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KILLING IN COMBAT MAY BE INDEPENDENTLY ASSOCIATED WITH SUICIDAL IDEATION

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Abstract

Background—The United States military has lost more troops to suicide than to combat for the second year in a row and better understanding combat-related risk factors for suicide is critical. We examined the association of killing and suicide among war veterans after accounting for PTSD, depression, and substance use disorders.

Methods—We utilized a cross-sectional, retrospective, nationally representative sample of Vietnam veterans from the National Vietnam Veterans Readjustment Study (NVVRS). In order to perform a more in depth analysis, we utilized a subsample of these data, the NVVRS Clinical Interview Sample (CIS), which is representative of 1.3 million veterans who were eligible for the clinical interview by virtue of living in proximity to an interview site, located within 28 standard metropolitan regions throughout the United States.

Results—Veterans who had higher killing experiences had twice the odds of suicidal ideation, compared to those with lower or no killing experiences (OR = 1.99, 95% CI = 1.07–3.67), even after adjusting for demographic variables, PTSD, depression, substance use disorders, and adjusted combat exposure. PTSD (OR = 3.42, 95% CI = 1.09–10.73), depression (OR = 11.49, 95% CI = 2.12–62.38), and substance use disorders (OR = 3.98, 95% CI = 1.01–15.60) were each associated with higher odds of suicidal ideation. Endorsement of suicide attempts was most strongly associated with PTSD (OR = 5.52, 95% CI = 1.21–25.29).

Conclusions—Killing experiences are not routinely examined when assessing suicide risk. Our findings have important implications for conducting suicide risk assessments in veterans of war. Depression and Anxiety 29:918–923, 2012.

Keywords

suicide; killing; depression; stress disorders; posttraumatic; war; veterans

INTRODUCTION

The United States military has lost more troops to suicide than to combat for the second year in a row.[1] More than 1,100 service members have committed suicide from 2005–2009.[1] The Army's suicide rate alone was 11.4 per 100,000 soldiers following the start of the Iraq

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War, and by 2009, it nearly doubled to 21.8 per 100,000 soldiers, surpassing the suicide rate of the general population for the first time.[1] Epidemiological studies of the Vietnam veteran cohort have collectively demonstrated a comparative risk of up to one and a half times that of similar-aged men in the postwar period.[2] In a population-based survey of veterans of multiple eras, veterans were twice as likely to die of suicide compared with nonveterans in the general population.[3] Although the Department of Defense (DoD) and the Veterans Administration (VA) have implemented several initiatives to decrease these rising suicide rates,[4] better understanding the factors associated with these increased rates is of critical importance.

Major risk factors for suicide include diagnoses of depression, PTSD, and substance use disorders. This has been well documented in Iraq and Afghanistan War veterans[5–8] and Vietnam veterans.[9–12] Given the magnitude of this public health issue, it is important to look at all possible important predictors of suicide to most comprehensively understand the problem and to develop effective interventions.

The relationship between particular combat variables and suicide has received less attention. Although some studies have found an association between general combat exposure and subsequent suicidal ideation,[8,12–14] only a few have attempted to dismantle this finding by examining whether particular types of combat exposure are more highly associated with suicide risk. For example, killing or failing to prevent death or injury was found to be associated with suicide attempt, whereas being a target of attempted killing or injury was more strongly associated with PTSD.[13] The authors concluded that experiences involving high personal responsibility, such as killing in combat, may be important to examine as independent predictors of suicide. What remains unclear is whether the association between killing and suicide would still remain after accounting for the contributions of PTSD, depression, and substance use disorders. For example, we have found that killing is associated with PTSD and substance use in veterans of multiple eras,[7,15–17] and that PTSD and depression are most strongly associated with suicidal ideation among Iraq and Afghanistan veterans.[7]

The purpose of this study was to test the hypothesis that killing in combat would be associated with increased suicidal ideation independent of diagnoses of PTSD, depression, and substance use disorders. As a secondary analysis, we also examined the association between suicide attempts and killing. We focused on a representative sample of Vietnam veterans in the National Vietnam Veterans Readjustment Study (NVVRS), which has detailed information about combat experiences, including killing in combat, in addition to detailed information on PTSD, depression, and substance use disorders. This is the first study to examine the association of killing and suicide after accounting for PTSD, depression, and substance use disorders in any sample of combat veterans.

MATERIALS AND METHODS

DATA SOURCE AND PROCEDURE

We used data from the NVVRS for these analyses.[18] The NVVRS included both the National Survey of the Vietnam Generation (NSVG) and the Clinical Interview Sample (CIS). The NSVG study included 1,600 Vietnam theater veterans, 730 Vietnam era veterans, 150 female civilian nurses, and 500 other civilians. The CIS included veterans who were eligible for the clinical interview by virtue of living in proximity to one of the interview sites within 28 standard metropolitan regions throughout the United States (42% of the total), and is representative of 1.3 million veterans.

Participants included veterans who served in Vietnam and surrounding areas between August 5, 1964, and May 7, 1975 and agreed to be interviewed about their predeployment, deployment, and post-deployment experiences for NVVRS. We used the CIS, given our interest in clinical diagnostic data (e.g. PTSD, depression, and substance use disorder) not found in the larger survey sample. The CIS contains 260 male veterans (N = 259 for this study given that one veteran was missing the appropriate weighting variable). When using sampling weights established for the CIS, demographics variables are very similar to the veterans included in the larger data set, and there is precedent for utilizing these weights for this purpose in recent papers using the NVVRS.[19, 20] Information about sampling strategies and sample characteristics have been previously reported in greater detail.[18, 21,22]

MEASURES

Demographics—In the NVVRS, veterans were asked to report age, race/ethnicity, and educational status. Although we used the previously established categories for age and education, we recoded race/ethnicity into two different variables. For African-American and Hispanic ethnicity, we recoded existing variables into dichotomous ones: African-American versus other and Hispanic versus other, especially given findings about the predominant impact of these categories of race/ethnicity on prevalence of PTSD.[18, 20,23]

Combat Experiences—The combat exposure measure was a 36-item scale assessing a myriad of war-related experiences and situations (e.g. how frequently respondents saw Americans being killed or injured, exposure to explosives, etc.[24] We removed the one item relating to killing (i.e. firing a weapon) from the scale to avoid overlap with the measure of killing experience described below. Similar to many of the NVVRS measures, a factor score was derived for each participant and was used to measure general combat exposure levels. The factor score was derived from a common factor analysis, and is thus a standardized score with zero representing the mean combat exposure score for the entire sample.

Killing Experiences—We derived a measure of killing experiences by creating four component variables (killing enemy; killing prisoners; killing civilians; and direct involvement in killing/injuring women, children, or elderly). We conducted a common factor analysis to determine the factor structure for these four component variables and found that a single factor best explained their intercorrelations. The four component variables had factors loadings between 0.49 and 0.65 on the single factor. We used the factor loadings to create a single standardized (mean zero) factor score integrating the four component variables into an overall measure of killing experiences.

Suicidal Ideation—Suicidal ideation was indexed by the following question: “Have you ever felt so low that you thought of committing suicide?” The response format was dichotomous.

Suicide Attempts—Suicide attempts were indexed by the following question: “Have you ever attempted suicide?” The response format was dichotomous.

Depression Diagnosis—The Structured Clinical Interview for DSM-III-R (SCID)[25] was used to assess current depression diagnosis. Individuals were asked a series of questions related to depression symptoms that are found in the DSM-III-R and are assessed for the purposes of establishing a depression diagnosis. The SCID is a well-established clinical tool and is administered by a mental health professional qualified in making clinical diagnoses.

Posttraumatic Stress Disorder Diagnosis—The SCID[25] was used to assess current PTSD diagnosis. Individuals were asked a series of questions related to PTSD symptoms

that are found in the DSM-III-R and are assessed for the purposes of establishing a PTSD diagnosis.

Substance Use Disorder Diagnoses—The SCID[25] was also used to assess current Alcohol and Drug Use Disorder Diagnoses (either abuse or dependence).

STATISTICAL ANALYSIS

All analyses were conducted with STATA 10, which has the capability of adjusting for survey sampling weights and strata. Analyses were conducted with the CIS ($N = 259$) and for these analyses, sampling weights and strata variables appropriate for the CIS were utilized. Thus, all CIS analyses are probability weighted to represent the population of 1.3 million male Vietnam theater veterans residing within the 28 standard metropolitan regions from which the veterans were surveyed.

For the logistic regression analysis, we were particularly interested in the association between killing experiences and suicidal ideation, after adjusting for multiple variables. The suicidal ideation outcome included all individuals endorsing suicidal ideation (i.e. those with attempts were not excluded from this group). We controlled for a number of demographic variables, including age, African-American race, Hispanic ethnicity, and educational attainment. We adjusted for PTSD, depression, and substance use diagnoses, given that these have each been found to be associated with suicidal ideation. We also adjusted for combat experiences excluding experiences of killing to ensure that our findings were associated with killing experiences in particular and not simply to exposure to combat. The same logistic regression analysis was run with suicide attempts as the outcome variable.

RESULTS

PARTICIPANTS AND CHARACTERISTICS

Demographics for the CIS reported here are weighted to the population of 1,323,433 Vietnam veterans described earlier. Participants were 41 years ($SE = 0.43$) on average at the time of participation. Participants were 13% Black, 7% Hispanic, and 80% White or other. The majority of participants had completed some college or were college graduates (55%). Nearly 14% of participants met diagnostic criteria for current PTSD and about 4% of participants met diagnostic criteria for current depression.

PARTICIPANTS AND CHARACTERISTICS BY SUICIDAL IDEATION AND ATTEMPTS

Demographic data; PTSD, depression, and substance use diagnoses; combat experiences excluding killing experiences; and killing scores are reported in those without suicide ideation or attempts, those with suicidal ideation only, and those with suicide attempts from the CIS weighted to the population (see Table 1). There were no demographic differences among each of the three groups. Veterans who endorsed suicidal ideation only were more likely to have met diagnostic criteria for PTSD, depression, and substance use ($P < .01$), and endorsed greater killing experiences ($P < .05$), compared to those endorsing neither or those endorsing suicide attempts. The combat experiences score did not differ among each of the three groups.

Logistic Regression of Suicidal Ideation—After adjusting for demographic variables, PTSD, depression, substance use disorder, and combat experiences, the association between killing experiences and suicidal ideation remained, with the those who had higher killing experiences having twice the odds of suicidal ideation, as compared to those with lower or no killing experiences (OR = 1.99, 95% CI = 1.07–3.67, $t = 2.19$; see Table 2). PTSD (OR = 3.42, 95% CI = 1.09–10.73, $t = 2.12$), depression (OR = 11.49, 95% CI = 2.12–62.38, $t =$

2.85), and substance use disorders (OR = 3.98, 95% CI = 1.01–15.60, t = 1.99) were each associated with higher odds of suicidal ideation.

LOGISTIC REGRESSION OF SUICIDE ATTEMPTS

In the model including demographic variables, PTSD, depression, substance use disorder, combat experiences, and killing experiences, PTSD was the only variable significantly associated with suicide attempts (OR = 5.52, 95% CI = 1.21–25.29, t = 2.21; see Table 3). In the final model, depression, substance use disorders, combat experiences, and killing were not significantly associated with suicide attempts.

DISCUSSION

This is the first known study to find that veterans of war endorsing killing experiences were twice as likely to report suicidal ideation as those who did not kill, even after accounting for PTSD, depression, substance use disorder diagnoses, and adjusted combat exposure. Although we previously found that killing is associated with PTSD and substance use in veterans of multiple eras,[6,14–16] and that PTSD and depression are most strongly associated with suicidal ideation among Iraq and Afghanistan veterans,[7] this is the first study demonstrating that killing experiences are independently associated with suicidal ideation, even after taking mental health diagnoses into account.

One framework for understanding this relationship postulates that those trained for combat and are faced with repeated exposure to painful and provocative events in war, habituate to the fear of death, and subsequently are inured to the concept of lethal self-injury.[26–28] Most recently, Bryan and colleagues [26] found that combat experiences were significantly associated with an acquired capability for suicide. Our study adds to this framework, suggesting that of combat experiences, killing in particular may be associated with suicidal ideation, and may require further exploration.

It is important to note that not all war veterans who kill in war experience mental health problems, suicidal ideation, and suicide attempts. Consequently, it is important to better understand which veterans who report killing are most bothered by these experiences and develop adverse outcomes as a result. Potential mediators of the relationship between killing and suicidal ideation are an important area for future inquiry (e.g. shame, guilt, killing attributions, particular killing circumstances, etc). Moral injury, defined as “perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations”[29] may also serve as a mediator between killing and suicidal ideation. Many individuals who struggle with having taken another life identify that killing, even in war, transgresses moral or religious beliefs, creating a sense of dissonance and internal conflict, which in the worst case may lead to suicide.

One of the central clinical implications of our results is the importance of understanding the experience of killing in war as it relates to the mental health care of veterans. Currently, the mental health impact of killing is not formally evaluated or addressed as part of PTSD or other mental health treatments, nor is it typically assessed when conducting suicide risk assessments.[7, 15,16] These results provide evidence that a comprehensive evaluation of veterans returning from combat should include an assessment of killing experiences and their psychological aftermath. This information can be used for treatment planning, including specific interventions targeted at the impact of killing.

Although killing experiences are important to evaluate and incorporate into treatment, this must be done in the most sensitive fashion and within the context of a sound therapeutic relationship. Military personnel who have killed may experience significant shame and/or

guilt and need to know that they will be able to explore the impact of killing in a safe environment. They also may have received criticism or been subject to insensitive questioning by others, causing them to be wary of speaking about this painful issue, especially when they fear others will not understand or be judgmental.

Interestingly, we found that suicide attempts were most strongly associated with PTSD, and that depression, substance use, general combat, and killing were not significantly associated with suicide attempts in the final regression model. The association between PTSD and suicide attempts has been well documented and it may be that third variables common to both, such as impulsivity[30] may best explain this finding. For example, among those participating in the WHO World Mental Health Surveys, disorders predicting the transition from suicidal thoughts to attempts were characterized by anxiety and poor impulse-control.[31] As a next step, it may be important to better understand if particular subtypes of PTSD, such as those with externalizing features[32] such as impulsivity, can be easily distinguished and are at higher risk for suicide attempts, particularly among veteran populations.

Although national epidemiological studies of suicide highlight important relationships between factors such as mental health diagnoses and prior attempts when examining the risk for suicide,[33, 34] we extend this research by highlighting the unique association between killing and suicidal ideation in veterans of war, above and beyond relationships with PTSD, depression, and substance use disorders. We also highlight that for this veteran population, PTSD is most strongly associated with suicide attempts, and suggest a more detailed investigation of third factors such as impulsivity in future research.

There are several important limitations that should be noted. First, the NVVRS is a cross-sectional study and as a result temporal relationships should not be assumed when interpreting these data. The NVVRS was conducted many years after the Vietnam War, and as a result, recall biases should be taken into account. Additionally, the most at-risk veterans may have completed suicide. This investigation was conducted with American Vietnam veterans and should not be generalized to veterans from other countries or veterans from other eras. We were only able to report these relationships for men. It will be important to look at these relationships in women following the current conflicts in Iraq and Afghanistan, given that there may be gender differences in suicidal ideation, killing experiences, and/or mental health symptoms. The diagnostic data that we had available to us (SCID) was already coded for absence or presence of depression and as a result we were not able to exclude certain questions. However, we did find that of 50 individuals who endorsed suicidal ideation, only 11 were also positive on depression. Suicidal ideation and suicide attempts were each assessed with a single indicator, and although there is precedent for doing so in other veteran studies, this is a limitation, and these finding should be replicated with more comprehensive measures of suicidal ideation and suicide attempts. For example, recent research has demonstrated that suicidal ideation is best measured by real-time electronic monitoring systems of suicidal thinking and/or measures of suicidal ideation at its worst time point.[35] Finally, although we do not assume that suicidal ideation will always lead to suicidal fatality, we believe that it is an outcome that is important to examine in its own right. Despite these limitations, suicide research should continue to be seen as a priority among military personnel and veterans.[36]

CONCLUSIONS

We found that veterans of war endorsing killing experiences were twice as likely to report suicidal ideation as those who did not kill, even after accounting for PTSD, depression, and substance use disorder diagnoses. This finding has important implications for the evaluation

and treatment of veterans who are troubled by killing in war, and may assist with better understanding the growing public health problem of suicide in our newly returning veterans.

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TABLE 1

Descriptives for demographics and utilized variables of CIS weighted to population

Variable	No suicidal ideation (*n* = 204; *percent or M and SE*)	Suicide ideation only (*n* = 40; *percent or M and SE*)	Suicide attempts (*n* = 12; *percent or M and SE*)
Age	41.40 (.53)	40.21 (.62)	39.41 (.71)
Race/ethnicity			
Black	13.37% (.01)	11.84% (.04)	18.66% (.11)
Hispanic	6.26% (.01)	8.68% (.03)	9.52% (.06)
White and other	80.38% (.02)	79.48% (.06)	71.83% (.14)
Education			
Less than high school	8.51% (.05)	7.74% (.05)	3.81% (.04)
High school	25.95% (.05)	21.00% (.09)	13.20% (.08)
Some college	43.49% (.05)	44.91% (.11)	81.25% (.10)
College graduate	10.04% (.03)	17.41% (.10)	–
Graduate/prof. school	12.01% (.03)	8.93% (.08)	1.73% (.02)
PTSD diagnosis (dx)*	9.96% (.02)	36.83% (.10)	30.98% (.18)
Depression dx*	1.13% (.00)	21.05% (.08)	5.43% (.05)
Substance use dx*	7.05% (.02)	27.76% (.10)	24.93% (.18)
Combat Score	− .09 (.05)	.06 (.17)	− .11 (.33)
Killing Score**	− .19 (.05)	.35 (.21)	.03 (.26)

Note: Percentages are reported for dichotomous and categorical variables. Means and standard deviations are reported for continuous variables.

Table based on $N = 259$ weighted to population ($N = 1{,}300{,}123$).

* $P < .01$.

** $P < .05$.

TABLE 2

Final model for logistic regression of suicidal ideation weighted to population

	Suicidal ideation		
Variables	**OR**	**95% CI**	***t***
Age	0.97	0.89–1.06	−0.06
Black	0.88	0.26–2.97	− 0.20
Hispanic	0.60	0.23–1.61	− 1.02
Education	1.38	0.79–2.38	1.14
Depression	**11.49**	**2.12–62.38**	**2.85***
PTSD	**3.42**	**1.09–10.73**	**2.12****
Substance Use	**3.98**	**1.01–15.60**	**1.99****
Combat	0.30	0.08–1.10	− 1.83
Killing	**1.99**	**1.07–3.67**	**2.19****

Note: Table based on $N = 228$ weighted to population ($N = 1{,}207{,}485$).

Bold = significant variables.

*$P < .01$.

**$P < .05$.

TABLE 3

Final model for logistic regression of suicide attempts weighted to population

	Suicide attempts		
Variables	**OR**	**95% CI**	***t***
Age	0.89	0.74–1.08	− 1.20
Black	0.50	0.08–3.21	− 0.74
Hispanic	0.72	0.11–4.52	− 0.36
Education	1.20	0.78–1.84	0.84
Depression	0.18	0.01–4.57	− 1.04
PTSD	**5.52**	**1.21–25.29**	**2.21***
Substance Abuse	3.85	0.72–20.69	1.58
Combat	0.29	0.05–1.88	− 1.30
Killing	1.32	0.58–2.99	0.67

Note: Table based on $N = 228$ weighted to population ($N = 1{,}220{,}695$).

Bold = significant variables.

* $P < .05$.