The Behavioral Health Harms of Youth Exposure to Gun Violence: A Rhode Island Example

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ABSTRACT

BACKGROUND: Youth exposure to gun violence is increasing and we must better understand its impact on mental health and substance use disorders in young adults.

METHODS: The 2024 Rhode Island Young Adult Survey recruited n=1,008 young adults. Multivariable logistic regressions were used for mental illness and substance use disorder outcomes on exposure to gun violence in childhood while controlling for sexual and gender identity, race/ethnicity, age, and social ladder.

RESULTS: Exposure to gun violence in childhood is highly prevalent (24.7%) and associated with higher odds of depression (AOR: 1.59 [95%CI: 1.16, 2.19]), suicide ideation (AOR: 2.13 [95%CI: 1.41, 3.22]), alcohol use disorder (AOR: 2.98 [95%CI: 1.34, 6.54], and cannabis use disorder (AOR: 1.87 [95%CI: 1.22, 2.88], but not anxiety.

CONCLUSION: Efforts to reduce adolescent exposure to gun violence must be comprehensive, addressing all levels from policy and legislation to social and community-based interventions.

KEYWORDS: young adults, gun violence, mental health, behavioral health, substance use

INTRODUCTION

Gun violence, both fatal and nonfatal, has grown significantly over the past two decades,[1,2] and the United States (US) has 10 times more mass shootings than other developed nations.[3] From 2012 to 2022, firearm deaths rose 62.5%,[1] with most due to suicide (56.1%) and homicide (40%).[2] Similar rates were seen in Rhode Island (RI) from 2019 to 2023, with suicides accounting for 61% of firearm deaths and homicides accounting for 36%.[4] During this time, there were also 452 nonfatal firearm-related hospital visits. Of all firearm-related injuries, 62% of deaths and 74% of hospital visits involved people under 35.[5] Firearm mortality among adolescents and young adults now surpasses motor vehicle accidents as their leading cause of death.[6]

Firearm homicides disproportionately affect males – six times more than females.[1] Yet, females are five times more likely to be affected by firearm injuries related to intimate partner violence incidents.[1] In RI, firearm deaths by gender revealed a significant disparity, with males accounting for 85% of deaths[4] and 87% of firearm injuries.[5] Literature on gun violence among sexual and gender minorities (SGMs) is limited, and no data are available for firearm injuries or fatalities for this population in RI. Significant racial and ethnic disparities exist in firearm injuries and deaths. From 2019–2023 in RI, over 71% of nonfatal firearm-related hospital visits involved Hispanic or Black individuals.[5] Hispanic individuals accounted for 20% of firearm deaths and 40% of nonfatal injuries; non-Hispanic Black individuals accounted for 9% and 31%, respectively.[4,5] Additionally, in 2022, Black adolescents had higher rates of firearm-related suicides compared to White adolescents and accounted for half of all firearm-related deaths in the US.[1] Other studies also suggest witnessing gun violence is more prevalent in low-income households and neighborhoods, particularly affecting Black and Latino youth.[7-9] This is further supported by RI data from 2019–2023, which shows that more than 50% of firearm injury-related hospital visits among Hispanic individuals were under age 25, compared to about 35% for non-Hispanic Black individuals, and 29% for non-Hispanic White individuals.[5]

Witnessing gun violence can have significant health implications, especially for children and adolescents. As an adverse childhood experience (ACE), exposure to gun violence is linked to trauma, anxiety, aggression, PTSD, and long-term emotional challenges.[9,10] One study shows that 41% of youth in major US cities have witnessed or heard gun violence,[11] and adolescents exposed to such violence are more likely to show behavioral changes, including future firearm carrying.[10-13] Further, chronic stress from this exposure can disrupt brain development, impair learning, and negatively impact both mental and physical health – paralleling the effects of other ACEs.[9,11]

Despite this harm, few studies report the prevalence of childhood exposure to gun violence, and even fewer have examined the association between childhood exposure to gun violence and behavioral health outcomes in young adulthood. This study aims to (1) estimate the prevalence of childhood exposure to gun violence in a convenience sample of young adults in RI, (2) estimate the prevalence by sexual or gender identity and race/ethnicity, and (3) examine the association between childhood exposure to gun violence and

mental illness (i.e., anxiety, depression, suicide ideation) and substance use disorder (i.e., alcohol use disorder, cannabis use disorder) outcomes in young adulthood.

METHODS

Sample

The Rhode Island Young Adult Survey (RIYAS) was a self-report, de-identified, cross-sectional survey implemented by the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities & Hospitals. The 2024 RIYAS was a web-based survey that used Qualtrics to collect data regarding young adult behavioral health, risk behaviors, and mental and physical health outcomes. The survey was administered to young adults, 18 to 25 years old, residing in Rhode Island for at least part of the year. Recruitment included targeted paid Instagram and Spotify ads, and was supplemented by flyers and emails to students at institutions of higher education. Participants received $10 gift cards as compensation for study participation. A total of N = 1,008 surveys were completed between June and September 2024 and were available for the current analysis. All participants provided electronic informed consent. This study was approved by the local Institutional Review Board.

Measures

Exposure to gun violence in childhood was assessed with a single item: *Have you ever seen or heard gun violence in your neighborhood, community or school?* Response options included *yes, in childhood; yes, in adulthood; no.* All those reporting *yes, in childhood* met the definition for exposure.

The valid and reliable Center of Epidemiologic Studies Depression Scale, 10-item version (CES-D10) was used to assess depression. CES-D10 items measure past week prevalence of symptoms related to depression. Responses were on a 4-point Likert scale ranging from *rarely or none of the time* to *most of the time.* Aggregated scores ≥10 indicated depression.[14] The valid and reliable Generalized Anxiety Disorder 7-item scale (GAD-7) was used to assess anxiety.[15] The GAD-7 items measure past two-week experiences of anxiety symptoms. Responses were collected on a 4-point Likert scale ranging from *not at all* to *nearly every day.* Aggregated scores of ≥10 indicate clinically significant anxiety.[16] Suicide ideation was assessed as an affirmative response to the survey question: *During the past 12 months, did you ever seriously consider attempting suicide?* Alcohol use disorder was assessed by the Alcohol Use Disorders Identification Test (AUDIT) score generated from 10 items.[17] This valid and reliable assessment includes eight items about drinking behaviors with various frequency responses, for example, ranging from *never* to *daily or almost daily.*[18] The final two items had response options *never; yes, but not in the past year; or yes, during the past year.* The assessment was scored according to scoring instructions. Scores of 15 or more were considered alcohol use disorder.[17] Cannabis use disorder was assessed via the Cannabis Use Disorders Identification Test – Revised (CUDIT-R). This valid and reliable assessment includes eight items total: seven about cannabis use with various frequency responses on a 5-point Likert scale, ranging from *never* to *daily or almost daily* and the final question, *Have you ever thought about cutting down, or stopping, your use of cannabis?* had response options *never; yes, but not in the past 6 months;* or *yes, during the past 6 months.*[19] Scores of 12 or more were considered cannabis use disorder.

Several potential confounders were measured as covariates (i.e., age in years, sexual and/or gender identity, race/ethnicity, and social status).[20-23] A single variable, sexual and/or gender identity, was categorized as heterosexual cisgender female, heterosexual cisgender male, and sexual and/or gender minority. Race/ethnicity was categorized as White non-Hispanic, Black non-Hispanic, Hispanic, Asian non-Hispanic, and Other non-Hispanic. The Other category includes participants identifying as Native American or Alaskan Native, Native Hawaiian or Other Pacific Islander, different identity not listed, or more than one race. The MacArthur Scale of Subjective Social Status, which asks participants to rank themselves relative to others in the community on a scale from 1 (worst off) to 10 (best off), was used to assess social status.[24]

Statistical Analysis

Descriptive statistics such as frequencies and percentages were computed for categorical variables, and means and standard errors were computed for continuous variables among the total sample and among those exposed to gun violence in childhood. Bivariable tests, namely two-sample t-tests for continuous variables and chi-square tests for categorical variables, were conducted. Prevalence of exposure to gun violence in childhood was plotted by race/ethnicity and by sexual and/or gender identity. Multivariable logistic regressions were conducted for each of the five outcomes controlling for all covariates. All statistical tests were assessed at $\alpha = 0.05$. Analyses were completed using STATA/SE 15.0 (StataCorp. 2017. College Station, TX: StataCorp LLC.), and statistical significance was determined using 95% confidence intervals (CI).

RESULTS

The mean age of the sample was 21.1 years old (SE: 0.07). Of the sample, 43.9% identified as a sexual and/or gender minority and 36.0% as cisgender heterosexual female (**Table 1**). Most of the sample identified as White, non-Hispanic (57.4%). Almost 1 in 4 (24.7%) young adults in the sample were exposed to gun violence in childhood. Bivariate results showed sexual and/or gender minorities were more likely to be exposed to gun violence in childhood (p=0.005), as were Hispanic young adults (p<0.001). Those exposed to gun

Table 1. Sociodemographics of the Sample and by Exposure to Gun Violence in Childhood

	Total N (%)	Exposed to Gun Violence in Childhood N=249 (24.7%)	P-value
Sexual and/or Gender Identity			**0.005**
Cisgender Heterosexual Male	203 (20.1)	37 (14.9)	
Cisgender Heterosexual Female	363 (36.0)	82 (32.9)	
Sexual or Gender Minority	442 (43.9)	130 (52.2)	
Race/Ethnicity			**<0.001**
White, non-Hispanic	579 (57.4)	99 (39.8)	
Black, non-Hispanic	77 (7.6)	25 (10.0)	
Hispanic	197 (19.5)	87 (34.9)	
Asian, non-Hispanic	86 (8.5)	20 (8.0)	
Other, non-Hispanic	69 (6.9)	18 (7.2)	
Age [Mean(SE)]	21.1 (0.07)	20.7 (0.14)	**<0.001**
Social Ladder* [Mean(SE)]	5.7 (0.06)	5.3 (0.06)	**<0.001**

*Social ladder refers to where someone would place themselves on a ladder relative to others in their community with 1 being worst off and 10 being best off

**P-values were calculated using chi-square tests for categorical variables and two-sample t-tests for continuous variables

Figure 1. Exposure to gun violence in childhood by race/ethnicity among Rhode Island young adults, 2024

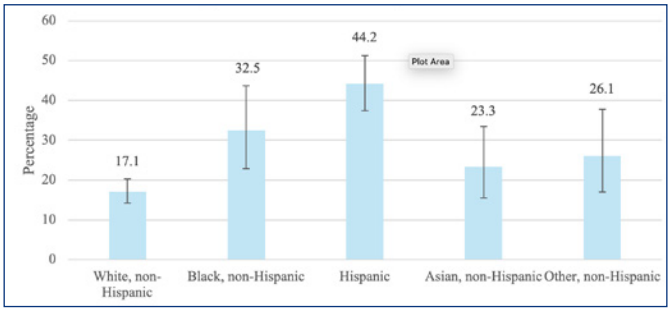
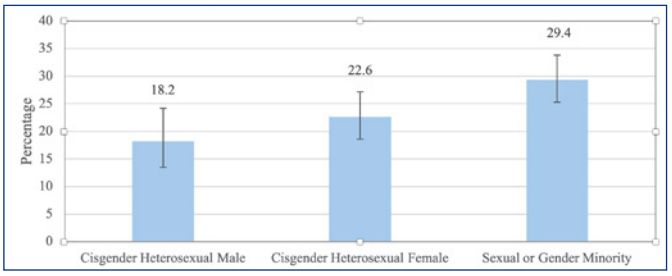


Figure 2. Exposure to gun violence in childhood by sexual and/or gender identity among Rhode Island young adults, 2024



violence in childhood were younger (p<0.001) and lower on the social ladder (p<0.001). Hispanic young adults and sexual and/or gender minorities had the highest prevalence of exposure to gun violence in childhood (44.2% and 29.4%, respectively; (**Figures 1,2**).

Multivariable logistic regressions showed exposure to gun violence in childhood was associated with increased odds of depression (AOR: 1.59 [95%CI: 1.16, 2.19]), suicide ideation (AOR: 2.13 [95%CI: 1.41, 3.22]), alcohol use disorder (AOR: 2.98 [95%CI: 1.34, 6.54], and cannabis use disorder (AOR: 1.87 [95%CI: 1.22, 2.88] (**Table 2**). Exposure to gun violence in childhood was not associated with anxiety.

Table 2. Adjusted Odds of Mental Illness or Substance Use Disorder Associated with Exposure to Gun Violence in Childhood

Outcomes	AOR	95% CI
Anxiety	1.24	(0.90, 1.72)
Depression	**1.59**	**(1.16, 2.19)**
Suicide Ideation	**2.13**	**(1.41, 3.22)**
Alcohol Use Disorder	**2.98**	**(1.34, 6.64)**
Cannabis Use Disorder	**1.87**	**(1.22, 2.88)**

NOTE: Adjusted Odds Ratios were computed by multivariable logistic regressions controlling for sexual and/or gender identity, race/ethnicity, age, and social status.

DISCUSSION

Findings suggest exposure to gun violence in childhood is highly prevalent, particularly among Hispanic and Black young adults, as well as sexual or gender minorities. Findings also suggest that this childhood exposure is associated with poor mental health and substance use disorder in young adulthood. The high prevalence of childhood exposure to gun violence in this study, almost 25%, is consistent with another study that mapped national data on fatal gun violence incidents to the homes and schools of an adolescent cohort. The study found that 21% of adolescents resided or attended school within 500 meters of an incident.[25]

This same study also showed comparable racial/ethnic disparities to the current study. For example, rates of adolescent exposure to fatal gun violence incidents were higher among those who were Black or Hispanic compared to those who were White.[25] These racial and ethnic disparities in childhood exposure to gun violence are long-standing and likely driven by economic inequality and systemic racism. Poverty and employment instability contributes to economic stress which has been shown to increase risk of exposure to gun violence.[26] Systemic racism, through decades of redlining, discriminatory housing policy, and mass incarceration, has created social instability for Hispanic and Black youth, also increasing risk of exposure to gun violence.[27]

The literature on childhood exposure to gun violence among sexual and gender minorities is limited, making these

findings novel and worthy of future research. Yet, a 2024 national sample of young people aged 10–34 years showed that those who do not identify as a man nor a woman had an increased risk of gun victimization relative to women and that sexual minorities had increased risk of gun victimization relative to heterosexuals.[28] Despite the limited literature, these findings are consistent with the known increased risk of violence against sexual and gender minority youth.[29]

Findings herein show childhood exposure to gun violence is associated with poor mental health and substance use disorder in young adulthood. Similar findings are rare in the literature, as most studies focus on firearm possession, firearm injury, and firearm fatality. One study suggests that youth exposure to gun violence is associated with hypertension in adulthood, but behavioral health outcomes were unmeasured.[30] Another nationally representative study of adolescents found that gun possession was associated with poor mental health and increased substance use.[31] Although research on youth exposure to gun violence remains limited, the biological effects of ACEs are well-established.[31-33] Chronic stress from ACEs alters brain structures like the amygdala, hippocampus, and prefrontal cortex, impairing emotion regulation and increasing the risk of depression, substance misuse, and other stress-related disorders.[32] Additionally, ACEs can lead to maladaptive coping, such as self-medicating with substances, and may cause epigenetic changes that heighten vulnerability to poor mental health outcomes.[33,34]

Limitations

This study has several limitations. First, this is a cross-sectional study and causality cannot be determined. Second, this is a self-report study prone to social desirability and recall bias, particularly since the events would have occurred in childhood. Finally, this is a convenience sample of young adults and may not be representative of young adults in general nor in RI.

Implications

Efforts to reduce adolescent exposure to gun violence must be comprehensive, addressing all levels from policy and legislation to social and community-based interventions. Legislative advancements serve as a foundation for the structural changes needed to have widespread impact on gun violence.[35,36] Building community resilience requires engaging local communities in targeted interventions that foster social cohesion, improve access to mental health resources, and address structural inequities from within. Additionally, interdisciplinary collaboration and sustainable funding are critical for systemic change.[37]

One promising approach is the Advanced Peace (AP) model, which focuses on reducing urban violence by addressing individual trauma. Instead of involving law enforcement, AP provides mentorship through outreach workers – often individuals with personal experiences of violence – who act as mentors and violence interrupters.[38] Advocates also recommend using Social Determinants of Health (SDoH) and Social Vulnerability Indices (SVIs) to guide more targeted gun violence interventions. A combined public health and public safety approach, such as the EpiCrim theory, can position communities to reduce gun violence while fostering social cohesion and resilience. Another effective strategy is the Cardiff Model, a multi-agency framework that utilizes data from both health and law enforcement sectors to enhance policing strategies and improve community violence prevention efforts.[35]

Healthcare providers play a crucial role in education, screening, and advocacy for gun violence prevention.[35] Training clinicians in risk-specific interventions and evidence-based practices is essential. Programs like the Violence Intervention Program (VIP) and Cradle to Grave (C2G) exemplify provider-led initiatives: VIP engages individuals in the acute hospital setting, providing long-term care management, psychological follow-up, and coordination with law enforcement and parole services. C2G educates adolescents through a two-hour experience that traces the medical journey of a young gunshot victim, highlighting the consequences of gun violence.[39] Additionally, firearm safety counseling and risk screening tools, such as the SaFETy Score, are critical for identifying high-risk youth.[40] Advocacy for firearm safety education in pediatric settings is also necessary to improve preventive efforts. This evidence-based programming has the potential to become self-sufficient when healthcare providers and community organizations actively engage with existing effective models, such as community health workers and Medicaid reimbursement strategies.[41] By integrating these resources, programs can strengthen sustainability and maximize impact.[35,39-41]

Federal and state level policy changes are not only needed to curb the flow of illegal guns, but to ensure adequate funding, resources, and infrastructure for community organizations and health care providers to implement these evidence-based programs.[6] A federal assault weapons ban should be implemented to reduce mass shooting injuries and fatalities.[42] Universal background checks and permit-to-purchase requirements should be implemented to reduce firearm homicide.[43] Addressing disparities in gun law enforcement and systemic racism should be a research priority. Increasing resources for solving nonfatal shootings and forming stronger community-police partnerships can also enhance violence prevention efforts.[44] To improve youth safety, legislation should focus on strengthening firearm storage laws and closing ownership loopholes to reduce firearm-related injuries.[45] Only through a unified effort where research informs policy, and policy empowers communities, can we drive lasting change and effectively reduce gun violence.

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