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Short communication

Prior suicide attempts are less common in suicide decedents who died by firearms relative to those who died by other means

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ABSTRACT

Background: Suicide prevention efforts often center on the identification of risk factors (e.g., prior suicide attempts); however, lists of risk factors without consideration of context may prove incapable of impacting suicide rates. One contextual variable worth considering is attempt method.
Methods: Utilizing data from the National Violent Death Reporting System (2005–2012), I examined suicide deaths (n=71,775) by firearms and other means to determine whether prior suicide attempts were more common in one group versus the other.
Results: Significantly fewer suicide decedents who died by firearms reported a prior history of suicide attempts (12.10%) than did decedents who died by other means (28.66%). This result was further replicated within each state that contributed data to the NVDRS.
Limitations: Only 17 states have contributed to the NVDRS thus far and, within those states, not all suicide deaths were reported. Due to the nature of the data, I was unable to test proposed mediators within our model.
Conclusions: Suicide decedents who die by firearms may die on their first attempt more often than other decedents due to a capability and willingness to utilize a highly lethal means. Current risk assessment protocols may be ill equipped to identify such individuals prospectively on their own. Broader methods of implementing means restriction (e.g., legislation) may thus be pivotal in suicide prevention efforts.

1. . Introduction

Historically, suicide prevention efforts have centered on the identification of risk factors. Many variables have been identified as risk factors for eventual death by suicide with prior suicide attempts repeatedly proving to be one of the most robust predictors (De Leo et al., 2013; Hawton, 2010) and several risk assessment frameworks and theories emphasizing attempt status as a variable substantially weighted when determining risk levels (Joiner et al., 1999; Klonsky and May, 2015; Posner et al., 2008). Recent research, however, has revealed that our ability to prospectively predict death by suicide is no better now than it was in the mid-20th century (Franklin et al., in preparation). Furthermore, suicide rates have climbed in recent years, indicating that our efforts to identify risk factors may be a suboptimal strategy, at least in isolation (Centers for Disease Control and Prevention, 2015). Consideration of context may thus prove pivotal in understanding the importance of specific variables (Klonsky and May, 2014).

One contextual factor worth considering is suicide method. Each year, more than half of suicide deaths within the US result from self-inflicted gunshot wounds despite the fact that this method is utilized in less than 5% of attempts (Centers for Disease Control and Prevention, 2015). Such findings highlight the high lethality of firearms and prior research has demonstrated that, in contrast to most other methods, firearms almost invariably result in death when utilized in a suicide attempt (Chapdelaine et al., 1991; Spicer and Miller, 2000). Research has repeatedly demonstrated that limiting access to highly lethal means results in decreased overall suicide rates (Carrington, 1999; Kreitman, 1976; Loftin et al., 1991; Nordentoft et al., 2010; Oliver and Hetzel, 1972; Sarchiapone et al., 2011) and that the notion of method substitution – seeking out another suicide method when access to one method is thwarted – is not supported by data (Daigle, 2005; Law et al., 2014; Lester and Abe, 1998). Furthermore, recent research has demonstrated that several state laws regulating access and exposure to handguns are associated with lower overall suicide rates (Anestis et al., 2015a, 2015b; Anestis and Anestis, 2015). In that work, the authors demonstrated that, in states with handgun regulation in place, the impact of the laws on overall suicide rates was largely explained by the proportion of suicide deaths resulting from firearms. Furthermore, the authors in both studies

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demonstrated that implementation of such laws is prospectively associated with decreases in overall suicide rates whereas repeal is prospectively associated with increased overall suicide rates.

Given the frequency with which firearms are utilized in lethal suicidal behavior within the US (Centers for Disease Control and Prevention, 2015), it is vital to more clearly understand to what extent robust predictors of future suicidal behavior overall apply to this particular method. Specifically, if fewer suicide decedents who utilized firearms in their lethal attempt had a history of prior suicide attempts than did suicide decedents who utilized other methods, this would indicate that our risk factor models are less useful in understanding who is most vulnerable to dying by suicide using firearms – the most common method of suicide death in the US (Centers for Disease Control and Prevention, 2015).

To address this question, I consulted the National Violent Death Reporting System (NVDRS), which collects information on violent deaths in a selection of states. Thus far only 16 states have participated for the majority of its existence with one additional state (Ohio) joining in 2011. The NVDRS is a voluntary system, meaning that not all suicide deaths are reported; however, reports include information on the circumstances of each death (e.g., prior history of suicide attempt, presence of a suicide note). Initial data collection began in the late 1990s; however, the number of states participating spiked in 2005 and, as such, I opted to examine all reported suicide deaths with known circumstances of death from 2005 through 2012 (the most recent year available) to examine whether a lower proportion of suicide decedents who died from self-inflicted gunshot wounds reported prior suicide attempts than did suicide decedents who died by other methods. Such findings would highlight the importance of emphasizing means restriction alongside assessing general risk factors. Indeed, if prior suicidal behavior is less common among those decedents who utilized firearms in their lethal attempt, this would indicate that many risk assessment approaches are ill equipped on their own to identify the majority of individuals who will die by suicide in the US.

2. Method

To compute the proportion of firearm and non-firearm suicide deaths in which the decedent had a prior history of one or more suicide attempts, I consulted the NVDRS website. For each of 16 states that had contributed data since 2005, I entered eight years of data (2005–2012), including total number of suicide deaths, total number of suicide deaths resulting from firearms (with and without prior suicide attempts) and the total number of suicide deaths resulting from methods other than firearms (with and without prior suicide attempts). I also included data from Ohio, which began contributing information on violent deaths in 2011.

2.1. Data analytic plan

To test whether a lower percentage of suicide decedents who died by self-inflicted gunshot wound had a prior history of one or more suicide attempts than did suicide decedents who died by other methods, I ran a series of two-sample *z*-tests. I first ran analyses for each individual state, summed across years. I then ran a single analysis that summed across all states and all years. Cohen's *d* was computed as an index of effect size.

3. Results

Information on the number and nature of suicide deaths by state and overall can be found in Table 1. The extent to which suicides were recorded into the system varied by state and, as such, states with a higher actual incidence of suicides did not necessarily have the highest number of suicides recorded into the NVDRS system. Across all states and years, a total of 71,775 suicide deaths of known circumstances were reported (36,896 by firearms; 34,879 by other means).

The initial results indicated that, in each state, the percentage of suicide decedents who died by firearms and who had a history of one or more suicide attempts (range=6.61–16.23%) was significantly lower than the percentage of suicide decedents who died by other means and who had a history of one or more suicide attempts (range=20.62–35.56%; *z*'s > 4.17; *p*'s < .001; Cohen's *d*'s > .25). Furthermore, when summed across all years and all contributing states, results again supported that the percentage of suicide decedents who died by firearms and had a history of one or more suicide attempts (12.10%) was significantly lower than the percentage of suicide decedents who died by other means and had a history of one or more suicide attempts (28.66%; $z=55.29$; $p<.001$; Cohen's $d=.41$). These results are presented in Table 1.

4. Discussion

Suicide is notoriously difficult to predict. Evidence-based risk assessment methods exist (e.g., Joiner et al. (1999) and Posner

Table 1
Descriptive data on suicide deaths (2005–2012) and the percentage of decedents by method with and without a prior history of suicide attempts.

State	Suicides	Firearm	Non-firearm	% Firearm prior attempt	% Non-firearm prior attempt	*z*	*p*	Cohen's *d*
Alaska	7304	4081	3223	11.59%	32.61%	21.95	< .001	.53
Colorado	3337	1742	1595	15.10%	34.73%	13.18	< .001	.47
Georgia	3397	2093	1304	11.18%	28.37%	12.75	< .001	.45
Kentucky	774	196	578	10.71%	29.24%	5.21	< .001	.38
Maryland	4654	2493	2161	14.28%	31.24%	13.89	< .001	.42
Massachusetts	4474	2732	1742	11.31%	27.73%	14.03	< .001	.43
New Jersey	8715	4826	3889	10.63%	26.77%	19.57	< .001	.43
New Mexico	4461	2391	2070	12.09%	27.44%	12.98	< .001	.40
North Carolina	3833	1199	2634	11.84%	25.06%	9.34	< .001	.56
Ohio	1126	278	848	7.55%	23.94%	5.94	< .001	.36
Oklahoma	3739	771	2968	6.61%	24.46%	10.88	< .001	.36
Oregon	3700	1748	1952	11.33%	28.28%	12.81	< .001	.43
Rhode Island	3289	2159	1130	7.41%	20.62%	11.09	< .001	.39
South Carolina	6267	3927	2340	9.98%	22.65%	13.69	< .001	.35
Utah	6205	3044	3161	18.59%	35.56%	15.01	< .001	.39
Virginia	1143	727	416	16.23%	26.44%	4.17	< .001	.25
Wisconsin	5357	2489	2868	14.38%	33.02%	15.85	< .001	.44
Total	71,775	36,896	34,879	12.10%	28.66%	55.29	< .001	.41