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Warning signs for suicide within a week of healthcare contact in Veteran decedents

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Abstract

Objectives—This study examined warning signs for suicide observed in the final day(s) of life in Veteran decedents who received healthcare from Veterans Health Administration (VHA) (N=381), using data obtained from detailed chart reviews.

Methods—Veterans who died within a week (7 days) of healthcare contact (18%) were compared to those who died later (82%). Multivariate logistic regression was used to examine differences in suicidal thoughts, psychiatric symptoms, and somatic symptoms as documented at the last visit, after controlling for demographic variables. A second multivariate regression examined whether the identified warning signs were also risk factors for suicide within a month (30 days) of contact.

Results—Documented suicidal ideation, OR (95% CI) = 3.46 (1.15-10.38), and psychotic symptoms, OR (95% CI) = 2.67 (1.11-6.42), at the last visit increased the likelihood of suicide within a week of healthcare contact. Both variables also increased the odds of suicide within a month of contact.

Conclusions—The assessment of suicidal ideation is critical to identifying Veterans at immediate risk. However, recognition of psychotic symptoms may also improve identification. In addition to indicating immediate risk, some warning signs may also suggest on-going risk.

Keywords

risk factors; death; military personnel

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1. Introduction

Warning signs are symptoms or stressors that are observed in the final day(s) before an event (Rudd, 2003; Rudd et al., 2006). Widely utilized in public education campaigns to prevent heart attacks, strokes, youth violence, and other health-related problems (Anonymous, 2004; Anonymous, 2008; Peterson and Newman, 2000), the concept of warning signs is starting to gain momentum in suicide prevention. Most suicide research focuses on risk factors that predict suicide over longer periods of time such as months and years (Nock et al., 2008), which may not help identify individuals who are at immediate risk or inform their treatment. Research examining warning signs that indicate and even contribute to immediate risk is therefore clearly needed.

A review of healthcare contact before suicide indicated that 64% of decedents made contact with healthcare providers within a month (30 days) of their suicide (Luoma et al., 2002). However, few studies examined factors that were associated with immediate or near-term risk. Those that have suggest that most individuals at immediate risk exhibit psychiatric symptoms such as intense anxiety and agitation but only a few directly communicate their suicidal thoughts or intent (Busch et al., 2003; Hendin et al., 2001). Although these studies had significant limitations as they used small samples and lacked control groups, they showed that data collected during the last healthcare contact may contain critical information concerning near-term risk.

Veterans who receive care from the Veterans Health Administration (VHA) are at higher risk for suicide than the general population (Men standardized mortality ratio [SMR] = 1.66; Women SMR = 1.87). (McCarthy et al., 2009) Studies of decedents who received VHA care suggest that 51-54% of Veterans make contact with VHA providers within a month of their suicide (Denneson et al., 2010; Smith et al., 2011). A recent study found that those who died within a month of contact were more likely to have documented psychiatric symptoms, HR (95% CI) = 2.95 (1.98, 4.39), and suicidal ideation, HR (95% CI) = 2.19 (1.57, 3.05), than those who died later (Britton et al., in press). There are, however, no studies on the specific psychiatric symptoms that show the strongest associations with immediate risk.

The purpose of this study was to identify warning signs for suicide within a week of healthcare contact in a sample of Veteran decedents. Analyses examined the impact of suicidal ideation, psychiatric symptoms (i.e., depression, anxiety, mania, psychosis, alcohol abuse, and drug abuse), and somatic symptoms (i.e., sleep, pain) that are associated with suicidal behavior in Veterans (Ilgen et al., 2010; Pigeon et al., in press), on near-term risk after accounting for demographic characteristics (i.e., gender, race/ethnicity, age, region [upstate New York vs. upper Midwest]). Based on the existing literature, we expected that Veterans who died within a week of contact would have more documented suicidal ideation and psychiatric symptoms than those who died later. To test whether the warning signs that predicted suicide within a week of contact were also risk factors, analyses also examined variables that were associated with suicide within a month (30 days) of contact.

2. Methods

2.1 Subjects

Participants were 423 suicide decedents who received VHA services from either Veterans Integrated Service Network (VISN) 2 located in upstate New York (i.e., upstate New York and north-central Pennsylvania, N = 130) or VISN 11 in the upper Midwest (i.e., central Illinois, Indiana, Michigan and northwest Ohio, N = 293) between fiscal years 2000 and 2006. Analyses were limited to Veterans who received VHA services during the last year of life. The study was approved by the Institutional Review Board at the Syracuse Veterans Administration Medical Center.

2.2 Data

Comprehensive information on patient factors and treatment utilization prior to suicide were obtained from three unique sources: (1) the VHA National Patient Care Database (NPCD) and other nationwide data resources available at the Austin Automation Center, (2) the National Center for Health Statistics (NCHS) National Death Index (NDI), and (3) information contained within the VHA Computerized Patient Record System (CPRS). These data have been used in previous studies (Britton et al., 2012; Pigeon et al., 2012).

2.2.1 NPCD and NDI Data—The VISN 11 Serious Mental Illness Training, Research, and Education Center (SMITREC) linked data from the NPCD and the NDI and created a National Suicide Registry that contains information about suicide on all patients who used VHA services in fiscal years 2000 through 2007. The NPCD was used to identify all individuals who used VHA inpatient, residential, or outpatient services between FY 2000 though the end of FY 2007, but did not have any record of VHA service use in FY 2008 or 2009. This data was then linked with NDI, which draws from US mortality data regarding dates and causes of death for all US residents. Data are derived from death certificates filed in state vital statistics offices and checked for accuracy by NCHS. NDI searches were conducted for all individuals identified by the NPCD search. The NDI data request protocol matched records using Social Security Number, last name, first name, middle initial, date of birth, race/ethnicity, sex, and state of residence. Frequently, NDI searches yield multiple records that are potential matches. In these instances, previously established procedures were used to identify “true” matches (Sohn et al., 2006). The NDI is considered the “gold standard” for mortality assessment information as it has the greatest sensitivity in determining vital status among all available population-level sources of mortality data (Cowper et al., 2002). The integrated database was used to identify participants who died within 30 days of their last visit as well as patient demographics such as age and gender.

2.2.2 CPRS data—All clinical notes about care provided within the VHA system are recorded in the CPRS medical record. Notes can be written in free form or using templates and typically include information about the patient's presenting problem and the type of care provided. CPRS data therefore provides information that is not officially tied to templates addressing visit encounters, notations about patient stressors, and treatment plans.

2.3 Chart Reviews

Chart reviews were conducted at the Center of Excellence for Suicide Prevention (COE) located in VISN 2. An extraction tool was used to systematically assess symptoms documented at the last visit (Valenstein et al., 2009). Symptoms that were assessed include suicidal ideation (e.g., statements about life not being worth living, suicide, plans, intent) and psychiatric symptoms associated with depression, alcohol use disorders, illicit drug use, prescription drug misuse, PTSD, mania, and psychosis. Note that documented DSM-IV psychiatric symptoms were recorded whether or not there was a formal diagnosis, necessitating the use of chart reviews (as opposed to aggregate electronic data) (American Psychiatric Association, 2000). For example, a chart was identified as having psychotic symptoms if hallucinations, delusions, or thought disorders, or a related diagnosis (e.g., schizophrenia) were noted at the last session. Chart reviews also identified information on documented somatic symptoms, including sleep and pain complaints. Masters and Bachelors-level reviewers received 8 hours of training, coded 20 charts together, and 15 charts independently to establish initial reliability. For each patient record, we used two or more independent coders who, after initial coding, met to compare results and resolved discrepancies to create a consensus record for use in analyses. When a clear consensus could not be reached, the coding decisions were staffed at a weekly consensus conference. In a previous study we calculated weighted Kappas among raters for both last year and last visit codes to assess the interrater reliability prior to consensus (Britton et al., in press). Kappas were weighted to reflect the proportion of charts coded by each pair of raters. Landis and Koch's recommendations were used to classify Kappas into poor (≤0.40), moderate (0.41-0.60), substantial (0.60-0.79), and outstanding (≥0.80) categories (Landis and Koch, 1977). Reliability for all variables was substantial or outstanding.

2.4 Analyses

Multivariate logistic regression models were used to examine predictors of suicide within 7 and 30 days of contact with VHA providers. Univariate logistic regression analyses identified variables that were associated with suicide at an alpha level of .05 for initial inclusion in the multivariate analysis. Backwards elimination was used to trim extraneous variables from the model because it avoids the potential biases of forward selection procedures (Hosmer and Lemeshow, 1989). Variables that were associated with suicide at an alpha level of .05 were kept in the model. The Hosmer-Lemeshow statistic was used to evaluate model fit, and odds ratios with 95% confidence intervals were derived using the method of maximum likelihood.

3. Results

Of the 423 suicide decedents studied, 381 (90%) used VHA services in the last year of life. Of the 381, 370 (97%) were male, 309 (82% of 379) were white, 126 (33%) were 75 or over, 173 (45%) were 55-74, 71 (19%) were 35-54, 11 (3%) were 18-34, and 262 (69%) were from the upper Midwest (vs. upstate New York). Decedents that did not use VHA services in the last year were more likely to be non-white (43% vs. 19%) and younger (36% < 55 vs. 21% < 55) than those that used services. These groups did not differ at a statistically significant level by gender or region.

Of the 381 who used VHA services in the last year, 67 (18%) died within a week of contact. In univariate analyses, suicidal ideation, psychotic symptoms, and sleep problems at the last visit were associated with suicide in the week after contact (see Table 1). There were no demographic differences between those who made contact within a week and those who died later. The multivariate analysis provided adequate fit, X^2 (1) = 1.95, p = 0.16, and indicated that suicidal ideation and psychotic symptoms were associated with suicide within a week of contact.

Of the 381, 174 (46%) died within a month of contact. In univariate analyses, suicidal ideation, depressive, anxiety, and psychotic symptoms, and sleep problems were associated with suicide within a month (Table 2). Female and receiving care from upstate New York was also associated with suicide. The multivariate analyses provided adequate fit, X^2 (3) = 2.97, p = 0.40, and suggested that suicidal ideation and psychotic symptoms were associated with suicide within a month of contact, after accounting for region (i.e., VISN). Sensitivity analyses examining the influence of region indicated that decedents from upstate New York were more likely to be 18-34 (6% vs. 2%) and 75 or older (38% vs. 31%) but less likely to be 35-54 (13% vs. 21%) and 55-74 (43% vs. 47%), Fischer's exact, p = 0.03, and trends suggested they may have had more depression, X^2 (1) = 3.79, p = .05, less pain, X^2 (1) = 3.64, p = .06, and fewer psychotic symptoms, Fischer's exact, p = 0.08, none of which explained the impact of region on outcome.

4. Discussion

In Veterans who died by suicide, documented suicidal ideation was the strongest predictor of suicide within a week of contact. Suicidal ideation is a known long-term risk factor for suicide (Brown et al., 2000), and is a common precursor to suicidal behavior that cuts across psychiatric disorders (Conner et al., 2008, Joe et al., 2006, Kessler et al., 1999). Experts contend that suicidal ideation must be a target of prevention (Mann et al., 2005), and suicide risk protocols recommend screening for suicidal ideation and obtaining further information (e.g., the presence of a plan or intent to act) to inform decisions about the severity of risk and appropriate level of care (Anonymous, 2003; Center for Substance Abuse Treatment, 2009). These findings support VHA efforts to increase the assessment and treatment of suicidal ideation and suggest that they may impact immediate as well as long-term risk. Although 47% of decedents with documented suicidal ideation died within a week of contact, ideation was only documented in 18% of suicides that occurred within a week, indicating that prevention efforts must improve the assessment, documentation, and treatment of suicidal ideation.

Efforts may also need to extend beyond suicidal ideation as psychotic symptoms at the last visit also predicted suicide within a week of contact. Evidence of severe psychiatric disturbance, psychotic symptoms is associated with increased long-term risk for suicide (Harris and Barraclough, 1997; Inskip et al., 1998). Individuals with psychotic symptoms may be seen more regularly by treatment providers increasing the likelihood of contact before suicide. Psychotic symptoms may also be more difficult to hide or mask than other psychiatric symptoms (e.g., depression, substance abuse), increasing their usefulness in predicting immediate risk (Cha et al., 2010; Nock et al., 2010). Emerging and unremitting

psychotic symptoms should therefore be an indication that treatment should be initiated or adjusted. VHA programs to enhance the monitoring of psychotic symptoms and common precursors to suicide attempts (e.g., suicidal ideation) in Veterans with psychotic symptoms may help clinicians identify individuals at immediate risk and provide an opportunity for intervention. Although hospitalization provides one means of managing risk in Veterans with psychotic symptoms, it is costly and frequently ineffective (Appleby et al., 1999; Desai et al., 2005; Hunt et al., 2007; Yim et al., 2004). The American Psychiatric Association supports an integrative approach to treatment and recommends the use of both anti-psychotics and anti-depressants for individual who may be at elevated suicide risk (Anonymous, 2003; Lehman et al., 2004). Treatments with potential to produce immediate effects and the possibility that psychosocial treatments may complement psychopharmacological treatments are also worth investigating (Kasckow and Zisook, 2008).

Receiving treatment in upstate New York (vs. upper Midwest) was associated with suicide within a month of care. Although there were regional differences in demographic and psychiatric symptoms, they did not influence the association, which may be a function of unmeasured participant characteristics or regional differences in service provision.

Interestingly, the variables that served as warning signs were also risk factors as both suicidal ideation and psychotic symptoms predicted suicide within a month of contact. In Veteran decedents, warning signs and risk factors may have a unique time frame over which they are salient and identifying each sign's time frame may help clinicians identify high-risk periods. However, it is also possible that our measure did not assess the characteristics of symptoms that change as they transition from a warning sign (indicating immediate risk) to a risk factor (indicating longer-term risk). For example, suicidal ideation may be a warning sign when it is accompanied by preparatory behavior such as a gun purchase, but a risk factor when it occurs without such behavior. Similarly, hallucinations might be a warning sign when they consist of suicide-related commands, but a risk factor when their content is unrelated to suicide. A comprehensive understanding of warning signs may require research on each factor's risk time frame, as well as a more nuanced examination of potentially important characteristics.

This study had limitations that are important to note. The sample was limited to VHA patients treated in the Midwest and Northeast, with unclear generalizability to other regions of the country. Data are based on chart reviews and information about the validity or completeness of the information contained in the charts is not available. There have been numerous suicide prevention practices instituted in VHA since the suicides studied herein occurred, making it unclear whether these findings would be replicated with a more recent sample. Region of the country was an important factor, but there was inadequate data to determine whether it was a function of treatment provision or other unmeasured variables. Data on healthcare services outside of VHA was unavailable, and chart reviews did not provide exhaustive coverage for all potential risk factors such as symptoms related to personality disorders. Details on the specific symptoms (e.g., type of suicidal ideation) that were documented were also unavailable. Important demographics, such as female Veterans, were also under-represented. Data did not assess symptoms observed in the final minutes or

hours of life, a time when warning signs are particularly pronounced, which is unfortunate as there is meager empirical data on this time period.

Nevertheless, this paper suggests that suicidal ideation and psychotic symptoms are warning signs for suicide in Veteran decedents. Research is needed to examine the findings across a representative sample of decedents, examine the risk time-frame for each warning sign, explore potential changes in the characteristics of warning signs that transition to risk factors, and to identify treatments that have an immediate effect on suicide risk so that psychiatric hospitalization is not clinicians' only option.

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Table 1

Suicide-related variables, somatic symptoms, and stressors among VHA suicide decedents who died within 7 days of contact

	Within 7 Days (N=67) N (%)	After 7 Days (N=314)	Univariate OR (95% CI)	Multivariate OR (95% CI)
Gender				
Male	64 (95.52)	306 (97.45)	0.56 (0.14-2.16)	--
Race/Ethnicity [a]				
White	58 (86.57)	251 (80.45)	1.57 (0.74-3.34)	--
Age				
18-34	1 (1.49)	10 (3.18)	0.42 (0.05-3.48)	--
35-54	14 (20.90)	57 (18.15)	1.04 (0.50-2.18)	--
55-74	28 (41.79)	145 (46.18)	0.82 (0.45-1.50)	--
75+	24 (35.82)	102 (32.48)	Ref.	--
Region				
Upstate New York	24 (35.82)	95 (30.25)	1.29 (0.74-2.24)	--
Upper Midwest	43 (64.18)	219 (69.75)	Ref.	--
Suicide-Related Variables				
Suicidal Ideation	7 (10.45)	8 (2.55)	4.46 (1.56-12.77)**	3.46 (1.15-10.38)*
Psychiatric Symptoms				
Depression	26 (38.81)	89 (28.34)	1.60 (0.92-2.78)	--
Anxiety	18 (26.87)	57 (18.15)	1.66 (0.90-3.05)	--
Mania	6 (8.96)	12 (3.82)	2.48 (0.89-6.85)	--
Psychosis	10 (14.93)	16 (5.10)	3.27 (1.41-7.56)**	2.67 (1.11-6.42)*
Substance Abuse				
Alcohol	12 (18.46)	47 (16.26)	1.16 (0.58-2.35)	--
Drugs	3 (4.62)	18 (6.23)	0.73 (0.21-2.55)	--
Somatic Symptoms				
Sleep	18 (26.87)	44 (14.01)	2.25 (1.20-4.22)*	--
Pain	23 (34.33)	119 (37.90)	0.86 (0.49-1.49)	--

*$p < .05$

**$p < .01$

[a] Race/ethnicity was missing for 2 participants.

Table 2

Suicide-related variables, somatic symptoms, and stressors among VHA suicide decedents who died within 30 days of contact

	Within 30 Days (N=174) N (%)	After 30 Days (N=207)	Univariate OR (95% CI)	Multivariate OR (95% CI)
Gender				
Male	165 (94.83)	205 (99.03)	0.18 (0.04-0.84)*	--
Race/Ethnicity [a]				
White	148 (85.55)	161 (78.16)	1.65 (0.97-2.83)	--
Age				
18-34	6 (3.45)	5 (2.42)	1.24 (0.36-4.27)	--
35-54	32 (18.39)	39 (18.84)	0.85 (0.47-1.52)	--
55-74	74 (42.53)	99 (47.83)	0.77 (0.49-1.22)	--
75+	62 (35.63)	64 (30.92)	Ref.	--
Region				
Upstate New York	71 (40.80)	48 (23.19)	2.28 (1.47-3.55)***	2.54 (1.61-3.99)***
Upper Midwest	103 (59.20)	159 (76.81)	Ref.	Ref.
Suicide-Related Variables				
Suicidal Ideation	13 (7.47)	2 (0.97)	8.28 (1.84-37.20)**	6.71 (1.44-31.35)*
Psychiatric Symptoms				
Depression	65 (37.36)	50 (24.15)	1.87 (1.20-2.91)**	--
Anxiety	42 (24.14)	33 (15.94)	1.68 (1.01-2.79)*	--
Mania	9 (5.17)	9 (4.35)	1.20 (0.47-3.09)	--
Psychosis	20 (11.49)	6 (2.90)	4.35 (1.71-11.09)**	4.33 (1.64-11.43)**
Substance Abuse				
Alcohol	32 (18.82)	27 (14.67)	1.35 (0.77-2.36)	--
Drugs	11 (6.47)	10 (5.43)	1.20 (0.50-2.91)	--
Somatic Symptoms				
Sleep	38 (21.84)	24 (11.59)	2.13 (1.22-3.72)**	--
Pain	67 (38.51)	75 (36.23)	1.10 (0.73-1.67)	--

* $p < .05$

** $p < .01$

*** $p < .001$

[a] Race/ethnicity was missing for 2 participants.