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Firearm Involvement in Violent Victimization and Mental Health: An Observational Study

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Background:

In 2015, firearms were involved in more than 250 000 nonfatal victimizations in the United States (1). Physicians are familiar with the physical consequences of firearm violence (2), but less is known about firearm-specific mental health consequences. The perceived level of threat to a person's life during a traumatic event may influence his or her mental health response (3). Because firearms are highly lethal, their presence may exacerbate the mental health effects of violent victimization.

Objective:

To assess the association between firearm involvement in a violent victimization and the prevalence of severe distress and social functioning problems attributed to the victimization.

Methods and Findings:

We used cross-sectional data from the National Crime Victimization Survey, a nationally representative sample of households (4). Respondents aged 12 years or older who experienced a personal violent victimization (that is, an attack; a threat of attack; or attempted harm, including unwanted sexual contact) in the 6 months before the interview were eligible for inclusion in the study ($n = 8465$). We included the first reported

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victimization for respondents interviewed between 2008 and 2015 (18% of respondents reported more than 1 victimization). When the first incident could not be distinguished, respondents were excluded from the sample (7% [$n = 581$]).

The presence of a weapon was self-reported. Firearm victimization ($n = 715$), the exposure of interest, was compared with that involving another weapon ($n = 1054$) and no weapon ($n = 5350$). Other weapons included rocks, knives, and axes. In 765 cases, the presence or type of weapon could not be determined and these cases were excluded from the study sample.

Two outcome measures were used to identify mental health consequences. Respondents reported whether being victimized was distressing (responses ranged from not at all to severely). Severe distress was compared with all other levels of distress. Respondents also reported whether the victimization led to substantial problems in their social life, including their job, schoolwork, and interactions with family or friends.

We calculated the prevalence of reported social functioning problems and severe distress among persons whose victimizations involved a firearm, another weapon, and no weapon and compared these proportions. We used survey weights and adjusted SEs to account for the complex survey design and reweighting to adjust for outcome missingness. Analyses were conducted using the `svy` commands in Stata, version 14.2 (StataCorp).

Twenty-six percent of the respondents in the sample reported severe distress as a result of the victimization, and 27% reported having problems at work or school or with friends or family after the incident. Table 1 shows respondent characteristics by victimization type.

Those whose violent victimizations involved firearms were more likely to report severe distress than those whose victimizations involved other weapons (prevalence ratio, 1.27 [95% CI, 1.06 to 1.51]) or did not involve weapons (prevalence ratio, 1.63 [CI, 1.38 to 1.93]) (Table 2). Differences in the prevalence of reported social functioning problems were not statistically significant. The findings remained consistent in models adjusted for the variables in Table 1 (data not shown).

Discussion:

Our findings suggest that firearm victimization is associated with increased levels of distress, greater than the effects of victimization itself. These findings may be explained by the fear of death being increased in situations involving more lethal weapons (3). However, the presence of a firearm did not seem to affect respondents' social functioning, perhaps because we used the first reported violent victimization. Cumulative exposures have documented associations with substantial mental health risk (5).

We present novel findings for a general population experiencing violent victimization. However, this study has some limitations. These include a cross-sectional design and reliance on self-reported measures of weapon exposure during the victimization and of mental health, which were sometimes not reported. In addition, we cannot determine whether responses to the mental health questions applied to the time of the event or a time during the 6 months after the event.

These findings suggest that firearm violence has unique negative effects on mental health in addition to well-understood effects on physical health and that patients victimized with a firearm may require special attention. They also highlight the emotional costs that might be avoided by investing in efforts to prevent firearm violence.

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Table 1.

Characteristics of Respondents, by Weapon Presence and Type^{*}

Characteristic	Firearm (<i>n</i> = 715)	Other Weapon (<i>n</i> = 1054)	No Weapon (<i>n</i> = 5350)	Full Sample (<i>n</i> = 7119)
Mean age (SD), <i>y</i>	35.2 (15.3)	32.8 (15.2)	32.8 (15.8)	33.0 (15.7)
Male	424 (60.7)	617 (60.8)	2533 (49.1)	3574 (52.0)
White only	481 (64.3)	816 (75.0)	4309 (78.5)	5606 (76.6)
Black only	192 (30.1)	154 (17.1)	657 (14.3)	1003 (16.3)
Asian only	13 (2.1)	25 (2.3)	115 (2.1)	153 (2.2)
Annual household income \$30 000	261 (49.3)	463 (56.0)	2431 (58.7)	3155 (57.4)
College degree [‡]	249 (33.3)	396 (37.3)	2306 (42.8)	2951 (41.0)
Moved with in the past year [‡]	231 (33.0)	336 (32.9)	1586 (30.5)	2153 (31.1)
Stable housing [§]	680 (96.4)	1001 (95.7)	5166 (97.0)	6847 (96.8)
Separated or divorced	144 (18.0)	243 (20.9)	1243 (21.3)	1630 (20.9)
Victimized by stranger	406 (65.6)	401 (41.6)	1382 (28.4)	2189 (33.9)
Previous victimization [¶]	103 (13.5)	202 (19.0)	971 (17.7)	1276 (17.4)

^{*} To categorize victimizations by weapon presence and type, we first used the question, "Did the offender have a weapon such as a gun or knife, or something to use as a weapon, such as a bottle or wrench?" Respondents who answered "no" were included in the "no weapon" category. Respondents who answered "yes" were then asked, "What was the weapon?" Firearms included all handguns, long guns, and "other guns." Other weapons included blunt objects, such as rocks, and sharp objects, such as knives, scissors, and axes. Values reported are numbers (percentages), unless otherwise indicated. Percentages and means are based on weighted data. Sample sizes are based on unweighted data and vary because of missing data.

[‡] Based on highest education level recorded in the household over the time period.

[‡] Lived in current residence <1 y vs. 1 y.

[§] Includes house, apartment, flat, and student housing. Unstable housing includes hotel, motel, unit in a rooming house, mobile home, trailer, and tent.

^{||} Anyone in the household having been separated or divorced at any time before the survey.

[¶] Includes victimizations that were not counted as a first victimization in this study (e.g., theft, item stolen from a pocket, and attack in which the victim reported not knowing the weapon).

Table 2.

Percentage of Respondents With Severe Distress and Social Functioning Problems, by the Presence of a Firearm During the Victimization*

Comparison	Weapon, %		Difference (95% CI), percentage points	Prevalence Ratio (95% CI) [‡]
	Firearm	Other or No Weapon		
Severe distress				
Firearm vs. other weapon (<i>n</i> = 1375) [‡]	39.1	30.9	8.2 (1.75 to 14.65)	1.27 (1.06 to 1.51)
Firearm vs. no weapon (<i>n</i> = 4865) [§]	38.6	23.6	14.9 (8.68 to 21.14)	1.63 (1.38 to 1.93)
Social functioning				
Firearm vs. other weapon (<i>n</i> = 1377)	26.3	27.1	−0.9 (−6.43 to 4.72)	0.97 (0.78 to 1.20)
Firearm vs. no weapon (<i>n</i> = 4862) [¶]	25.4	25.8	−0.4 (−5.26 to 4.46)	0.98 (0.81 to 1.19)

* Level of emotional distress associated with the index crime was identified with the questions, "How distressing was being a victim of this crime to you? Was it not at all distressing, mildly distressing, moderately distressing, or severely distressing?" We coded emotional distress as a binary variable, with severe distress as 1 group and all other levels of distress as the reference. Social functioning was a binary outcome indicating whether the respondent reported that being a victim of the index crime led to substantial problems in his or her social life. The following 2 questions were used to identify problems in social functioning: "Did being a victim of this crime lead you to have significant problems with your job or schoolwork, or trouble with your boss, coworkers, or peers?" and "Did being a victim of this crime lead you to have significant problems with family members or friends, including getting into more arguments or fights than you did before, not feeling you could trust them as much, or not feeling as close to them as you did before?" A positive response to either question was coded to indicate the presence of problems in social functioning. To identify firearm involvement, we first used the question, "Did the offender have a weapon such as a gun or knife, or something to use as a weapon, such as a bottle or wrench?" Respondents who answered "no" were included in the "no weapon" category. Respondents who answered "yes" were then asked, "What was the weapon?" Firearms included all handguns, long guns, and "other guns." Other weapons included blunt objects, such as rocks, and sharp objects, such as knives, scissors, and axes. Models include survey and censoring weights and are adjusted for clustering and stratification present in the survey design. Firearm estimates vary across comparisons within each outcome because of the use of censoring weights.

[†] Calculated as the proportion of persons victimized with a firearm who experienced the outcome divided by the proportion of those victimized with another weapon or no weapon who experienced the outcome. The denominator differed depending on the comparison group of interest.

[‡] 391 respondents were missing data on distress level. Three additional respondents who were unique within strata were excluded to facilitate calculation of design-adjusted SEs.

[§] 1200 respondents were missing data on distress level.

^{||} 389 respondents were missing data on social functioning. Three additional respondents who were unique within strata were excluded to facilitate calculation of design-adjusted SEs.

[¶] 1203 respondents were missing data on social functioning.