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Association between Adolescent Weapon Carrying and Suicidality: Analysis of the 2015 Youth Risk Behavior Survey

Elizabeth Davenport

ABSTRACT

ASSOCIATION BETWEEN ADOLESCENT WEAPON CARRYING AND SUICIDALITY: ANALYSIS OF THE 2015 YOUTH RISK BEHAVIOR SURVEY

By
Elizabeth H. Davenport
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INTRODUCTION: Adolescence is a period known for risk taking behaviors. Both weapon carrying and suicidality among U.S. youth are growing public health concerns. The goal of this study is to examine the patterns between weapon carrying and suicidality among U.S. high school students using 2015 national Youth Risk Behavior Survey (YRBS).

METHODS: Analyses were performed using data from the 2015 YRBS (N=15,624). The sample consisted of students in grades 9-12 (48.7% female and 51.3% as male) Of those surveyed, 54.5% identified as White, 13.6% as African American, 22.3% as Hispanic, and 9.7% as another race/ethnicity. The main exposure variable weapon carrying (carried a weapon in the past 30 days) was analyzed against three outcome variables: suicide ideation (seriously considered suicide in the past 12 months), suicide planning (made a plan to commit suicide in the past 12 months), and suicide attempt (attempted suicide at least once in the past 12 months). Bivariate analysis was used to determine prevalence across the exposure and outcome variables, as well as determine potential covariates. Multivariate logistic regression tables were built to examine the relationship between weapon carrying and three suicide outcomes, controlling for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, and sad/hopeless feelings. Additionally, adjusted odds ratios were calculated after stratifying by sex.

RESULTS: Among 15,624 high school students, 16.2% reported carrying a weapon (knife, club, gun or other) in the past 30 days. Additionally, 5.3% of students reported having carried a gun in the past 30 days, the large majority of which identified as male (85.4%). It was found that 17.7% of the students reported having seriously considered suicide, 14.6% reported having made a plan to commit suicide, and 8.6% had actually attempted suicide; the majority of those who reported suicidality were female. The multivariate logistic regression model found that students who reported weapon carrying were 1.6 times more likely to report serious consideration of suicide than those students who did not report weapon carrying (OR_{adj} =1.61, 95% CI [1.16, 2.24]), 1.77 times more likely to report having made a plan to commit suicide than those students who did not report weapon carrying (OR_{adj}= 1.77, 95% CI [1.23, 2.55]); and 1.5 times more likely to have reported a suicide attempt than those students who did not report weapon carrying (OR_{adj}=

1.51, 95% CI [1.08, 2.10]). After stratification, females who carried weapons were 1.8 times as likely to report suicide ideation (OR adj=1.80, 95% CI [1.37, 2.67]), 2.3 times as likely to report suicide planning (OR adj=2.28, 95% CI [1.40,3.73]), and 2.7 times as likely to report suicide attempt (OR adj=2.71, 95% CI [1.52, 3.41]) than those who did not carry weapons. Males who carried weapons were 1.6 times as likely to report suicide ideation than those who did not carry weapons (OR adj=1.55, 95% CI [1.11, 2.18]), and there was not a statistically significant difference between males who carried weapons and those who did not in the suicide planning or attempt models.

DISCUSSION: Given the correlation found between weapon carrying and suicidality**,** future youth suicide prevention programs should consider weapon carrying to be an important factor for youth suicidality and should target adolescents at high risk for weapon carrying. Furthermore, as 5.3% of students reported having carried a gun in the past 30 days, weapon carrying prevention should pay special attention to youth's access to firearms. Firearms are the most lethal mode of suicide and considering the high prevalence of students already at risk for suicidality, measures should be taken to reduce youth access to firearms.

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by

ELIZABETH H. DAVENPORT

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30303

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by

ELIZABETH H. DAVENPORT

Approved:

___SHANTA R DUBE, PHD_____
Committee Chair

__DANIEL WHITAKER, PHD_____
Committee Member

__J. MICHAEL BRYAN_____
Committee Member

__12/01/2016_____
Date

Author's Statement Page

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___ELIZABETH H. DAVENPORT_____
Signature of Author

TABLE OF CONTENTS

List of Tables

Introduction

Background

Suicide is the third leading cause of death among adolescent and young adults aged 10-24 (Wolitzky-Taylor, Ruggerio, McCart, 2010). While suicide is a rare event, there are several factors that predict risk in adolescents, including gender, race/ethnicity past alcohol and drug abuse, direct/indirect violence exposure, past occurrence of posttraumatic stress disorder (PTSD) and major depressive episode (MDE), access to lethal modes of suicide, and previous suicide attempts/ideation (Wolitzky-Taylor et al., 2010). MDE has been found in some studies to be the strongest predictor of adolescent suicide (Wolitzky-Taylor et al., 2010).

Since 1995, suicide rates amongst adolescents have remained stable (Wolitzky-Taylor, et al., 2010). The leading methods of adolescent suicide attempts are suffocation (43%), discharge of firearms (42%), poisoning (6%), and falling (3%) with suicide by firearm the most lethal (Shenassa, Catlin and Buka, 2003). Concurrently, the United States has the highest firearm ownership rates of any country; 35% to 39% of households own a gun, and 22% report having owned firearms (Anglemyer et al., 2014). A study conducted in 2016 that examined data from hospital records and state-level gun ownership logs found a strong correlation between adult suicide attempt via firearm and state-level firearm ownership (Lapado et al., 2016). This connection may seem intuitive, but the study's conclusions are especially important for males, for whom it was found that gun ownership was associated not only with gun-related suicide attempts, but also other forms of suicide attempts (Lapado et al., 2016). Firearm exposure does not solely affect the adults who own the weapons; the risk for completed suicide is increased when one simply has access to firearms (Anglemyer, 2014). The reverse relationship has also

been found to be true; families with increased risk of mental health issues/suicidality are more likely to have accessible weapons in the home (Lapado et al., 2016).

Data from the Youth Risk Behavior Survey (YRBS) can help to shed some light regarding youth weapon carrying and risk of suicidality. In 2009, data from the YRBS surveys indicated a significant prevalence of weapon carrying (17.5%), as well as suicide ideation, planning, and attempts (13.8% , 10.9%, and 6.9%, respectively) among American high school students (Eaton et al., 2010). The 2015 YRBS showed an increase in the prevalence of student reported suicide ideation, from 13.8% to 17.7% ; suicide planning, from 10.9% to 14.6%; and suicide attempts, from 6.9% to 8.6% (Kann, McManus and Harris, 2016).

Research Questions

As previously stated, 42% of completed adolescent suicides are firearm related (Shenassa et al., 2003), and the annual rate of suicides by firearm is higher in the United States than in any other country (Anglemyer et al., 2014). These statistics highlight the importance of understanding the association between weapon carrying and suicidality. The goal of this study was to examine the patterns between adolescent students who report weapon carrying and suicidality among respondents from the 2015 national YRBS.

- What is the prevalence of weapon carrying across sociodemographic groups of U.S. high school students?
- What is the prevalence of suicidality across sociodemographic groups of U.S. high school students?
- What is the relationship between carrying a weapon and suicidality among students in U.S. high schools?

H_1: U.S. high school students who report carrying a weapon will be more likely to report suicide ideation than students who do not carry weapons.

H_2: U.S. high school students who report carrying a weapon will be more likely to report that they have made a suicide plan than students who do not carry weapons.

H_3: U.S. high school students who report carrying a weapon will be more likely to report one or more suicide attempt(s) than students who do not carry weapons.

Literature Review

This review of the literature will focus on articles that discuss five central themes related to the research topic: Adolescent Suicide Prevalence and Risk Factors, Youth Weapon Carrying, Exposure to Interpersonal Violence and Suicidality, Depression, and Firearms and Suicide Risk.

Suicide Prevalence and Risk Factors

The difficulty in predicting suicides provides the impetus for epidemiological research on suicide risk factors for adolescents. A study conducted in 2001 examines the relationship between adverse childhood events (ACE) and adolescent suicidal thoughts and behaviors (Dube, Anda, Feletti, Chapman, Williamson, and Giles, 2001). To do so, the research team designed a retrospective cohort study (N=17,337) of adults who attended a specific primary care clinic within a 3-year period. The participants completed a survey about childhood abuse, household dysfunction and suicide attempts, as well as other health-related issues. The study found that the lifetime prevalence of having at least one suicide attempt was 3.8%, and experience of an ACE in any category greatly increased the risk of suicide attempt by two-five times (Dube et al., 2001). An ACE score of 7 or more was associated with 31 times the risk for suicide attempt. After the model adjusted for illicit drug use, depressed affect, and self-reported alcoholism, the

strength of the relationship between ACE score and suicide attempt was reduced to 17 times the risk, which suggests that the relationship is partially mediating by these factors (Dube et al., 2001). Notably, the study found the population-attributable risk fraction for 1 or more adverse childhood experiences to be 80% for childhood/adolescent suicide attempts (Dube et al., 2001). These findings highlight ACE as an important risk factor in childhood/adolescent suicide attempts, and underline that prevention of such events may reduce numbers of childhood/adolescent suicide attempts (Dube et al., 2001).

A study conducted in 2003 reviews suicide risk and prevention tactics for adolescents from the first half of the last 20 (Gould et al., 2003). The results cite a dramatic decrease in adolescent suicides from 1993-2003, and suggests the increase in antidepressant use for adolescents as a potentially important factor in this decrease. The study notes that Age, Sex, and Race/Ethnicity are all demographic risk factors for adolescent suicidality: with higher suicide rates reported for late teens and young adults, higher suicide ideation/consideration/attempts reported for female adolescents, higher completed suicide rates reported for male adolescents, and higher suicide rates amongst white adolescents (Gould et al., 2003). The study assessed several risk factors, including personal characteristics, family characteristics, and adverse life circumstances.

Overall, the study concluded that there was a surge in research on adolescent suicide from 1993-2003, one that resulted in the emergence of several new risk factors, like underlying psychiatric problems in youth/parents, in addition to previously-determined risk factors, such as parental divorce and impaired parent-child relationships (Gould et al., 2003). The study cites the problematic lack of research available on protective factors, and the importance of further implementing prevention programs that have been found to be successful, including school-

based training, screening of at-risk youth, and lethal-means restriction. The researchers emphasize the complexity of youth suicide, and call for a multifaceted, diverse approach to future prevention, diagnosis and treatment plans (Gould et al., 2003).

Wolitzky-Taylor conducted a study that followed the trends in adolescent suicide from 1995 to 2005. The study gathered data from the National Survey of Adolescents (N=4,023), conducted in 1995, and the National Survey of Adolescents-Replication (N=3,614), conducted in 2005. Participants in both survey cycles completed a survey over the phone that measured suicide ideation and attempt, as well as its potential risk factor: major depressive episode (MDE), post-traumatic stress disorder (PTSD), violence exposure, and substance use. The study found that overall prevalence of adolescent suicide ideation decreased from 1995-2005 (12.7% to 10.9%), potentially due to a surge in mental health awareness and prevention during the decade (Wolitzky-Taylor, 2010).

While this decrease in suicide ideation seems encouraging, it is important to note that the study only found statistically significant decreases in adolescent males. Additionally, the study found stabilization of suicide attempts amongst both males and females, suggesting that the correspondence between ideation and likelihood of attempt may be on an upward trend (Wolitzky-Taylor, 2010). The study found several risk factors to be consistently associated with increased suicidality, including direct or indirect violence exposure, history of Posttraumatic Stress Disorder (PTSD), history of anxiety, female gender, carrying a gun to school, sexual activity, and MDE (Wolitzky-Taylor, 2010). Notably, the study found that neither ethnic/racial groups nor income level were associated with increased suicide risk, meaning the issue of adolescent suicide is spread across diverse populations. There are some important considerations that arise from the limitations of the study. The method by which the trend analysis was

performed, taking the data from the initial year (1995) and comparing it to the data from the terminal year of the study (2005) without comparing the years in between, leaves room for error in analysis (Wolitzky-Taylor, 2010). The researchers have no information on how data trended during the decade interim, which hinders the conclusions they can draw. Furthermore, the study's methodology does not allow for collection of information about suicide deaths, just ideation and attempt. Overall, the study found adolescent suicidality to still be a significant public health issue, despite finding some downward trends from 1995-2005 (Wolitzky-Taylor, 2010).

Another longitudinal study conducted an analysis of suicidality trends amongst US high school students from 1991-2011. This twenty-year study analyzed data from 11 cycles of the national Youth Risk Behavior surveys (YRBS) (Lowry et al., 2014). Each survey had data from approximately 14,000 students, and was weighted to represent a national sample from that year. The researchers stratified their analysis by sex and assessed several potential risk factors including four measures of community-related violence, four measure of school-related violence, four substance abuse measures, five sexual health measures, five weight-related measures, and four measures that assessed level of physical activity (Lowry et al., 2014). The study found that female students were more likely to consider suicide than their male counterparts (19.3% v. 12.5%), as well as make a plan to commit suicide (15.0% v. 10.8%), to have attempted suicide (9.8% v. 5.8%) and to have attempted suicide with injuries that required medical attention (2.9% v. 1.9%) (Lowry et al., 2014). Amongst females, there was a significant decline in the prevalence of suicidal thoughts and attempts from 1991-2011. Interesting to note is that the researchers found a significant quadratic trend amongst the prevalence of serious suicide considerations amongst females: from 1991-2009 the prevalence decreased, and then increased from 2009-2011

(Lowry et al., 2014). For males, the study found a decrease in suicidal consideration from 1991-2011, but not in suicide attempts. Similar to the results for female participants, the study found that while male prevalence of serious suicide consideration decreased from 1991-2007, it increased from 2007-2011 (Lowry et al., 2014).

Unlike the Wolitzky-Taylor study, the researchers did find some demographic measures to be risk factors for suicidality, being female, Hispanic, and in lower grade levels were all found to put students at higher risk for suicide. Additional risk factors found included: violence-related behaviors, substance use, risky sexual behaviors, and unhealthy weight control behaviors (Lowry et al., 2014). Among female students, the risk factors most strongly associated with suicidality were injection drug use, carrying a weapon on school property, and methamphetamine use. Among male students, the risk factors most strongly associated with suicidality were injection drug use, using vomiting or laxatives for weight control, and ever having been forced to have sex. The researchers make a similar conclusion to Wolitzky-Taylor et al. regarding the overall decrease in suicidal consideration and stabilization of suicide attempts: the number of students who consider suicide without actually attempting suicide is decreasing, perhaps suggesting that impulsive suicides amongst adolescents are on the rise (Lowry et al., 2014).

A study also published in 2014 explores the idea of this noted increased lethality of suicide method, by conducting a comparison of Korean adolescents and American adolescent who are at risk for suicide. The study cites the lethality of the suicide method as a strong indicator for completed suicide (Park, Cho, Kim, Kim, Yoo and Hong, 2014). To further examine this idea, the researchers examined the relationship between suicide rates and lethality of suicide method between adolescents aged 10-19 in Korea and the United States. The time period analyzed was 2000-2009, and data on suicide rates and methods were collected from the

World Health Organization (WHO) mortality database (Park et al., 2014). Suicide methods studied were as follows: self-poisoning, hanging, firearms, jumping from a high place, and others, and poisoning was separated into further subgroups. After analyzing the data for both countries, the researchers concluded that an increased use of more lethal suicide methods resulted in more completed suicide deaths (Park et al., 2014). The highly lethal suicide methods, jumping and hanging, increased over the decade, and followed the trend in increased suicide rates. However, this association did not hold true for the United States, where suicide trends have held steady since 2000 (Park et al., 2014).

Suicide by firearm was the most frequently used method of males living in the U.S., and more common among American adolescent females than their Korean counterparts. Despite laws that exist curtailing the access of youth to firearms (an 18-year age limit enacted in 2004 and child access prevention laws), evidence indicates that these protections do little to decrease suicide rates among youth (Park et al., 2014). The study concluded that suicide by jumping has increased in decade studied in Korean adolescents, while hanging suicide took the lead for American adolescents (Park et al., 2014). The lethality of jumping, hanging and firearm related suicides are a public health concern, given that the period of adolescence is characterized by risk taking, impulsivity, and natural inclination toward experimentation. The researchers call for more efforts to limit both Korean and American adolescents' accessibility to these highly lethal forms of suicide (Park et al., 2014).

An important aspect of adolescent suicidality is the potential for detrimental effects into adulthood. An article published in 2015 examines this connection between adolescent suicide ideation/attempt and its effect into adulthood. According to the researchers, adolescent suicidality is more frequent and less severe than adult suicidality, a point that counters the Park

et al. study's findings, and raises questions on the true impact of adolescent suicide on adult health (Briere, Rohde, Seely, Klein, Lewinsohn, 2015). To determine the long-term effects of youth suicidality, the researchers gathered data on 816 participants who were assessed in a longitudinal study with measurements taken at four points in time from adolescence to adulthood. The main outcome of adult suicide attempt was measured at the second, third and fourth interval. Potential confounders were assessed through the study. The study found that 8.9% of participants reported an adolescent suicide attempt, with higher prevalence in women (Briere et al., 2015). As the age of the participants progressed (from 18 to 30), prevalence of suicide attempts decreased (4.6%). The adjusted model found significant association between an adolescent suicide attempt and negative health outcomes in adulthood including suicidality and psychopathology (Briere et al., 2015). The study concludes that these results indicate that adolescents who experience suicidality are more likely to have related, adverse mental health outcomes into adulthood (Briere et al., 2015). These findings emphasize the importance of the prevention of adolescent suicide attempt, and intervention at the suicide ideation phase, as well as prevention of known risk factors of youth suicide.

Weapon Carrying

A study conducted in 2007 explored potential motivators of adolescent weapon carrying in youth. The study notes that weapon carrying has been linked to the perpetration of serious violence in youth and also states that child maltreatment has also been linked to perpetration of violent behavior (Leeb et al., 2007). Therefore, the researchers examine the connection between childhood maltreatment, physical and sexual abuse, and weapon carrying in adolescence. To do so, cross-sectional data was taken from the Youth Violence Survey, a survey based on youth living in high-risk communities, sampled from grades 7, 9, 11 and 12 (N=3,487). The survey

assesses risk and protective factors for dating violence, peer violence, and suicidal behavior (Leeb et al., 2007). 23% of the sample reported having experienced childhood physical abuse, and 9% reported sexual abuse before the, age of 10 (Leeb et al., 2007). More than 16% of students reported weapon carrying in the month prior to the survey, and 4.9% reported having carried a gun. In concordance with the literature, more male youths reported carrying guns than their female counterparts.

The study found the association between firearm carrying and child maltreatment to be statistically insignificant), and therefore did not further investigate the relationship. However, the test for weapon carrying and childhood maltreat was significant, therefore exposure to maltreatment before the age of 10 was posited to be linked to adolescent weapon carrying (Leeb et al., 2007). Strong correlation was found between youth who experienced physical abuse and weapon carrying, and sexual abuse was linked to weapon carrying in females, but not males. In fact, the study found that 24% of weapon carrying among girls was linked to past sexual abuse before the age of 10 (Leeb et al., 2007).

Despite finding this strong correlation, the study was limited by the fact that it could not further investigate the motivation behind carrying weapons for these sexually abused females. It is suggested that sexual abuse may be related to antisocial behavior and delinquency in girls, both factors that have also been linked to weapon carrying and physical violence (Leeb et al., 2007). It is important to note that the study did not find association between past sexual abuse and gun carrying. This is perhaps due to the small portion of the sample size that reported gun specific carrying, and the resulting small statistical power. Likewise, students may have been more willing to answer “yes” to the general weapon carrying survey question than the gun

specific question (Leeb et al., 2007). These potential underestimations are important to be considered with all adolescent research.

Another study assessed victimization and health risk factors among weapon-carrying youth. The study examined the local-level 2003-2007 YRBS, and found that amongst New York City teens, one in five high schoolers carried a weapon, a prevalence that remained steady over the time period examined (Strayton et al., 2011). The article states that weapon carrying has been associated with violence-related injury, disability and death, especially among young people (Strayton et al., 2011). Furthermore, weapon carrying adolescents are at greater risk of injury that requires medical attention (Strayton et al., 2011). In order to better understand adolescent who carry weapons, the researchers assessed two dependent variables: a dichotomous variable that categorizing students into two groups, those who carrying weapon and those who do not; and a 3-level nominal variable that categorized students as 1. weapon carriers with victimization, 2. weapon carriers with no victimization, and 3. non-weapon carriers (Strayton et al., 2011).

Victimization was measured by responses to survey questions that assessed unsafe feelings at school, threatening with a weapon at school, partner violence, and forced sexual intercourse. The independent variables assessed in the study were categorized into four domains: demographic (grade, gender, race/ethnicity, sexual identity), mental health (depression symptoms and suicide attempts), behavioral (smoking, alcohol abuse, drug use, physical fighting, and risky sexual behavior), and social factors (participation in family meals, fair treatment by teachers, gang membership, and grades) (Strayton et al., 2011). The study found that weapon carrying, regardless of victimization status, was more common among male high schoolers, and black and Hispanic students, as well as more common in younger high school students (9th and 10th graders) than older high school students (12th graders) (Strayton et al., 2011). Additionally,

when compared with non-weapon carriers, weapon carrier had high prevalence of depression symptoms, binge drinking, and using marijuana.

Between the groups of weapon-carriers, those who had experience victimization were more likely to carry more lethal weapons, like firearms. They were also more likely to carry these more lethal weapons onto school property, and have higher prevalence rates of mental health and behavioral health risk factors, and were significantly more likely to be members of a gang (Strayton et al., 2011). While the study's sample is large and diverse, it is still just representative on the local-level, and only applicable for the particular geographical area studied (New York City). Also, the methodology limits the amount known about particulars of victimization--for example, child sexual abuse could have a different impact than dating violence (Strayton et al., 2011). The study shows that adolescent weapon-carrying is a diverse issue, and emphasizes the important role that youth mental health and victimization play in understanding and preventing weapon-carrying behaviors.

A third article examines trends in bullying, physical fighting and weapon carrying in 6th- through 10th-grade students from 1998 to 2010. This study examines the nationally representative Health Behavior in School-Aged Children surveys from 1998 (N= 15,686), 2002 (N=14,818), 2006 (N=9,229) and 2010 (N= 10,926) (Perius et al., 2014). The researchers assessed bullying behaviors, physical fighting, and weapon carrying, as well as weapon type and subtypes of bullying, accounting for trends and variation based on demographic factors. The study found that over the time frame, bullying perpetration and victimization both decreased, while weapon carrying increased among white students only. Of the 15% of adolescents who carried weapons in 2010, the study reports that 58% carried a knife, 20% carried a gun, 6.3% carried brass knuckles, 4.3% carried a stick or club, and 3.3% carried mace or tear gas (Perius et

al., 2014). Overall, there was a slight increase in weapon carrying from 1998 to 2010. The study had several notable limitations. First, the variables assessed were not available across each survey cycle. Secondly, the weapon-carrying measure did not account for intent of weapon carrying, i.e., whether the weapon from an offensive aggression tool, or intended for self-defense. The study found that while rate of bullying and physical fighting decreased from 1998 2010, rates of weapon-carrying remain stable, and increased for white males (Perius et al., 2014).

Owning and carrying weapons is a significant issue among US male adolescents when compared to other developed nations. A study that examined weapon carrying trends across Belgium, Canada, Israel, Macedonia and the US found that while overall more males were carrying weapons than females, in the US, almost twice as many boys engaged in this behavior (Stickley et al., 2015). The study used data collected from the Social and Health Assessment (SAHA). The researchers assessed weapon carrying on school property, family environment measures (family structure, parental education and parental warmth), substance use, violent behavior and attitude measures (peer victimization, physical fighting, and perception of weapon carrying risk), delinquent peers, and other risk factors (future expectations, perceived school safety and neighborhood safety) (Stickley et al., 2015).

The researchers state that adolescent weapon carrying poses threats to both health and educational attainment (Stickley et al., 2015). Risk factors for weapon carrying include lack of family structure and poor parental relationships, as well as exposure to school violence and feeling unsafe at school (Stickley et al., 2015). Having a positive outlook on the future was found to be a protective factor against weapon carrying for adolescent males, and parental knowledge and involvement was found to be protective across males and females (Stickley et al., 2015). In all three countries examined, males were more likely to carry weapons than females. Substance

abuse and experiencing peer victimization were associated with higher risk of weapon carrying for boys and girls in all three countries. Furthermore, the figures for American girls who carry weapons was four times higher than in other countries. This could be in part due to the fact that the US boasts the highest prevalence of gun ownership over any other country, with approximately 35-39% of households owning a gun, and 22% of adults reporting ownership of a firearm (Angelmeyer et al., 2014). The study concludes by noting the discordance in the literature regarding adolescents' motivation for weapon carrying, which essentially boils down to the question, are youth carrying weapons as a means of self-defense against an imminent threat, or for more aggressive, proactive reasons? There are conflicting answers to this in previous research, although aggressive behavior does seem to be more closely associated to weapon carrying than does a history of victimization. The present study found both rooted aggression and response to victimization to be correlated to teen weapon-carrying, although the evidence for weapon carrying as a response to victimization was much weaker (Stickley et al., 2015).

Studies in the field of criminology provide some additional insights into risk factors for carrying weapons. Three classes of predictors from theoretical development in criminology, social bonding, strain and social learning (Begue et al., 2016), were utilized to understand weapon carrying in French youth. Social bonding is a behavioral model based on the idea that behavior is shaped by our various attachments. Attachment describes the "psychological and emotional connection one feels toward other persons or groups, and the extent to which one cares about their opinions and feeling" (Begue et al., 2016). In youth, parental relationships make up a large portion of social bonding and attachment. Past research has found that a perceived lack of parental support predicts weapon carrying in adolescents, as does a perceived lack of attachment to their school (Begue et al., 2016). Strain theory models the idea that criminal behavior is

shaped by experience of sources of strain and stress (Begue et al., 2016). At risk adolescents face stress and strain from several sources, including school, in the form of violence at school, bullying, or threats. This strain at school has been linked to higher odds for youth carrying weapons at school (Begue et al., 2016). The third model examined is social learning, a model that posits that behavior is influenced by what the individual sees as the social norm, and imitates. In other words, if other youth are carrying of weapons and participating in violence, and this is held as a social standard by a youth, that youth is at higher risk for also carrying weapons and participating in violence (Begue et al., 2016).

Overall, three social bonding measures (having a negative maternal relationship, repeating a grade and having pro-delinquency beliefs) were found to be associated with higher risk of weapon carrying. Three strain variables were found to predict weapon carrying, including two victimization measures. An important characteristic of the findings was that only certain types of victimization were found to be correlated with weapon carrying, for example, online bullying was unrelated, while physical assault was related.

This is an important step building on previous research that found not all victimization to be associated with weapon carrying (Begue et al., 2016). The study found that peer delinquency was the strongest predictor in adolescent weapon carrying (Begue et al., 2016). As adolescence is marked by a development need for peer approval, this correlation makes sense. It also emphasizes the importance of prevention programs that target entire peer groups. A large limitation of this study lies in the fact that the number of French youth reporting weapon carrying was quite low (11.3% of boys and 1.6% of girls) compared to the United States (22.2% for boys and 7.1% for girls) (Begue et al., 2016). This distinction simultaneously limits the statistical

power of the article's findings, and highlights the alarmingly high number of American youth who carry weapons in comparison with similar developed countries.

Interpersonal Violence

In 2009, a study was published that examined the relationship between interpersonal violence and suicide risk among adolescents. Data was collected using the national 2005 YRBS, which sampled a nationally-representative population to investigate various forms of violence exposure and their connection with suicidality (Nickerson et al., 2009). Particular emphasis was put on sex differences (Nickerson et al., 2009). All analysis was stratified on sex, with measures including: four weapon carrying measures (carrying weapons, carrying a gun, carrying a weapon to school, unsafe feelings at school), six violence engagement and victimization measures (physical fight, injured in fight, threatened at school, fought at school, property stolen at school, attempted suicide), and finally 3 measures of suicidality (suicide ideation, plan and attempt), controlling for demographic variables, weapon carrying variables, and violence exposure variables (Nickerson et al., 2009). It was found that certain violence exposures were uniquely related to suicidal behaviors.

The odds of physical fighting were twice as high for males, and the odds of carrying a weapon were four times as high (Nickerson et al., 2009). On the other hand, females were more likely to report unsafe feelings at school, as well as suicide ideation, plans and attempts (Nickerson et al., 2009). Carrying a weapon, being threatened or injured at school, physical fighting and injury during a fight were all predictors for increased risk of male and female suicide ideation, planning and attempts (Nickerson et al., 2009). Carrying a weapon was associated for higher risk of suicide, but carrying a gun was not (Nickerson et al., 2009). The researchers conclude that, due to the large correlation found between violence exposure and

suicidality, school psychologists should screen for suicidal thoughts and behaviors when a student has committed or witnessed violence in school (Nickerson et al., 2009). These findings highlight the importance of understanding violent behavior and its motivators among our nation's youth.

Interpersonal violence is a common exposure among adolescents. More than one-third of youth aged 10-16 have been victims of assault (Peleg-Oren et al., 2013). In fact, youth are at higher risk than any other age group for community violence exposure (Peleg-Oren et al., 2013). These experiences with interpersonal violence have grave psychological consequences for youth, and the prevalence rates for exposure to interpersonal violence are predicted to increase into 2050 (Peleg-Oren et al., 2013). To further understand the consequences of interpersonal violence exposure, a study examined its relationship as a predictor for youth alcohol abuse.

The study found that more males were involved in physical fighting than females, and more females were victims of sexual assault and rape. Risks associated with interpersonal violence for female adolescents include substance use, unhealthy weight control behaviors, earlier sexual activity, risky sexual behaviors, pregnancy, and increased risk of suicide ideation and attempts (Peleg-Oren et al., 2013). After adjusting for gender, ethnicity and grade, strong correlations were found between students who had been in a physical fight and consumed alcohol, and also had greater odds for binge drinking (Peleg-Oren et al., 2013). These findings strength past literature, that has found high prevalence of both interpersonal violence among adolescents and alcohol use.

Several limitations exist, the generalizability of this sample is limited due to its region-specific survey (Peleg-Oren et al., 2013). Also, as with all YRBS and self-reported surveys, students may be less likely to answer honestly risk-behavior questions that reveal illegal

behavior, such as underage drinking. It important to note that prevalence found could therefore be underestimated (Peleg-Oren et al., 2013). The study concludes that adolescents who have faced interpersonal violence experiences may be at a high risk for alcohol use (Peleg-Oren et al., 2013).

Another study expanded on the findings of the previous study, assessing psychological health and academic success in students exposed to interpersonal violence. This study sampled from rural adolescents, given that 19% of American adolescents live in rural communities (Martz et al., 2016) and are also at higher risk of poverty. Data was again collected using the local-level 2011 and 2012 YRBS from two high school in adjacent rural areas (N=1,003). The poverty levels of the geographical area sampled were emphasized by Census data, which reported that 21.1% of the population studied had incomes below poverty level in 2013 (Martz et al., 2016). Interpersonal violence exposure was operationalized into three categories: physical violence in a dating relationship, victim of forced sexual intercourse, and those who experience both (Martz et al., 2016). In alignment with previous research, the study found that females were more likely than males to report a history of forced sexual intercourse. Physical interpersonal violence exposure was found to be associated with higher risk of suicide ideation, planning and attempt for both males and females (Martz et al., 2016). Sexual interpersonal violence history was found to be associated with greater risk of depression, suicide ideation and planning for both sexes, and suicide attempt in females (Martz et al., 2016).

The researchers note that being a victim of both sexual and physical violence was especially predictive of higher risk of suicidality in females (Martz et al., 2016). This significance among females but not their male counterparts could be explained by the lower numbers of males who reported having experienced sexual and physical violence. These low

report rates affect statistical significance. Exposure to interpersonal violence was demonstrated to increase risk for male depression, suicide ideation and planning, and therefore should not be dismissed as a potential health risk for males in light of stronger female correlations (Martz et al., 2016). It is important that researchers consider the effects of exposure to interpersonal violence in rural adolescents, as those living in both rural setting and poverty have increased risk of depression and suicidality (Martz et al., 2016).

Another way to measure the impact of exposure to interpersonal violence is through adolescent's use of available mental health services. A 2014 study assesses the relationship between youth exposure to violence and use of mental health services (Green et al., 2014). Exposure to violence in this study were categorized into four types: peer, family, sexual and witnessing (Green et al., 2014). Data was collecting using the 2008 Boston Youth Survey (BYS) (N=1878), a survey of high-school students (grade 9-12) in the Boston Public School districts. The student population surveyed is predominantly low-income and minority (Green et al., 2014). The survey has sixteen questions that measure the four categories of violence exposure in the past year.

The study found that more than half of the student population (56.9%) reported having been exposed to at least one form of violence 18. While witnessing violence was the most frequently reported (45.5%), then peer violence (21.8%), family violence (17.1%) and sexual violence (3.4%), only 22.8% of respondents had a mental health screening the past year (Green et al., 2014). Females who had experienced violence were significantly more likely to seek mental health services (Green et al., 2014). Youth victims of peer violence were no more likely to seek services than their non-victimized peers (Green et al., 2014). It was also found that both suicide ideation/ self-injurious behavior explained the association between number of violence

exposures and mental health services sought (Green et al., 2014). It is important to note that, among students reporting serious suicide ideation, less than half had contact with a mental health provider (Green et al., 2014). This highlights the fact supported elsewhere in the literature that those adolescents who need mental health services are not seeking them. The study also highlights the importance of differentiating between types of interpersonal violence among adolescents, as the different measures of violence had different mental health implications across the categories (Green et al., 2014).

Depression

Depression symptoms and Major Depression Episode (MDE) have been found to be common risk factors in adolescent suicide risk throughout the literature (cite all sources). In fact, 12% of youth meet the criteria for MDE or dysthymia (a milder form of major depression) (Dunn, Milliren, Evans, Subramanian, Richmond, 2015). Dunn et al. examine common risk factors for adolescent depression, the influence of school and neighborhoods, to better understand adolescent depression, and suggest prevention tactics. To do so, data was collected from the National Longitudinal Study of Adolescent Health (wave 1, 1994-1995). The survey is one of the few nationally representative surveys that gather school and neighborhood based health and health behavior information on youth (Dunn et al., 2015). In addition to student participants, caregivers were recruited to give information on the home. The outcome of interest was depressive symptoms, measured at wave 1 with a 19-question measure, adapted from the Center for Epidemiological Studies Depression Scale (CES-D) (Dunn et al., 2015). Dependent variables examined were socioeconomic status (SES), and race/ethnicity. The study sample was majority white (58%), largely made up of adolescents aged 15.6 years, and who were economically disadvantaged (70% of adolescents' parents had no college degree and 10% had a

parent receiving government assistance) (Dunn et al., 2015). Two major conclusions emerged from the examination of all these factors: 1. Schools had more influence in mid-level depression symptoms than did homes and 2. Only student-level factors (gender, race/ethnicity, age, parental SES) were linked to depressive symptoms (Dunn et al., 2015).

An article published in 2016 takes another approach to understanding the underlying factors of adolescent depression, by turning away from adolescent's environment and instead examines the influence of individual's internal emotional regulation capacity on the risk for depression (Stikkelbroek, Bodden, Kleinjam, Reijnders and van Baar, 2016). The study looks at youth's emotional reaction to stressful life events (loss of a loved one, health threats or relational challenges), to determine how cognitive emotional regulation mediates depressive symptoms (Stikkelbroek et al., 2016). The adolescent sample studied consisted of 398 participants, all living in the Netherlands, aged 11 to 22 years, who were divided into two groups based on high and low scores of depression symptoms. Cognitive emotional relation strategies were investigated with a questionnaire, designed to measure emotional regulation skills on a 5-point Likrt scale. (Stikkelbroek et al., 2016). A second questionnaire measured stressful life events.

The study found correlation between certain stressful life events and the level of depression symptoms in youth (Stikkelbroek et al., 2016). The types of stressful life event that were associated with depression were health threatening and relational challenges, while loss of a loved one was not related. More frequent use of maladaptive cognitive emotion regulation was also positively, associated, and the inverse (use of adaptive cognitive emotion regulation) was found to be protective against depression (Stikkelbroek et al., 2016). Overall, the use of maladaptive cognitive emotion regulation (self-blame, catastrophizing and rumination) and less use of adaptive cognitive emotion regulation strategies (positive reappraisal, refocus on

planning) were significantly associated with increased risk of depressive symptoms (Stikkelbroek et al., 2016). These findings support a push for more emotion regulation-based counseling for school-aged adolescents, to learn better, more adaptive coping mechanisms for stressful life events, and protect against development of depressive symptoms.

Yet another article assessed the prevalence of suicide risk in adolescents with depressive symptoms. Taking a sample from Brazil, Lourenco et al. examined the association between risk of suicide and depressive symptoms (Lourenco de Araujo Veras, Ximenes, Vasconcelos, Sougey, 2015). A population-based cross-sectional study was conducted with students aged 10-17 enrolled in public schools in northeast Brazil in 2014 (N=1,379). Data was collected using the Children's Depression Inventory (CDI) and the International Neuropsychiatric Interview (Veras, 2015). To assess depressive symptoms, two groups were created based on responses to the CDI: "with depressive symptoms" and "without depressive symptoms." Risk of suicide was categorized similarly, as "with risk of suicide" and "without risk of suicide" (Veras, 2015). The overall prevalence of risk of suicide found was 29.7%. Age and sex were associated with suicide risk, suicide risk increased with age, and females were more likely to be at risk than males. The study also concluded that adolescent with depression symptoms had a 3.4-fold greater chance of developing risk of suicide (Veras, 2015). This article was the first of its kind demonstrating the prevalence of suicide risk in northeast Brazil, and further imbeds the correlation between depressive symptoms and adolescent suicide risk.

A pilot study, consisting of just 31 adolescents aged 11 to 15, sought to examine stressful life events, worry and rumination as potential risk factors for depression. The study states that adolescence is characterized by "physical, psychosocial and emotional growth," which leaves youth particularly vulnerable to negative health outcomes like depression (Young, Dietrich,

2015). The pilot test used a prospective, longitudinal study design. There were three waves of data collected, and instruments used to measure variables consisted of five surveys. The final sample analyzed (N=33) was majority male and Caucasian. Through building multivariate associations, the study found stressful life events, ruminative thinking and worry to all three be involved in the development of anxiety and depression symptoms in the adolescents studied (Young et al., 2015). As the study is a pilot study with a relatively small sample size, there are most certainly limitations to the researchers' findings. These results are meant as preliminary results that preclude further research into the risk factors of the development of anxiety and depression among adolescents (Young et al., 2015).

Suicide and Firearms

A research report conducted in 2003 examines the lethality of firearms compared to other methods of suicide. The study also aimed to quantify the extent to which suicide mortality rates could be impacted by limiting access to firearms (Shenassa, Catlin, Buka, 2003). The data was collected from Illinois hospital discharge information, on suicides and para-suicides (suicide attempts that result in severe injury, but not death) from 1990-1997. The total number of suicide episode was reported, and then broken into percentages of suicide and para-suicide. The data did not include deaths from Veteran Affairs hospitals or psychiatric hospitals. From 1990-1997, there were 37,352 hospital admissions for para-suicide, and 10,287 completed suicides reported (Shenassa et al., 2003). Poisoning was the most common method of suicide among men and women, then firearms and suffocation. Among minors, the most common methods were poisons, cuts and guns (Shenassa et al., 2003). Though the numbers for completed suicides by firearm did not take the top rank in numbers, they were the most lethal of the methods used, having a 96%

lethality rate. In other words, those who choose to use a firearm as their method were more likely to have completed suicide (Shenassa et al., 2003).

A huge limitation of the study is the lack of data from VA and psychiatric hospitals. While the data exists for completed suicide, the researchers could not obtain information on suicide attempts, therefore potentially inflating the lethality measures (Shenassa et al., 2003). The researcher's undermine this limitation through stating that "there is no evidence that this inflation occurs differentially by suicide method, thus, it does not bias firearms' relative lethality" (Shenassa et al., 2003). The researchers conclude that, due to their disproportionate lethality, a population-based preventive effort to limit access to firearms would be beneficial in decreasing completed suicide rates (Shenassa et al., 2003).

A systematic review and meta-analysis conducted in 2014 further examines the relationship between firearm accessibility and risk for suicide and homicide victimization, with close attention paid to how this relationship impacts the entire household (Anglemyer, Horvath, Rutherford, 2014). To systematic review was conducted using PubMed, EMBASE, the Cochrane Central Register of Controlled Trials, and Web of Science in August 2013. The search yielded 6,902 references that were combed down to 3,747 for close review, and 70 for a full-text review (Anglemyer et al., 2014). Ultimately, 15 observational studies were included in the meta-analysis. Of the 15 studies, most often homicide and suicide victims were men (63% and 75%, respectively). Most persons who completed suicides were white (78% to 98%), and most homicide victims were non-Hispanic black or another race (28.6%). Four of the fourteen studies assessed were studies on adolescent suicide (Anglemyer et al., 2014). Among US-based studies examined, proportion of completed suicides by firearm ranged from 47% to 73%. The pooled data from all 14 studies examined revealed that all but 1 study found a significantly higher odds

of suicide among persons with access to firearms than those who did not have access to firearms (Anglemyer et al., 2014). In fact, persons with access to firearms were found to be three times at higher risk of suicide than those with no access (Anglemyer et al., 2014). This increased risk is especially alarming given that the United States boasts the highest proportion of gun ownership of any country (Anglemyer et al., 2014).

A systematic review published in 2016 examines the relationship of firearm access and suicide rates among US adults from 1981-2013 (Siegel and Rothman, 2016). The review notes a polarization in the literature on the significance of the association between firearm ownership and increased risk of suicide (Siegel et al., 2016). In 2004, the conflicting evidence led the National Research council to declare that the "association is more modest between [individual] firearm ownership and firearm suicide...the causal relationship remains unclear" (Siegel et al., 2016). The researchers emphasize the value of long term data on firearms and suicide to resolve this issue, and therefore focuses their assessment on a 33-year period, 1981-2013. State-level firearm ownership rates were measured via a proxy derived from firearm related suicide rates from each state. The relationship between firearm ownership level and the adjusted overall and firearm related suicide rate that state were examined for each year, with control for factors that could confound the relationship (Siegel et al., 2016). The outcome variable, suicide rate, was adjusted for age and gender, and obtained from the CDC's Web-Based Injury Statistics Query and Reporting Systems database.

Over the 33-year period, the proportion of state-level gun ownership ranged from 12.2% in Hawaii to 72.8% in Wyoming, with an overall average of 41% (Siegel et al., 2016). Over the time period examined, gun ownership decreased on average (45.6% to 36.5%). Men were 6.2 times more likely than women to use a firearm as a means of suicide, and among both genders,

suicides by firearm decreased from 12%-15%. Overall, the study found a strong correlation between higher levels of gun ownership and higher firearm suicide rates (Siegel et al., 2016). For men, it was found that gun ownership significantly increased risk of any type of suicide, although this relationship did not hold true for women (Siegel et al., 2016).

Methods

Data Source

The national Youth Risk Behavior Survey (YRBS) is a component of the Youth Risk Behavior Surveillance System, managed by the Centers for Disease Control and Prevention (CDC) to monitor key youth risk behaviors. The YRBS is a nationally representative, school-based survey that is conducted biennially and gives information on the health risk behaviors of high school students. The national YRBS obtains a nationally representative sample through a three-stage cluster sample design. The target population consists of public and private school students in grades 9-12, in all 50 states and the District of Columbia. Once active or passive parental consent is established, trained data collectors give the anonymous, self-administered questionnaire to the students (MMWR, 2013).

Measures

In total, sixteen measures from the YRBS 2015 were used for the analysis (Table 1). Weapon carrying (reported carrying a weapon (club, knife, gun or other) in the past 30 days) was the main examined exposure. Gun carrying (reported carrying a gun in the past 30 days) was reported as a descriptive percentage of the exposure. Three measures of suicidality were used as the main outcomes: suicide ideation (have seriously considered suicide in the past 12 months) and suicide planning (has made a plan to commit suicide in the past 12 months, and suicide attempt (has attempted suicide once or more than once in the past 30 days).

Each model controlled for multiple potential confounders, including demographic variables and other suicide risk factors. Four demographic measures were considered as potential confounders: age, grade, sex, and race/ethnicity. Four measures of interpersonal violence exposure were included in the models: forced sexual intercourse, partner violence, physical fight, and unsafe feelings at or on the way to school. Additionally, three other risk factor measures for suicide and weapon carrying were included in the model: depression symptoms, current alcohol abuse, and lifetime drug abuse. Lifetime drug use was determined by a positive response to having ever used marijuana, cocaine, heroin or ecstasy.

Table 1. Measures of suicide thoughts and behaviors (dependent variables), weapon carrying (independent variable), and other risk factors.

Variable	Question	Response Choices
Suicide thoughts and behaviors		
Suicide Ideation	During the past 12 months, did you ever seriously consider attempting suicide?	Yes, No
Suicide Plan	During the past 12 months, did you make a plan about how you would attempt suicide?	Yes, No
Suicide Attempt	During the past 12 months, how many times did you actually attempt suicide?	0 times, 1 or more times
Weapon Carrying		
Weapon Carrying	During the past 30 days, on how many days did you carry a weapon such as a gun, knife, or club?	0 days, 1 or more days
Gun carrying	During the past 30 days, on how many days did you carry a gun?	See above.

Demographic covariates		
Age	How old are you?	12 years or younger, 13, 14, 15, 16, 17, 18 years or older
Gender	What is your sex?	Female, Male
Grade	In what grade are you?	9th grade, 10th grade, 11th grade, 12th grade
Race/Ethnicity	What is your race? Or How do you describe yourself? (2005) And Are you Hispanic?	American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White Yes, No
Other covariates		
Sad and Hopeless Feelings	During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?	Yes, No
Alcohol Use	During the past 30 days, on how many days did you have at least one drink of alcohol?	0 days, 1 or more days
Drug Use	During your life, how many times have you used marijuana? During your life, how many times have you used any form of cocaine, including powder, crack, or freebase? During your life, how many times have you used heroin (also called smack, junk, or China White)? During your life, how many times have you used ecstasy (also called MDMA)?	0 times, 1 or more times See above. See above. See above.

Interpersonal Violence		
Forced sexual intercourse	Have you ever been physically forced to have sexual intercourse when you did not want to?	Yes, No
Partner Violence	During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)	I did not date or go out with anyone during the past 12 months or 0 times, 1 or more times
Physical Fight	During the past 12 months, how many times were you in a physical fight?	0 times, 1 or more times
Unsafe Feelings	During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?	0 days, 1 or more days

Statistical Analysis

All data analyses were performed using SAS 9.3. The data from the national YRBS are weighted based on sex, race/ethnicity, and grade to adjust for school and student nonresponse, as well as to correct oversampling of black and Hispanic students[8]. The SurveyFreq procedure was used to obtain descriptive statistics (prevalence estimates, raw numbers and weighted percentages were reported). Missing values were considered not missing completely at random. Bivariate analysis was used to examine the association between the weapon carrying measure and the three measures of suicidality, to report total and subgroup prevalence (raw counts and weighted percentages), and identify potential covariates (Tables 2, 3). The SurveyLogistic procedure was used to conduct the multivariate analysis, which was used to build multivariable logistic regression models to assess the relationship between the weapon carrying (independent

variable) and the measures of suicidality (dependent variables), reporting both crude odds ratios and adjusted odds ratios, as well as 95% confidence intervals (Tables 4, 5, 6). The sample was then stratified by sex (male, female), and adjusted odds ratios and 95% confidence intervals reported (Tables 7, 8, 9).

Results

Demographic Characteristics

In 2015, 15,624 high school aged adolescents took the YRBS. Of these participants, 48.7% identified as female and 51.3% identified as male; 27.2% were in 9th grade, 25.7% in 10th grade, 23.9% in 11th grade, and 23.1% were in 12th grade; 54.5% identified as White, 13.6% as African American, 22.3% as Hispanic, and 9.7% as another race/ethnicity (American Indian or Alaska native, Asian, Native Hawaiian or other Pacific Islander, and multiple races (non-Hispanic) (Kann et al., 2016).

Characteristics of Weapon Carrying

Among 15,624 high school students, 16.2% reported carrying a weapon (knife, club, gun or other) in the past 30 days. Of those who reported carrying a weapon, most were in 9^{th} (27.0%) and 10^{th} (25.9%) grades; a little over three-quarter (77.1%) were male. Of those students who reported carrying weapons, 54.9% also reported alcohol use in the past 30 days, and 34.2% reported sad and hopeless feelings for the past 2 weeks. Additionally, 5.3% of students reported having carried a gun in the past 30 days. Of those students who reported carrying a gun, 85.4% identified as male. Of the students who reported recent gun carrying, 56.9% also reported having been in a recent physical fight, and 64.3% reported having had at least one alcoholic drink in the past 30 days.

Characteristics of Suicidality

Approximately eighteen percent of the students reported having seriously considered suicide in the past 12 months, 14.6% reported having made a plan to commit suicide, and 8.6% had actually attempted suicide. The majority of those students who had seriously considered suicide, made a plan to commit suicide and attempted suicide were female (64.5%, 65.2% and 67.0% respectively). The majority of students who attempted suicide reporting having at least one alcoholic drink in the past 30 days (56.3%). The vast majority of students who had considered, planned, and attempted suicide in the past 12 months also reported feeling sad or hopeless in the past 2 weeks (76.8%, 75.9%, and 79.9% respectively).

Association of Weapon Carrying and Suicide Ideation

The unadjusted model that compared students who reported having considered suicide in the past 12 months against students who also reported carrying a weapon in the past 30 days, found that students who carried a weapon were 1.7 times more likely to have considered suicide (OR=1.73, 95% CI [1.49, 2.00]) than those students who did not report carrying a weapon. After controlling for the covariates sex, race/ethnicity, interpersonal violence exposure measures, alcohol use, drug use, and sad and hopeless feelings, it was found that students who carried a weapon were 1.6 times more likely to have reported consideration of suicide than those students who did not report carrying a weapon (OR_{adj}=1.61, 95% CI [1.16, 2.24]). Also notable is that those students who reported having experienced forced sexual intercourse and physical dating violence were twice as likely to report serious consideration of suicide than those students who did not report having experienced these forms of interpersonal violence (OR_{adj} = 2.18, 95% CI

[1.68, 2.84]; OR $_{adj}$= 2.01, 95% CI [1.49, 2.87]). Likewise, students who reported having felt sad and hopeless in the past 2 weeks were 10 times as likely to have reported serious suicide consideration than those students who did not report having felt sad and hopeless in the past 2 weeks (OR $_{adj}$= 10.44 , 95% CI [7.93, 13.75]), after adjusting for all previously mentioned covariates.

Association of Weapon Carrying and Suicide Planning

The unadjusted model that compared students who reported having made a plan to commit suicide in the past 12 months against students who also reported carrying a weapon in the past 30 days, found that students who carried a weapon were 1.8 times more likely to have made a plan to commit suicide (OR= 1.83, 95% CI [1.55, 2.16]) than those students who did not report carrying a weapon. After controlling for the covariates sex, race/ethnicity, interpersonal violence exposure measures, alcohol use, drug use, and sad and hopeless feelings, it was found that students who carried a weapon were 1.77 times more likely to have reported having made a plan to commit suicide than those students who did not report carrying a weapon (OR $_{adj}$= 1.77, 95% CI [1.23, 2.55]). Like the previous model, students who reported having experienced forced sexual intercourse and dating violence were 1.5-2 times as likely to report having made a plan to commit suicide than those students who did not report having experienced these types of interpersonal violence (OR $_{adj}$ = 2.33, 95% CI [1.77, 3.07]; OR $_{adj}$=1.59, 95% CI [1.20, 2.10]). Students who had reported feeling sad or hopeless for 2 weeks consistently in the past year were 7 times more likely to reported having made a plan to commit suicide than those students who did not report feeling sad and hopeless, after controlling for the aforementioned covariates (OR $_{adj}$= 7.12, 95% CI [5.47, 9.27]).

Association of Weapon Carrying and Suicide Attempt

The unadjusted model that compared students who reported having attempted suicide in the past 12 months against students who also reported carrying a weapon in the past 30 days, found that students who carried a weapon were 1.9 times more likely to have made a suicide attempt (OR= 1.91, 95% CI, [1.37, 2.67]) than those students who did not report carrying a weapon. After controlling for the covariates sex, race/ethnicity, interpersonal violence exposure measures, alcohol use, drug use, and sad and hopeless feelings, it was found that students who carried a weapon were 1.5 times more likely to have reported a suicide attempt than those students who did not report carrying a weapon (OR_{adj}= 1.51, 95% CI [1.08, 2.10]). Notably, students who reported experiencing interpersonal violence (unsafe feelings that kept them from school, a physical fight, forced intercourse, and physical dating violence) were 2-3 times as likely to have reported a suicide attempt (OR_{adj}= 1.80, 95% CI [1.27, 2.56]; OR_{adj}= 2.06, 95% CI [1.69, 2.63]; OR_{adj}= 1.81, 95% CI [1.39, 2.36]; OR_{adj} =2.66, 95% CI [1.77, 3.99], respectively). Students who had reported feeling sad or hopeless for 2 weeks consistently in the past year were 8.7 times more likely to have reported a suicide attempt (OR_{adj} = 8.71, 95% CI [5.93, 12.81]) than those students who did not report having felt sad and hopeless, after adjusting for the aforementioned covariates.

Stratification by Sex

In the stratified model for suicide ideation, females who carried weapons were 1.8 times as likely to also report suicide ideation than those who did not carry weapons (OR_{adj}=1.80, 95% CI [1.37, 2.67]) and males who carried weapons were 1.55 times as likely to also report suicide ideation than those who did not carry weapons (OR_{adj}=1.55, 95% CI [1.11, 2.18]). In the suicide planning model, stratified by sex, females who carried weapons were 2.28 times as likely to also

report suicide planning than those who did not carry weapons (OR_{adj}= 2.28, 95% CI [1.40, 3.73], while there was no statistically significant difference found for males who carried weapons and males who did not carry weapons (OR_{adj}= 1.49, 95% CI [1.00, 2.22]). In the suicide attempt model stratified by sex, females who carried weapons were 2.7 times as likely to also report at least one suicide attempt (OR_{adj}=2.71, 95% CI [1.52, 3.41]), while there was no statistically significant difference found for males who carried weapons and those who did not carry weapons (OR_{adj}= 0.95, 95% CI [0.53, 1.67]).

Discussion

Research Question

The study found that students who reported weapon carrying in the past 30 days were almost twice as likely to report serious consideration of suicide and having made a plan to commit suicide, and one and half times as likely to have actually attempted suicide than those students who did not carry weapons. Weapon carrying, therefore, seems to be a considerable risk factor for suicidality in American high school students. Due to the high prevalence of students who reported having had suicide ideation (17.7%), a plan to commit suicide (14.6%), and a suicide attempt (8.6%), it is important to understand and mitigate the various risk factors associated with adolescent suicidality. The correlation found in this study suggests that, to the benefit of their student's mental health, schools that do not already take measures to limit weapon carrying should, and schools that do implement rules to limit weapon carrying should reinforce or augment their existing guidelines.

Once the sample is stratified by sex (male, female), it is interesting to note how the odds ratios change. In the suicide ideation model, both male and female populations who carry guns are at higher risk of also reporting serious consideration of suicide. In the suicide planning model, the

risk for females who carry weapons almost doubles, and the risk for males who carry weapons is no different than for males who do not carry weapons. Likewise, in the suicide attempt model, females who carry weapons are at almost 3 times greater risk for attempting suicide, while their male counterparts who carry weapons are at no greater risk than those who don't carry weapons. While it was found that adolescent males are more likely to report weapon carrying than females, the stratification results seem to imply that weapon carrying has more of an effect on female suicidality than on males, and increasingly so as seriousness of suicidality increases.

This effect evident after stratification could be a result of the motivation that female youth have for carrying weapons; the literature states that most females carry weapons as a defense against victimization (cite). Additionally, female students were found to be more likely to report all four measures of interpersonal violence, and had notably high reports of forced sexual intercourse and physical dating violence. Forced sexual intercourse and physical dating violence are two strong indicators of victimization, the sort that has been correlated to female weapon carrying (cite). It is also important to note that students who reported interpersonal violence in the form of forced sexual intercourse and physical dating violence were two-fold more likely to also report suicide ideation and planning, and students who reported experiencing interpersonal violence in the form of unsafe feelings, physical fighting, forced sexual intercourse or physical dating violence were more likely to report having made a suicide attempt. These correlations parallel the literature (Peleg-Oren et al., 2013; Nickerson et al., 2009), and underline the importance of limiting interpersonal violence exposure amongst adolescents.

Efforts to lessen both the effect of weapon carrying and interpersonal violence amongst adolescent females are needed Given that these factors were found to greatly increase risk of all levels of suicidality, a reduction in their prevalence could lead to significant reduction of

suicidality. Additionally, students who reported having felt sad and hopeless for two weeks consistently were eight to ten times as likely to report suicide ideation, planning, and attempt than those students who did not report such feelings. This correlation is strong, and indicative of the danger of such feelings amongst adolescent students. Given the high prevalence of students who reported feeling sad or hopeless, those students at risk of also experiencing suicidality is quite large. While this measure by itself does not suffice as a measure of depression, it suggests a large prevalence of depression-like symptoms in adolescents. Given the strong correlation found between sad and hopeless feelings and suicidal thoughts and behaviors, more research is greatly needed into the prevalence of depression diagnosis in American adolescents.

Study Limitations

There are a few key limitations to this study. First, the data only reflects information on adolescent students, as the survey was given only in schools. Therefore, the findings are not representative of adolescents who are home-schooled, or do not attend school. This limits the generalizability of the findings. Secondly, the measures used to operationalize weapon carrying and suicidality are measured on different time scales (30 days and 12 months, respectively). This causes temporality issues, and makes determining the direction of the correlation impossible. Also, the measures available for potential suicide risk factors are limited; key risk factors such as MDE, PTSD, anxiety, and history of past suicide attempt (Wolitzky-Taylor et al., 2010) are not operationalized by the YRBS questionnaire. Therefore, these key predictors' influence on the examined relationship between weapon carrying and suicidality cannot be included in the logistic regression model, potentially over-inflating the relationship found.

Implications

There are several key implications that can be drawn from the results. First, as weapon carrying is correlated to all levels of suicidality, efforts should be made to prevent youth access to such weapons. Secondly, as females who carry weapons are almost twice as likely than females who do not carry weapons to report suicide ideation and planning, and almost three times as likely to have reported a suicide attempt, special attention should be given to females at high risk for carrying weapons. More research needs to be done on why female youth are carrying weapons. Likewise, the lack of correlation found between male weapon carrying and suicide planning and attempt could be due to underreporting by male youth. Adolescent suicide prevention programs should take all of these factors into consideration to most effectively serve American students.

It has been established in the literature that suicide by firearm is the most lethal mode, as it results in the most completed suicide attempts. Given the alarming number of students who reported weapon carrying, as well as the number of students who specifically reported carrying a gun in the past month, the findings necessitate more research on youth weapon and firearm accessibility. Adolescence is a time marked by increased risk behaviors and impulsivity, and youth are particularly vulnerable to making short-sighted decisions. The high prevalence of adolescent suicidality found underlines the importance of mitigating the circumstances that put students at risk for these suicide thoughts and behaviors. Weapon carrying is a particularly worrisome correlation, as access to weapons and specifically firearms not only increases risk of suicidality, but also gives youth access to the most lethal means of suicide. Future research should further investigate youth access to weapons and firearms, to better understand how to most effectively reduce these numbers.

Conclusion

The findings of this study hold implications for understanding the complex and multifaceted risk factors of adolescent suicidality. There is a gap in the literature regarding exactly what role weapon carrying plays in adolescent suicidality; the relationship found between adolescent weapon carrying and suicidality underlines the importance of limiting adolescent access to weapons. To best know how to limit this access, more research is needed on how students gain access to the weapons they report carrying. Furthermore, adolescents who are not current students should also be included in future research as they are vital to understanding the entire scope of the issue of weapon carrying and suicidality.

Table 2: Participant Characteristics and Association with Weapon and Gun Carrying

N=15,624	Carried a Weapon	P-value [c]	Carried a Gun	P-Value [c]
Total Exposed	2,526 (16.2)		713 (5.3)	
Participant Characteristics				
Grade				
9th	642 (27.0)	0.0030	166 (22.8)	<.0001**
10th	632 (25.9)		165 (25.4)	
11th	632 (23.6)		181 (24.6)	
12th	579 (22.8)		182 (25.4)	
Ungraded/ Other	19 (0.6)		12 (1.7)	
Missing	22		7	
Sex				
Female	631 (22.9)	<.0001**	117 (14.6)	<.0001**
Male	1870 (77.1)		582 (85.4)	
Missing	25		14	
Race/Ethnicity				
American Indian/Alaskan Native	45 (0.9)	<.0001**	11 (0.7)	0.0008**
Asian	37 (1.7)		11 (1.7)	
Black or African American	155 (9.3)		88 (15.3)	
Native Hawaiian or Other Pacific Islander	22 (1.1)		9 (2.0)	
White- Non-Hispanic	1374 (61.8)		317 (56.3)	
Hispanic Latino	288 (7.2)		84 (6.0)	
Multiple- Hispanic	409 (12.1)		136 (12.8)	
Multiple- Non-Hispanic	145 (6.0)		40 (5.1)	
Missing	51		17	
Age Group				
12 years or younger	20 (0.7)	<.0001**	12 (1.6)	<.0001**
13 years old	5 (0.1)		3 (0.2)	
14 years old	264 (8.4)		52 (6.1)	
15 years old	593 (25.9)		145 (20.4)	
16 years old	655 (25.1)		166 (24.7)	
17 years old	597 (23.6)		170 (24.3)	
18 years old or older	381 (16.2)		161 (22.6)	
Missing	11		4	
Interpersonal Violence				
Unsafe feelings?				
Yes	288 (10.7)	<.0001**	126 (17.0)	<.0001**
No	2231 (89.3)		585 (83.0)	
Missing	7		2	
Physical Fight?				
Yes	972 (47.3)	<.0001**	389 (56.9)	<.0001**
No	1092 (52.7)		274 (43.1)	
Missing	462		50	
Forced sexual intercourse?				
Yes	249 (9.8)	<.0001**	91 (12.8)	<.0001**
No	2166 (90.2)		579 (87.2)	
Missing	111		43	
Physical dating violence?				
Yes		<.0001**		<.0001**
No	296 (14.3)		199 (18.9)	
Missing	1617 (85.7)		454 (81.1)	
	613		140	
Alcohol Use				

Yes	1219 (54.9)	<.0001**	397 (64.3)	<.0001**
No	1003 (45.1)		200 (35.7)	
Missing	304		116	
Drug Use (Marijuana, Heroin, Cocaine or Ecstasy)				
Yes	367 (13.3)	<.0001**	166 (22.6)	<.0001**
No	2136 (86.7)		540 (77.4)	
Missing	23		7	
Sad or Hopeless Feelings				
Yes	879 (34.2)	<.0001 **	230 (31.4)	0.57
No	1614 (65.8)		469 (68.6)	
Missing	33		14	
Suicide thought and behaviors				
Suicide Ideation				
Yes	632 (25.1)	<.0001**	173 (23.0)	0.004**
No	1858 (75.0)		528 (77.0)	
Missing	36		12	
Suicide Plan				
Yes	551 (21.5)		156 (20.4)	0.002*
No	1924 (78.5)	<.0001**	543 (79.6)	
Missing	36		14	
Suicide Attempt				
Yes	278 (14.0)	<.0001**	97 (14.3)	
No	1583 (86.0)		492 (85.7)	<.0001**
Missing	665		124	

*Unweighted frequencies, weighted percentages reported
**statistically significant p-value (alpha=0.05)
P-value[c]-chi square

Table 3: Participant Characteristics and Associations with Suicide Ideation, Suicide plan, and Suicide Attempt

N=15,624	Suicide Ideation	P-value [C]	Suicide Plan	P-Value [C]	Suicide Attempt	P-Value [C]
Total variable	2,808 (17.7)		2,331 (14.6)		1,203 (8.6)	
Participant Characteristics						
Grade						
9th	752 (28.0)	0.013**	655 (27.9)	0.15	366 (32.1)	<.0001**
10th	717 (26.5)		584 (27.0)		314 (28.1)	
11th	711 (23.8)		565 (22.8)		301 (22.7)	
12th	586 (21.3)		495 (22.0)		201 (16.7)	
Ungraded/ Other	17 (0.5)		13 (0.3)		7 (0.5)	
Missing	25		19		14	
Sex						
Female	1852 (64.5)	<.0001**	1535 (65.2)	<.0001**	831 (67.0)	<.0001**
Male	936 (35.5)		774 (34.8)		360 (32.9)	
Missing	20		22		12	
Race/Ethnicity						
American Indian/Alaskan Native	38 (0.7)	0.0001**	35 (0.7)	0.05	21 (1.0)	<.0001**
Asian	114 (3.7)		80 (3.3)		55 (3.5)	
Black or African American	252 (11.1)		221 (12.8)		147 (12.9)	
Native Hawaiian/Other Pacific Islander	15 (0.7)		13 (0.7)		7 (0.5)	
White- Non-Hispanic	1243 (53.0)		1017 (52.0)		411 (44.6)	
Hispanic Latino	376 (9.0)		310 (9.1)		186 (11.6)	
Multiple- Hispanic	549 (14.7)		477 (15.1)		273 (17.4)	
Multiple- Non-Hispanic	162 (7.0)		128 (6.2)		74 (8.5)	
Missing	59		50		29	
Age Group						
12 years or younger	16 (0.3)		15 (0.4)		6 (0.4)	
13 years old	5 (0.1)	0.44	2 (0.04)	0.23	1 (0.1)	0.0002**
14 years old	334 (10.6)		275 (10.9)		140 (11.0)	
15 years old	670 (26.1)		579 (26.1)		329 (30.9)	
16 years old	728 (25.5)		600 (25.6)		325 (26.5)	
17 years old	705 (23.4)		562 (22.2)		279 (20.0)	
18 years old or older	341 (14.0)		288 (14.7)		119 (11.1)	
Missing	9		10		4	

Interpersonal Violence						
Unsafe feelings?						
Yes	423 (13.3)	<.0001**	352 (12.6)	<.0001**	242 (17.1)	<.0001**
No	2378 (86.7)		1973 (87.4)		957 (82.9)	
Missing	7		6		4	
Physical Fight?						
Yes	813 (34.7)		699 (35.3)		476 (46.8)	<.0001**
No	1534 (65.3)	<.0001**	1249 (64.7)	<.0001**	566 (53.2)	
Missing	461		383		161	
Forced sexual intercourse?						<.0001**
Yes	520 (17.8)	<.0001**	452 (19.6)	<.0001**	288 (25.1)	
No	2138 (82.2)		1766 (80.4)		833 (74.9)	
Missing	150		113		82	
Physical dating violence?						<.0001**
	498 (22.4)	<.0001**	407 (22.5)	<.0001**	293 (30.1)	
Yes	1579 (77.6)		1293 (77.5)		636 (70.0)	
No	731		631		274	
Missing						
Alcohol Use						
Yes	1200 (49.1)	<.0001**	998 (49.2)	<.0001**	569 (56.3)	<.0001**
No	1268 (50.1)		1062 (50.8)		452 (43.7)	
Missing	340		271		182	
Lifetime Drug Use (Marijuana, Heroin, Cocaine or Ecstasy)						
Yes	319 (11.2)		269 (11.6)		184 (15.2)	
No	2476 (88.8)	<.0001**	2051 (88.4)	<.0001**	1014 (84.8)	<.0001**
Missing	13		11		5	
Sad and Hopeless Feelings						
Yes	2188 (76.8)	<.0001**	1808 (75.9)	<.0001**	979 (79.9)	<.0001**
No	603 (23.2)		509 (24.1)		210 (20.1)	
Missing	17		14		14	
Weapon Carrying						
Carried a weapon?						
Yes	632 (23.0)	<.0001**	551 (24.3)	<.0001**	278 (27.0)	<.0001**
No	1934 (77.0)		1568 (75.7)		748 (73.0)	
Missing	242		212		177	
Carried a gun?					97 (8.3)	
Yes	173 (6.8)	0.0037**	156 (7.4)	0.002**	962 (92.0)	<.0001**
No	2210 (93.2)		1836 (92.6)		144	
Missing	42		339			

*Unweighted frequencies, weighted percentages reported
**statistically significant p-value (alpha=0.05)
P-value[c]-chi square

Table 4. Multivariate logistic regression model examining the association between weapon carrying and suicide ideation.

	Unadjusted Model			Adjusted Model*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upper
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	1.73	1.49	2.00	1.61	1.16	2.24
	1.00			1.00		
Sex						
Male	0.46	0.40	0.52	0.63	0.52	0.76
Female	1.00			1.00		
Race/Ethnicity						
American Indian/Alaskan Native	1.27	0.75	2.15	0.62	0.29	1.33
Asian	1.04	0.73	1.47	1.18	0.55	2.55
Black or African American	0.82	0.65	1.04	0.67	0.42	1.05
Native Hawaiian/Other Pacific Islander	1.21	0.50	2.96	1.14	0.88	4.47
Hispanic Latino	0.91	0.73	1.13	0.75	0.59	0.95
Multiple- Hispanic	1.29	1.06	1.58	0.97	0.72	1.30
Multiple- Non-Hispanic	1.74	1.22	2.49	1.39	0.88	2.21
White- Non-Hispanic	1.00			1.00		
Interpersonal Violence						
Unsafe feelings?	3.83	2.97	4.93	1.13	0.80	1.61
	1.00			1.00		
Physical Fight?	2.14	1.86	2.47	1.31	1.02	1.68
	1.00			1.00		
Forced sexual intercourse?	4.79	4.00	5.73	2.18	1.68	2.84
	1.00			1.00		
Physical dating violence?	4.22	3.39	5.27	2.01	1.49	2.87
	1.00			1.00		
Alcohol use						
Had alcohol one or more days in past 30 days	2.32	2.01	2.67	1.34	1.11	1.62
	1.00			1.00		
Drug use						
Used marijuana, cocaine, heroin, or ecstasy in lifetime	3.25	2.63	4.01	1.33	0.95	1.84
	1.00			1.00		
Sad and Hopeless Feelings						
Felt so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities in past 12 months	13.57	11.26	16.35	10.44	7.93	13.75
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

Table 5. Multivariate logistic regression model examining the association between weapon carrying and suicide planning.

	Unadjusted Model			Adjusted Model*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upper
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	1.83	1.55	2.16	1.77	1.23	2.55
	1.00			1.00		
Sex						
Male	0.45	0.40	0.52	0.57	0.44	0.73
Female	1.00			1.00		
Race/Ethnicity						
American Indian/Alaskan Native	1.31	0.87	1.97	0.76	0.41	1.44
Asian	0.99	0.58	1.69	1.40	0.67	2.83
Black or African American	0.99	0.72	1.35	0.96	0.63	1.46
Native Hawaiian/Other Pacific Islander	1.12	0.46	2.76	0.46	0.08	2.79
Hispanic Latino	0.94	0.73	1.21	0.96	0.72	1.29
Multiple- Hispanic	1.35	1.08	1.67	1.09	0.79	1.50
Multiple- Non-Hispanic	1.52	1.10	2.49	1.04	0.68	1.59
White- Non-Hispanic	1.00			1.00		
Interpersonal Violence						
Unsafe feelings?	3.24	2.46	4.27	1.14	0.87	1.51
	1.00			1.00		
Physical Fight?	2.13	1.87	2.42	1.27	1.01	1.60
	1.00			1.00		
Forced sexual intercourse?	5.23	4.18	5.73	2.33	1.77	3.07
	1.00			1.00		
Physical dating violence?	3.80	3.04	4.73	1.59	1.20	2.10
	1.00			1.00		
Alcohol use						
Had alcohol one or more days in past 30 days	2.24	1.98	2.54	1.38	1.15	1.66
	1.00			1.00		
Drug use						
Used marijuana, cocaine, heroin, or ecstasy in lifetime	3.17	2.49	4.04	1.24	0.85	1.79
	1.00			1.00		
Sad and Hopeless Feelings						
Felt so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities in past 12 months	11.14	8.97	13.82	7.12	5.47	9.27
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

Table 6. Multivariate logistic regression model examining the association between weapon carrying and suicide attempt.

	Unadjusted Model			Adjusted Model*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upp
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	1.91	1.37	2.67	1.51	1.08	2.10
	1.00			1.00		
Sex						
Male	0.45	0.35	0.57	0.55	0.40	0.76
Female	1.00			1.00		
Race/Ethnicity						
American Indian/Alaskan Native	2.42	1.35	4.34	1.44	0.51	4.07
Asian	1.16	0.72	1.87	1.84	0.98	3.43
Black or African American	1.35	0.93	1.95	1.17	0.64	2.13
Native Hawaiian/Other Pacific Islander	1.11	0.33	3.72	1.44	0.11	19.1
Hispanic Latino	1.53	1.09	2.17	1.65	1.16	2.35
Multiple- Hispanic	1.94	1.37	2.73	1.54	0.96	2.47
Multiple- Non-Hispanic	2.46	1.65	3.67	2.81	1.61	4.92
White- Non-Hispanic	1.00			1.00		
Interpersonal Violence						
Unsafe feelings?	5.07	3.92	6.55	1.80	1.27	2.56
	1.00			1.00		
Physical Fight?	3.55	2.89	4.36	2.06	1.69	2.63
	1.00			1.00		
Forced sexual intercourse?	6.60	5.27	8.26	1.81	1.39	2.36
	1.00			1.00		
Physical dating violence?	5.60	4.12	7.62	2.66	1.77	3.99
	1.00			1.00		
Alcohol use						
Had alcohol one or more days in past 30 days	2.94	2.40	3.60	1.34	1.08	1.65
	1.00			1.00		
Drug use						
Used marijuana, cocaine, heroin, or ecstasy in lifetime	4.56	3.29	6.32	1.12	0.67	1.86
	1.00			1.00		
Sad and Hopeless Feelings						
Felt so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities in past 12 months	11.79	9.03	15.40	8.71	5.93	12.8
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

Table 7. Multivariate logistic regression model examining the association between weapon carrying and suicide ideation, stratified by sex

	Female*			Male*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upp
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	1.80	1.37	2.67	1.55	1.11	2.18
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

Table 8. Multivariate logistic regression model examining the association between weapon carrying and suicide planning, stratified by sex

	Female*			Male*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upp
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	2.28	1.40	3.73	1.49	1.00	2.22
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

Table 9. Multivariate logistic regression model examining the association between weapon carrying and suicide attempt, stratified by sex

	Female*			Male*		
	O.R.	95% C.I.		O.R.	95% C.I.	
Variable	Estimate	Lower	Upper	Estimate	Lower	Upp
Carried Weapon						
Carried a weapon such as a gun, knife, or club, during the past 30 days	2.71	1.52	3.41	0.95	0.53	1.67
	1.00			1.00		

O.R. - Odds Ratio
C.I. - Confidence Interval
*- Adjusted for sex, race/ethnicity, interpersonal violence exposures, alcohol use, drug use, sad and hopeless feelings

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