Patterns of Treatment Utilization Before Suicide Among Male Veterans With Substance Use Disorders

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Objectives. We sought to describe the extent and nature of contact with the health care system before suicide among veterans with substance use disorders (SUDs).

Methods. We examined all male Veterans Health Administration patients who died by suicide between October 1, 1999, and September 30, 2007, and who had a documented SUD diagnosis during the 2 years before death (n=3132).

Results. Over half (55.5%; n=1740) of the male patients were seen during the month before suicide, and 25.4% (n=796) were seen during the week before suicide. In examining those with a medical visit in the year before suicide (n=2964), most of the last visits before suicide (56.6%; n=1679) were in a general medical setting, 32.8% (n=973) were in a specialty mental health setting, and 10.5% (n=312) were in SUD treatment.

Conclusions. Men with SUDs who died from suicide were frequently seen in the month before their death. Most were last seen in general medical settings, although a substantial minority of those with SUDs was seen in specialty mental health settings. (*Am J Public Health.* 2012;102:S88–S92. doi:10.2105/AJPH.2011.300392)

Suicide represents a major public health concern.[1] Over 30 000 suicides occur in the United States each year, and suicide is a leading cause of death and years of potential life lost among Americans aged 18 to 65 years.[2] Individuals with substance use disorders (SUDs) are at high risk for suicidal behaviors, including suicide attempts and fatal suicides.[3–5] For example, survey data indicate that the risk of lifetime suicide attempt is nearly 6 times greater among individuals with SUDs than among the general population.[4] Data from SUD treatment settings also indicate that individuals treated for cocaine dependence,[6] opiate dependence,[7] and various other SUDs[8–10] have high lifetime prevalence rates of suicide attempts. Data on suicide mortality show similar results, including cohort studies showing that individuals treated for alcohol, opiate, intravenous drug, and stimulant use disorders are at high risk for eventual suicide[5] and controlled postmortem studies showing that alcohol and other SUDs confer risk for suicide.[11] Moreover, alcohol use disorders are the second most prevalent disorders among suicide decedents, following only mood disorders.[12]

Existing evidence indicates that between 24% and 69% of suicide decedents contact a health care professional during the month before suicide, with 23% to 47% having a health care contact in the week before suicide.[13–19] However, relatively little is known about how individuals with SUDs interact with the health care system before suicide. Understanding which SUD patients may be at heightened risk for suicide, as well as treatment patterns before suicide, is essential to develop effective interventions to prevent suicide among this large at-risk population.

The goals of this study were 2-fold. First, we aimed to describe the demographic and clinical characteristics of male patients with SUDs who died by suicide, as well as the nature of their contacts with the health care system during the year before suicide. The decision was made to focus on male patients because of concerns about low numbers of female patients utilizing Veterans Health Administration (VHA) services. Second, we examined the factors associated with the setting of care on the last visit before suicide. Such information was needed to aid in the development of more precise risk models for suicide among male patients with SUDs and to identify promising service contact points for suicide prevention interventions.

METHODS

Study data were obtained from the Veterans Affairs (VA) National Patient Care Database (NPCD) and the National Death Index (NDI). Study methods were approved by the Ann Arbor VA's institutional review board.

Sample

As outlined previously,[20] we comprehensively identified all VHA patients who died by suicide from October 1, 1999, to September 30, 2007 (fiscal years [FYs] 2000–2007; N=16 892). To identify VA patients who died by suicide from FY 2000–FY 2007, we first identified all individuals who used VA services based on treatment records in the NPCD during this period. We then examined whether these individuals had any record of contact with a VHA treatment provider in FY 2008 or FY 2009 and, thus, were known to be alive through the end of the observation period (end of FY 2007). For these individuals, no NDI searches were conducted. NDI searches conducted for the remaining individuals with no VA utilization in FY 2008 or FY 2009 revealed 16 892 suicides from FY 2000 to FY 2007. Among this sample, we identified individuals who had at least 1 SUD diagnosis documented in electronic medical records by a VA clinician during the 2 years before death. A total of 3227 patients with previous SUDs (according to the previously described criteria) were alive at the beginning of FY 2000 (October 1, 1999) and died by suicide by the end of FY 2007 (September 30, 2007). This sample of 3227 patients represents 18.5% of all VHA suicides. Over 97% (n=3132) of these suicides occurred among men, and the remaining analyses focused on these 3132 male suicide decedents with a SUD diagnosis in the 2 years before death.

Measures

Cause of death. The NDI is considered the "gold standard" for mortality assessment

TABLE 1—Sample Characteristics of Male Veterans With Substance Use Disorders Who Died by Suicide: Fiscal Years 2000–2007

Characteristic	Total (n = 3132), No. (%)
Race	
White	2374 (75.8)
Black	193 (6.2)
Other	35 (1.1)
Missing	530 (16.9)
Age, y	
18–44	1108 (35.4)
45–64	1723 (55.0)
≥65	247 (7.9)
Missing	54 (1.7)
Psychiatric conditions	
Major depression	1000 (31.9)
Other anxiety disorder	858 (27.4)
PTSD	721 (23.0)
Bipolar disorder	582 (18.6)
Personality disorder	472 (15.1)
Schizophrenia	403 (12.9)
≥2 Psychiatric conditions	1507 (48.1)
Substance abuse	
Alcohol	2611 (83.4)
Cocaine	512 (16.4)
Cannabis	478 (15.3)
Opiate	426 (13.6)
Barbiturate	191 (6.1)
Amphetamine	150 (4.8)
Other or polysubstance	999 (31.9)

Note. PTSD = posttraumatic stress disorder. Suicides occurred from fiscal years 2000 to fiscal year 2007 among men with at least 1 substance use disorder diagnosis 2 years before date of death.

information.[21] The NDI includes national data regarding dates and causes of death for all US residents, derived from death certificates filed in state vital statistics offices. The NDI data request included Social Security Number, last name, first name, middle initial, date of birth, race/ethnicity, gender, and state of residence. Frequently, NDI searches yield multiple records that are potential matches. Established procedures described by Sohn et al.[22] were used to identify "true matches" from the set of available matches. Using NDI data, we identified dates and causes of death. Suicide deaths were identified using the *International Classification of Diseases-10* (*ICD-10*) codes X60–X84 and Y87.0.[23]

Demographic information. Demographic information available for each patient included age in years (categorized into 18–44 years old, 45–64 years old, and ≥65 years old), and race (categorized into White, Black, unknown or other, and missing). Reliable data on other demographic characteristics (e.g., employment, salary) were not available in the present sample.

Substance use disorder and other psychiatric diagnoses. SUD and mental disorder diagnoses were based on *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*) diagnostic codes,[24] reflecting clinical diagnoses made by VA treatment providers during their clinical encounters. The current VA clinical records system uses *ICD-9-CM.*

Specific SUDs examined were any diagnoses of intoxication, withdrawal, abuse, or dependence involving alcohol, cocaine, cannabis, opiates, amphetamines, barbiturates, or multiple substances, or other. The multiple substances or other category included individuals with an *ICD-9* clinical diagnosis of "polysubstance abuse" or "polysubstance dependence" as well as individuals with a rarer SUD diagnosis (e.g., inhalant abuse). Participants could be diagnosed with multiple SUDs. Presence or absence of the following psychiatric diagnoses during the 2 years before suicide was also examined: major depression, schizophrenia, bipolar disorder I or II, posttraumatic stress disorder (PTSD), other anxiety disorder, and any personality disorder. An indicator was also created for each patient to reflect the presence of 2 or more nonsubstance use related mental health conditions.

Treatment utilization. Information in the NPCD was examined to generate indicators of care within the 12 months before suicide. The following indicators were utilized to reflect care received within 7, 30, and 90 days, and within the year before death: any SUD treatment, any mental health treatment, and any other medical treatment. Most of the visits in the "other medical treatment" category were outpatient medical care visits in the following settings: primary care (21.8%), admission or screening (13.6%), and telephone triage (4.4%). Overall, 20.3% of visits occurred with a prescribing provider, 14.2% occurred in an emergency room, 13.3% were telephone visits, and 1.1% were psychotherapy visits. Additionally, the specific setting of care of the last visit was examined and categorized into the following 3 mutually exclusive categories: SUD, mental health, or other medical. If a participant received more than 1 type of care on the last visit, the setting of care of the last visit was coded using the following hierarchy: (1) inpatient or outpatient SUD; (2) inpatient or outpatient mental health; and (3) inpatient or outpatient general medical treatment. Additionally, we developed a measure of number of days between last treatment contact and suicide.

Analyses

Descriptive statistics of the sample were completed using frequencies or means, as appropriate. Bivariate analyses were completed examining the patient characteristics associated with receiving care on the last visit in different settings (i.e., SUD, mental health, or other medical treatment). Finally, a multivariate multinomial logistic regression analysis[25] was completed, which examined the adjusted association between patient

TABLE 2—Recent Treatment Before Suicide Among Male Veterans: Fiscal Year 2000–2007

	Total (n = 3132), No.(%)
Overall: any treatment or contact	
7 d prior	796 (25.4)
30 d prior	1740 (55.6)
90 d prior	2378 (75.9)
1 y prior	2964 (94.6)
Categories of treatment: any substance abuse treatment	
7 d prior	125 (4.0)
30 d prior	318 (10.2)
90 d prior	533 (17.0)
1 y prior	1026 (32.8)
Any mental health treatment	
7 d prior	382 (12.2)
30 d prior	930 (29.7)
90 d prior	1461 (46.7)
1 y prior	2163 (69.1)
Any other medical contact	
7 d prior	480 (15.3)
30 d prior	1337 (42.7)
90 d prior	2057 (65.7)
1 y prior	2800 (89.4)

characteristics and likelihood of completing their last visit before suicide death in SUD or mental health treatment relative to other medical treatment on the last visit before suicide.

RESULTS

The previously mentioned methods identified 3132 suicides among male VA patients from FY 2000–FY 2007 who had at least 1 SUD diagnosis during the 2 years before death. As described in Table 1, this sample was 6.2% Black (n=193) and 75.8% White (n=2394). Alcohol use disorders were the most common type of SUD, affecting 83.4% of the sample (n=2611), with other or polysubstance abuse being the second most common SUD (31.9%; n=999). Psychiatric comorbidity was prevalent, and the most common psychiatric condition in suicide decedents with SUDs was depression (31.9%; n=1000). Moreover, almost half (48.1%; n=1507) of suicide decedents with SUDs were diagnosed with 2 or more psychiatric problems in the 2 years before death.

Timing and Type of Treatment Before Suicide

Data on treatment contacts before suicide are presented in Table 2. The majority of the total sample (94.6%; n=2964) had some contact with the VHA during the year preceding suicide. Over half (55.5%; n=1740) were seen at a VA facility during the month before death, and 25.4% (n=796) were seen during the week before suicide. In the year before suicide, 32.8% (n=1026) of the sample was seen in SUD treatment, 69% (n=2163) in mental health treatment, and 89.4% (n=2800) in other medical treatment settings.

Data from male patients who had some contact with the VHA during the year before suicide (n=2964) were used in subsequent analyses of treatment patterns. For these analyses, treatment received on the last visit before suicide was classified into 3 groups: (1) SUD treatment (10.5%; n=312); (2) mental health treatment (32.8%; n=973); or (3) any other medical contact (56.6%; n=1679). Bivariate analyses revealed significant differences among these 3 groups (Table 3). Fewer Black patients received mental health treatment, and older patients were significantly more likely to receive other medical treatment on their last VA visit before suicide. As expected, patients with

TABLE 3—Patient Characteristics and Treatment Received on Last Visit Before Suicide Among Male Veterans: Fiscal Year 2000–2007

Characteristic or Treatment Received	Total Sample[a] (n=2964; 100%), %	SUD (n=312; 10.5%), %	Mental Health (n=973; 32.8%), %	Other Medical Contact (n=1679; 56.6%), %	χ^2	*P*
Race						
White	76.5	74.0	79.5	75.2	7.4	.025
Black	6.1	3.9	6.2	6.5	3.2	.199
Other	1.2	1.0	1.1	1.3	0.2	.896
Missing	16.3	21.2	13.3	17.1	12.8	.017
Age, y						
18–44	35.3	43.5	42.2	29.7	51.8	<.001
45–64	56.5	53.5	54.7	58.2	4.3	.114
≥65	8.2	3.0	3.1	12.1	77.7	<.001
Psychiatric conditions						
Major depression	32.8	33.7	43.4	26.6	79.0	<.001
Other anxiety disorder	28.3	23.1	34.6	25.6	29.4	<.001
PTSD	23.9	21.5	30.9	20.3	39.8	<.001
Bipolar disorder	19.2	15.4	29.6	13.9	101.4	<.001
Personality disorder	15.4	11.9	23.5	11.3	77.4	<.001
Schizophrenia	13.1	5.8	24.5	7.9	165.6	<.001
≥2 Psychiatric conditions	49.5	42.3	68.1	40.0	202.8	<.001
Substance abuse						
Alcohol	83.4	89.1	79.1	84.8	22.3	<.001
Cocaine	16.3	27.2	18.9	12.8	47.2	<.001
Cannabis	15.4	19.2	19.7	12.2	31.2	<.001
Opiate	13.9	21.2	12.7	13.3	15.3	.005
Barbiturate	6.3	5.1	8.7	5.1	14.9	.006
Amphetamine	4.8	7.7	6.4	3.3	19.7	<.001
Other or polysubstance	32.3	43.3	33.4	29.5	23.6	<.001

Note: PTSD = posttraumatic stress disorder; SUD = substance use disorder.
[a]Patients receiving treatment in year before suicide.

TABLE 4—Predictors of Type of Treatment Received at Last Visit Before Suicide, Adjusting for Race, Age, and Psychiatric and Substance Use Disorders Among Male Veterans: Fiscal Year 2000–2007

	SUD (n = 301), OR (95% CI)	Mental Health (n = 966), OR (95% CI)
Race		
Black (vs White)	0.42* (0.22, 0.79)	0.71 (0.49, 1.03)
Other (vs White)	0.80 (0.23, 2.73)	0.91 (0.41, 2.01)
Missing (vs White)	1.39 (0.99, 1.95)	1.11 (0.86, 1.43)
Age, y		
18–44 (vs ≥65)	4.40** (2.16, 8.94)	3.88** (2.54, 5.94)
45–64 (vs ≥65)	3.19 (1.59, 6.39)	2.81** (1.86, 4.25)
Psychiatric conditions		
Major depression	1.32 (0.99, 1.76)	1.48** (1.22, 1.79)
Other anxiety disorder	0.77 (0.54, 1.11)	0.97 (0.78, 1.21)
PTSD	0.98 (0.67, 1.41)	1.22 (0.98, 1.53)
Bipolar disorder***	0.95 (0.64, 1.40)	1.48* (1.18, 1.86)
Schizophrenia†	0.64 (0.37, 1.09)	2.57** (1.99, 3.32)
Personality disorder***	0.74 (0.48, 1.13)	1.24 (0.97, 1.58)
≥2 Psychiatric conditions***	1.04 (0.68, 1.59)	1.80** (1.38, 2.35)
Substance abuse		
Alcohol†	1.79* (1.19, 2.70)	0.69* (0.55, 0.86)
Cocaine***	2.05** (1.45, 2.88)	1.22 (0.94, 1.57)
Cannabis	1.10 (0.77, 1.58)	1.04 (0.82, 1.33)
Opiate***	1.35 (0.95, 1.92)	0.68* (0.52, 0.89)
Barbiturate***	0.76 (0.42, 1.38)	1.39 (0.98, 1.98)
Amphetamine	1.45 (0.85, 2.49)	1.26 (0.84, 1.89)
Other or polysubstance†	1.52* (1.14, 2.03)	0.70* (0.57, 0.85)

Note. CI = confidence interval; OR = odds ratio; PTSD = posttramautic stress disorder; SUD = substance use disorder. Observations used: n = 2910. Reference category is patients with "other medical contact' on last visit before suicide (n = 1643). *P < .05 and **P < .001, for association with either SUD or mental health treatment; ***P < .05 and †P < .001, for significant difference between SUD and mental health treatment.

psychiatric diagnoses were significantly more likely to receive mental health treatment at their last visit. Major depression diagnosis (43.4%) and having 2 or more psychiatric diagnoses (68.1%) were most highly related to treatment in a mental health setting. Last visits among patients with alcohol, cocaine, opiate, amphetamines, or other or polysubstance use disorders were significantly more likely to be in a SUD setting, although patients with alcohol use disorders were also seen quite frequently in mental health and other medical settings.

Adjusted Models of Factors Associated With Treatment Setting Before Suicide

A series of multivariable analyses were conducted to examine the relative impact of predictors of setting for a patient's last visit before suicide (Table 4). In these analyses, Black male veterans with SUDs who died from suicide were less likely to be seen in SUD treatment settings than mental health or general medical settings. Older veterans were far less likely to be seen in SUD treatment than in mental health or general medical settings. Most of the psychiatric conditions (i.e., depression, bipolar disorder, schizophrenia, personality disorder, and multiple psychiatric conditions) were associated with an increased likelihood of being treated in specialty mental health treatment before suicide, relative to other medical settings. Alcohol, cocaine, and other or polysubstance use disorders were associated with a greater likelihood of receiving care in SUD treatment as the last setting of care before suicide. Additionally, alcohol, opiate, and other or polysubstance use disorders were associated with lower likelihood of receiving care in mental health treatment as the last setting of care before suicide compared with other medical settings.

DISCUSSION

Our findings on service utilization before suicide confirmed as well as extended previous work on health service use before suicide.[13–18] We confirmed that male patients with SUDs who died from suicide often had contact with VHA providers before their deaths. Approximately 26% of male VHA patients with SUDs who died by suicide made contact with a VHA treatment provider within 1 week and 56% within 1 month of suicide. We extended previous work by examining the types of treatment settings in which patients with SUD diagnoses were last seen. We found that the majority of these contacts were within medical settings, although both specialty mental health and SUD treatment programs had contact with a sizable portion of SUD patients on the last visit before suicide. Consistent with the symptom profile of patients, those men with more severe psychopathology were more likely to be seen last in specialty mental health care settings, whereas those diagnosed with alcohol, cocaine, and polysubstance use disorders were more likely to be seen last in SUD treatment settings.

The large number of suicides in male veterans with SUDs was consistent with previous research.[26] This previous research found that the risk of suicide associated with a SUD was lower than that for bipolar disorder or depression, but higher than that for schizophrenia, PTSD, and other anxiety disorders. The present data showed that SUD patients at risk for suicide received care in a variety of treatment settings and not solely specialty SUD treatment. A lower percentage of male VHA patients with a SUD diagnosis were seen in specialty SUD treatment than either mental health or general medical treatment. The results of the adjusted and unadjusted analyses indicated that specific patient factors were associated with the setting of last care before suicide. Thus, future research on suicide prevention is needed in both specialty SUD treatment as well as other VHA treatment settings, for example, research on the impact of suicide screening and targeted intervention efforts on rates of suicidal behavior in SUD patients in different treatment venues.

These results must be viewed in light of the study's limitations. Classification of cause of death was based on data from the NDI. Although the NDI is widely regarded as the best national-level source of mortality data,[21] misclassification of cause of death could have influenced the present results. In addition, the sample consisted solely of patients receiving treatment services from the VHA, and the results of this study might not be generalizable to other patient populations. Moreover, all diagnoses were made during visits with VHA treatment providers (some of whom did not have a mental health background) and could be expected to differ from results that would be obtained with structured diagnostic research interviews. Further, the way that the sample was constructed might have increased the estimated rates of treatment utilization in those with SUDs before suicide; specifically, because a diagnosis of a SUD from a VHA treatment provider in the 2 years before suicide was required for inclusion in the sample, individuals within the sample were, by definition, in some form of contact with the VHA system in the 2 years before death. Our sample was also large and represented approximately 19% of all VA suicides during the observation period. Findings based on this large sample are likely to be important for understanding the role of the treatment system in suicides of VHA patients with SUDs. It is also important to note that the analyses did not allow for the examination of the extent to which specific treatment settings might have reduced or increased suicide risk. Instead, the analyses were intended to help identify settings in which veterans received care before suicide to inform future research efforts.

To our knowledge, ours is the first study to describe the nature and setting of care provided to men with SUDs before suicide within an integrated health care setting. Most of these patients were in general contact with the health care system in the period before death, which could provide the potential for future evaluations of suicide risk detection and intervention strategies based in specialty SUD treatment as well as other mental health treatment and medical care settings. A high proportion of male VA SUD patients were seen within a month before suicide in a wide range of treatment settings, suggesting the value of conducting risk reduction research and evaluation across a broad spectrum of care. ■

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Human Participant Protection

Study methods were approved by the Ann Arbor VA's institutional review board.

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