



# Differentiating suicide decedents who died using firearms from those who died using other methods



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## ABSTRACT

Studies have documented a link between gun ownership and suicide, but little is known about characteristics of those most likely to use a gun in a suicide attempt rather than alternative methods. We examined which factors differentiate suicide decedents who died using a gun from those who died by other methods. We further examined whether such findings are consistent within the subcomponent of our larger sample comprised entirely of gun owning suicide decedents. Data reflect 267 suicide decedents, with data provided by individuals who identified as having lost someone to suicide (loss survivors). Within the full sample, a higher proportion of gun-owning and male suicide decedents died by firearm. Further, individuals who had previously discussed suicide or engaged in one or more non-lethal suicide attempts were less likely to die by suicide using a gun. Within the subsample of gun owning suicide decedents, a greater proportion of decedents who stored guns at home and in unsecure locations died from self-inflicted gunshot wounds. These findings add clarity to the relationship between firearm ownership and death by suicide at the individual level. Furthermore, these findings are consistent with the notion that means safety implementation may represent a vital suicide prevention tool.

Within the United States (US), guns account for a disproportionate amount of suicide deaths. Despite being used in less than 5% of suicide attempts, guns typically account for more US suicide deaths than do all other methods combined, with male suicide decedents substantially more likely to die using a gun than are female suicide decedents (Centers for Disease Control and Prevention, 2016). This discrepancy can be partially accounted for by the lethality of the method, with 80–95% of all firearm suicide attempts resulting in death (Card, 1974; Carrington, 1999; Chapdelaine et al., 1991; Spicer and Miller, 2000). The extreme lethality of the method, however, does not provide insight into which individuals are most likely to use a gun in a suicide attempt.

Although gun ownership has repeatedly exhibited a non-significant association with suicidal ideation (Ilgen et al., 2008; Khazem et al., 2016; Miller et al., 2009), many studies have demonstrated that gun ownership is associated with death by suicide (Miller et al., 2013, 2007, 2015; Opoliner et al., 2014). Possession of a gun thus does not appear to cause otherwise healthy individuals to become suicidal, but may facilitate death by suicide among those experiencing suicidal ideation. The Three Step Theory of Suicide (Klonsky and May, 2015) proposes that guns function in this manner by enhancing the capability for suicide, thereby increasing the odds of transition from ideation to

attempt. This possibility is supported by data indicating that gun owning individuals endorsing suicidal ideation are seven times likelier to develop a suicide plan involving a gun than are non-gun owners endorsing suicidal ideation (Betz et al., 2011). Furthermore, studies examining the question on a population level have repeatedly found that gun ownership predicts overall suicide rates beyond the effects of a vast array of covariates, including psychopathology, antidepressant use, and prior suicidal behavior (Miller et al., 2013, 2007, 2015; Opoliner et al., 2014). Indeed, this effect is substantial enough that researchers have argued it is statistically implausible that an unnamed confounding variable better explains the association between gun ownership and suicide (Miller et al., 2016). This finding has been mirrored by research conducted at the individual level, with results indicating the purchase of a gun is associated with an increased risk for suicide (Wintemute et al., 1999) and that suicide is more than five times as likely in homes in which a gun is kept (Simon, 2007).

An emerging line of work has considered the role of gun storage practices in suicide risk. For instance, Brent (Brent, 2001) reported that suicide rates are higher in homes where guns were stored loaded and unlocked. Similarly, Shenassa, Rogers, Spalding, and Roberts (Shenassa et al., 2004) reported that suicide decedents who died by

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suicide using a gun were more likely to have kept a gun at home and to have stored their gun unlocked than were decedents who died using other methods. Grossman and colleagues (Grossman et al., 2005) compared child and adolescent firearm suicide cases to matched controls and found that guns in the homes of suicide decedents were more likely to have been stored loaded, unlocked, and within close proximity of ammunition. More recently, Khazem and colleagues (Khazem et al., 2016) examined firearm owning National Guard personnel and found soldiers who stored personal firearms loaded and in a non-secure location (e.g., bedside table) were more fearless about death. Fearlessness about death has been proposed as a prominent factor in the transition from suicidal ideation to suicide attempt (Joiner, 2005), with data supporting that contention across diverse samples (Anestis and Joiner, 2011; Anestis et al., 2015a; Joiner et al., 2009). Khazem and colleagues (Khazem et al., 2016) also reported that the association between current suicidal ideation and the belief that suicide is likely in the future was higher among soldiers who stored their guns unsafely.

The importance of guns in suicide is further illustrated by research examining means safety – efforts to reduce access to or increase the safe storage of potentially lethal means for suicide. The bulk of this evidence has focused on legislative efforts, demonstrating that state laws regulating handgun ownership (e.g., universal background checks) are associated with lower statewide overall suicide rates (Anestis and Anestis, 2015; Anestis et al., 2015b; Boor and Bair, 1990; Lester and Murrell, 1982; Loftin et al., 1991; Miller et al., 2002; Rodriguez Andres and Hempstead, 2011; Yang and Lester, 1991). This point mirrors findings from Israel, where the suicide rate for young adults decreased by 40% after the Israeli Defense Force changed a policy such that soldiers could no longer bring their firearms home on the weekend (Lubin et al., 2010). Evidence that non-legislative interventions (e.g., lethal means counseling) geared towards safer storage (e.g., storing gun locked) and temporary and voluntary removal of firearms during suicidal crises effectively reduces suicide rates is lacking; however, researchers have promoted the need for a research agenda with a focus on such possibilities (Barber and Miller, 2014). The need for such work is highlighted by the fact that individuals who die by suicide using a gun are less likely than those who die by other means to have prior non-lethal suicide attempts, thereby indicating that they are more likely than other suicide decedents to die on their first attempt (Anestis, 2016).

This study aimed to replicate and expand upon the above findings by examining which factors differentiate suicide decedents who die using a gun from those who die by other methods. We further aimed to examine whether those same factors differentiate gun owning suicide decedents who died using a gun from those who died using a different method. We anticipated that gun owners and men would be more likely to die by suicide using a gun, and individuals who had previously discussed suicide or engaged in one or more non-lethal suicide attempts would be less likely to die using a gun. Although gun ownership is undoubtedly an important factor in firearm suicide, it is equally important to note that not all firearm suicide decedents are gun owners and, as such, it is vital that data reflect potential differences across populations. By focusing on gun owners, we can focus on which aspects of gun ownership (e.g., storage practices) might confer risk when a gun is already in possession. Within this subsample, we anticipated that gun owners who stored their gun(s) less safely (at home, loaded, non-secured location) and male gun owners would be more likely to have died by suicide using a gun and that gun owners with a prior history of discussing suicide or engaging in previous non-lethal suicide attempts would be less likely to die using a gun. Results consistent with our hypotheses would expand upon prior research by focusing on suicide decedents at the individual level, while also considering the extent to which factors relevant to a mixed sample of gun owners and non-gun owners replicate in a subsample of gun owners.

## 1. Method

### 1.1. Participants

All procedures for this study were approved by the relevant institutional review board prior to the onset of data collection. Data in this study reflect 267 individuals who died by suicide within the United States. Data from 26 suicide decedents who died outside the US were not included in these analyses. The data were provided by individuals (loss survivors) recruited via listservs, message boards, and other similar formats, who were informed they would be asked about an individual they had lost to suicide and the circumstances surrounding his or her death. Advertisements for the study included a secure link to a study presented via Qualtrics software. Each loss survivor was presented with an online informed consent document at the outset of the protocol and they were only presented with further questions if they indicated that they wished to participate. Participants were not required to answer any questions and were given the opportunity to opt out at any time. No compensation was provided for participation. No identifying information was collected from loss survivors. Each participant was given contact information for the principal investigator in order to allow them to provide feedback or ask questions.

Loss survivors most frequently endorsed that the suicide decedent was their child (20.6%), with others reporting that the suicide decedent was their sibling (18.4%), friend (16.1%), parent (14.6%), other family member (e.g., spouse; 17.2%), or that their relationship did not fit any of the listed categories (e.g., boyfriend; 13.1%). With respect to their closeness to the decedent at the time of death, answers ranged from 1 (“Not at all Close”; 4.5%) to 5 (“Extremely Close”; 41.9%).<sup>1</sup> In situations in which multiple loss survivors responded about suicide decedents from the same city or town, with matching demographics and method of death, only the earliest response was included in the final dataset in order to diminish the odds that any single suicide decedent was represented more than once in our sample. Only one such instance was noted in our dataset, with five respondents referring to the same decedent.

The majority of suicide decedents in this sample (64.4%) died more than three years ago, with 12.4% dying within the past year. The decedents were predominantly male (77.2%), white (94.4%), and heterosexual (90.3%). These individuals ranged in age from 13 to 80 ( $M_{age} = 36.19$ ,  $SD = 16.05$ ). Among those aged 28 or higher (the mid-way point between average age of first marriage for women and men in the United States (United States Census Bureau, 2016)), 47.0% were married, 20.7% were divorced, 5.5% were widowed and not remarried, and 26.8% had never been married. Among decedents aged 26 and higher (average age of first child in the United States (Mathews and Hamilton, 2016)), 68.0% had at least one child. The demographic distribution of the suicide decedents in this sample are thus highly consistent both with official US data (Centers for Disease Control and Prevention, 2016) and with those from classic psychological autopsy research (Robins, 1981). The most common methods for death among suicide decedents were firearms (44.6%), hanging (27.3%), and intentional overdose (13.5%). Individuals who utilized multiple methods in a single fatal attempt were classified as “other.” No individuals who utilized a gun endorsed the use of multiple methods, thereby eliminating any concerns regarding criterion contamination in between group comparisons. These data are available in Table 1.

<sup>1</sup> Due to concerns that the level of closeness between reporter and decedent may spuriously influence results, we examined the association between closeness and each variable used in our primary analyses. No relationships were significant, thereby mitigating such concerns.

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