (MDE) in Past Year	No	1072	91.39%
	Yes	101	8.61%
Serious Mental Health Indicator (SMI) in Past Year	No	1060	90.37%
	Yes	113	9.63%

Analytic Plan

Using SPSS (version 28.0.0.0), appropriate transformations were performed on outcome and predictive variables as outlined above. Bivariate analyses, using Chi-squares and Fishers Exact (for cells including 6 or fewer responses), were conducted to compare veterans war status, sociodemographic, familial characteristics, health, and mental health variables (**Table 2**). To estimate the risk of suicidality, odds ratios were calculated using binary logistic regression models, adjusting for (in blocks) those variables that were significant in bivariate analyses (**Table 3**).

Block 1 is unadjusted examining the effect that the key independent variable, War on Terror Veteran status, had on Suicidality. **Block 2** controlled for the demographic variables sex, race, age, education, family income, and whether participant was ever arrested. **Block 3** controlled for the familial characteristic variables' marital status, household size, and sexual orientation. **Block 4** controlled for the health/substance use variables overall health, alcohol use disorder (past year), marijuana use disorder (past year), other substance use disorder (past year). **Block 5** controlled for the mental health treatment variables inpatient MH treatment (past year),

outpatient MH treatment (past year), prescription for MH (past year), other MH treatment (past year). The full regression was then performed controlling for MDE (**Block 6**).

Table 2. Bivariate Analysis

	Thoughts of Suicide (Past Year)		
Variable	**No 1,112, (94.7)**	**Yes 61, (5.2)**	**p-value**
War on Terror Veteran			
No	717 (64.5)	22 (36.1)	0.000
Yes	395 (35.5)	39 (63.9)	
Sociodemographic			
Gender			
Male	973 (87.5)	49 (80.3)	0.103
Female	139 (12.5)	12 (19.7)	
Race			
White	896 (80.6)	51 (83.6)	0.422
Black	76 (6.8)	1 (1.6)	
Hispanic	69 (6.2)	5 (8.2)	
Other	71 (6.4)	4 (6.6)	
Age			
18-34 Years Old	146 (13.1)	23 (37.7)	0.000
35-49 Years	291 (26.2)	24 (39.3)	
Old 50 Years and Older	675 (60.7)	14 (23.0)	
4 Year College Graduate or More			0.002
No	594 (53.4)	45 (73.8)	
Yes	518 (46.6)	16 (26.2)	
Family Income ($29,999 or Less)			0.000
No	1,001 (90.0)	45(73.8)	
Yes	111 (10.0)	16 (26.2)	
Employment Status			0.973
Unemployed	508 (45.7)	28 (45.9)	
Employed	604 (54.3)	33 (54.1)	
Ever Arrested and Booked			0.005
No	880 (79.1)	39 (63.9)	
Yes	232 (20.9)	22 (36.1)	

	Thoughts of Suicide (Past Year)		
Ever in a Combat Zone			
No	645 (58.0)	37 (60.7)	0.683
Yes	467 (42.0)	24 (39.3)	
Familial Characteristics			
Married			
Not Married	345 (31.0)	39 (63.9)	0.000
Married	767 (69.0)	22 (36.1)	
Household Size (1 Person)			
No	941 (84.6)	44 (72.1)	0.01
Yes	171 (15.4)	17 (27.9)	
Sexuality			
Heterosexual	1,071 (96.3)	52 (85.2)	0.000
Gay, Lesbian, or Bisexual	41 (3.7)	9 (14.8)	
Health/Substance Use			
Overall Health (Poor-Fair)			
No	959 (86.2)	42 (68.9)	0.000
Yes	153 (13.8)	19 (31.1)	
Alcohol Use Disorder (Past Year)			
No	1,020 (91.7)	46 (75.4)	0.000
Yes	92 (8.3)	15 (24.6)	
Marijuana Use Disorder (Past Year)			
No	1,078 (96.9)	54 (88.5)	0.000
Yes	34 (3.1)	7 (11.5)	
Other Substance Use Disorder (Past Year)			
No	1,099 (98.8)	53 (86.9)	0.000
Yes	13 (1.2)	8 (13.1)	
Mental Health Treatment			
Mental Health Inpatient Treatment (Past Year)			0.000 (.009 F.E.)
No	1,106 (99.5)	58 (95.1)	
Yes	6 (0.5)	3 (4.9)	
Mental Health Outpatient Treatment (Past Year)			
No	1,011 (90.9)	38 (62.3)	0.000
Yes	101 (9.1)	23 (37.7)	

	Thoughts of Suicide (Past Year)		
Mental Health Prescription (Past Year)			0.000
No	981 (88.2)	39 (63.9)	
Yes	131 (11.8)	22 (36.1)	
Received Any Mental Health Treatment (Past Year)			0.000
No	945 (85.0)	33 (54.1)	
Yes	167 (15.0)	28 (45.9)	
Mental Health			
Major Depressive Episode (MDE) in Past Year			0.000
No	1047 (94.2)	25 (41)	
Yes	65 (5.8)	36 (59)	
Serious Mental Health Indicator (SMI) in Past Year			0.000
No	1039 (93.4)	21 (34.4)	
Yes	73 (6.6)	40 (65.6)	

Results

The sociodemographic characteristics listed in **Table 1** show that Veteran respondents were mostly over the age of 50 (58.7%) and male (87.1%) with just over a third of respondents having served after September 2001 (the War on Terror) (37.0%). Of respondents 80.7% were white, 6.6% were black, 6.3% were Hispanic, and 6.4% were "other" (which encompasses native Americans, native Alaskans, native Hawaiians, Asians, and those who identified as one or more). Employment and education levels were both near even with 54.3% of respondents being employed and 45.5% having completed a four-year degree or more. Though family income levels among respondents indicated a majority (89.2%) had a family income of $30,000 or more. One out of every eighteen respondents indicated serious thoughts of suicide over the past year.

Table 2 presents the bivariate associations between Veteran sociodemographic, family characteristics, health, substance use, mental health treatment, and mental health with suicidality from the past year. Of these, sixty-one (5.2%) expressed having had suicidality at least one time over the past year. Suicidality was significantly associated with being a War on Terror Veteran, of those with suicidal ideation 63.9% were War on Terror Veterans which was statistically significant at a confidence of p=.05 (p=0.000). Veteran age was significant showing that the 18-34 and 35–49-year-old Veterans made up 37.7% and 39.3% (respectively) of those who expressed suicidality in the past year (p=0.000). Education was inversely associated with suicidality, having 73.8 percent, almost a full three-quarters, of Veterans indicating suicidality stating that they had less than a 4-year college degree or more (p=.002). Family income indicated some increased risk of suicidality, however, only 26.2% of those Veterans expressing suicidality made $29,999 (p=0.000). Having ever been arrested and booked showed some significant relation, with one of every three people who had experienced suicidality having been arrested at some point in their life (p=.005). Marriage and household size showed some protective factors, with only 36.1% of those who experienced suicidality being married (p=0.000) while household size showed that just over one-fourth (27.9%) of those experiencing suicidality indicating they lived in a single person household (p=.01). Those who identified as sexual minorities (gay, lesbian, or bisexual) were at a higher risk of experiencing suicidality, with 14.8% of those who experienced suicidality being gay, lesbian, or bisexual, a large difference to their counterparts who did not experience suicidality only making up 3.7% of their column (p=0.000). Perceived health showed that almost one-third (31.1%) of those with increased suicidality perceived their health to be either poor or fair (p=0.000). Substance use showed statistical significance across the board (p=0.000), and of those who experienced suicidality, in the past year 24.6% indicated

alcohol use disorder, 11.5% indicated cannabis use disorder, and 13.1% indicated other substance use disorder. Mental health treatment (inpatient, outpatient, prescriptions, and other) all indicated significant relation to suicidality (p=0.000) with the only caveat being that inpatient procedures needed to be verified with the Fischer's Exact test (F.E.=.009). Of those who experienced suicidality, over the past year only 4.9% were admitted for inpatient mental health care, while 37.7% were treated via outpatient centers, and 36.1% were prescribed medication for their treatments, 45.9% fell into the category of other care options. Mental health factors were both very significant (p=0.000), of those having increased suicidality 59% had a major depressive episode in the past year, and 65.6% experienced serious psychological distress indicators over the past year.

The variable *ever on combat duty* was omitted from the multivariate analysis after finding no significance during the bivariate analysis.

Multivariate analyses

Block 1 of **Table 3** below shows how the primary independent variable, serving during the War on Terror or later, effects the likelihood that a respondent will have had serious thoughts of suicide (suicidality) in the past year. This model suggests that those Veterans who responded "Yes" to serving after September 2001 were approximately three times as likely to have increased suicidality than those who did not (OR=3.218, 95% CI: 1.881-5.504; p=0.000). The baseline model was then expanded to control for Demographics, Family Information, Health, Drug Use, Mental Health Treatment, and Mental Health (**Blocks 2-6**).

Table 3. Binary Logistic Regression Predicting Positive Suicidality Among Veterans

	Block 1		Block 2		Block 3	
	OR (CI)	P	OR (CI)	P	OR (CI)	P
War on Terror Veteran	3.218*** (1.881-5.504)	0.000	3.471*** (1.935-6.226)	0.000	2.972*** (1.625-5.434)	0.000
Sociodemographic						
Sex			1.749 (.870-3.513)	0.116	1.250 (.586-2.666)	0.564
Race (white/non-white)			1.932 (.936-3.987)	0.075	2.074~* (.991-4.343)	0.053
Middle Aged Veterans			1.261 (.704-2.261)	0.436	1.467 (.812-2.650)	0.204
4 Year College Graduate or More			.440** (.237-.817)	0.009	.489* (.259-.923)	0.027
Family Income ($29,999 or Less)			2.769** (1.449-5.290)	0.002	1.896 (.949-3.789)	0.07
Ever Arrested and Booked			1.910* (1.071-3.407)	0.028	1.668 (.922-3.017)	0.091
Familial Characteristics						
Married					.432* (.222-.843)	0.014
Household Size (1 Person)					1.264 (.622-2.569)	0.516
Sexuality (1=Gay, Lesbian, or Bisexual)					3.280** (1.361-7.908)	0.000

	Block 1		Block 2		Block 3	
	OR (CI)	P	OR (CI)	P	OR (CI)	P
Health/Substance Use						
Overall Health (Poor-Fair)						
Alcohol Use Disorder (Past Year)						
Marijuana Use Disorder (Past Year)						
Other Substance Use Disorder (Past Year)						
Mental Health Treatment						
Mental Health Inpatient Treatment (Past Year)						
Mental Health Outpatient Treatment (Past Year)						
Mental Health Prescription (Past Year)						
Received Any Mental Health Treatment (Past Year)						
Mental Health						
Major Depressive Episode (Past Year)						
	.048 (1)		.125 (7)		.165 (10)	

	Block 4		Block 5		Block 6	
	OR (CI)	P	OR (CI)	P	OR (CI)	P
War on Terror Veteran	2.892*** (1.549-5.399)	0.000	3.002*** (1.574-5.726)	0.000	2.339* (1.172-4.667)	0.016
Sociodemographic						
Sex	1.163 (.540-2.506)	0.700	0.850 (.370-1.953)	0.701	0.684 (.275-1.698)	0.413
Race (white/non-white)	2.064 (.962-4.427)	0.063	1.899 (.872-4.136)	0.106	1.764 (.784-3.969)	0.170
Middle Aged Veterans	1.512 (.818-2.796)	0.187	1.344 (.720-2.508)	0.353	1.320 (.671-2.599)	0.421
4 Year College Graduate or More	.509* (.268-.967)	0.039	.472~* (.244-.913)	0.026	.502~* (.247-1.023)	0.058
Family Income ($29,999 or Less)	1.445 (.686-3.044)	0.333	1.413 (.659-3.031)	0.374	1.236 (.521-2.933)	0.631
Ever Arrested and Booked	1.259 (.668-2.373)	0.476	1.160 (.606-2.221)	0.653	1.191 (.589-2.408)	0.626
Familial Characteristics						
Married	.478* (.239-.955)	0.037	.444* (.218-.905)	0.026	.445* (.207-.956)	0.038
Household Size (1 Person)	1.300 (.620-2.727)	0.487	1.194 (.555-2.567)	0.650	0.887 (.375-2.097)	0.784
Sexuality (1=Gay, Lesbian, or Bisexual)	3.552** (1.410-8.949)	0.007	2.579~* (.499-5.150)	0.059	1.668 (.528-5.270)	0.384
Health/Substance Use						
Overall Health (Poor-Fair)	2.311* (1.197-4.462)	0.013	2.047* (1.044-4.011)	0.037	1.247 (.576-2.701)	0.576

	Block 4		Block 5		Block 6	
	OR (CI)	P	OR (CI)	P	OR (CI)	P
Alcohol Use Disorder (Past Year)	2.361* (1.191-4.681)	0.014	2.239* (1.116-4.492)	0.023	1.204 (.535-2.707)	0.653
Marijuana Use Disorder (Past Year)	.969 (.335-2.862)	0.968	.938 (.310-2.837)	0.910	.713 (.207-2.458)	0.593
Other Substance Use Disorder (Past Year)	6.277** (2.090-18.848)	0.001	3.658* (1.050-12.749)	0.042	3.261 (.793-13.410)	0.101
Mental Health Treatment						
Mental Health Inpatient Treatment (Past Year)			2.792 (.382-20.426)	0.312	4.205 (.480-36.835)	0.195
Mental Health Outpatient Treatment (Past Year)			2.776 (.870-8.861)	0.085	2.828 (.781-10.235)	0.113
Mental Health Prescription (Past Year)			1.404 (.440-4.484)	0.567	0.813 (.229-2.883)	0.748
Received Any Mental Health Treatment (Past Year)			1.025 (.212-4.945)	0.976	0.607 (.105-3.500)	0.577
Mental Health						
Major Depressive Episode (Past Year)					14.422*** (6.584-31.589)	0.000
	.221 (14)		.256 (18)		.363 (19)	

~* = p (.06-.51)
* = p<.05
** = p<.01
*** = p<.001

The next model (**Block 2**) controlled for sex, race, age, education, family income, and whether respondent was ever arrested. In this model the effect of the primary independent variable was still significant (p=0.000) (OR=3.471, 95% CI: 1.935-6.226).

Income was significantly (p=0.002) associated with Veteran suicidality. Those veterans with household incomes $29,999 or less were more likely to endorse suicidality (OR=2.769; 95% CI=1.449-5.290) than those who made more $30,000 or more. Educational attainment was significantly (p=0.009) and inversely associated with suicidality, those with a 4-year college degree or more were over 50% less likely to have expressed suicidality (OR=0.440; 95% CI=.237-.817). Arrest status was also significantly associated with suicidality (OR=1.910; 95% CI=1.071-3.407) such that those who had ever been ever arrested had an increased risk of suicidality. Adjusting for sociodemographics and previous arrests, slightly increased the odds of War on Terror Veterans endorsement of suicidality versus other Veterans, as the main affect of War on Terror Veteran status increased from 2.892 to 3.002 indicating the possibility of a suppression effect wherein the addition of these variables increase the predictive validity of my key independent variable.

Block 3 introduces controls for marital status, household size, and sexual orientation. Although this model showed a slight decrease in the OR of the primary independent variable, it remained statistically significant (OR=2.972, 95% CI:1.625-5.434, p=0.000). Marriage (OR=.432, 95% CI:.222-.843, p=.014) and Sexuality (OR=3.280, 95% CI:1.361-7.908, p=0.000) were both statistically significant in this model, while household size (OR=1.264, 95% CI:.622-2.569, p=.516) was not. Indicating (in this model) that having a four-year degree and being married were buffers against increased suicidality. While identifying as gay, lesbian, or bisexual carried an increased likelihood of suicidality. Race reached levels nearing significance in this

model where non-white was omitted as the reference category (OR=2.074, 95% CI:.991-4.343, p=.053). Education (OR=.489, 95% CI:.259-.923, p=.027) remained fairly consistent, while arrest (OR=1.668, 95% CI:.922-3.017, p=.091) and family income (OR=1.896, 95% CI:.949-3.789, p=.070) were no longer statistically significant. This shows that even when controlling for familial characteristics education remains a possible buffer against suicidality.

Block 4 expanded controls for health and substance use. The primary independent variable remained fairly consistent (OR=2.892, 95% CI:1.549-5.399, p=0.000). Three out of the four new controls were statistically significant. Those being: overall health (OR=2.311, 95% CI:1.197-4.462, p=.013), alcohol abuse disorder (past year) (OR=2.361, 95% CI:1.191-4.681, p=.014), and other substance abuse disorder (past year) (OR=6.227, 95% CI:2.090-18.848, p=.001). While marijuana use disorder was not statistically significant by even a small margin (OR=.969, 95% CI:.335-2.862, p=.968). Suggesting that those who rate their health as fair or poor, those who drink chronically, and those who utilize other drugs (with the exception of marijuana) to levels of abuse, are more likely to experience increased suicidality to their healthier, non-drug using, counterparts. Education (OR=.509, 95% CI:.268-.967, p=.039), marriage (OR=.478, 95% CI:.239-.95, p=.037), and sexuality (OR=3.552, 95% CI:1.410-8.949, p=.007) remained statistically significant.

Block 5 expanded into mental health (MH) treatments by type: inpatient (OR=2.792, 95% CI:.382-20.426, p=.312), outpatient (OR=2.776, 95% CI:.870-8.861, p=.085), prescription (OR=1.404, 95% CI:.440-4.484, p=.567), and other (1.025, 95% CI:.212-4.945, p=.976). The primary independent variable showed a small bump up (OR=3.002, 95% CI:1.574-5.762, p=0.000) while still remaining firmly in the realm of statistically significant. Education (OR=.472, 95% CI:.244-.913, p=.026), marriage (OR=.444, 95% CI:.281-.905, p=.026), overall

health (OR=2.047, 95% CI:1.044-4.011, p=.037), alcohol use disorder (past year) (OR=2.239, 95% CI:1.116-4.492, p=.023), and other substance abuse disorder (past year) (OR=3.658, 95% CI:1.050-12.749, p=.042) all remained statistically significant in this model. While sexuality dipped to borderline levels of significance (OR=2.579, 95% CI:.499-5.150, p=.059). One should note the drop in other substance abuse disorder (past year) in this model, as controlling for MH treatment seems to have some relational effect. None of the MH treatments were statistically significant in this model, with the other category being the furthest from statistical significance. This model indicates some relationships between substance abuse and MH treatment, with a four-year degree and being married still remaining the greatest buffers against suicidality.

Block 6 is the full regression model which adds the control for major depressive episode (MDE) (past year) (OR=14.422, 95% CI:6.584-31.589, p=0.000). The primary independent variable does dip by a fair margin when controlling for major depression (OR=2.339, 95% CI:1.172-4.667, p=.016), however, the results still show statistical significance towards War on Terror Veterans being more prone to increased levels of suicidality by a little more than two times than their non-War on Terror Veteran counterparts. Marriage remained significant (OR=.445, 95% CI:.207-.956, p=.038) and education remained borderline significant (OR=.502, 95% CI:.244-.913, p=.058). While sexuality (OR=1.668, 95% CI:.528-5.270, p=.384), overall health (OR=1.247, 95% CI:.576-2.701, p=.576), alcohol use disorder (past year) (OR=1.204, 95% CI:.535-2.707, p=.653), and other substance use disorder (OR=3.261, 95% CI:.793-13.410, p=.101) all became statistically insignificant with the additional MDE control. MH treatments remained statistically insignificant. The implications of this final model being, that all other risk factors become less accurate predictors for an increase in suicidality with the addition of MDE as a predictor.

Discussion

Both the CDC and Institute of Medicine have named suicide as a serious public health crisis in the United States (CDC 2021; Institute of Medicine et al. 2002), and asserted that research on and prevention of suicide risk is a national priority (Institute of Medicine et al. 2002). In 2020, suicide was among the top ten leading causes of deaths for people ages 10-64 with some groups being at higher risk for suicide and suicidality than others, among them are Veterans (CDC 2021). Over the past decade, suicide rates among veterans have been increasing, in one study looking at veteran suicide compared to non-veterans found that the rate of suicide among veterans was 30.4 per 100,000 compared to 17.0 per 100,000 in a similar cohort of non-veterans (Ramchand 2021). Suicidality, defined here as thoughts of suicide is the leading predictor of death by suicide (Ramchand 2021). In this study, using a nationally representative sample of US Veterans, over five percent reported past year thoughts of suicide, slightly less than similar studies which have found rates of adult suicidality among veterans to be approximately six percent (CDC, 2021).

Also similar to the extant literature of suicidality, in this analysis I found similar correlates of suicidality in bivariate analyses, including age (Phillips 2014), income (Andrés et al. 2011), history of arrests (White et al. 2012), being unmarried (May and Klonsky 2016), identifying as a sexual/gender minority (Cochran et al. 2013; Matarazzo et al. 2014), self-rated health (Dittrich et al. 2015), substance use disorder (Nichter et al. 2020), mental health disorders such as major depressive disorder (Sher et al. 2012) and mental health treatment (Nichter et al. 2020).

The War on Terror Veterans made up a substantial portion of those who had expressed suicidality over the past year (63.9%) even after controlling for other variables. In the final model, with all controls in place, War on Terror Veterans were still approximately 2.3 times more likely to express suicidality than their Veteran cohorts from previous wars (pre-Vietnam era through the Gulf war) (**Table 3**). This is an interesting phenomenon, as one would initially think that those of the Vietnam war, who were exposed to substantially higher death tolls, would have expressed greater suicidality. However, there is some thought that those Veterans of the War on Terror who would have died previously (due to technology limitations) are surviving with both traumatic brain injuries, and other permanent disabilities, leading to higher suicidality (Castro and Kintzle 2014; Fonda et al. 2017).

This analysis was consistent with previous research on Veteran suicidality in many factors, with the most notable being marriage as a protective factor even after controlling for major depressive episode (past year) (May et al. 2015). This analysis expands upon and draws questions to the utilization and effectiveness of mental health treatments on suicidality, as all forms of treatment did not have statistical significance to that effect (Alang and McAlpine 2019). This also supports current predictive factors such as educational attainment, sexuality, and substance abuse (Cochran et al. 2013; Markowitz et al. 2019).

One very sizeable difference from literature pertaining to Veterans, however, is the lack of statistical significance that having served in a combat zone holds, though only from an indirect pathway, as combat exposure alone is not related to suicide (Bryan et al. 2013). However, combat exposure increases the risk for PTSD severity to increase, which increases the likelihood of depression, which in turn increases the risk for suicide (Bryan et al. 2013). This question would have been the closest from the NSDUH relating to deployment and related PTSD, which

has been shown to be predictive of suicidality among veterans in numerous studies on the topic (Arenson et al. 2018; Bryan et al. 2013; Gaudet et al. 2016).This may be in part due to chance from the randomization of the sampling, or the fact that many of the Veterans were in the fifty-plus category for age, but it is worth noting.

It could be that this sample is a good, representative sample of Veterans from the general population in the U.S. and that mental health treatments, at least in this sample, do not appear to offer protection against suicidality, though this should be viewed as an intriguing avenue to research further rather than an implication of causality. There is usually a thought that increased mental healthcare access reduces suicides, though some research has shown that it may actually be (in Veterans) a lack of willingness to utilize the mental healthcare programs, and may not indicate an accurate assessment of these programs as they stand (Nichter et al. 2020). This warrants a very close look at our current Veteran healthcare systems into how they actively engage and support our Veterans.

Limitations/Further Directions

The major limitations of this study come from the lack of specific PTSD questions about perceived, or diagnosed, PTSD and from where that PTSD may have come, since PTSD has been found to be highly associated with veteran suicide (Arenson et al. 2018). This is an item the NSDUH may specifically want to address on future surveys to gain a more comprehensive picture of mental health in the population. Other limiting factors are the nature of the NSDUH specifically omitting institutionalized populations (prison, live-in facilities, active military, etc.) which leaves out the useful information that could be gained from those perspectives. Especially given how those transitioning between active military and civilian life can experience a great deal of stress at the levels of change. Though this study does have some important strengths as

well, such as being a nationally representative sample of the United States. It also is conducted annually and can be used to compare trends over multiple years. Based on this analysis I would say that there is enough support for current risk factors to warrant a more targeted study, focusing specifically on Veteran suicidality so that we can continue to further understand the "Why?" behind the behaviors.

Suicide is a serious problem in the World, the United States, and among U.S. military Veterans. There were high rates of suicidality among Veterans in this nationally representative sample, giving rise to concern for these Veterans coming home from the War on Terror. We should continue to explore suicide as a public health concern and attempt to give our Veterans the mental health treatment options and public support that they deserve, to help mitigate the currently high risk of suicide they experience.

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