Published in final edited form as:

Alcohol Clin Exp Res. 2015 August ; 39(8): 1510–1517. doi:10.1111/acer.12788.

Precipitating Circumstances of Suicide and Alcohol Intoxication among U.S. Ethnic Groups

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Abstract

Background—To assess the prevalence of nine different types of precipitating circumstances among suicide decedents, and examine the association between circumstances and post-mortem blood alcohol content (BAC $\geq$ 0.08 g/dl.) across U.S. ethnic groups.

Methods—Data come from the restricted 2003-2011 National Violent Death Reporting System (NVDRS), with post-mortem information on 59,384 male and female suicide decedents for 17 states of the U.S.

Results—Among men, precipitating circumstances statistically associated with a BAC $\geq$ 0.08 g/dl were physical health and job problems for Blacks, and experiencing a crisis, physical health problems and intimate partner problem for Hispanics. Among women, the only precipitating circumstance associated with a BAC $\geq$ 0.08 g/dl was substance abuse problems other than alcohol for Blacks. The number of precipitating circumstances present before the suicide was negatively associated with a BAC $\geq$ 0.08 g/dl for Whites, Blacks and Hispanics.

Conclusions—Selected precipitating circumstances were associated with a BAC ≥ 0.08 g/dl, and the strongest determinant of this level of alcohol intoxication prior to suicide among all ethnic groups was the presence of an alcohol problem.

Keywords

alcohol; suicide; NVDRS; race/ethnicity; precipitating circumstances

INTRODUCTION

Suicide is a major public health problem in the United States and the world (Goldsmith et al., 2002; World Health Organization [WHO], 2012). In the United States, a total of 41,149 people died by suicide in 2013, an age adjusted rate of 12.63 per 100,000 (Centers for Disease Control and Prevention [CDC], 2013). Suicide is the tenth leading cause of death in the U.S., and is the fourth ranking cause of years of potential life lost (YPLL) before age 65 (CDC, 2013). Data from the 2003-2012 National Violent Death Reporting System show that age-adjusted suicide rates (2000 as standard year) were higher among American Indian/Alaska Native (AI/AN; 15.14/100,000) and Whites (11.14/100,000) than among Hispanics, Blacks and Asians/Pacific Islanders (between 3.81 and 4.79/100,000, CDC 2015).

Alcohol is closely associated with suicide (Langhinrichsen-Rohling et al., 2011, Gonzalez and Hewell, 2012, Cherpitel et al., 2004, Kim et al., 2012). According to the U.S. Centers for Disease Control and Prevention, on average, 8,179 suicides (23%) and 273,206 YPLL (36%) were attributable to alcohol annually in 2006–13 (CDC, 2013). Existing studies confirm that alcohol is commonly consumed prior to suicide; for example, 37% of male and 29% of female suicide decedents in a U.S. national sample had positive blood alcohol levels (Kaplan et al., 2013, Caetano et al., 2013, Conner et al., 2014b). Also, individuals who drank prior to suicide tended to consume high levels of alcohol. Recorded estimates of mean blood alcohol concentrations (BACs) were 0.15g/dl and 0.13 g/dl in male and female suicide decedents, respectively, who used alcohol prior to the leading methods of suicide (Conner et al., 2014b). National Violent Death Reporting System (NVDRS) suicide data by ethnic group show that the proportion of suicide decedents with a positive BAC ranged from 47% among AI/ANs to 23% among Asians/Pacific Islanders (PIs), with average BAC highest among AIs/ANs. Among those who were tested for BAC, the proportion of decedents legally intoxicated prior to suicide based on the 0.08 g/dl threshold was: Blacks, 15%; AIs/ANs, 36%; Asians/PIs, 13%; Hispanics, 28% (Caetano et al., 2013).

Suicides are commonly preceded by a precipitating adverse event(s). Interpersonal disruptions, physical illness, unemployment, job problems, financial problems, serious injury or assault, bereavement, domestic violence, and accommodation problems (for the elderly) are among the precipitating events for suicide, with interpersonal disruptions most common (Foster, 2011, Almasi et al., 2009, Conner et al., 2012, Beautrais, 2001). Precipitating events vary by suicide method, gender, age and other factors. For instance, physical illness problems are more common among older decedents (Foster, 2011, Kaplan et al., 2012c, Kaplan et al., 2012a). Kaplan et al. (2012a) report that having a health problem was one of the best predictors of suicide by firearm among older men in a U.S. sample. The

presence of an alcohol use disorder increases suicide risk (Cavanagh et al., 2003, Wilcox et al., 2004). Data from the 2012 National Survey on Drug Use and Health (NSDUH) show that adults 18 or older with a past year substance use disorder were about 4 times more likely than those without such disorders to report serious thoughts about suicide in the past year (12.6% vs. 3%, SAMHSA, 2013). Alcohol dependent individuals coming to clinical attention are approximately 9 times more likely to die by suicide than the general population (Wilcox et al., 2004). Alcohol use disorders are second only to mood disorders as the most common psychiatric condition among suicide decedents (Cavanagh et al., 2003).

Most studies focusing on precipitating circumstances in suicide failed to examine the extent to which these circumstances precede suicides among ethnic minorities. Karch et al. (2006) examined substance use problems and mental illness occurring prior to suicide among Whites, Blacks, Hispanics and "Others". Whites, Hispanics and Others had higher level of reported alcohol problems. A current mental illness and depression were more likely to be present among Whites, while schizophrenia was more prevalent among Blacks. The failure to examine in detail how the circumstances precipitating suicide vary among ethnic minorities is a serious gap in the literature. Together, ethnic minorities represented 15% of the 52,276 suicide decedents in the 2003-2011 NVDRS data base (Kaplan et al., 2014). Further, in 2009 AIs/ANs had the highest rate of suicide in the U.S. (CDC, 2011), and about 50% of the suicides that occur in this group are of individuals 30 years of age and younger (Caetano et al., 2013). Research focused on understanding the factors of risk associated with suicide among ethnic minority groups is therefore essential to generate knowledge to improve the treatment of suicide-related disorders and suicide prevention, especially treatment and prevention offered in the ever increasing areas of the country with a substantial minority population. This paper attempts to respond to this need for ethnic-specific research by examining the following three research questions: 1) What is the prevalence of different types of precipitating circumstances among suicide decedents in racial/ethnic groups, and how does the prevalence of these circumstances vary across racial/ethnic groups; and 2) What is the association between precipitating circumstances and having a BAC equal to or higher than .08 g/dl immediately prior to suicide.

A key consideration is that some of the circumstances precipitating suicide including health or social problems such as substance use disorders, intimate partner violence, job and financial problems are more prevalent among some ethnic minorities independent of suicide (Caetano et al., 2008, Chartier et al., 2013, Grant et al., 2004, Hasin et al., 2007, Zeng et al., 2013). Thus, it is reasonable to expect that these circumstances will be more prevalent among suicide decedents in ethnic minority groups. A second consideration is that alcohol consumption varies considerably by gender, therefore, the analyses in the paper are gender-specific or control for the effect of gender on the outcomes of interest. A third consideration is that the analyses are conducted by ethnic group because of the considerable existing evidence that such groups drink in different ways, and that alcohol's association with suicide also varies across these groups (e.g., Caetano et al., 2013). Fourth, it is also reasonable to consider precipitating circumstances as precursors to positive Blood Alcohol Content (BAC) and alcohol intoxication (BAC $\geq$ 0.08 g/dl). The rationale is that most of the circumstances studied were likely to be present in decedents' lives prior to the last drinking occasion, assessed through BAC level. Finally, the analyses focus on the association between

precipitating circumstances and a BAC equal to or higher than .08 g/dl because this is the legal alcohol intoxication level in the United States. To achieve this BAC concentration, a man or a woman with an average weight and height in the U.S. population would have to drink about 5 (men) or 4 (women) standard drinks in about 2 hours, which corresponds to an episode of binge drinking according to the National Institute on Alcohol Abuse and Alcoholism (<http://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking>. Accessed on April 27, 2015).

METHODS

Data source

The NVDRS is a state-based surveillance system that provides information on violent deaths for 17 participating states (Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, South Carolina, Rhode Island, Utah, Virginia, and Wisconsin, Caetano et al., 2013). Data are gathered from coroner/medical examiner (C/ME) records including toxicology reports, police reports, death certificates, crime laboratories, and Alcohol, Tobacco, Firearms and Explosives (ATF) firearm trace reports. Information on acute alcohol use is based on toxicological analyses of decedents as part of the C/ME investigation. Suicide decedents were identified as those with death certificates that listed International Classification of Diseases, 10th Revision codes X60-84 or Y87.0. The data analyzed here cover 59,384 persons age 18 and older who died by suicide in the 17 NVDRS states during 2003-2011 and have a blood alcohol test.

Measures

Blood Alcohol Content (BAC): Overall, 70% of decedents were tested for the presence of alcohol, with the range in various ethnic groups being 63% to 77% among men and from 73% to 83% among women. Blood alcohol levels were coded in terms of weight by volume, and then classified as < 0.08 g/dl or ≥ 0.08 g/dl.

Circumstances prior to suicide: The circumstances preceding suicide were derived from death investigations assembled by the coroner/medical examiner and law enforcement reports, based on on-scene investigations; information from next of kin and witnesses; medical records; autopsy examinations; postmortem toxicological testing; and, in some cases, contact with health care providers (CDC, , 2008). Most medical examiner and coroner offices use trained lay investigators who follow national investigative guidelines (National Institute of Justice, , 2011). Nine special circumstances that preceded the suicide were analyzed: depressed mood, current mental health problems, alcohol problem, other substance problems, financial problems, physical health problem, job problem, intimate partner problem, life crisis.

Sociodemographic variables. These were obtained from death certificates and included gender, age group (< 21, 21-29, 30-39, 40-49, ≥ 50), race/ethnicity (White, Black, AI/AN, Asian/Pacific Islander (PI), and Hispanic), educational attainment (≤ high school, > high school) and metropolitan status. Of note, educational attainment, which is voluntary information, was missing for more than 90% of the decedents in Rhode Island and Georgia;

thus, a category for “missing” was included to retain these two states. Other states were missing less than 10%. Counties of death were assigned a rural-urban continuum code based on a classification system developed by the U.S. Department of Agriculture Economic Research Service (2003). The original 9 categories were collapsed into 2 categories: metropolitan (codes 1 through 3) and non-metropolitan (codes 4 through 9).

Statistical Analysis

Because of the potential close association between reported alcohol problems and BAC level, this circumstance was not included in the analyses in Tables 1, 2, 3, nor in the count of circumstances in Table 4. The proportion of decedents with an alcohol problem is reported in the text under Results, and its effect on BAC is assessed independently of other circumstances in the multivariate logistic regressions analysis in Table 4. In Table 1 Pearson chi-square was used to test differences in the proportion of decedents with a specific circumstance across ethnic groups. In Tables 2 and 3 the association between the presence of a precipitating circumstance and BAC .08 or higher was assessed with multivariate analysis of variance testing an interaction between race/ethnicity and BAC .08 separately for males and females, respectively. In Table 4, multivariate logistic regression analysis was used to examine the independent effect of the number of precipitating circumstances on BAC (BAC 0.08 g/dl) controlling for sociodemographic factors, alcohol problems and suicide method. Models are ethnic specific because of previous evidence indicating differences across ethnic groups on the association between acute alcohol intoxication and suicide (Caetano et al., 2013).

RESULT

Proportion of different types of precipitating circumstances among decedents tested for BAC

First, post mortem investigations did not identify any of the precipitating circumstances prior to suicide in 8% of White, 12% of Black, 10% of AI/AN, 10% of Asian/Pacific Islanders, and 9% of Hispanic decedents. Also, the proportion of decedents with an alcohol problem in each ethnic group among men were: Whites, 21%; Blacks, 10%; American Indian/Alaskan Natives, 27%; Asian/Pacific Islanders, 12%; Hispanics, 22% (Pearson chi-square, $p < .05$). The proportions among women were: Whites, 17%; Blacks, 8%; AI/AN, 21%; Asian/Pacific Islanders, 3%; Hispanics, 15% (Pearson chi-square, $p < .05$).

The distributions of precipitating circumstances differed in ethnic groups at a statistically significant level in males and females (Table 1), with the only exception being “experienced a crisis” among women. Among men, the precipitating circumstances that were common across all ethnic groups were depressed mood and intimate partner problems. Data collected by postmortem investigators indicated that depressed mood was presented in 43% of White suicide decedents among Blacks to 31% of decedents among Asian/Pis. Further, 46% of decedents among Hispanics and 31% of decedents among Asian/Pis had been in a relationship affected by intimate partner problems. In addition to depressed mood and an intimate partner problem, the presence of a current mental health problem and ever treatment for a mental health problem were additional common precipitating circumstances

among Whites and Asian/Pacific Islanders. Disclosure of intent to attempt suicide and the experience of a crisis were the two additional top common circumstances for Asians and Hispanics. Among Blacks, besides depressed mood and an intimate partner problem, the two other common circumstances included current treatment for a mental health problem and an experienced crisis. The least common precipitating circumstance among Whites, Blacks and Asians was a financial problem, whereas among Asian/Pacific Islanders it was a substance problem other than alcohol and among Hispanics, it was a physical health problem.

Among women, the precipitating circumstances that were common in all ethnic groups were ever having had treatment for mental problems and a current mental problem. Between 61% and 43% of the women decedents had being treated for a mental problem and between 66.5% and 59% had had a current mental health problem. Depressed mood and current treatment for a mental health problem were also common across all groups. The proportion of suicide decedents that had had depressed mood ranged from 49.2% among Hispanic women to 38.2% among Black women. The proportion of decedents with a history of current treatment for mental illness varied from 55% among Whites to 36.4% among Asian/Pacific Islanders. Other circumstances present in approximately one quarter of decedents in each ethnic group were, disclosing intent to commit suicide among Whites, Blacks, American Indian/Native Alaskans and Hispanics; history of suicide attempts among Whites, Blacks, American Indians/Alaskan Natives and Hispanics; experiencing a crisis among Asian/Pacific Islanders and Hispanics; and intimate partner problem in all ethnic groups.

Proportion of decedents with BAC .08 g/dl or higher among those with and without selected precipitating circumstances

In Tables 2 and 3 statistical testing was done using Whites as a comparison group. There are a few instances where there is a statistically significant association between a BAC .08 or higher and the presence of a precipitating circumstance. Among men, this association can be seen for physical health and job problems for Blacks, and for experiencing a crisis, physical health problems and intimate partner problem for Hispanics (Table 2). Among women, the only precipitating circumstance associated with a BAC .08 or higher is a substance abuse problem other than alcohol for Blacks (Table 3).

Multivariate logistic regression of elevated BAC on sociodemographic factors, suicide methods and number of precipitating circumstances

The main independent variable of interest, the number of precipitating circumstances present before the suicide, is negatively associated with a BAC .08 or higher compared to a negative or lower BAC for Whites and Hispanics (Table 4). Also, among all ethnic groups the most important variable positively associated with a BAC .08 or higher is the presence of alcohol problems as a precipitating circumstance. The odds of having a post-mortem BAC .08 or higher increase from 4.5 to almost 7 times higher if this variable was reported. Among Whites other variables positively associated with a BAC .08 or higher are being a male and having high school or less education. Older age, being not married, suicide by hanging/suffocation, poisoning and “other” methods are inversely associated with having a BAC .08 or higher. Among Blacks, suicide by hanging /suffocation and “other” method are inversely associated with a BAC .08 or higher. Among American Indians/Alaskan Natives

older age and suicide poisoning are negatively associated with elevated BAC. Among Asians/Pacific Islanders suicide by “other” methods has a negative association with a BAC .08 or higher. Finally, among Hispanics, older age, suicide by hanging/suffocation, poisoning or “other” methods compared to suicide by firearm are negatively associated with BAC .08 or higher.

DISCUSSION

The prevalence of suicide precipitating circumstances differs by gender and ethnicity. Some of the most frequent circumstances among decedents are depressed mood and mental health problems, and especially so among White women. This finding is expected because suicide is commonly associated with mental health problems such as depression. About 10% of the U.S. adult population has a diagnosis of any mood disorder in a 12 month span and 7% have a diagnosis of major depressive disorder (Kessler et al., 2005). Women have higher rates than men, but White women do not have higher rates (8%) than Black or Hispanic women (12.8% and 11.4%, respectively, Gonzalez et al., 2010). The fact that mental health problems in general are higher among White suicide decedents could be due to Whites’ increased access to health care and mental health treatment. The fact that the rate of “current treatment for mental illness” is higher among White decedents (Table 1) is suggestive that indeed access to care may be the explanatory factor behind the high rate of mental health related circumstances reported among these individuals in the NVDRS data set.

Certain circumstances are more common among American Indians/Alaskan Natives such as disclosure of intent to die by suicide, previous suicide attempts, and substance use problems. Data for 2002-2004 from the Indian Health Service indicate that American Indians/Alaskan Natives had a suicide rate 1.7 times higher than the rate for all racial/ethnic groups in the U.S., which may be associated with a higher rate of previous suicide attempts (Gone and Trimble, 2012). American Indian/Alaskan Natives in general also have a higher rate of substance use problems. For instance, in 2012 the rate of illicit drug use in the population 12 years of age and older was 12.7% for American Indians/Alaskan Natives, 11.3% for Blacks, 8.3% for Hispanics, and 3.7% for Asians (SAMHSA, 2013). Interestingly, job and financial problems were not more common among decedents from disadvantaged minorities as hypothesized, but were higher among Asians, independent of gender. This finding may not reflect a higher rate of these problems in the Asian/Pacific Islander population in the U.S., but could be a cultural reaction to the presence of these types of problems (Lester, 1997). This result has practical application for clinicians treating the Asian/Pacific Islander population. These professionals should pay special attention to their client population and carefully assess suicide risk when patients or their families report job and financial problems. Finally, intimate partner problems are higher among ethnic minority decedents, with the exception of Asians/Pacific Islanders, than among Whites, as hypothesized. General population data indicate that indeed prevalence and incidence rates of intimate partner violence, for instance, are higher among Blacks and Hispanic couples than Whites (Caetano et al., 2005).

The analysis of the association between specific types of precipitating circumstances and BAC .08 or higher revealed only a few statistically significant associations. Also, these

associations were not uniform across ethnic groups. Black men with a physical health problem and job problems had higher rates of alcohol intoxication than those without such circumstances. Among Asians/Pacific Islanders those with a depressed mood had higher rates of BAC .08 or higher, perhaps due to the close association between depression and increased alcohol consumption (Boden and Fergusson, 2010). Curiously, Hispanic men who experienced a crisis and those with a physical health problem had a lower rate of post-mortem alcohol intoxication, contrary to expectation. The same negative association with experiencing a crisis was found among Hispanic women. Although speculative, this may be due to the fact that the presence of a physical health problem led to decreased alcohol consumption and also precipitated the crisis.

Overall, the lack of association between most types of circumstances and alcohol intoxication suggests that acute alcohol intoxication prior to suicide is either linked to the act of committing suicide per se or is due to prior alcohol problems. In fact, the logistic regression analysis in Table 4 shows that, uniformly across all ethnic groups, the major risk factor for acute alcohol intoxication prior to suicide is the existence of a prior alcohol problem. While this is not an unexpected finding, it emphasizes the importance of suicide risk assessment for clients in treatment for alcohol problems. Individuals with alcohol problems in treatment have a suicide risk about 10 times higher than the general population (Wilcox et al., 2004). The Substance Abuse and Mental Health Services Administration has recognized this increased risk and has issued useful guidelines describing how treatment professionals can respond to the risk (SAMHSA, 2009). This result also corroborates the information from family and friends about the presence of alcohol problems in decedents' life. In other words, one would expect that decedents with alcohol problems prior to suicide would have a higher likelihood of being intoxicated at the time of the suicide than decedents without prior alcohol problems. Nevertheless, it is also important to notice that the proportion of men identified as having an alcohol problem as a precipitating circumstance ranged from 3% to 27%, and among women the range was 3% to 21%, yet, the proportion of decedents with a BAC equal to or higher than .08 is higher, underscoring that not all who had post mortem levels of alcohol intoxication in their blood had previous alcohol problems. In these cases where alcohol intoxication prior to suicide was present but alcohol problems were not a precipitating circumstance, alcohol may have been used as a means to lower anxiety about suicide, to anesthetize pain associated with it, and/or to marshal the courage to carry it out. In other words, it is possible that drinking may have been used to "facilitate" the act of suicide, a phenomenon documented in about one-third of alcohol-involved suicide attempts in three prior studies (Baca-Garcia et al., 2001, Spokas et al., 2012, Conner et al., 2014a).

In summary, as stated above, a little over a third of the men and about a third of the women who commit suicide have positive BACs, indicating alcohol consumption immediately prior to suicide (Caetano et al., 2013; Conner et al., 2014b; Kaplan et al., 2013). Drinking, therefore, plays an important role in suicide. However, most suicide precipitating circumstances are not associated with the presence of alcohol intoxication. These circumstances occur prior to suicide, and the drinking is independently done perhaps to facilitate the suicide. One possible exception is when the circumstance is an alcohol problem. In this case it is probable that the drinking immediately prior to suicide is part of a

longer and chronic alcohol use disorder. As expected, depression and mental health related problems figure prominently among the various suicide precipitating circumstances. However, culture is also an important factor in determining what types of precipitating factors may influence someone's decision to commit suicide. A potential example is the relatively important association between job and financial problems and suicide among Asians/Pacific Islanders. Nevertheless, a key finding is the minimal (if any) variation among racial-ethnic groups in the relationship between circumstances and intoxication. The implication is that suicide prevention efforts addressing alcohol should be tailored to people's psychosocial conditions. With respect to alcohol and suicide, conditions that can affect anyone (such as chronic alcohol misuse) may over-ride racial-ethnic variations. Thus, strengthening the connections among suicide prevention programs, alcohol control policies, and treatment for people with alcohol use disorders should be encouraged.

Finally, there are several potential areas for future research on the association between suicide precipitating circumstances and drinking. Research should focus on the reliability and validity of the post-mortem information collected from family and friends, especially regarding past mental problems, mental health treatment and alcohol problems. Also, given that there usually are more than one precipitating circumstance reported by family and friends, it would be important to identify whether the suicide can be associated with a particular factor or it is the weight of several factors that leads one to suicide. Studies where suicide decedents are compared to controls from the community would also add important information to better understand the role of drinking in suicide. This is particularly the case with ethnic minorities given that information on how community controls drink is more difficult to find for minority groups than for the White majority population.

Strengths and limitations

The NVDRS has many strengths (Caetano et al., 2013). It is the only surveillance system for violent deaths in the United States, collecting information from multiple sources to characterize violent deaths as opposed to using only death certificates (which contain limited data). Further, although the NVDRS states are not necessarily representative of the United States, the populations of these 17 states are similar in terms of gender, age, ethnic/racial composition, urban/rural characteristics, and overall suicide rates to the nation as a whole. Finally, collection of postmortem data is particularly challenging when states have independent county-based C/ME systems rather than a centralized ME state system. It is worth noting that 63% of the states participating in the NVDRS have a centralized ME system compared with only 15% in non-NVDRS states (Edwards et al., 2009).

The study also has limitations. Not all suicide decedents were tested for BAC across states. Fortunately, only three of the sixteen states (Alaska, Georgia, and Oregon) had alcohol testing rates below the 50% level. Toxicology testing is often determined by availability of state funding. However, all demographic subgroups had toxicological testing rates at or above 65% except those aged 60 years and older who's testing rate was slightly lower (62%). Also, decedents' ethnicity was determined from information provided by family members, by direct observation by the coroner or medical examiner's office, by police officers, and by directors of funerary agencies. There is evidence that ethnicity is

misidentified in death certificates, being more substantially so for American Indians/Alaskan Natives and Hispanics than other ethnic groups (Arias et al., 2008). Third, the quality of the information about precipitating circumstances is dependent not only in the quality of the post-mortem interview with friends and family members, but also on the extent to which friends and family members can be contacted and are willing to be interviewed and provide information. It is possible that the quality of such information varies by ethnicity. For instance, homelessness and family breakup, affects some ethnic groups more than others. To the extent that friends and family cannot be contacted or refuse to be interviewed, data on precipitating circumstances cannot be collected. Fourth, diverse national groups were lumped together, especially among Asians, American Indians, Pacific Islanders, and Hispanics. The association between suicide, alcohol intoxication and precipitating circumstances may vary considerably across subgroups of these groups (e.g. different American Indian tribes, different Asian or Hispanic national groups). Fifth, the presence of precipitating circumstances was elicited by proxy based methods, with the potential for biases, particularly underestimates. Sixth, precipitating circumstances are defined broadly in NVDRS and include behavioral health symptoms, stressful life events or circumstances that may be ongoing or acute, and a history of prior suicide attempts. Seventh, the data are uncontrolled and the presence of a precipitating circumstance is not synonymous with it serving a causal risk factor.

Acknowledgments

Funding

This study was supported in part by grant R01 AA020063 from the *National Institute on Alcohol Abuse and Alcoholism*.

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Table 1
Proportions of suicide decedents with specific types of precipitating circumstances by race/ethnicity and gender.

	White	Black	American Indian/Alaska Native	Asian/Pacific Islander	Hispanic
Men					
Depressed mood *	43.5	30.7	34.9	40.5	40.8
Ever Treated for mental problem *	37.2	23.1	21.9	29.6	24.4
Current mental health problem *	42.7	27.6	28.0	35.5	29.4
Current treatment for mental illness *	30.8	16.8	17.9	22.1	20.1
Disclosed intent to commit suicide *	30.2	22.6	34.1	21.2	30.9
History of suicide attempts *	17.2	12.1	19.7	13.4	18.9
Substance problem other than alcohol *	15.7	14.1	15.5	7.0	18.9
Experienced a crisis *	29.2	36.2	29.9	25.8	35.0
Financial problem *	14.0	10.1	9.7	16.3	11.7
Physical health problem *	22.3	10.7	12.5	14.2	11.6
Job problem *	15.4	10.7	11.4	18.1	13.9
Intimate partner problem *	32.7	38.1	42.4	30.6	46.3
Number of circumstances, mean (SD)	2.15 (1.34)	1.78 (1.21)	1.84 (1.31)	1.88 (1.20)	2.07 (1.34)
Women					
Depressed mood *	44.4	38.2	44.6	45.7	49.2
Ever Treated for mental problem *	61.5	53.2	46.8	43.1	50.3
Current mental health problem *	66.7	59.3	53.2	46.3	52.3
Current treatment for mental illness *	55.0	45.1	41.4	36.4	43.8
Disclosed intent to commit suicide *	29.7	24.7	33.9	23.6	33.5
History of suicide attempts *	35.3	26.7	34.4	22.4	35.7
Substance problem other than alcohol *	19.0	14.8	21.5	4.2	18.2

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	White	Black	American Indian/Alaska Native	Asian/Pacific Islander	Hispanic
Experienced a crisis	24.0	24.4	20.4	25.2	26.9
Financial problem *	10.8	9.9	5.4	13.1	8.1
Physical health problem *	24.2	18.9	23.1	16.6	17.9
Job problem *	9.0	10.9	5.9	13.4	8.5
Intimate partner problem *	26.2	26.4	34.4	28.4	39.4
Number of circumstances, mean (SD)	2.24 (1.33)	2.02 (1.19)	2.08 (1.24)	1.93 (1.27)	2.20 (1.32)

* Significant ($p<.05$) Pearson chi-square of difference between racial/ethnic groups.

Table 2

Proportion of suicide decedents with BAC .08 g/dl or higher by presence or absence of specific precipitating circumstance and ethnicity among men

	White, % (n ^d)		Black, % (n ^d)		American Indian/Alaskan Native, % (n ^d)		Asian/Pacific Islander, % (n ^d)		Hispanic, % (n ^d)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Men										
Depressed mood	24 (14294)	25 (18444)	17 (1997)	18 (888)	40 (205)	44 (385)	17 (242)	12 (350) *	31 (812)	30 (1160)
Ever Treated for mental problems	21 (12240)	26 (20498)	19 (2206)	12 (679)	33 (129)	45 (461)	12 (180)	15 (412)	22 (482)	33 (1490)
Current mental health problem	22 (14028)	26 (18710)	20 (2081)	13 (804)	36 (165)	45 (425)	13 (215)	15 (377)	23 (581)	34 (1391)
Current treatment for mental illness	20 (10145)	26 (22593)	19 (2393)	11 (492)	31 (105)	45 (485)	12 (134)	15 (458)	22 (401)	33 (1571)
Disclosed intent to commit suicide	28 (9937)	23 (22801)	17 (2225)	21 (660)	47 (200)	41 (390)	12 (128)	15 (464)	33 (621)	29 (1351)
History of suicide attempts	25 (5606)	24 (27132)	18 (2533)	16 (352)	45 (117)	42 (473)	20 (80)	13 (512)	31 (374)	31 (1598)
Substance problem other than alcohol	27 (5101)	24 (27638)	18 (2477)	17 (408)	42 (91)	43 (499)	13 (40)	14 (552)	33 (373)	30 (1599)
Experienced a crisis	28 (9601)	23 (23137)	16 (1830)	20 (1055)	46 (175)	41 (415)	15 (153)	14 (439)	28 (697)	32 (1275) *
Financial problem	26 (4605)	24 (28133)	18 (2591)	15 (294)	44 (57)	42 (533)	19 (98)	13 (494)	27 (233)	31 (1739)
Physical health problem	14 (7382)	28 (25357)	19 (2575)	9 (310) *	25 (75)	45 (515)	3 (86)	16 (506)	18 (234)	32 (1738) *
Job problem	28 (5041)	24 (27697)	18 (2572)	17 (313) *	51 (68)	41 (522)	19 (108)	13 (484)	38 (280)	29 (1692)
Intimate partner problem	34 (10655)	20 (22083)	14 (1779)	24 (1106)	49 (251)	38 (339)	20 (182)	11 (410)	35 (912)	27 (1060) *

^d Represents the total number of cases BAC tested per row within racial/ethnic group.

* Significant (p<.05) interaction between the racial/ethnic category (relative to white) and BAC .08 (relative to <.08) using MANOVA.

Proportion of suicide decedents with BAC .08 g/d or higher by presence or absence of specific precipitating circumstance and ethnicity among women

Table 3

	White, % (n ^d)		Black, % (n ^d)		American Indian/Alaskan Native % (n ^d)		Asian/PI, % (n ^d)		Hispanic, % (n ^d)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Women										
Depressed mood	19 (4524)	17 (5664)	14 (366)	10 (223)	29 (83)	40 (103)	11 (139)	12 (162)	27 (223)	23 (222)
Ever treated for mental problem	17 (6271)	20 (3917)	15 (274)	10 (315)	29 (87)	40 (99)	7 (129)	15 (172)	21 (223)	29 (222)
Current mental health problem	17 (6803)	20 (3385)	16 (238)	10 (351)	28 (99)	43 (87)	7 (139)	15 (162)	23 (232)	27 (213)
Current treatment for mental illness	16 (5613)	20 (4575)	15 (322)	10 (267)	30 (77)	39 (109)	7 (110)	14 (191)	22 (194)	27 (251)
Disclosed intent to commit suicide	21 (3029)	17 (7159)	11 (441)	16 (148)	32 (63)	37 (123)	11 (72)	12 (229)	26 (152)	24 (293)
History of suicide attempts	19 (3615)	17 (6573)	12 (437)	13 (152)	30 (64)	38 (122)	7 (68)	13 (233)	25 (159)	25 (286)
Substance problem other than alcohol	19 (1938)	18 (8250)	11 (502)	22 (87) [*]	25 (40)	38 (146)	8 (13)	12 (288)	27 (81)	24 (364)
Experienced a crisis	22 (2457)	17 (7732)	11 (446)	17 (143)	32 (38)	36 (148)	13 (77)	11 (224)	23 (120)	26 (325) [*]
Financial problem	20 (1108)	18 (9080)	12 (531)	17 (58)	60 (10)	34 (176)	18 (39)	11 (262)	30 (37)	24 (408)
Physical health problem	11 (2474)	20 (7714)	13 (477)	10 (112)	21 (43)	39 (143)	6 (51)	13 (250)	14 (81)	27 (364)
Job problem	23 (924)	17 (9264)	12 (524)	12 (65)	36 (11)	35 (175)	12 (41)	12 (260)	36 (39)	24 (406)
Intimate partner problem	26 (2671)	15 (7517)	11 (432)	17 (157)	41 (64)	32 (122)	13 (87)	11 (214)	27 (178)	23 (267)

^dRepresents the total number of cases BAC tested per row within racial/ethnic group.^{*} Significant (p<.05) interaction between the racial/ethnic category (relative to white) and BAC .08 (relative to <.08) using MANOVA.

Odds ratios and 95% Confidence Limits from multivariate logistic regression of BAC level on sociodemographic factors, suicide methods, and number of precipitating circumstances.

Table 4

	White	Black	AIAN	Asian/PI	Hispanic
Number of circumstances ^a	0.93 (0.91 - 0.94) ***	0.99 (0.91 - 1.07)	0.89 (0.78 - 1.01)	0.97 (0.82 - 1.15)	0.86 (0.79 - 0.92) ***
Male (vs female)	1.17 (1.09 - 1.24) ***	1.26 (0.94 - 1.69)	1.08 (0.73 - 1.59)	0.91 (0.57 - 1.46)	0.93 (0.71 - 1.22)
Age in 5-year interval	0.89 (0.89 - 0.90) ***	0.95 (0.92 - 0.99) **	0.84 (0.78 - 0.90) ***	0.99 (0.92 - 1.06)	0.92 (0.89 - 0.96) ***
high school (vs > high school)	1.08 (1.02 - 1.14) **	1.22 (0.97 - 1.54)	1.10 (0.70 - 1.72)	1.15 (0.74 - 1.78)	1.33 (1.03 - 1.70)
Not married (vs married)	0.98 (0.93 - 1.03)	1.04 (0.84 - 1.29)	1.11 (0.75 - 1.62)	1.10 (0.71 - 1.72)	1.05 (0.85 - 1.29)
Metropolitan (vs rural)	1.06 (0.99 - 1.13)	1.12 (0.84 - 1.49)	0.78 (0.56 - 1.08)	1.04 (0.34 - 3.22)	1.15 (0.90 - 1.48)
Hanging/suffocation (vs firearm)	0.76 (0.71 - 0.81) ***	0.55 (0.43 - 0.71) ***	0.65 (0.45 - 0.96)	0.84 (0.50 - 1.41)	0.66 (0.53 - 0.82) **
Poisoning (vs firearm)	0.54 (0.50 - 0.57) ***	0.78 (0.57 - 1.07)	0.60 (0.37 - 0.96)	0.94 (0.47 - 1.86)	0.50 (0.37 - 0.68) ***
Other method (vs firearm)	0.51 (0.45 - 0.57) ***	0.43 (0.29 - 0.63) ***	1.63 (0.85 - 3.14)	0.25 (0.10 - 0.65) **	0.53 (0.36 - 0.79) **
Alcohol Problem (vs none known)	6.90 (6.53 - 7.29) ***	4.40 (3.44 - 5.64) ***	5.58 (3.82 - 8.15) ***	5.30 (3.05 - 9.20) ***	5.93 (4.74 - 7.41) ***

Analysis used logistic regression, alpha was adjusted for multiple comparison using Bonferroni method ($p < .01$).

^aNumber of circumstances truncated to 6 and higher.

**
p < .01

p < .001. Results in the table are from separate ethnic-specific regressions.