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The Relationship Between Mental Illness and Mass Shooting

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Walden University
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Abstract

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MD, American International School of Medicine, 2010

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Dissertation Submitted in Partial Fulfillment

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Abstract

Whenever a mass shooting occurs, it impacts the immediate families of the perpetrator, victims, and the whole nation: emotionally and financially. The research on the association between mental illness (MI) and mass shooting fatalities is limited. The purpose of this quantitative, cross-sectional study was to explore the association between MI and mass shooting using the archival data of the Stanford University database of mass shootings in America from 2000 to 2016. The theoretical framework was based on Bronfenbrenner's social-ecological theory and the cognitive-behavioral theory to explain socio-environmental factors that impact human growth and development. The results showed that the proportion of mass shooters with MI (42.1%) was significantly greater than the proportion of the general population with MI (18.9%), $Z = -1137.72$, $p < .0001$. Shooters with MI have caused a significantly higher number of fatalities than those without MI, $t\ (61.71) = 3.10$, $p < .01$. Conversely, among mass shooters, there is no association between MI and type of killing, $X^2\ (7) = 13.72$, $p = .056$. A chi-square analysis indicated that MI was not significantly related to the type of gun used in the shooting, $X^2\ (4) = 4.34$, $p = .36$. Lastly, study participants with MI evidenced a significantly higher number of fatalities relative to those without MI, $B = 2.05$, $SE = .86$, $\beta = .23$, $p < .05$. The study has implications for social change: the findings can guide policymakers to fund research (a) to identify associations between MI and mass shootings and (b) on the need for more legislation and/or gun accident prevention programs to decrease mass shootings.

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Dedication

This is dedicated to my dear husband Dr. Kingsley Chukwueke who has been very supportive in every way throughout this journey.

Acknowledgments

I want to thank my mother who took care of my family while I was busy with my studies, my father for his love and prayers, and my friends Esther Dialah and Gloria Ebirim for their love and friendship. Also, to my wonderful children Chidinma, Nneoma, Ngozi, and Ugochi Chukwueke, who have been very understanding and supportive. I love you. I want to thank my former chair Dr. Cain, my current chair Dr. Rea, committee member Dr. Kyulo, Dr. William O'Bannon (statistician), and the university research reviewer, Dr. Albert Terrillion.

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Chapter 1: Introduction to the Study

Introduction

A mass shooting, for this study, is defined as a shooting incident that results in three or more victims (not necessarily fatalities) and not including the shooter; it must not be gang, drug, or organized crime-related (Stanford Geospatial Center, 2016). The Federal Bureau of Investigation (FBI) defined it as "a multiple homicide incident in which four or more victims are murdered with firearms—not including the offender(s)—within one event, and in one or more locations relatively near one another" (Krouse, 2015).

Whenever a mass shooting occurs, its traumatic effect on the people caught in the violence—as well as their friends, families, neighbors, and the nation—is enormous. Mass shooting in the United States was described by Knoll & Annas (2016); Burgess (2006) and Balgaman (2013) as a rare phenomenon; however, Hoyer and Heath (2013) reported that a mass shooting happens once every two weeks in the United States. On October 1, 2017, the United States saw its deadliest mass shooting. It was committed by a 64-year old gunman in Las Vegas and killed 58 people and wounded or injured 869; on June 13, 2016, a lone gunman shot and killed 50 people and wounded 53 at a gay nightclub in Orlando, Florida (Alvarez & Pérez-Peña, 2016).

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM–5;* American Psychiatric Association [APA], 2013) defined mental illness as a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion, regulation or behavior that reflects a dysfunction in the psychological, biological or

developmental processes underlying mental functioning. The National Institute of Mental Health (NIMH; 2017) categorized mental health into two broad headings: any mental illness and serious mental illness. According to the NIMH, "any mental illness" (AMI) is

> A mental, behavioral or emotional disorder which can vary in how it affects the individual, ranging from no impairment to, mild, moderate, and severe impairment while serious mental illness (SMI) is defined as a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities. (NIMH, 2017)

For this study, the NIMH definition of mental illness was used because a *DSM–5* diagnosis and the full behavioral health records of the participants were not available. The broad definition of mental illness is intended to capture any report of mental illness. People may not be able to accurately report the type of mental illness of their friends or family members, but they can see that a person is deranged.

According to the NIMH (2017), one in six adults in the United States lives with mental illness (44.7 million with AMI in 2016), but only 19.2 million (43.1%) received mental health treatment in 2016. According to the National Alliance on Mental Illness (NAMI; 2011), funding for mental health has been inadequate and funding cuts have been described as a national crisis. Compared to 2017, the 2018 budget included more funding cuts ($600M reduction in funding for the Substance Abuse and Mental Health Services Administration (SAMHSA), that will adversely impact mental health services

and exacerbate the problem (Howard, 2018). The main purpose of SAMHSA is to lead public health efforts that advance the behavioral health of the nation.

Upon review of funding for mental health, the Cumming Institute (n.d.) found a correlation between higher violent crime rates from 2005 to 2010 in states that cut down on their psychiatric hospital beds and found that states that had decreased funding for public hospitals had higher arrest-related deaths. On the other hand, increased access to mental health care has been shown to reduce firearm violence and suicide (Holliday, 2018).

Researchers have attempted to probe the minds of mass shooters to see if there are commonalities that can point to a predisposition to violence. Some characteristics discussed include substance use (Elbogen & Johnson, 2009; Witt, van Don, & Fazel, 2013), early childhood trauma, and other environmental factors (Hong, Cho, Allen-Meares, & Espelage, 2010). However, different reactions of individuals to the same situation can be explored using Bronfenbrenner's socio-ecological theory (1979) and cognitive-behavioral theory (Beck & Pretzer, 2005).

When a mass shooting occurs, the media focus more on people with mental illness and gun control (Duwe, 2013; Florida Intelligence Fusion Center study, 2013; Metzi & Macleish, 2015) as opposed to other possible motives (e.g. hate crimes). It is unclear whether the restriction of guns for people with mental illness will solve most of the problem or if other important factors are being overlooked. The public expects the U.S. government to develop a policy that focuses on the primary prevention of these acts. It may be challenging to come up with a single plan to eradicate mass shootings, but the

results of previous studies highlight some measures that can curtail them. An example of primary prevention on a population level may be to set a system in place to curtail gun acquisition such as universal background checks and banning assault rifles. For this study, I explored available data to look for a trend or relationship between mass shooting and people with mental illness. If a correlation exists, then the preponderance of evidence can be used to effect a policy change on gun violence prevention and increased health care and social services access for people with mental illnesses.

Problem Statement

The total annual cost of gun violence according to Mother Jones (Lee & Lurie, 2018) is $229 billion. According to Grinshteyn and Hemenway (2016), the gun homicide rate in the United States is 25.2 times higher than other high-income economies and the rate of firearm suicide is eight times higher in the U.S.A compared to other high-income countries (Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and United Kingdom [England and Wales, Northern Ireland, Scotland] These high-income countries (as defined by the World Bank) belong to the Organization for Economic Co-Operation and Development (OECD, 2010). In another study, Hemenway (2006) found that there are more guns and fewer gun laws in the U.S. than other developed nations.

Each time a mass shooting occurs, discussion follows about gun control and people with mental illnesses, who are often considered the perpetrators. About one in five

U.S. adults are reported to live with a mental illness (46.6 million in 2017; NIMH, 2017), and according to the 2004 U.S. census, 26% (57.7 million) of people, age 18 and older, suffer from a diagnosable mental disorder yearly (Insel, 2013). In 2009-2010, violence with firearms accounted for 22,571 firearm homicides and 38,126 firearm suicides in the United States (Kegler, 2013), and the majority of the violence was among persons aged 10–19 years (Centers for Disease Control and Prevention [CDC], 2013). However, from 2015 -2016, that number increased to 27,394 for firearm homicides among persons aged 10-19 years while firearm suicides totaled 44, 995 in the same age group. This is a major public health problem. (Kegler, Dahlberg & Mercy (2018)

The 15th leading cause of death (all ages) during 2009–2010 in the United States was homicide and the second leading cause of death for people 10–19 years of age (CDC, 2013). Of these, firearms were the cause of death in 68% of cases and among 83% of youth (Parks, Johnson, McDaniel, & Gladden, 2014). On the other hand, Stone, Simon & Fowler (2018) reported that suicide is the 10th leading cause of death in the U.S.A., which has increased in every state since 1999–2016; of people who died by suicide 54% had no known mental health condition.

Some shootings that captured headlines include that of Congresswoman Gabby Gifford, who was shot in the head in Tucson, Arizona; many others were wounded (Lacey & David, 2011). Others include the Sandy Hook Elementary shootings with 28 fatalities, most of whom were children (Vogel, Horowitz & Fahrenthold, 2012); the Virginia Tech shooting, where 32 students and teachers in the school were killed [History.com Editors, 2011 the Aurora, Colorado Movie Theater shooting, which resulted

in 12 fatalities (Frosch & Johnson, 2012); and the Oregon shooting, in October 2015, a gunman went on a shooting rampage that killed his professor and nine other students reportedly singling out those who stood up as Christians before the gunman was shot and killed. Each time, the public and government leaders revisited the gun control debate, with most people blaming massive gun violence on people with mental disorders (Duwe, 2013; Florida Intelligence Fusion Center study, 2013).

Many gray areas exist about the relationship between mental illness and gun violence, and more research is needed (Hong et al., 2010; Shultz, Cohen, Muschert, & Flores de Apodaca, 2013; Witt, Hawton, & Fazel, 2014). Some unanswered questions include whether a relationship exists between mental illness and the prevalence of mass shooting; and (a) the number of victims killed in a mass shooting, (b) the type of killing (killed by a stranger or a family member), (c)type of gun used in the shooting (gun type), and (d) race/ethnicity of the shooters. This study sought to answer them.

Purpose

The purpose of this study was to use the available data, in this case, the Stanford University database of mass shootings in the United States from 2006 to 2016, to quantitatively determine whether there is any relationship between mental illness and mass shooting, the number of victims killed, and type of guns used among mass shooters.

Research Questions and Hypothesis

RQ1: Is there a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population?

Hypothesis 1 (Alternate): There is a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

Null Hypothesis: There is not a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

RQ 2: Is there a difference in the number of victims killed by mass shooters with mental illness versus those without mental illness?

Hypothesis 2 (Alternate): There is a difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

Null Hypothesis: There is no difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

RQ3: Among mass shooters, is there a relationship between mental illness and type of killing?

Hypothesis 3 (Alternate): There is a difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

Null Hypothesis: There is no difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

RQ4: Among mass shooters, is there a difference in the type of gun used by those with mental illness versus without mental illness?

Hypothesis 4 (Alternate): There is a difference in the type of gun used among mass shooters with mental illness versus those without a mental illness.

Null Hypothesis: There is no difference in the type of gun used among mass shooters with mental illnesses versus those without a mental illness.

Theoretical Framework for the Study

In this section, I discuss the cognitive behavioral theory and the Bronfenbrenner's social ecological theory. The theory used to make sense of what may drive a mass shooter to engage in the act of violence is cognitive-behavioral theory. According to the cognitive-behavioral theorist, Aaron Beck, talking about the "cognitive perspective of hate and violence" (Beck & Pretzer, 2005), thoughts affect emotions; and how a person feels, in turn, affects his or her behavior (Beck & Pretzer, 2005; Ellis, 2004). According to Beck and Pretzer (2005), the wrong thoughts are considered cognitive distortions that influence one's interpretation of life events, emotions, and behavioral responses. They went on to say that people with negative automatic thoughts, such as failure, rejection, and loss, resort to sadness and tend to give up easily. Conversely, people who have a positive outlook on life including thoughts of gain, achievement, and feelings of approval by others tend to feel pleasure and never give up. Furthermore, when someone thinks she has been wronged or mistreated, she tends to hold on to that ill-feeling; the urge to retaliate is evident in the "anger-prone" individuals who exaggerate the gravity of noxious events (Beck & Pretzer, 2005).

An individual's early life experiences help form his or her core beliefs and the way she or he looks at and understands the world (Beck & Pretzer, 2005). Bad experiences such as physical or emotional trauma, sexual abuse, bullying, and dysfunctional families, can lead to negative views of self, the world, and the future (Whealin, Reuzek, & Southwick, 2008). A negative, maladaptive way of thinking might drive a person to believe that everyone hates him, he is no good, or that he is never going to amount to anything. These negative feelings may, in turn, lead a person to resort to the less adaptive behavior of wanting to harm the people he believes have hurt him. Mass shooters who have negative feelings toward a race, religion, or sexual orientation; who experience family feuds; or who felt rejected and been bullied by peers; come back with so much animosity that they want any person tied to the stressor dead.

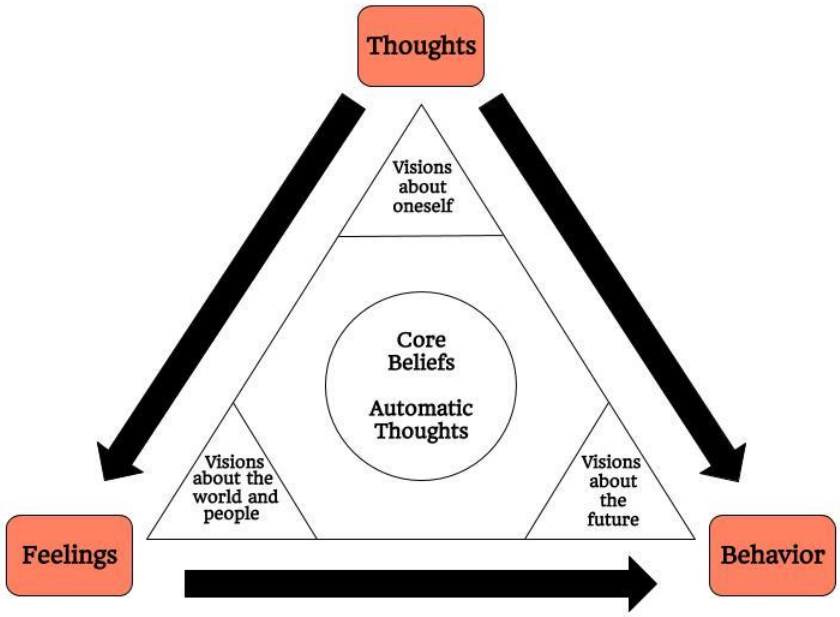

Figure 1. The cognitive triad.

The theoretical underpinning for this study was the social-ecological systems theory developed by Russian American psychologist, Urie Bronfenbrenner, in 1979. It delves into five levels of systems in a person's environment that affect the development of that individual, who they become, and how they act. Bronfenbrenner opined that a child's development is not only affected by their immediate environment, but by other things in the vicinity, such as the culture and government (Bronfenbrenner's Mesosystem: Definition & Examples, 2015) These five levels are microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Researchers have used this theory to explore the role of sociodemographic factors in people with violent behaviors, like mass

shootings. I used this theory to explore the risk factors associated with mass shooting types of violence and the factors that affect human growth and development, such as family, school, and community. Bronfenbrenner (1979) hypothesized that genetic potentials for effective psychological functioning are actualized through proximal processes (environmental interaction), and if these proximal processes are weak, the genetic potential fails to actualize and vice versa.

Hong et al. (2010) examined the Columbine school shooting through the lens of Bronfenbrenner's (1979) social-ecological theory. They focused on identifying associated risk factors in the Columbine school shooting using the ecological systems theory. The two adolescent white male high school students resorted to violence to repay the people whom they perceived as ridiculing them and killed 12 students and a teacher before killing themselves, a homicide suicide mission. The risk factors are categorized into five levels. In this way, Hong et al. use Bronfenbrenner's social-ecological theory (1979) as a model to explain the factors that affect an individual, and subsequently, the family. Bronfenbrenner (1979) places the individual at the core, which comprises of that individual's age, sex, and health, all of which play a role in human development. The individual is in contact with the microsystem, which includes the family, church group, place of work (in the case of an adult), neighborhood play area, peers, and health services. These interactions help to shape the individual.

In order to understand the Bronfenbrenner's theory, definitions of the five levels of systems which include of the microsystem, mesosystem, exosystem, macrosystem and chronosystem, are helpful:

The first and most proximal to the child is the microsystem. It consists of family, school, church group, peers, neighborhood play area and health services. In the mesosystem, there are interactions between two or more settings of the microsystems, for example, family and school for a child, family, and church group for an adult and the support system of the individual. Since the systems are interconnected, a break or conflict in one will impact the others.

The exosystem entails the link between two or more settings, one's immediate environment (e.g., home), which is the comfort zone, and the external environment of which the person has no control over, but which indirectly impacts what happens in the home (Bronfenbrenner, 1981). For example, a parent's job may affect whether the parent can attend a child's game at school or attend Sunday school. The exosystem includes mass media, social welfare services, legal services, neighbors, friends and family, and their interactions.

The macrosystem looks at the larger socio-cultural context, such as values or norms in a culture and how they impact the individual.

The chronosystem is the fifth layer and it addresses the socio-historical context; that is, the conditions and times when events occur in one's life and how they impact the individual.

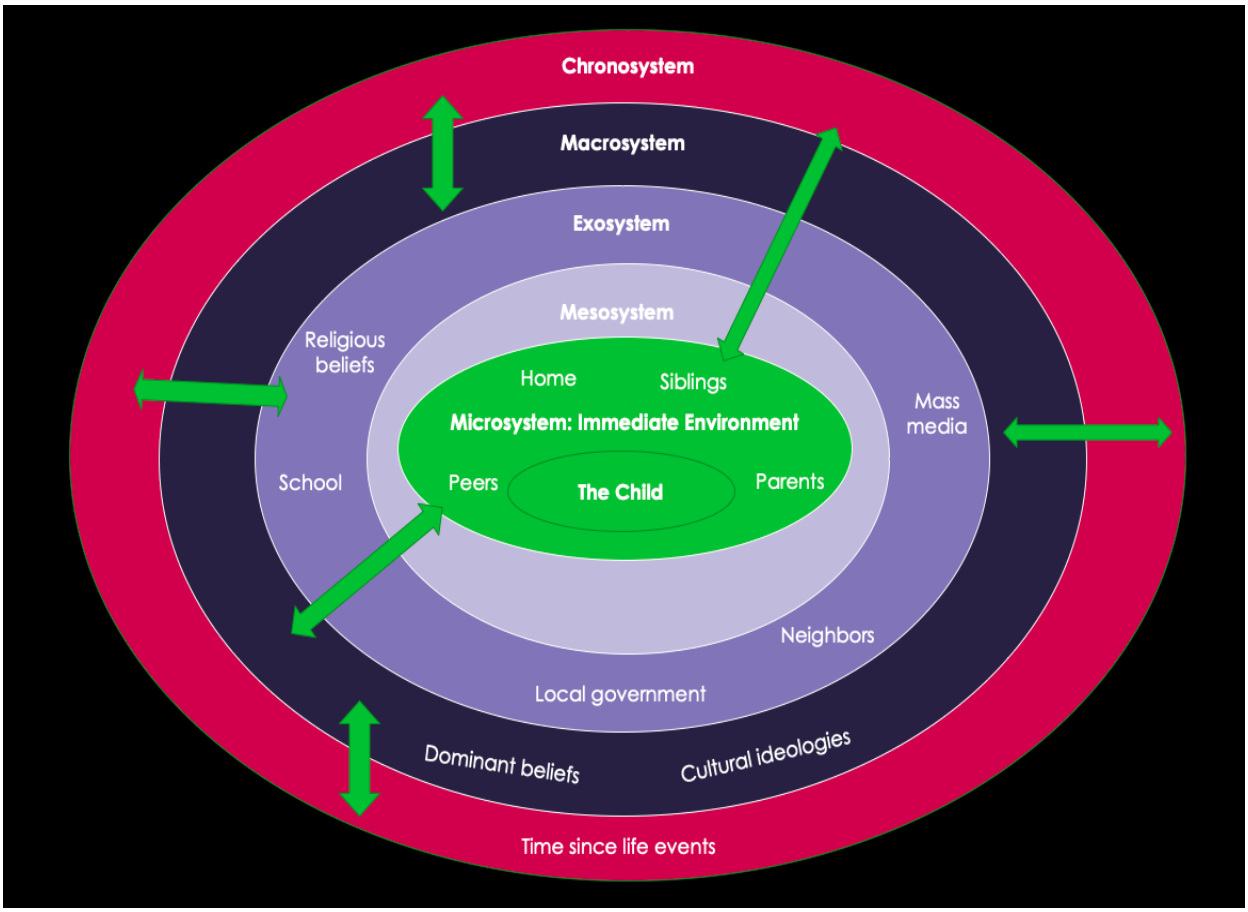

Figure 2. Depiction of Bronfenbrenner's five levels of systems.

Nature of the Study

This study was completed using the quantitative method because of the nature of the phenomena being studied; it was not possible to do a cohort study or a case-control study, in which there is a control group and an experimental group or a study in which people with the propensity toward violence are followed to see if they will engage in a mass shooting. The secondary data are appropriate for this study because most of the mass shooters either end up dead by homicide suicide or they are killed by the authorities in a shoot-out making it impossible to interview the shooter. As Frankfort-Nachmias and

Nachmias (2008) put it, conceptual-substantive factors is one of the reasons why researchers use secondary data because it be the only available source of data to answer the research question of interest, and it enables one to search a broader range with lower cost. Using secondary data also allows for replication of the study if the data are reliable.

The primary data for this study were from the Stanford University database of mass shootings in America from 2000 to 2016. A subset was used for the statistical analysis. The population consisted of all mass shooters from 2000 to 2016 *(n* = 114). Regarding statistical power, the G*power software (Faul, Erdfelder, Buchner, & Lang, (2009) indicated that a chi-square, with a maximum of 3 degrees of freedom and probability set at .05, would detect a medium-size effect (*V/phi* = .30) using 100 study participants. Thus, the current sample of 114 cases provided sufficient power for this analysis.

To address Hypothesis 1 / Research Question 1, a 2-sample z-test was used to compare differences in the proportion of mental illness among mass shooters versus the proportion of mental illness in the general population.

For Hypothesis 2, an independent samples *t* test was used to examine Research Question 2, comparing the difference in numbers of victims killed by mass shooters with mental illness versus those without mental illness.

Hypothesis 3: A chi-square analysis was used to answer Research Question 3 on the relationship between mental illness and the type of killing.

Hypothesis 4: A chi-square analysis was used to answer Research Question 4 on the relationship between the type of gun used by those with mental illness versus without mental illness.

Definitions

Mass shooting: The definition used by the Stanford database is a mass shooting incident that results in three or more victims (not necessarily fatalities) and not including the shooter and must not be gang, drug or organized crime-related (Stanford Geospatial Center, 2016). It was classified into types like family killing, public or stranger killing, hate crime and terrorism.

Mental illness: The National Institute of Mental Health (NIMH) categorized mental illness into two broad headings, (a) any Mental Illness (AMI) and (b) Serious Mental illness. Any mental illness was defined as "mental, behavioral or emotional disorder which can vary in how it affects the individual ranging from no impairment to, mild, moderate, and severe impairment.” While serious mental illness is defined as "a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities." These are the people who are on disability due to mental illness (NIMH, 2017). This study will use the NIMH definition of AMI.

Assumptions

The assumptions of this study are as follows:

That the data was collected discretely and maintained good research integrity. Stanford Geospatial database was chosen amongst other mass shooting databases for that reason. The sample is representative of the population in that it included mass shootings and shooters from all over the U. S. A. It is my belief that the study can be replicated and the results generalizable.

Scope and Delimitations

The framework of this study focused on mass murders in America that stemmed from shooting. There are other aspects of mass murders such as by arson, and stabbing, to name a few. However, mass shooting was chosen to study violence related to firearms and to focus on a scope that is feasible given the time frame and financial constraints.

Secondly, I included mass shootings in America as opposed to a particular region or state so as to capture as many cases as possible so that the result can be generalizable.

Limitations

The Stanford MSA is an aggregation of a curated set of spatial and temporal data about mass shootings in America, taken from online media sources and maintained with the help of student assistants, interns, or temporary staff (The Geospatial Center, 2016. It is important to review the results of this data with these limitations in mind. In general, limitations are inherent with secondary data; for example, I could not obtain the exact data desired to answer the research questions and instead had to make do with the information that prior researchers had collected (Frankfort-Nachmias & Nachmias, 2008). Equally important to consider is that mental illness is not reportable by law and

has historically been tracked by secondary sources, which have some limitations (Ewalt (1960).

For this study, the sample was adequately selected and large enough, and the result is generalizable. The ages of the mass shooters were not available, making it impossible to run a statistical analysis that would have shown that demographic in the descriptive analysis. According to Szklo and Nieto (2014), selection bias is a systematic error and may distort the measure of association between the variables being studied, and it can lead to a threat to internal validity; it may be minimized by randomization (Creswell, 2009).

The data were a convenience sample that had already been collected and could constitute a form of selection bias.

Significance

Many innocent lives have been lost from mass shootings in the United States: 547 from 1983 to 2012 (Bjelopera et al., 2013). However, in 2017, one of the deadliest mass shootings in the U.S.A happened in Las Vegas, Nevada where a lone gun man killed 58 people and 546 injured; subsequently killing himself (statistica.com, 2020). According to sttistica.com (2020), since 2015, the country has recorded one of the worst mass shootings in the U.S.A. Determining if a relationship exists between mental illness and mass shooting will help law and policymakers to strategize about how to reduce the occurrence of these violent acts, given the financial burden of $214 billion per year stemming from the cost of gun violence. Changing policy will bring about positive social

change; lives will be saved by channeling gun violence prevention efforts to most needed areas.

Summary

This dissertation on mass shootings in the United States sought to explore whether any relationship exists between mental illness and mass shootings based on an analysis of archival data of mass shootings in America from 2000 to 2016.

In this chapter, I discussed the relevance of the problem of mass shooting in the U. S. A. and the gap in the literature identified. I have reviewed the theoretical foundation, an attempt to understand some of the possible predisposing factors for violence in an individual. I discussed the nature of the study and gave definitions of the main variables being studied, the assumptions of the study, the scope and delimitations, limitations, significance of the study and implications for social change. If the result shows that people with mental illness are overrepresented in mass shootings, or are more or less likely to go on a shooting rampage and kill family members or strangers compared to the mass shooters who do not have a mental illness, that result will guide the establishment of new policies or the modification of old ones geared towards mitigation of gun violence in that population. The scope of the study will not allow an examination of various gun laws and their impact on the incidence of mass shootings; however, previous studies, as shown in the literature, will be reviewed. Based on the results of the study, I will recommend policy changes or measures to curtail mass shootings and gun violence.

In Chapter 2, I present the findings of reviewed literature on what is known and where there still remains a gap in understanding the relationship between mental illness and mass shooting. Chapter 2 provides information about the theoretical framework. Chapter 3 describes the research methodology used to conduct the study. In Chapter 4, I present the study findings. Finally, in Chapter 5, I discuss the results of the study, the implications for positive social change, and recommendations for future research and action.

Chapter 2: Literature Review

Introduction

This chapter will show information obtained from the review of literature and the literature review strategy; a synopsis of the literature on what is known about mass shooting and mental illness. I will also explain the application of the theoretical framework used. Mass shooting has continued to be a problem in our society with no clear remedy at this time. Whenever a mass shooting incident occurs, there is renewed talks by the public about people with mental illness, gun violence and gun laws. Mass shooting has cost loss of many lives in the U.S.A and financial loss. It is of utmost importance to tackle the menace of violent and sudden death that results from mass shooting. It affects young and old, black and white, anyone can find themselves in the line of fire. The importance of this matter leaves little wonder why in the recent presidential campaigns, the presidential hopefuls espouse their plans on how to curb mass shooting.

Problem Statement

The total annual cost of gun violence per Mother Jones (Lee & Lurie (2018) is USD 229 billion. According to Grinshteyn & Hemenway (2016), the gun homicide rate in the United States of America is 25.2 times more than other high income economies and the rate of firearm suicide is eight times higher in the US compared to other high income countries such as (Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Spain,

Sweden, Switzerland and United Kingdom [England and Wales, Northern Ireland, Scotland]. These high-income countries (as defined by the World Bank) belong to the Organization for Economic Co-Operation and Development (OECD, 2010). In another study, Hemenway (2006) found that there are more guns and less gun laws in the U.S than other developed nations firearm. Each time an incident of mass shooting occurs, discussion about gun control, and people with mental illnesses who are often considered the perpetrators ensues. About one in five U.S. adults are reported to live with a mental illness (46.6 million in 2017; NIMH, 2017) and from the 2004 U.S. census, 26% (57.7 million) of people age 18 and older suffer from a diagnosable mental disorder yearly (Insel, 2013). Violence with firearms, which remains a public health problem, accounts for 22,571 firearm homicides and 38,126 firearm suicides in the United States, and the majority was among persons aged 10–19 years (Centers for Disease Control and Prevention [CDC], 2013,).

The 15th leading cause of death (all ages) during 2009–2010 in the United States is homicide, and the second leading cause of death for people between 10–19 years of age (CDC, 2013). Of these, firearms were the cause of death in 68% of cases, and in 83% of youths (Parks, Johnson, McDaniel, & Gladden, 2014). Also, according to Stone, Simon & Fowler (2018, June), suicide is the 10th leading cause of death in the USA which has increased in every state since 1999-2016; and 54% of people who died by suicide did not have any known mental health condition.

Some shootings that captured headlines have been discussed in Chapter 1.

Many gray areas exist about the relationship between mental illness and gun violence, and more research is needed (Hong et al., 2010; Shultz, Cohen, Muschert, & Flores de Apodaca, 2013; Witt, Hawton, & Fazel, 2014). Some unanswered questions include whether a relationship exists between mental illness and the prevalence of mass shooting; and (a) the number of victims killed in a mass shooting; (b) the type of killing (killed by a stranger or a family member); (c)type of gun used in the shooting (gun type) and; (d) race/ethnicity of the shooters. This study sought to answer them.

Purpose

The purpose of this study was to use the available data, in this case, the Stanford University database of mass shootings in the United States from 2006 to 2016 to quantitatively determine whether there is any relationship between mental illness and mass shooting, the number of victims killed, and type of guns used among mass shooters. with mental illness versus those without. The goal is to use the results of this study to effect a policy change that pertains to mass shootings in America.

Literature Search Strategy

To identify prospective, peer-reviewed articles (as well as books and grey literature), the following databases were searched for the years 2005 – 2018 using the following keywords. . : Mental illness, schizophrenia, bipolar disorder, depression, mass shooting, mass gun violence, mass homicide, mass murder, and psychiatric history. I used the Boolean operators AND and OR to optimize the results. Abstracts were used to judge an article's relevancy to the research. I also Included availability of full text in the filters.

1. Stanford University Mass Shootings in America (MSA)
2. Walden University multiple databases: Thoreau
3. Columbia University Medical Center Library
4. Google Scholar
5. American Academy of Psychiatry and Law: AAPL.org
6. USA Today database of Mass Shooting
7. Motherjones.com database A guide to Mass Shootings in America
8. FBI data
9. Sage Knowledge
10. Everytown for Gun Safety database

Key Search Terms: Mental illness, schizophrenia, bipolar disorder, depression, mass shooting, mass gun violence, mass homicide, mass murder, and psychiatric history.

Scope of Literature Review

I reviewed peer-reviewed journal articles from 2005 to 2018 and found a scarcity of randomized studies addressing mass shooting in relationship to mental illness. The studies included in the review pertained to factors regarding understanding the mindset of the shooter, the identifiable risk factors and some commonalities amongst and the role of gun laws and access to gun in mass shooting. Some explored policy issues.

Theoretical Foundation

The theory underpinning for this study was Bronfenbrenner's (1979) social-ecological theory. Bronfenbrenner is a Russian-American psychologist who hypothesized that five levels of systems exist in a person's environment that affect human

growth and development. These five levels are microsystem, mesosystem, exosystem, macrosystem, and chronosystem. I used this theory to explore the risk factors associated with mass shooting types of violence and the factors that affect human growth and development, such as family, school, and community. Bronfenbrenner hypothesized that genetic potentials for effective psychological functioning are actualized through proximal processes (environmental interaction), and if these are weak, the genetic potential fails to actualize and vice versa.

Hong et al. (2010) examined the Columbine school shooting in the context of Bronfenbrenner's (1979) social-ecological theory. Through this case study, I focused on identifying associated risk factors and correlating factors in the Columbine school shooting type of violence using the ecological systems theory and the identified risk factors for violence for the two school shooters. The risk factors are categorized into five levels, known as the exo-, meso-, chrono-, macro-, and microsystems.

Hogel et al (2010) uses Bronfenbrenner's social-ecological theory (Bronfenbrenner, 1979) as a model to explain the factors that affect an individual, and subsequently, the family. Bronfenbrenner places the individual at the core; the individual's age, sex, and health play a role in human development. The individual is in contact with the microsystem, which includes the family, church group, place of work (in the case of an adult), neighborhood play area, peers, and health services. These interactions help to shape the individual.

In order to understand the Bronfenbrenner's theory, definitions of the five levels of mesosystem, exosystem, macrosystem, chronosystem, and microsystem are helpful: The first and most proximal to the child is the microsystem. It consists of family, school, church group, peers, neighborhood play area and health services. In the mesosystem, there are interactions between two or more settings of the microsystems, for example, family and school for a child, family, and church group for an adult and the support system of the individual. Since the systems are interconnected, a break or conflict in one will impact the others.

The exosystem entails the link between two or more settings, one's immediate environment (e.g., home), which is the comfort zone, and the external environment of which the person has no control over, but which indirectly impacts what happens in the home (Bronfenbrenner, 1981). For example, a parent's job may affect whether the parent can attend a child's game at school or attend Sunday school. The exosystem includes mass media, social welfare services, legal services, neighbors, friends and family, and their interactions.

The macrosystem looks at the larger socio-cultural context, such as values or norms in a culture and how they impact the individual.

The chronosystem is the fifth layer and it addresses the socio-historical context, that is, the conditions and times when events occur in one's life and how they impact the individual.

Literature Related to Key Variables and/or Concepts

Mass shootings are horrendous acts of violence that occur once every two weeks on the average leading to the senseless loss of many lives (Overberg et al., 2013). Rocque (2012) revealed that rampage shootings increased in the 1900s and 2000s but are still a rare phenomenon. Violence with firearms accounts for 22,571 firearm homicides and 38,126 firearm suicides in the US, and most of the cases were among persons aged 10-19 years (CDC, 2013).

Homicide was ranked the 15th leading cause of death (all ages) during 2009–2010; the second leading cause of death for people between 10–19 years (CDC, 2013). Suicide is the 10th leading cause of death in the United States for all ages, with over 47,000 lives lost (CDC, 2014), but for people age 10 – 34 years it is the second leading cause of death, and 50% of the suicides are committed with firearms (NIMH, n.d.).

Homicide on the other hand is the 5th leading cause of death amongst people ages 10–14 and ages 34–44 (NIMH, n.d.), and it has increased among people ages 20–24 by 15% from 2014–2017, while suicide rates increased amongst the same age group by 36% from 2000 to 2017 (Curtin & Heron, 2019).

A recent statistic from the CDC by Curtin and Heron (2019) showed that:

- The suicide rate among persons aged 10–24 was stable from 2000 to 2007, and then increased 56% between 2007 (6.8 per 100,000) and 2017 (10.6). The pace of increase for suicide was greater from 2013 to 2017 (7% annually, on average) than from 2007 to 2013 (3% annually).

- After a stable period from 2000 to 2007, the homicide rate among persons aged 10–24 declined 23% from 2007 (9.0) to 2014 (6.7), and then increased 18% through 2017 (7.9).
- In 2000, the homicide rate for persons aged 10–24 (8.7) was higher than the suicide rate (7.2) and remained higher through 2009. From 2011 to 2017, the suicide rate was higher than the homicide rate (10.6 and 7.9, respectively, in 2017).

Every time there is a case of mass shooting, the discussion is rekindled about who to blame—whether the people with mental illness or the government for non-stringent gun laws?. People ask questions and try to understand why someone will go on a rampage of killing, but sometimes the questions can never be answered because either the shooters killed themselves or they were killed by the police. Given the nature of these killings and rarity of samples, it is not possible to do a randomized controlled study and that explains the scarcity of research materials on this issue. This is, therefore, a gap that needs to be filled, more research is needed to understand some of the risk factors to violence, if mental illness plays a great role, and how to prevent them if possible

The 2004 U.S census showed that 26% (57.7 million people) of Americans age 18 and older suffer from a diagnosable mental illness every year (Insel, 2013). Is it possible to extrapolate from this data that people with mental illness will account for most of the shooting in America? On reviewing the literature, there were many schools of thought as to why these shooters committed these crimes. Some of the factors were as follows:

To see if there is a link between mental illness and violence, Elbogen and Johnson (2009) used nationally representative longitudinal data to examine the risk factors that will predict violent behavior and the role these risks play in predicting the type of violence. When they used bivariate analysis, the results showed an increased incidence of violence amongst people with mental illness who have co-occurring substance use or dependence (Elbogen & Johnson, 2009; Witt, van Don, & Fazel, 2013), but using multivariate analysis revealed that mental illness alone did not predict future violence but its association with other factors such as abuse (Elbogen & Johnson, 2009; McGinty, Webster, Jarlenski, & Barry, 2014; Langman, 2009; Roque 2012), legal issues, social issues (Flynn et al., 2009), and victimization matters. However, Keers, Ullrich, DeStalvo and Coid (2014) had an inconclusive result in trying to establish the link between psychosis and violence.

Still on the issue of exploring relationships between schizophrenia and violence, Witt, Hawton, and Fazel (2014) did a randomized controlled trial (RCT) using data obtained from the clinical antipsychotic trials of intervention effectiveness (CATIE) trial which was done in four phases using 1460 adults with schizophrenia treated between 2001 and 2004 as a sample, and they investigated the longitudinal association between suicidality and violence. They controlled for confounders such as medication noncompliance, alcohol misuse, lifetime major depression, and anti-personality disorder. Their research questions were geared towards finding out if suicidal behaviors including suicidal ideations, threats, and attempts were significantly associated with increased risk of violence in individuals with schizophrenia. Their study found suicidal threats and

attempts were significantly associated with increased risk of violent behavior in males and females with schizophrenia, however, certain behaviors and threats may be independent risk factors for the violence seen in schizophrenia.

Another study conducted by Central Florida Intelligence Exchange (CFIX, 2013) analyzed 14 mass shooting cases that occurred between 2011 and 2013 and concluded that 79% of the shootings were committed by individuals with "continuous behavioral issues and mental illness," but this study used a very small sample as it did not include all mass shooting cases for those years and there was no explanation such as a random selection of the samples as to why all were not included.

Another area of consideration used to look at the link between mental illness and mass shooting was the characteristics of the shooters. Some of the common characteristics were physical and sexual abuse (Langman, 2009; McGinty Webster, Jarlenski, & Barry, 2014), psychosis, schizophrenia spectrum disorders, and psychopathic characteristics (narcissistic and sadistic; Langman, 2009). The characteristics of 10 shooters studied by Langman (2009) showed that the shooters were in three categories: those traumatized (3/10), the psychotic (5/10), and the psychopathic (2/10). They had similarities as well as differences, and other factors such as family structure, role models, and peer influence (socio-demographic) played a role in their lives before the shooting. Flynn et al. (2009) found that the age range of perpetrators was 18 to 88 years with a median of 41 years, mostly men (78%), the primary diagnosis was affective disorder (26%), personality disorder (32%), and anxiety disorders (16%), and the most common homicide tool used was a sharp instrument, while the method was suicide by hanging.

Hong, Cho, Allen- Meares and Espelage (2010) used Bronfenbrenner's ecological systems analysis to explore the factors associated with the Columbine school shooting type of violence and found multiple related factors (family, school, and community) affect the individual directly or indirectly.

Another possibility explored was violent offending among prisoners with psychosis after their release. Keers, Urllrich, Destalvo, and Coid (2014) found schizophrenia and delusional disorder were not significantly associated with a higher risk of re-offending after adjusting for confounders, however, people with untreated schizophrenia are more likely to experience persecutory delusions, and subsequently, violence, than those on continuous treatment. Also, trying to answer this question, Sussman and Kotze (2013), in their retrospective single-center descriptive study of nine perpetrators of homicide unsuccessful suicide (HUS) who were observed in their hospital found that median age was 27, and seven out of the nine were men. They analyzed sex, type of homicide, sociodemographic, psychiatric diagnosis, and any substance use as well as criminal records. Of those nine, one had a psychotic disorder not otherwise specified, four had no psychiatric diagnosis, and four had psychiatric diagnoses such as schizophrenia, major depressive disorder, and posttraumatic stress disorder (PTSD). Markowitz (2011), in his study, showed that mentally ill people are over-arrested and locked in city and county jails; 64% of inmates in jails and 56% of state prisoners have a history of mental illness and about one-third of homeless people meet the criteria for major mental illness and are more vulnerable to being victims of crimes.

Another factor considered by various studies was the media coverage of the mass shooting and its effects. McGinty, Webster, Jarlenski and Barry (2014) analyzed news media portrayal of association between severe mental illness and gun violence to see if the media coverage led to policies that restricted gun acquisition by people with mental illness. The study found that two weeks following the mass shooting, the media linked gun violence to people with severe mental illness and increased their coverage of gun restriction for this population. Also, Swanson, McGinty, Fazel and Mays (2014) found that media accounts of mass shootings give credence to the public perception of the dangerousness of people with mental illness. In the same token, Rocque (2012) found media coverage was excessive in school shootings, which increased public anxiety to a "moral panic."

Finally, the national context of firearm mortality was examined and the national data on firearms deaths that occurred in two decades (1990–2010) were analyzed by Schultz, Cohen, Muschert and Flores de Apocada (2013) It showed that among 34 of the most advanced economy nations of the world, the US has the highest rate of firearm homicides. Seventy percent of homicides were committed with firearms compared to 50% for suicides by firearm, while Flynn et al. (2009) reported that the most common method of homicide was a sharp instrument (23%) while hanging was the preferred method of suicide.

Baumann and Teasdale (2017) asserted that there is a link between firearm access and mental illness. Baumann and Teasdale (2017) used the MacArthur violence Risk Assessment Study on their study sample and conducted binomial logistic regression to

explore the relationship between access to firearm for psychiatric patients and their status on suicidality and violence. Using multivariate analysis, they found that access to firearms did not predispose these psychiatric patients to perpetration of violence OR = 0.588; 95% CI = 0.196- 1.764 but had an impact as a risk factor for suicide 23.5% (OR = 4.690; 95% CI = 1.147 – 19.172). In other words, the people with mental illness are more likely to focus on self-harm (suicidal) than violence.

Gozner (2015) ties the gruesome nature of the recent mass shootings to proliferation of guns in our society. According to Gozner (2015), a study by The children Safety Network reported that the cost of gun violence is $174 billion a year which includes mental health care, wage loss, pain and suffering amount to $645 every year for every gun in America. Gozner (2017) also stated that most of people with temporary or chronic mental illness are not violent though may contribute, but preventing them from owning a gun or improving care for people with mental illness will not solve the problem of gun violence. Proponents of gun control have suggested measures for reducing gun violence such as having background checks during gun shows before anyone can buy a gun, banning industrial assault weapons and high ammunition magazines, gun owners purchasing liability insurance, digital technologies such as thumbprints installed in guns to allow for easy tracing of bullets used (Gozner, 2015).

On the issue of reduced access to mental health care and firearm violence, Meszaros (2017), reported that mass shooting events increased significantly since the 1980s which he tied to higher ownership of firearms. Meszaros (2017) cited Markowitz 2006) who found that untreated mental illness contributed to violent crime. Friedman

2006 in Meszaros (2017) states that people with mental illness are two times more likely to commit violent acts in their lifetime.

Summary and Conclusions

So far some of the characteristic risk factors found across the board were chronic life strains (stressors), the interplay between the family dynamics, peer influences (Hong, Allen–Meares, & Espelange, 2010), traumatized individuals, be it sexual or physical abuse, domestic violence, bullying, and taunting or treatment noncompliance for some. A major risk factor for violence was the co-morbid substance use which tends to increase the risk of violence in people with mental illness. On the other spectrum are the "copycats" who want to outdo a previous shooter or the psychopathic shooter who yearns to inflict pain on others (Rocque, 2012).

Concerning mental illness and mass shooting, the research is yet to reach the desired level as evidenced by a lack of research data on the pertinent issue of mass shooting in America and the call for more research by the researchers of the studies reviewed. There are media hype and misinformation and misrepresentation concerning the dangerousness of people with mental illness. Also, there is a wide discrepancy as to the relatedness of mental illness and gun violence; For example, Appelbaum attributes violence by people with mental illness to be 3-5% (Johnson, 2012), and conversely, that 96% violent crimes are perpetrated by people who do not have a mental illness (Brauser, 2013). Also, the Institute of Medicine (2005) stated that of all the violent acts in the U.S.A., people with mental illness are only responsible for about 5% while a Central Florida Intelligence study gave it a warping 79%, though incomplete data was used.

Similarly, a study done by health and law enforcement experts as reported by Vestal (2019) found that people with serious mental illness were linked with less than 4% of all violent acts committed in the U.S.A.

A new study, collection of more data, and a larger sample will be required to obtain a more generalizable result (Hanlon, Coda, Cobia & Rubin, 2012), and an extensive way of review of each case whenever possible is the best way to understand the mental state of health of the perpetrators (Flynn et al., 2009). This study will attempt to fill the gap by using a larger sample and carefully reviewing the available data obtained from the databases of the mass shooting in America. The social change implication of the study includes helping to bridge the gap in understanding violence as it relates to people with mental illness, and guiding policymakers in appropriate allocation of funds to curb gun violence which has a great morbidity and mortality, cost and financial burden on our nation. Lawmakers should consider funding programs that will educate the public on safe gun ownership, such as a youth program—standing in the GAP (gun accident prevention), stricter gun control laws, and a background check before the acquisition of guns. Also recommended is possible psychological referral for people in custody battles to help defray animosity and urge for retaliation as well as gun restriction for people with a history of drug use and serious mental illness.

In Chapter 3 I discuss the research design and methodology which includes sampling and sampling procedures, operationalization of the variables, and the threats to validity and ethical procedures.

Chapter 3: Research Method

Introduction

Mass shootings used to be considered a rare phenomenon, but in the 21st century, the frequency has increased. According to Overberg et al., (2013), mass shooting happens once every 2 weeks and this increase has revived the debate about factors that contribute to them. I used the available data to explore whether any relationship exists between mental illness and mass shooting in the United States, to influence public policy on gun violence prevention. Australia enacted a gun reform in 1996 and a resultant cessation of mass shootings occurred from then until May 2016 (Chapman, Alpers, & Jones, 2016; Crescente, 2016).

The purpose of this study was to use the available data from the Stanford University database of mass shootings in the United States from 2006 to 2016 to quantitatively determine whether there is any relationship between mental illness and mass shooting, the number of victims killed, and type of guns used among mass shooters; with mental illness versus those without. The goal is to use the results of this study to effect a policy change that pertains to mass shootings in America.

Chapter 3 is about the research methodology used to answer the research questions and covers the following topics: (a) the study variables (independent and dependent variables), (b) the research design and how it is connected to the research questions, (c) population, (d) sampling method and procedures used, (e) inclusion and exclusion criteria, (f) sample size, (g) an explanation of participant selection, (h) data collection, (i) the procedure for gaining access to the archival data and how data will be

analyzed, (j) instrumentation and operationalization of constructs, (k) threats to validity, and (l) ethical considerations and procedures.

Research Design and Rationale

The research design for this study **is** the quantitative ex post facto analysis of secondary data consisting of mass shooters in America from 2000 to 2016. I selected this study design to explore whether any relationship exists between mental illness and mass shooters, the type of mental illness, and the type of mass shooting. Due to the nature of the mass shooting events, the unpredictability, and the traumatic experience for the people affected, it was not feasible to conduct a randomized controlled study. Most mass shooters either end up being killed or kill themselves. This factor makes it difficult to obtain some needed information about the shooters. Therefore, retrospective data that includes information about mass shootings and shooters are the most feasible way to answer the research questions.

The independent variables were mental illness or no mental illness and type of mental illness. The dependent variables were mass shooting (mass firearm homicide) and type of mass shooting (family killing, stranger or public killing, hate crime).

Sampling and Sampling Procedures

The population are people who committed acts of mass shooting in the United States from 2000 to 2016 available in the Stanford University MSA (2016). I selected this timeframe because it covers the period from when the researchers had more collection of the data and 2016 served as the cutoff point.. The sample included incidents with lone gun man, only mass killings that were shootings and excluded gang, crime, and drug

related shooting. The mass shooters with unknown history of mental illness were also excluded

The population consisted of all mass shooters from 2000 to 2016 (n = 114). In terms of statistical power for the independent-samples t test, the G*power software indicated that a medium-size effect (Cohen's d = .53) between the two means (2-tailed test) with power set at .80 and alpha set at .05, would require a sample size of 114 study participants

In terms of statistical power for the chi-square analysis, the G*power software indicated that a chi-square with a maximum of 7 degrees of freedom and probability set at .05 and power at .80, would detect a medium/large size effect (phi = .40) using 90 study participants (Faul, Erdfelder, Buchner & Lang, 2009).

The current sample size of 114 study participants that is representative of mass shooters in America, provided sufficient statistical power for the current analysis, which allows for generalizability and shows that there is an 80% chance that the result is significant.

Procedures for Recruitment, Participation, and Data Collection

The quantitative data for this study was secondary and collected by a team of researchers at the Geospatial Center of Stanford University (Stanford Geospatial Center, 2016). It includes the mass shootings in America from 2000 to 2016 where three or more people were, not necessarily killed, and not including the suspects in an event. The killing qualified if it occurred within a single location, but possibly multiple locations and in a single day. The motive appears to be indiscriminate and not identified as gang or drug-related by media.

For this study, I only selected incidents that involved shooting alone. The data were collected by the Stanford University Geospatial Center and I wrote a letter to them asking for permission to use their data for the current study and they granted it asking that they are cited.

As previously stated above, they had an initial intensive investigation using existing online reports as far back as 1966. Those earlier days had fewer cases because of poor media reporting, but as time went on, there was increased media reporting and a subsequent spike in incidents, which may not necessarily indicate the rate of mass shootings alone. The newer reports were cross-referenced against a minimum of three corroborating online reporting sources (and in some cases up to six or seven sources) before adding it to the MSA. Whenever there is a new incident of mass shooting, there is about two to four weeks' time lag because of the vetting process before it can be included in the public release database.

The data, therefore, are a convenient sample of available archival data. The target population is people who committed acts of mass shooting in the United States of America from 2000 to 2016. No recruitment of participants was required, and no informed consent required. Though archival data will be used, it will take about two weeks to gather the data.

Instrumentation and Operationalization of Constructs

The instruments used for this archival data aggregation curated as a set of spatial and temporal data about mass shootings in America according to Stanford Geospatial Center (2016). They defined mass shooting as three or more shooting victims (not

necessarily fatalities) and not including the shooter. The shooting must not be gang, drug, or organized crime-related"; whereas, the FBI defined a mass shooting as any firearm violence that involves the loss of four or more lives, not including the suspect (Bjelopera et al., 2013). The American Psychiatric Association (2013) defined mental illness as "a syndrome characterized by a clinically significant disturbance in an individual's cognition, emotion, regulation or behavior that reflects a dysfunction in the psychological, biological, or developmental functioning."

For this study, mental illness was defined as any mental illness (NIMH, 2017) or severe mental illness, such as anyone who has been diagnosed with schizophrenia, bipolar disorder, schizoaffective disorder, major depressive disorder, or who was under the care of a psychiatrist before the incident. Because the medical records were not easily accessible, reports from the Stanford Geospatial center (2016) were acceptable. They defined mental illness as a potential motive for the shooting attributed to mental health problems and a history of mental illness was defined as "a detailed description of any known mental illness history the shooter may have had during the time of the incident." See the other terminologies as shown in Appendix D.

Data Analysis Plan

To address Research Question 1, a 2-sample z-test was used to compare differences in the proportion of mental illness among mass shooters versus the rate of mental illness in the general population (Stangroom, 2018). An independent sample *t* test was used to examine Research Question 2 comparing the difference in numbers of victims killed by mass shooters with mental illness versus those without mental illness.

A chi-square analysis was used to answer Research Question 3 examining the relationship between mental illness and the type of killing. A second chi-square analysis was used to answer Research Question 4 examining the relationship between the type of gun used by those with mental illness versus without mental illness.

The parametric test assumptions of normality and no undue influence of outlier scores were met for the independent-samples *t* test. The only test assumption that was not met in this analysis concerned the chi-square analysis regarding Research Questions 3 and 4 as the analysis produced several cells with a count lower than 5.

In terms of statistical power for the independent-samples *t* test, the G*power software indicated that a medium-size effect (Cohen's *d* = .53) between the two means (2-tailed test) with power set at .80 and alpha set at .05, would require a sample size of 114 study participants. In terms of statistical power for the chi-square analysis, the G*power software indicated that a chi-square with a maximum of 7 degrees of freedom and probability set at .05 and power at .80, would detect a medium/large size effect (phi = .40) using 90 study participants. Thus, the current sample size of 114 study participants provided sufficient statistical power for the current analysis (Strangroom, 2020).

Threats to Validity

According to Rudestam and Newton (2007), the dependence on data collected by others and the dependence on others for data analysis is a problem that arises when a researcher uses secondary data. Rudestam and Newton stated some positive and negative aspects of using secondary data: secondary data is better than can be collected independently by any graduate student and is cheaper than collecting primary data.

Therefore, because primary data can be labor-intensive and expensive, the graduate student may not have the resources and time to collect large data promptly. However, the prior data collection method may not have involved the right instruments to address the researcher's questions.

The selection process can be a source of threat to internal validity if some participants have certain characteristics that make it more likely for them to have a certain outcome (Creswell, 2009). This study involved all the available data of mass shootings from the year that adequate record-keeping started, which according to the Stanford MSA database was from 2000 to 2016, so that every case of mass shooting was included and had an equal chance of being selected.

Another threat to internal validity is mortality, which makes it difficult to know the outcomes of the individuals who drop out (Creswell, 2009). Some mass shooters commit suicide or are killed in the crossfire making it impossible to know the reasons why they decided to engage in the mass shooting. Second, some shooters escape and information about them are not known. However, recruiting a large sample according to Creswell (2009) helps account for the dropouts while determining the outcome.

Ethical Procedures

The secondary data for this study was in the public domain, the databases have names and other biographic data of the mass shooters, and some sources include the shooter's picture. However, to maintain some form of privacy, this study did not include the names and pictures of the mass shooters, though available in the public domain. There was no need for consent from participants before IRB approval.

Summary

This chapter focused on the methodology, any threats to validity, the data analysis plan, and the ethical considerations. The data were archival data collected by and for the Stanford Mass Shootings in America (MSA) database. The Stanford MSA is an aggregation of a curated set of spatial and temporal data about mass shootings in America, taken from online media sources; it is an attempt to facilitate research on gun violence in the U.S. by making raw data more accessible (The Geospatial Center, 2016).

According to the MSA's methodology, they had an initial intensive investigation to fill in the historic record as far back as 1966. The newer reports were cross-referenced against a minimum of three corroborating online reporting sources (and in some cases, up to six or seven sources) before adding it to the MSA. Whenever there is a new incident of a mass shooting, there is a 2–4-week time lag—because of the vetting process—before it can be included in the public release database. This study will obtain permission from Stanford University to use its database for the current study.

Independent Variables: Mental illness or no mental illness

Dependent variables: Mass shooting (mass firearm homicide) and type of killing as explained in the data dictionary: school, social, romantic partner, racial/religious group, government, general public, family, and colleague/workmate/business acquaintance.

Next, Chapter 4 will pertain to the data collection, analysis, and results of the study.

Chapter 4: Results

Introduction

The purpose of this quantitative cross-sectional study was to use the Stanford University MSA to determine if there is any relationship between mental illness and mass shootings (including the number of victims killed and type of guns used among mass shooters) . In this chapter, I include the purpose of the study, four research questions and hypotheses, the data collection, results, and summary. The data collection section entails descriptive and demographic characteristics of the sample and how representative it is of the population of interest, the statistical assumptions, and the data analysis plan.

Research Questions and Hypothesis

RQ1: Is there a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population?

Hypothesis 1 (Alternate): There is a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

Null Hypothesis: There is not a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

RQ 2: Is there a difference in the number of victims killed by mass shooters with mental illness versus those without mental illness?

Hypothesis 2 (Alternate): There is a difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

Null Hypothesis: There is no difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

RQ3: Among mass shooters, is there a relationship between mental illness and type of killing?

Hypothesis 3 (Alternate): There is a difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

Null: There is no difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

RQ4: Among mass shooters, is there a difference in the type of gun used by those with mental illness versus without mental illness?

Hypothesis 4 (Alternate): There is a difference in the type of gun used among mass shooters with mental illness those versus those without a mental illness.

Null: There is no difference in the type of gun used among mass shooters with mental illnesses versus those without a mental illness.

Data Collection

This study used archival data collected by Stanford University Geospatial Center, The dataset contained mass shootings from 1966 to 2016. Initially, only a few cases were

recorded, but as time went on, reporting and online recording became more robust according to the Geospatial Center (2016). I decided to start from 2000 to 2016 to get an adequate sample for the planned analysis and a cut-off point. The process of data collection and sorting took about 2 weeks. The sample is representative of the population of interest.

To present the data concisely and accurately, I used descriptive statistics (Green & Salkind, 2012). According to McHugh (2003), to achieve the goal of descriptive statistics, the level of measurement must match the measurement criteria and should address the research question.

Data Analysis Plan

I conducted a secondary data analysis using data from Stanford Geospatial Center (2016). Data analysis was conducted in two phases as planned in Chapter 3. I presented the data descriptively, followed by an inferential data analysis to address the study research questions and related hypotheses. To address Research Question 1, a 2-sample z-test was used to compare differences in the proportion of mental illness among mass shooters versus the rate of mental illness in the general population (Stangroom, 2018). An independent-samples *t* test was used to examine Research Question 2, comparing the difference in numbers of victims killed by mass shooters with mental illness to those without mental illness.

A chi-square analysis was used to answer Research Question 3 on the relationship between mental illness and the type of killing. A second chi-square analysis was used to answer Research Question 4 examining the relationship between the type of

gun used by those with mental illness versus without mental illness. To examine the multiple influences of the study variables upon the number of fatalities, a multiple linear regression model was added to this analysis. The parametric test assumptions of normality and no undue influence of outlier scores were met for the independent-samples *t* test. The only test assumption that was not met in this analysis concerned the chi-square analysis regarding Research Questions 3 and 4 as the analysis produced several cells with a count lower than 5.

In terms of statistical power for the independent-samples *t* test, the G*power software indicated that a medium-size effect (Cohen's *d* = .53) between the two means (2-tailed test) with power set at .80 and alpha set at .05, would require a sample size of 114 study participants. In terms of statistical power for the chi-square analysis, the G*power software indicated that a chi-square with a maximum of 7 degrees of freedom and probability set at .05 and power at .80, would detect a medium/large size effect (phi = .40) using 90 study participants. Thus, the current sample size of 114 study participants provided sufficient statistical power for the current analysis.

Results

Statistical analysis performed for the research questions includes descriptive statistics, *t* tests, chi-square, and multiple linear regression tests and are as follows.

Descriptive Analysis

Table 1 presents a descriptive analysis of study participant demographic characteristics. Data indicated that the sample was mostly male (*n* = 108; 94.7%) and predominantly of a White racial/ethnic identity (*n* = 54; 47.4%). Almost half of the study

participants had a mental illness (*n* = 48, 42.1%) and used a handgun as the type of gun in a shooting (*n* = 64, 56.1%). The most common type of shooting was family (*n* = 25, 21.9%).

Table 1

Descriptive Analysis of Categorical Demographic Characteristics

Variable	*N*	%
Gender		
Male	108	94.7
Female	3	2.6
Male/female	3	2.6
Race/ethnicity		
White	54	47.4
Black	30	26.3
Asian	8	7.0
Native American/Alaskan Native	3	2.6
Biracial	2	1.8
Other	13	11.4
Unknown	4	3.5
Mental illness		
Yes	48	42.1
No	66	57.9
Gun type		
Handgun	64	56.1
Rifle	9	7.9
Shotgun	5	4.4
Multiple guns	21	18.4
Unknown	15	13.2
Type of shooting		
School	21	18.4
Social	15	13.2
Romantic partner	8	7.0
Racial/religious group	5	4.4
Government	8	7.0
General public	19	16.7
Family	25	21.9
Colleague/workmate/ business acquaintance	13	11.4

Figure 3 presents the distribution of the number of fatalities for each shooting event. Please note the mean number of fatalities per shooting was 4.82 (*SD* = 4.65) with the minimum and maximum of fatalities being 0–33, respectively. There were two outlier scores of 28 and 33 fatalities. These outlier scores did not have an undue effect on study findings.

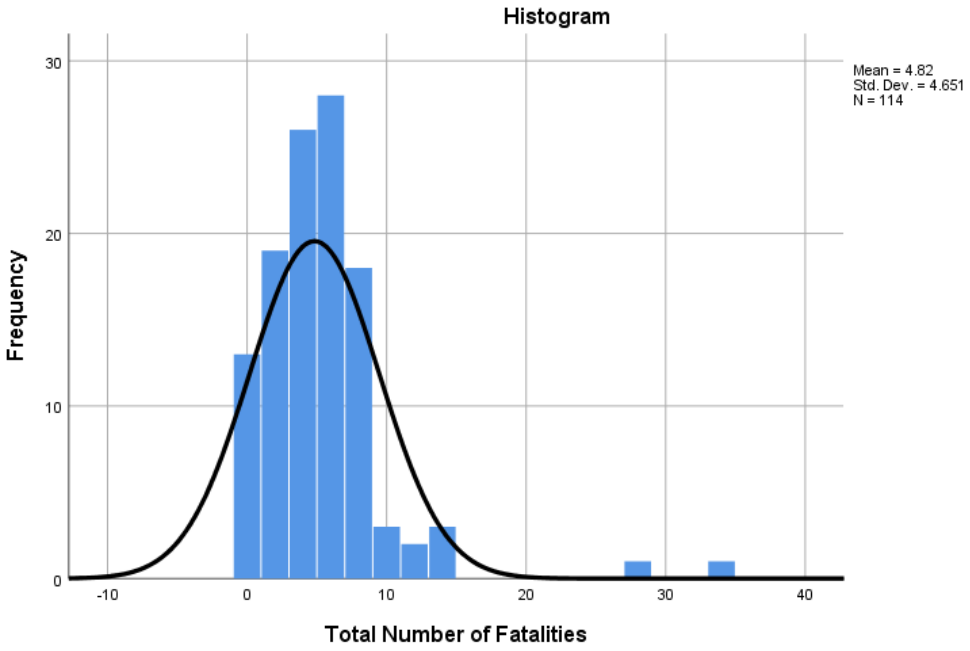

Figure 3. Distribution of number of fatalities for each shooting event.
The mean number of fatalities per shooting is 4.82 (SD = 4.65) with the minimum and maximum of fatalities being 0-33, respectively. There were 2 outlier scores (to the right of the distribution) of 28 and 33 fatalities. These outlier scores did not have an undue effect on study findings. The graph is depicting only fatalities. **There were no fatalities from 0 to 2 fatalities.

Bivariate Analysis and Hypothesis Testing

RQ1: Is there a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population?

Hypothesis 1 (Alternate Hypothesis): There is a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

Null Hypothesis: There is not a difference in the proportion of mental health problems among mass shooters versus the proportion of individuals with mental illness in the general population.

Table 2 presents a 2-sample z-test (2-tailed) to compare differences in sample proportions between mass shooters with mental illness versus the rate of mental illness in the general population. The National Institute of Mental Health (NIMH) reported that in 2017, there were an estimated 46.6 million adults aged 18 or older in the United States with AMI, which represented 18.9% of all U.S. adults ("NIMH »Home", 2019) Analysis did indicate a statistically significant difference where the proportion of mass shooters with mental illness (42.1%) was significantly greater than the proportion of the general population with mental illness (18.9%), $Z = -1137.72$, $p<.0001$. Thus, the data supported Hypothesis 1.

Table 2

Results of a 2-Sample Z-Test to Compare Differences in Sample Proportion Between of Mass Shooters with Mental Illness Versus the Proportion of Mental Illness in the General Population

Variable	Proportion	*Z*-Value	*p*
Proportion of mental illness among mass shooters (*n* = 114)	42.1%	-1137.72	.0001
Proportion of mental illness among the general population (*n* = 46.6 million)	18.9%		

RQ 2: Is there a difference in the number of victims killed by mass shooters with mental illness versus those without mental illness?

Hypothesis 2 (Alternate): There is a difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

Null Hypothesis: There is no difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness.

Table 3 presents an independent samples *t* test analysis examining the mean differences between the number of fatalities between shooters with and without mental illness. Bivariate analysis indicated that shooters with mental illness ($M = 6.50$, $SD = 6.03$) evidenced a significantly higher mean number of fatalities relative to those without mental illness ($M = 3.61$, $SD = 2.79$), $t(61.71) = 3.10$, $p<.01$. The Cohen's *d* effect size for this test was 0.62, which is a medium/large effect size. Thus, the data supported Hypothesis 2.

Table 3

Independent Samples T Test Analysis Examining the Mean Differences Between the Number of Fatalities Between Shooters with and Without Mental Illness

	Number of Fatalities		
Variable	M (*SD*)	t(*df*)	*p*
Mental illness status		3.10 (*61.71*)	.003
Perpetrator has mental illness (*n* = 48)	6.50 (*6.03*)		
Perpetrator does not have mental illness (*n* = 66)	3.61 (*2.79*)		

RQ3: Among mass shooters, is there a relationship between mental illness and type of killing?

Hypothesis 3 (Alternate): There is a difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

Null: There is no difference in the type of killing among mass shooters with mental illness versus those without a mental illness.

Table 4 presents a chi-square analysis that indicates the presence of mental illness (Yes/No) differed by type of killing at a level approaching statistical significance, $X^2(7) = 13.72$, $p = .056$, with a medium Cramer's Phi effect size of .35. Within the crosstabulation, those with mental illness were overrepresented in the categories of type of killing reflecting romantic partner, mental illness: $n = 6$ (75.0%) vs. no mental illness: $n = 2$ (25.0%), as well as underrepresented in the categories social, mental illness: $n = 2$ (13.3%) vs. no mental illness: $n = 13$ (86.7%) and racial/religious group: mental illness: $n = 0$ (0.0%) vs. no mental illness: $n = 5$ (100.0%). Thus, although the data may warrant consideration, Hypothesis 3 is not supported.

Table 4

Chi-Square Analysis of the Presence of Mental Illness (Yes/No) and Type of Killing (n = 114)

		Does the perpetrator have mental illness?		
Variable		No	Yes	X^2(*df*) p
Type of Killing				13.72 (*7*).056
School	Count	11	10	
	Row %	52.4	47.6	
	Column %	16.7	20.8	
Social	Count	13	2	
	Row %	86.7	13.3	
	Column %	19.7	4.2	
Romantic Partner	Count	2	6	
	Row %	25.0	75.0	
	Column %	3.0	12.5	
Racial/Religious Group	Count	5	0	
	Row %	100.0	0.0	
	Column %	7.6	0.0	
Government	Count	4	4	
	Row %	50.0	50.0	
	Column %	6.1	8.3	
General Public	Count	9	10	
	Row %	47.4	52.6	
	Column %	13.6	20.8	
Family	Count	14	11	
	Row %	56.0	44.0	
	Column %	21.2	22.9	
Colleague/Workmate/	Count	8	5	
Business acquaintance	Row %	61.5	38.5	
	Column %	12.1	10.4	

RQ4: Among mass shooters, is there a difference in the type of gun used by those with mental illness versus without mental illness?

Hypothesis 4 (Alternate): There is a difference in the type of gun used among mass shooters with mental illness versus those without a mental illness.

Null: There is no difference in the type of gun used among mass shooters with mental illnesses versus those without a mental illness.

Table 5 presents a chi-square of analysis that indicates the presence of mental illness (Yes/No) was not significantly related to the type of gun used in the shooting, X^2 (4) = 4.34, p = .36. Thus, Hypothesis 4 is not supported.

Table 5

Chi-Square Analysis of Presence of Mental Illness (Yes/No) and Type of Gun Used in the Shooting (n = 114)

		Does the Perpetrator Have Mental Illness?		
Variable		No	Yes	X^2(*df*)p
Gun Type				4.34 (*4*).36
Handgun	Count	39	25	
	Row %	60.9	39.1	
	Column %	59.1	52.1	
Rifle	Count	7	2	
	Row %	77.8	22.2	
	Column %	10.6	4.2	
Shotgun	Count	2	3	
	Row %	40.0	60.0	
	Column %	3.0	6.3	
Multiple Guns	Count	9	12	
	Row %	42.9	57.1	
	Column %	13.6	25.0	
Unknown	Count	9	6	
	Row %	60.0	40.0	
	Column %	13.6	12.5	

Multivariate Analysis

To examine the multiple influences of the study variables upon the *number of fatalities,* a multiple linear regression model was added to this analysis. Subsequently, Table 6 presents a multiple linear regression model examining the dependent variable *number of fatalities*, as a function of selected explanatory variables. Analysis indicated that the overall model was statistically significant, F (113) = 2.96, p<.01 and explained about 20% of the variance in the dependent variable (R^2 = .20, Adjusted R^2 = .14).

In terms of individual predictors, regarding *race,* analysis indicated that in reference to White study participants, Black study participants evidenced a lower *number of fatalities* on average, at a level that approached statistical significance, B = -1.79, SE = 1.01, β = -.18, p<.10, while the Other group was unrelated. The explanatory variables *Gun Type* and *Shooter Type* were not significantly related to the dependent variable. Lastly, study participants with *Mental Illness* evidenced a significantly higher *number of fatalities* relative to those without mental illness, B = 2.05, SE = .86, β = .23, p<.05.

Table 6

Multiple Linear Regression Model Examining the Dependent Variable Number of Fatalities, as a Function of Selected Explanatory Variables (n=114)

Variable	B (SE)	β	p
Race			
White (Reference group)			
Black	-1.79 (1.01)	-.18	.08
Other	.46 (.97)	.05	.64
Gun Type			
Handgun (Reference group)			
Multiple Guns	1.67 (1.10)	.15	.13
Rifle or Shotgun	-1.81 (1.26)	-.13	.16
Unknown	-2.02 (1.28)	-.15	.12
Shooting Type			
School or Government (Reference group)			
Social or Religious	.37 (1.26)	.03	.77
Family or Romantic	.14 (.99)	.01	.89
Work Colleagues	1.60 (1.32)	.12	.23
Mental Illness (Yes=1, No=0)	2.05 (.86)	.23	.02

Model = $F(113)=2.96$, $p<.01$, $R^2=.20$, Adjusted $R^2=.14$

Summary

The purpose of this study was to examine if there were any associations between mental illness and mass shooting, and the type of mass shooting, which shows if the shooter tends to target family, or strangers, relational issues, or hate crimes. Also, I analyzed the number of victims killed by perpetrators with mental illness versus those without, and to see if there is any difference in the type of guns used by the shooters using data collected by Stanford University Geospatial center (2016). The study results showed that the proportion of mass shooters with mental illness (42.1%) was significantly greater than the proportion of the general population with mental illness (18.9%), Z = -1137.72, $p<.0001$, thus, supporting Hypothesis 1. The result also revealed

that shooters with mental illness have a significantly higher mean number of fatalities relative to those without mental illness, thereby supporting Hypothesis 2. As shown in Table 3, the hypothesis that among mass shooters there a relationship between mental illness and type of killing, was not supported, those with mental illness were overrepresented in the categories of killing reflecting romantic partner versus those without. mental illness: n = 6 (75.0%) vs. no mental illness: n = 2 (25.0%), as well as underrepresented in the categories social, mental illness: n = 2 (13.3%) vs. no mental illness: n = 13 (86.7%) and racial/religious group: mental illness: n = 0 (0.0%) vs. no mental illness: n = 5 (100.0%). Table 4 presents a chi-square analysis that indicates the presence of mental illness (Yes/No) was not significantly related to the type of gun used in the shooting, X^2 (4) = 4.34, p = .36. Thus, Hypothesis 4 was not supported.

Chapter 5 covers the interpretations of the findings, the limitations, recommendations, and or recommendations for practice, the implications for social change, and the conclusion.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative, cross-sectional study was to determine if there is any relationship between mental illness and mass shootings using the Stanford University MSA database. Specifically, I looked at the number of victims killed by mass shooters with mental illness versus those without mental illness and the type of gun used by mass shooters with mental illness versus those without mental illness. The goal was to effect a policy change on mass shootings in America.

Various factors influence mass shootings. It is multifactorial and has psychological (Norris, 2007), economical (Mother Jones, 2015), and social impacts as public fear increases and perceived safety decreases (Lowe & Galea, 2015).

This study was completed by using the quantitative cross-sectional methodology. Because of the nature of the phenomena being studied, it was not possible to do a cohort study or a case-control study whereby you have a control group and experimental group or follow people with the propensity of violence to see if they will engage in mass shooting. As Frankfort-Nachmias and Nachmias (2008) put it, conceptual-substantive factors whereby secondary data may be the only available source of data to answer the research question of interest, and it enables one to search a broader range with lower cost. It also allows for replication of the study if the data is reliable. The primary data were obtained from the Stanford University MSA database However, only a subset of the data were used for the statistical analysis.

The study results showed that the proportion of mass shooters with mental illness (42.1%) was significantly greater than the proportion of the general population with mental illness (18.9%), $Z = -1137.72$, $p<.0001$, thus supporting Hypothesis 1. The results also showed that shooters with mental illness have a significantly higher mean number of fatalities relative to those without mental illness, thereby supporting Hypothesis 2. As shown in Table 3, the hypothesis that among mass shooters, there is a relationship between mental illness and type of killing was not supported. Those with mental illness were overrepresented in the categories of killing, of romantic partner versus those without mental illness: $n = 6$ (75.0%) vs. no mental illness: $n = 2$ (25.0%). Those with mental illness were underrepresented in the categories social, mental illness: $n = 2$ (13.3%) vs. no mental illness: $n = 13$ (86.7%) and racial/religious group: mental illness: $n = 0$ (0.0%) vs. no mental illness: $n = 5$ (100.0%). Table 4 presents a chi-square analysis that indicates the presence of mental illness (Yes/No) was not significantly related to the type of gun used in the shooting, X^2 (4) = 4.34, $p = .36$. Thus, Hypothesis 4 was not supported.

This final chapter covers the interpretations of the findings, limitations, recommendations for practice, implications for social change, and conclusion.

Interpretation of the Findings

The descriptive analysis of study participant demographic characteristics indicated that the mass shooters were mostly male ($n = 108$; 94.7%) and predominantly of a White racial/ethnic identity ($n = 54$; 47.4%). Almost half of the study participants had a mental illness ($n = 48$, 42.1%) and used a handgun as the type of gun in a shooting

(*n* = 64, 56.1%). The most common type of shooting was family (*n* = 25, 21.9%). The mean number of fatalities per shooting is 4.82 (*SD* = 4.65) with the minimum and maximum of fatalities being 0-33, respectively. There were 2 outlier scores (to the right of the distribution) of 28 and 33 fatalities. These outlier scores did not have an undue effect on study findings.

The study results showed that the proportion of mass shooters with mental illness (42.1%) was significantly greater than the proportion of the general population with mental illness (18.9%), $Z = -1137.72$, $p<.0001$. thus, supporting hypothesis.1. A 2-sample z-test (2-tailed) was used to compare differences in sample proportions between mass shooters with mental illness versus the rate of mental illness in the general population. As reported by the National Institute of Mental Health (NIMH) reported that in 2017, there were an estimated 46.6 million adults aged 18 or older in the United States with Any Mental Illness (AMI), which represented 18.9% of all U.S. adults. I used any mental illness definition as defined by NIMH to capture any report of mental illness in the mass shooters since it was not possible to get the mental health records. It is pertinent to note that no report of mental illness is not absolute, and we may not rule out the possibility of undiagnosed mental illness. This finding is statistically significant at $p<.0001$. When compared with previous studies about violence in people with mental illness according to Applebaum (2006), (Applebaum in Johnson, 2012) was 3-5% and the Institute of Medicine (2005) reported that people with mental illness are only responsible for about 5% of violent acts in the USA. Also, Brauser (2013) stated that 96% of violent crimes are perpetrated by people who do not have a mental illness, while Knoll and Annas (2016)

reported that yearly gun-related homicides committed by people with mental illness represent less than 1% of the gun homicides. Conversely, the Central Florida Intelligence Exchange (2013) analyzed 14 mass shooting cases that occurred between 2011 and 2013 and concluded that individuals with "continuous behavioral issues and mental illness" (p. x) committed 79% of the shootings This study used a small sample as it did not include all mass shooting cases for those years, and the researchers offered no explanation, such as a random selection of the samples, regarding why all were not included.

Looking at the descriptive analysis that showed mass shooters were mostly male (*n* = 108; 94.7%) and predominantly of a White racial/ethnic identity (*n* = 54; 47.4%), is mental illness disproportionately prevalent in men than women? Not necessarily. Some types of mental illness are more prevalent in men and others more in women, while some are equally prevalent. However, according to the CDC, as reported by Gramlich (2019), six-in-ten-gun related deaths in the U.S.A. were suicides and middle-aged white men have the highest rates of suicide and in 2017, 69.67% of suicide deaths were white males (American Foundation for Suicide Prevention). Given that most mass shooters end up killing themselves before they are accosted or are killed by the responding police force, would it be fair to assume that most of these shooters are on a suicide or suicide homicide mission? A longitudinal study of the mental health of adults in Great Britain as reported by Recovery Across Mental Health (n.d.) showed that women are more likely to have been treated with mental health problems compared to men (29% vs. 17%). One in four women compared to one in 10 men will require treatment for depression, women are twice as likely to experience anxiety than men, and PTSD is more common in women,

however, men are more likely to have alcohol or drug problem and three times more likely to be diagnosed with antisocial personality disorder and use violence against others (American Psychological Association, 2011; Recovery Across Mental Health, n.d.; WHO, 2013). Schizophrenia affects men and women equally, women are more likely to attempt suicide, but men are four times more likely to die by suicide (American Psychiatric Association (2017). Although, Riecher-Rössler (2018) found that women have a later onset of schizophrenia than men.

Hypothesis 2 states that there is a difference in the number of victims killed by mass shooters with mental illness versus those without a mental illness. An independent samples *t* test analysis was used to examine the mean differences between the number of fatalities between shooters with and without mental illness. Bivariate analysis indicated that shooters with mental illness (M = 6.50, SD = 6.03) evidenced a significantly higher mean number of fatalities relative to those without mental illness (M = 3.61, SD = 2.79), $t(61.71) = 3.10$, $p<.01$. The Cohen's d effect size for this test was 0.62, which is a medium/large effect size. Thus, the data which is statistically significant at 0.62 medium/large effect supported Hypothesis 2. Using a multiple linear regression analysis, study participants with *Mental Illness* evidenced a significantly higher *number of fatalities* relative to those without mental illness, B = 2.05, SE = .86, β = .23, $p<.05$.

Based on the scope of this study, it is not possible to extrapolate why people with mental illness would kill more people.

For the third research question, I wanted to find out if there was any relationship between mass shooters reported as having a mental illness and type of killing? Chi-square

analysis showed that the presence of mental illness (Yes/No) differed by type of killing at a level approaching statistical significance, X^2 (7) = 13.72, p = .056, with a medium Cramer's Phi effect size of .35. Within the crosstabulation, those with mental illness were overrepresented in the categories of type of killing reflecting romantic partner, mental illness: n = 6 (75.0%) vs. no mental illness: n = 2 (25.0%), as well as underrepresented in the categories social, mental illness: n = 2 (13.3%) vs. no mental illness: n = 13 (86.7%) and racial/religious group: mental illness: n = 0 (0.0%) vs. no mental illness: n = 5 (100.0%). It is not statistically significant because the p-value is slightly above .05 (p = .056), we will fail to reject the null hypothesis. Thus, because this is a preliminary study, the data may warrant consideration.

Mass shooters with mental illness were more represented in the killing of a romantic partner and general public (strangers), while mass shooters without mental illness tended to kill racial and religious groups such as can be called hate crimes, social settings, school, family, and places of work. This is not an inference of causality, but rather an association. The cognitive-behavioral theory may help to explain why mass shooters may kill family members or strangers. According to the cognitive-behavioral theories, thoughts affect feelings and feelings affect behaviors (Beck, 1976; Ellis, 1955). That means that how people think and perceive the world around them may be distorted and may lead to behaviors of excessive anger and desire to get even hence some school shooters. The same goes for the radical religious fanatics who see every other person from other religions as their enemy with a mindset of doing the right thing by using themselves as suicide bombers or mass shooters. The same cognitive distortions may

have been a factor in the shooting of gay men at a nightclub in Florida whereby the shooter had a negative worldview and extremism that drove him to kill these people. Finally, Hypothesis 4 states that there is a difference in the type of gun used among mass shooters with mental illness versus those without a mental illness however, a chi-square of analysis result showed that the presence of mental illness (Yes/No) was not significantly related to the type of gun used in the shooting, $X^2(4) = 4.34$, $p = .36$. Thus, Hypothesis 4 is not supported.

Mass shooters with mental illness mostly used handguns (39.1%), likewise for mass shooters without mental illness (60.9%). Mass shooters without mental illness used rifles (77.8%) more than those with mental illness (22,2%) and both groups used multiple guns mental illness (57.1%) versus 42.9% for mass shooters without mental illness. This shows that people with mental illness are just as likely to use any gun as people without mental illness.

Discussion

Mass shooting is a public health issue that needs attention and equally important is mental health awareness, and funding. Every time there is a mass shooting incident, the discussion about gun control laws, and the notion that mental illness may be the cause of ensues anew. Without looking at the facts, this supposition paints a wrong picture in the minds of the public. When a mass shooting happens, it affects our whole nation, such as the Newtown shooting of elementary school children and some of their teachers, the Florida gay nightclub shooting where about 50 people lost their lives, and recently, the Parkland high school shooting in Florida. There was a lot of heated debate on both sides

of the aisle (Democrats and Republicans), however no legislation was enacted following the Parkland shootings. Regarding the frequency of mass shootings in various regions in the United States, the data showed that some states have a disproportionately higher frequency than other states, e.g., California, Texas, Florida, and Los Angeles. The next step of the research will be to consider the gun laws of these regions to see if there is a correlation between gun control laws and the incidence of mass shootings or gun violence.

The New York Times reported about a database completed nearly 12 months after the Sandy Hook Elementary shooting in Newtown, Connecticut, stating that "almost every state enacted at least one-gun law." However, out of the 1500 state gun bills introduced, only 178 passed at least one chamber of a state legislature and only 109 of them became law (Yanish, Andrews, Buchanan & Mclean, 2013). The report continued, saying that of the 109 laws that passed, 70 loosened gun restrictions in mostly Republican-controlled states, while 39 tightened gun restrictions in states controlled by Democrats. Frohlich & Sauter (2020) reported similar results from a study that showed higher gun deaths in the United States compared to other high-income nations and lowest incidence of gun death associated with a lower rate of gun ownership.

One may wonder why it is important to know the number of people killed by people reported as having a mental illness. Is it by chance that mass shooters reported as having a mental illness are more represented in incidents where the number of victims is high (shooters with mental illness (M = 6.50, SD = 6.03) evidenced a significantly higher

mean number of fatalities relative to those without mental illness (M = 3.61, SD = 2.79)? Also, the regression analysis showed that mental illness is related to the number of fatalities after we control for race, shooting type, and type of gun. In recent mass shootings in 2019, the President of United States, Trump, has been shown on national television soon after the shootings take place saying, “it’s mental illness.” Are people more inclined to report mental illness when the number of victims is higher as it shows in the study results? Does that have anything to do with the public perception of the dangerousness of people with mental illness or are they capable of planning and executing such high-level planning, coordination, and execution? Since the mass shooters with reported mental illness are just as likely to use any gun as people without mental illness, and mental illness is more represented in mass shooters compared to the general population, this will necessitate efforts to prevent gun ownership in people with a diagnosable severe mental illness.

Some of the shootings were recorded as hate crimes and needs to be tackled. The U.S.A needs to take action and plan on how to curtail some of these mass shootings that were identified as hate crimes In the President’s remarks released by the White House (August 5, 2019), he mentioned a racist and hateful manifesto posted by the El Paso shooter who killed 20 people and injured 26 others. There are many more of such hate crimes such as the gay club shooting in Florida and the church shooting previously mentioned.

The President outlined four things that he would like to accomplish as follows:

- “We must do a better job of identifying and acting on early warning signs”

- “We must stop the glorification of violence in our society”
- “We must reform our mental health laws to better identify mentally disturbed individuals....”
- “We must make sure that those judged to pose a grave risk to public safety do not have access to firearms, and that if they do, those firearms can be taken through rapid due process.”

Politicians come and go, mass shootings happen as they come and go, preventive measures to curtail mass shootings are usually part of their manifesto while running for office and immediately after a mass shooting incident. The Dayton Ohio shooter with 100 rounds of ammunition was able to kill nine people in one minute because of the high capacity weapon. How much longer do we as a nation need to sit and watch these mass shootings and hold our legislators accountable for passing a simple measure such as background checks. It was introduced by Representative Mike Thompson, passed the house on 2/27/19 (bipartisan Background Checks Act of 2019; Thompson, 2019), and has yet to become law.

Australia enacted a stricter gun control law in 1996 (ban of rapid firearms) after a horrendous mass shooting at a café in 1996 that claimed the lives of 35 people and 26 injured. A follow up in 2016, according to researchers, showed that mass shootings stopped following the stricter gun control. Could that be a mere coincidence? Can we, as Americans, try to replicate what the Australians did to curb mass shooting?

In a recent study by Dimaggio et al. (2019) using pooled open-source data sets from three well documented and referenced sources of mass shooting data from 1981 to 2017, the results showed that 85.8% or 430 of the total 501 reported mass shooting fatalities were linked to assault rifles. Also, during the period of the federal assault weapon ban (1994–2004), mass shootings in the united states were reduced (DiMaggio, Avraham, Berry, Bukur, Feldman, Klein et al.,2019).

The results of this study show most of the mass shootings are family killings, which buttress the claims by previous studies. For instance, Knoll and Annas (2015) found that 68% of perpetrators of school violence, most of which involved guns, had easy access to and used firearms owned by their family. Some of the ways our nation can control access to guns to people who may be a danger to themselves and others include having minimal tolerance for reports of shooting threats, increased funding for mental health services, a national database for gun purchase, and banning bump stocks amongst other measures. The best prevention is primary prevention before any problem arises. Let the government weave in gun accident prevention programs in schools and the communities, safe and sensible gun ownership, etc.

Limitations of the Study

The Stanford MSA is an aggregation of a curated set of spatial and temporal data about mass shootings in America, taken from online media sources and maintained with the help of student assistants, interns, or temporary staff (The Geospatial Center). It is important to review the results of this data with these limitations in mind. The limitations of this study include not being able to get the behavioral health history of the mass

shooters and the Yes/No categorization of mental illness does not give the full mental history of the mass shooter. The history of mental illness is as recorded by the mass shooting database (Stanford Geospatial Center) which was collateral information from police records, local news reports, and from friends and family. Another limitation is that the archival data does not give the ages of the shooters and it was not possible to use age as a variable in the analysis. However, having the age would not have answered any research question of relationship to mental illness but would have revealed the age range of shooters.

According to Price and Murnan (2004), identifying limitations of a study is subjective. However, it is fair to say that this subject matter is broad and time constraints will not allow me to exhaust all possible research questions that may relate to this issue.

At the onset, one concern was the ability to get enough of a sample, but the sample size was adequate. In terms of statistical power for the chi-square analysis, the G*power software indicated that a chi-square with a maximum of 7 degrees of freedom and probability set at .05 and power at .80, would detect a medium/large size effect (phi=.40) using 90 study participants.. Thus, the current sample of 114 mass shooters provides sufficient power for this analysis and has the power of the generalizability of the result. The Stanford University MSA database has fewer recorded cases of mass shooting compared to USA Today or Every Town for Gun Safety or Mother Jones databases but was chosen because the data dictionary showed the steps and operationalized the variables used. Finally, I was not able to control for the confounding variables because

archival data were used and no data were collected for confounding variables, and therefore, not available in the dataset that was used in this analysis.

Recommendations

For future studies, it will be useful to gain medical records if possible, to substantiate the claim to mental or no mental illness and if possible to get a data set that has ages of the perpetrators. Observe the gun laws in regions with a higher occurrence of mass shootings to see if there is any correlation.

The government should increase funding for mental health and the research to explore risk factors for violence. The best prevention is primary prevention before any problem arises. Let the government weave in gun accident prevention programs in schools and the communities, safe and sensible gun ownership, etc.

Preventive measures needed include enhanced school discipline, security, clinicians, and family members and or friends should take every threat of violence seriously (Madfis & Levin, 2013). Funding for mental health services that will take the people with mental illness off the streets and away from violence-prone situations and victimization is necessary (Markowitz, 2011).

With that in mind, policymakers should focus on evidence-based data to improve on gun violence prevention and amend policies that stigmatize people with mental illness (Swanson, McGinty, Fazel & Mays, 2014) and should consider how exposure of the public to the news that portrays people with SMI as dangerous will affect the public to support the improvement of public mental health services (McGinty, Webster, Jarlenski, & Barry, 2014).

For young people where the rate of homicides and suicides are highest by gun violence, I would create an initiative known as standing in the "GAP" for our youth. GAP stands for gun accident prevention to educate our youth about guns (use, its dangers, and prevention of accidents). Preventing violence by firearm amongst the youth will reduce morbidity and mortality attributed to that cause. Though suicide is unpredictable among people with mental illness, there are tools for risk assessment of suicide established by APA (2013). This is not to say that everyone that engages in a mass shooting is doing it only because of suicidal ideations.

Implications

The CDC (2013) ranked violence with a firearm which remains a public health nightmare and accounts for 22,571 firearm homicides and 38,126 firearm suicides in the U.S. Homicide as the 15th leading cause of death (all ages) during 2009–2010 in the United States. It occurs every two weeks (Hoyer & Heath, 2013) and the magnitude of the murders differ from case to case. This is not a case peculiar to the United States of America, but is happening worldwide (e.g., recent mass shootings in Paris).

The social change implication of the study includes helping to bridge the gap in understanding violence as it relates to people with mental illness, and guiding policymakers in appropriate allocation of funds to curb gun violence which has a great morbidity and mortality cost and financial burden on our nation. Lawmakers should consider funding programs that will educate the public on safe gun ownership, such as a youth program—standing in the GAP (gun accident prevention), stricter gun control laws, and a background check before the acquisition of guns. Possible psychological

referral for people in custody battles to help defray animosity and urge for retaliation. Gun restriction for people with a history of drug use and serious mental illness.

Conclusion

Mass shooting has cost America many lives, economic loss, and psychological trauma, which for some, may have made an indelible mark on their lives. Another mass shooting is one too many. According to Toppo (2017), 2017 was coined the deadliest year regarding mass shootings in at least a decade. Let us as a nation not lose sight of other factors that play a role in the mass shooting. As people with mental illness are more represented in mass shootings, we need to focus our attention on mental health awareness and funding for mental health programs and factors related to mass shootings.

Mass shooting is a public health problem and need to be tackled from the primary and secondary levels using the universal approach.. According to the American Psychological Association (APA (2013), the social ecological model, which is a public health framework can be used to address the problem of gun violence at various levels such as, individual level, relationship, community and societal levels.. As shown in the literature review, limiting access to firearms may curtal firearm suicides

This calls for more research and exploration of other factors that came up in the literature review as some of the factors that make it easier for gun acquisition such as loose gun laws. The law should not be a respecter of persons and lawmakers should pass laws to make it more difficult to acquire an assault-type rifle and the ability to kill masses of people. Primary prevention is of utmost importance in public health and should stir us

as a nation and our lawmakers into enacting gun accident prevention programs in schools and the communities, safe and sensible gun ownership, banning of high capacity assault-type weapons and universal background checks.

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Appendix A: List of Mass Shooting Committed with the AR-15

(USA Today 2018, February 14)

1. Feb. 24, 1984: Shooter, 28, used an AR-15, a Stoeger 12-gauge shotgun and a Winchester 12-gauge shotgun to kill two and wound 12 at 49th Street Elementary School in Los Angeles before killing himself.
2. Oct. 7, 2007: Shooter 20, used an AR-15 to kill six and injure one at an apartment in Crandon, Wis., before killing himself.
3. June 20, 2012: Shooter, 24, used an AR-15-style .223-caliber Smith and Wesson rifle with a 100-round magazine, a 12-gauge Remington shotgun, and two .40-caliber Glock semi-automatic pistols to kill 12 and injure 58 at a movie theater in Aurora, Colo.
4. Dec. 14, 2012: Shooter, 20, used an AR-15-style rifle, a .223-caliber Bushmaster, to kill 27 people — his mother, 20 students, and six teachers — in Newtown, Conn., before killing himself.
5. June 7, 2013: Shooter, 23, used an AR-15-style .223-caliber rifle and a .44-caliber Remington revolver to kill five and injure three at a home in Santa Monica, Calif. before he was killed.
6. March 19, 2015: Shooter, 24, used an AR-15 to kill one and injure two on a street in Little Water, N.M. before he was killed.
7. May 31, 2015: Shooter, 36, used an AR-15 and .45-caliber handgun to kill two and injure two at a store in Conyers, GA before he was killed.

8. Oct. 31, 2015: Shooter, 33, used an AR-15, a .357-caliber revolver and a 9mm semi-automatic pistol to kill three on a street in Colorado Springs, Colo. before he was killed.
9. Dec. 2, 2015: Shooter, 28 and 27, used two AR-15-style, .223-caliber Remington rifles and two 9 mm handguns to kill 14 and injure 21 at his workplace in San Bernardino, Calif., before they were killed.
10. June 12, 2016: Shooter, 29, used an AR-15 style rifle (a Sig Sauer MCX), and a 9mm Glock semi-automatic pistol to kill 49 people and injure 50 at an Orlando nightclub before he was killed.
11. Oct. 1, 2017: Shooter, 64, used a stockpile of guns including an AR-15 to kill 58 people and injure hundreds at a music festival in Las Vegas before he killed himself.
12. Nov. 5, 2017: Shooter, 26, used an AR-15 style Ruger rifle to kill 26 people at a church in Sutherland Springs, Texas before he was killed.
13. Feb. 14, 2018: Police say, Shooter, 19, used an AR-15-style rifle to kill at least 17 people at Marjory Stoneman Douglas High School in Parkland, Fla.

Appendix B: Letter of Permission to Use Stanford University Dataset

Re: Mass Shootings in America Database Request3
Priscilla Chukwueke
To:
Tue, Jul 7, 2015, at 10:51 PM
Thank you very much for sharing this information. I appreciate the timely manner in which you responded as well.
Priscilla Chukwueke

On Tuesday, July 7, 2015, 2:01 PM, XXX wrote:
Hello Priscilla,
Please find attached the most recent *Stanford Mass Shootings in America* database and data dictionary.
The database is not complete and updating it is an ongoing project. It takes several days to several weeks to properly QA a new indecent before adding it to the release database so the most recent shooting events will likely not be included. If you find any errors or missing information, please let us know. Please be sure to credit the *Stanford Geospatial Center* for any publications, work, or visuals based on this database.
Please do not use any of the current visualizations found on the MSA website, they are based on older versions of the database and no longer up to date. You can quickly create your maps and graphics with the attached data from sites like Google Fusions Tables, or CartoDB.
If you have any questions, please contact XXXX at

Regards,

XXXX

Priscilla Chukwueke
To:
Sat, May 21, 2016, at 3:38 PM
Hello XXX
How are you? I hope this meets you well. I am now at the point in my dissertation process where I would incorporate the data from your database, but when I opened the email, there was no attachment. I searched all through my mail but could not find it. Please I would appreciate it if can you resend me the updated information on what you have for mass shootings in America. I am looking at the years 2006 to 2015, but I will appreciate whatever information you have.
Thank you very much for your help.
Priscilla Chukwueke, MD

Show original message
Thank you very much for your help.
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Appendix C: History of Federal Firearms Laws in the United States

(Adapted from Department of Justice, Appendix C)

I. “Controlling the Firearms Market: The Gun Control Act of 1968

Following the assassinations of President John F. Kennedy, Senator Robert Kennedy, and Dr. Martin Luther King, Jr., Congress passed the Gun Control Act of 1968 (GCA). The amended GCA is the primary means the federal government uses to regulate firearms. The GCA's stated goals are to "keep firearms out of the hands of those not legally entitled to possess them due to age, criminal background or incompetency, and to assist law enforcement authorities in the states and their subdivisions in combating the increasing prevalence of crime in the United States." (S. Rep. No. 90-1097 (1968).

A. Requiring Federal Licenses for Transferring Firearms Under the GCA

The GCA created a process of regulating the interstate movement of firearms by requiring persons who manufacture, import, or deal with firearms also known as “federal firearms licensees" (FFLs) to obtain a license from the Secretary of the Treasury. The license entitles the holder to ship, transport, and receive firearms in interstate or foreign commerce. The FFL must maintain records of all acquisitions and dispositions of firearms and comply with applicable state and local laws in transferring firearms. This record-keeping enables tracing of guns used for crimes and for accountability of firearms dealers, manufacturers, and importers, a basis for investigating illegal firearms trafficking. The Enforcement Branch of the Alcohol and Tobacco Tax Division of the Internal Revenue Service initially enforced the GCA. On July 1, 1972, the Bureau of

Alcohol, Tobacco, and Firearms (ATF) was created as an independent Bureau within the Treasury Department.

B. Prohibiting Certain Transfers and Possession

The GCA made it unlawful for certain persons to receive firearms and made it a felony for an FFL to transfer a firearm knowing, or having reasonable cause to believe, that the transferee is prohibited from receiving the firearm. Subsequent amendments made it unlawful for any person to knowingly transfer a firearm to a prohibited person, and made it unlawful for the following categories of prohibited persons to possess a firearm:

• Felons.

• Fugitives.

• Drug addicts or unlawful drug users.

• Persons committed to mental institutions or adjudicated as "mentally defective".

• Persons dishonorably discharged from the armed forces.

• Persons who have renounced their United States citizenship.

• Illegal or nonimmigrant aliens.

• Persons subject to certain domestic violence restraining orders; and

• Persons convicted of misdemeanor crimes of domestic violence.

The GCA also prohibits anyone under a felony indictment from receiving or transporting a firearm. Also, with certain limited exceptions, juveniles under 18 years of age may not possess handguns. Finally, the GCA makes it unlawful for an FFL to transfer a handgun to anyone under the age of 21, or a long gun to anyone under the age of 18. Young people between the ages of 18 and 21 may still buy handguns from non-licensed sellers in the

secondary market, and there are no age restrictions on the transfer of rifles and shotguns by non-licensed sellers.

C. Controlling the Interstate Flow of Firearms Under the GCA

The GCA helps individual states enforce their laws regulating firearms possession and transfers by generally prohibiting the transport and shipment of firearms across state lines, except among FFLs. Before the GCA, the differences among state controls over firearms' commerce impaired the ability of states to enforce their laws. The GCA's interstate prohibitions were intended to reduce the effects of the illegal gun commerce between states with poor firearms regulation and those with strict.

D. Regulating Imported Firearms

At the time when Congress passed the GCA, it was well known that the rifle used to assassinate President John F. Kennedy was a surplus Italian military rifle imported into the United States. Besides, so-called "Saturday night specials"-inexpensive and often imported handguns-were associated with rising street crime. Accordingly, the GCA established a framework for "curbing the flow of surplus military weapons and other firearms being brought into the United States which are not particularly suitable for target shooting and hunting." (S. Rep. No. 90-1097, at 24 (1968)

Under the Act, all imported firearms must be "generally recognized as particularly suitable for sporting purposes" before being approved for importation. Handguns are judged against "factoring criteria," which include length, frame construction, weight, caliber, and safety features. The factoring criteria have not been reexamined since they were established in 1968.

Domestically produced handguns do not have to satisfy the factoring criteria applied to imported handguns. If the same test were required for domestically produced handguns as for imported handguns, eight of the top ten traced handguns in the United States in 1998 would have been barred.

II. The Early 1980s: Drugs and Guns

In the early 1980s, high levels of gun violence were associated with the burgeoning crack epidemic. In 1984, Congress enacted the Comprehensive Crime Control Act and the Armed Career Criminal Act, which enhanced the sentences of those convicted of using firearms in crimes of violence. In 1986, Congress extended these enhanced penalties to criminals who use or carry firearms during serious drug offenses. In 1998, Congress amended the GCA to provide for a mandatory seven-year enhancement for brandishing a firearm and a ten-year enhancement for discharging a firearm in the commission of a crime of violence or drug trafficking crime.

These amendments to the GCA imposed:

• A mandatory five-year prison term for using or carrying a firearm during a crime of violence or drug trafficking crime.

• A mandatory fifteen-year prison term for felons in possession of a firearm who had three prior convictions for violent felonies or serious drug offenses.

• Ten-Year sentence enhancement for using a short-barreled rifle or shotgun, or a semiautomatic assault weapon, in a crime of violence or drug trafficking crime.

• Thirty-Year sentence enhancement for using a machine gun, destructive device, or a firearm equipped with a silencer during a crime of violence or drug trafficking crime; and

• A twenty-year prison term or life imprisonment for a second or subsequent GCA offenses.

To take advantage of these stiffer penalties, in 1986 ATF developed the "Achilles Program" to concentrate on enforcing these new laws. The Achilles Program made firearms possession by violent criminals their "Achilles heel" by exposing them to lengthy prison sentences under the new firearms laws. ATF worked closely with U.S. Attorneys and state and local law enf6orcement officials to ensure that drug dealers and violent criminals were prosecuted in the forum where they would receive the greatest punishment for their crimes. These enforcement activities continue today.

III. A Step Backward: The Firearms Owners' Protection Act of 1986

In 1986, Congress loosened several controls it had established in the GCA. The stated purpose of the Firearms Owners' Protection Act of 1986 (FOPA) was to ensure that the GCA did not "place any undue or unnecessary Federal restrictions or burdens on law-abiding citizens," See Firearms Owners' Protection Act, Pub. L. No. 99-308, 100 Stat. 449 (1986), as amended.

but it opened many loopholes through which illegal gun traffickers can slip. In FOPA, Congress:

- Allowed FFLs to temporarily conduct business away from their normal place of business, such as at organized gun shows.

- Narrowed the scope of those who "engage in the business" of dealing in firearms (and are therefore required to have a license) to include only those who devote "time, attention, and labor to dealing in firearms as a regular course of trade or business with the principal objective of livelihood and profit through the repetitive purchase and resale of firearms." Significantly, FOPA excluded those who buy and sell firearms to "enhance a personal collection" or for a "hobby," or who "sell all or part of a personal collection." The complex definition made it difficult to identify illegal dealers who claim that they are mere "hobbyists" or trading firearms from their collection.
- Reduced the criminal penalties for certain recordkeeping offenses committed by FFLs, from felonies to misdemeanors.
- Prohibited ATF from centralizing or computerizing firearms purchase records.
- Permitted sales of ammunition without a license.
- Allowed a convicted felon to obtain firearms where the convicting jurisdiction automatically restored the felons' civil rights upon release from prison or completion of the sentence.
- Prohibited ATF from conducting more than one warrantless compliance inspection of a licensee in any 12 months.
- Required the government to prove either a "knowing" or "willful" state of mind for all GCA violations; and

- Required any forfeiture proceeding of any firearm or ammunition involved in any violation of the GCA to be commenced within 120 days of seizure.

On the positive side, FOPA finally banned the manufacture of machine guns for civilian use and made it unlawful for anyone, not just licensees, to sell firearms to prohibited persons.

A notable effect of FOPA was to direct ATF's enforcement efforts away from the legal and illegal firearms markets, and toward creating programs that sought primarily to identify, prosecute and punish violent criminals who used firearms in crime. For example, in the late 1980s, the Justice Department and ATF developed an intensive prosecution initiative known as "Project Trigger lock," which identified and prosecuted recidivist criminals under firearms laws that mandated long prison terms for repeat offenders.

IV. Reducing the Illegal Supply of Guns

Firearms violence continued to escalate throughout the 1980s and early 1990s, with increasing public concern that criminals were becoming even more heavily armed. Firearms enforcement efforts remained focused on the criminal users of firearms, not the markets in which criminals acquired their guns.

Following President Clinton's election in 1992, the Administration and Congress again focused on the need to keep guns out of the hands of criminals and juveniles not eligible to possess firearms. In 1993, after a legislative battle that spanned seven years, Congress finally passed, and President Clinton signed,

the Brady Handgun Violence Prevention Act. The Brady Law for the first-time empowered FFLs and law enforcement to combat the practice of "lying and buying." Although the GCA made it illegal for felons and other prohibited persons to possess or acquire firearms, FFLs had no way to know whether a customer was lying about his background to get a gun. The Brady Law changed this by requiring that FFLs check with law enforcement officials before selling a firearm. In this way, the Brady Law eliminated the "honor system" in firearms purchases, requiring verification of statements made by prospective purchasers that they are legally entitled to obtain a firearm.

From its effective date in early 1994 through November 30, 1998, the Brady Law required background checks for handgun purchases only. These background checks were done by individual state or local law enforcement officials, usually the local sheriff's office or police department. As of November 30, 1998, with the creation of the FBI's National Instant Criminal Background Check System (NICS), a computerized background check is now conducted to determine if a would-be gun buyer is legally permitted to acquire a gun. Depending on the individual state, an FFL may contact NICS directly or through their state point-of-contact. In its first year of operation, NICS denied firearms to more than 160,000 felons, fugitives, and other prohibited persons. Overall, since 1993, the Brady Law has prevented more than 500,000 prohibited persons from acquiring firearms from licensed dealers.

V. Reforming the Federal Firearms Licensing System

In a further effort to keep firearms out of the hands of criminals and regulate the illegal flow of guns, President Clinton directed a review of gun dealer licensing in August 1993. Recognizing that acquiring a gun dealer license was often easier than getting a driver's license, the directive seeks to ensure that only those engaged in a legitimate firearms business be licensed. At the time, it was estimated that over 40 percent of the licensees conducted no business at all but used their licenses to buy and sell firearms across state lines at wholesale prices, often in violation of state and local zoning or tax laws.

The Brady Law also changed the licensing procedures for FFLs by increasing the dealer licensing fee from $10 per year to $200 for three years. Subsequently, under the Violent Crime Control and Law Enforcement Act of 1994, licensees were required to submit photographs and fingerprints as part of their application, and to certify that their firearms business complied with all state and local laws, including zoning regulations. Because of these reform efforts, the number of FFLs dropped from over 282,000 in 1993 to fewer than 104,000 in 1999.

VI. The Youth Handgun Safety Act and the Youth Crime Gun Interdiction Initiative

Armed juveniles and school violence increasingly drew Congress' attention in the late 1980s. In response to several multiple school shootings, in 1990 Congress enacted the Gun-Free School Zones Act, which made it unlawful for anyone to

possess a firearm near a school. The Gun-Free School Zones Act was held unconstitutional by the Supreme Court in Lopez v. the United States, 514 U.S. 549 (1995) because the law lacked enough connection to interstate commerce. Congress thereafter amended the law to require that the firearm move in, or otherwise affect, interstate commerce.

Also, that same year, the Gun-Free Schools Act conditioned state receipt of federal education grant money on an agreement to expel any student found to have a firearm on school property. This law also requires grant recipients to refer any student who brings a gun to school to juvenile justice authorities.

Youth gun homicides escalated in the early 1990s, tripling between 1985 and 1993. In 1994, President Clinton signed into law the Youth Handgun Safety Act, which generally bans possession of handguns by people under age 18 and prohibits adults from transferring handguns to juveniles. Before this amendment, FFLs were prohibited from selling handguns to anyone under age 21, but there were no federal restrictions on the possession of handguns by juveniles or the transfer of handguns to juveniles by non-licensees.

The Youth Handgun Safety Act does not apply to long guns. Since the enactment of the Gun Control Act in 1968, FFLs have been prohibited from selling long guns to persons under age 18. However, no federal law prohibits possession of long guns, including "grandfathered" semiautomatic assault rifles, by juveniles. Nor is it unlawful for an unlicensed individual to transfer a long gun to a juvenile.

In 1996, ATF created the Youth Crime Gun Interdiction Initiative (YCGII) to develop better information about how youthful offenders obtain firearms and to use that information to arrest illegal gun traffickers and reduce youth gun violence. YCGII provides for comprehensive crime gun tracing. The program is based in cities plagued by youth firearms violence problems. YCGII began in 17 cities and now operates in 37 cities.

VII. The Assault Weapons Ban and Related Import Restrictions

In September 1994, Congress passed the Violent Crime Control and Law Enforcement Act which made it unlawful, with certain exceptions, to manufacture, transfer, or possess semiautomatic assault weapons. Congress had been presented with significant evidence demonstrating that these weapons were "the weapons of choice among drug dealers, criminal gangs, hate groups, and mentally deranged persons bent on mass murder," (H.R. Rep. No. 103-489, at13 (1994) and concluded these guns were so dangerous they had no place in the civilian marketplace. The 1994 Act also made it unlawful to possess or transfer large capacity ammunition feeding devices, generally defined as a magazine, belt, drum, feed strip, or similar device that can hold more than 10 rounds of ammunition.

In 1997, members of Congress and others expressed concern that certain rifles modified to evade the assault rifle ban continued to be imported into the country. Based on this concern and the fact that nearly ten years had elapsed since the last

comprehensive review of the importation of rifles, the Department of the Treasury conducted a study to determine if certain modified semiautomatic assault rifles met the GCA's sporting purposes test. In an April 1998 report, the Department issued a determination that modified semiautomatic assault rifles that could accept a large capacity military magazine were not for sporting purposes under the GCA and could not be imported.

The 1994 ban on semiautomatic assault weapons and large capacity feeding devices continues to have significant deficiencies in meeting its stated objectives. For example, the ban only applies to assault weapons and magazines manufactured after September 13, 1994, thereby "grandfathering" thousands of weapons and magazines. Moreover, the ban's definition of assault weapons is so narrow and that it does not prohibit the manufacture, transfer, and possession of many weapons that can fire many rounds of ammunition quickly, without being reloaded.

VIII. State and Local Firearms Laws

Through their independent efforts and in collaboration with the federal government, state and local governments play a crucial role in the effort to reduce firearms crimes and accidents. Some state laws place more stringent controls on the use and possession of firearms than federal law. For example:

- In 1993, Virginia limited handgun sales to one per month per person, resulting in a significant drop in the percentage of guns that had been purchased in Virginia and used in crimes in New England.
- Maryland's ban on the production and sale of unreliable, inexpensive handguns has reduced the frequency with which the banned handguns are used in crime in that state.
- In 1995, Nevada took a significant step toward preventing felons from possessing firearms by passing legislation that allows a private person who wishes to transfer a firearm to another person to request a background check on the transferee from the Nevada criminal history records repository.
- Connecticut recently amended its laws to provide that individuals adjudicated delinquent for committing serious juvenile offenses are not eligible to possess firearms or receive permits to carry firearms as adults.
- In 1992, Hawaii made it a misdemeanor to store or leave a firearm, loaded or unloaded, within reach or easy access of anyone younger than 16 years of age.
- California generally requires all firearms transfers to be processed through an FFL. It also recently passed other strong gun control measures, including provisions that limit handgun purchases to one per month, require all assault weapons to be registered, and prohibit the sale or manufacture of unsafe handguns.

IX. The Youth Crime Gun Enforcement Act

In November 1998, the President directed the Secretary of the Treasury and the Attorney General to make recommendations responding to the fact that criminals and other prohibited persons can obtain firearms at gun shows without Brady Law background checks. Under current law, large numbers of firearms are sold anonymously at the more than 4,000 gun shows held each year. Most sellers at gun shows do not seek background checks on purchasers to find out if the buyer is a felon or otherwise prohibited from possessing a firearm. In January 1999, the Departments of the Treasury and Justice responded with a report describing the gaps in current law and recommending by extending the Brady Law to "close the gun show loophole" (Violence Policy Center, n.d).

In recognition of the need to strengthen our federal firearms laws as part of a comprehensive effort to reduce gun violence, the Administration developed a gun safety bill that was submitted to Congress in April 1999. The Youth Gun Crime Enforcement Act of 1999 (YGCEA) is intended to strengthen federal firearms laws and make it more difficult for juveniles and criminals to gain access to guns. Among the provisions contained in the bill are those to close the gun show loophole, strengthen penalties against gun traffickers, and reduce youth access to firearms".

Appendix D: MSA/Methodology/Stanford_MSA_Data_Dictionary

MSA/Methodology/Stanford_MSA_Data_Dictionary
.csv
Find file Copy path
"hospitality facility" with ""ab75e7d on Jul 7, 2016

Total Number of Victims	Field	Number	
Total Number of Fatalities	Field	Number	The total number of people killed during the incident, including the shooter(s) when applicable. This number includes the shooter(s) if he/she was killed or committed suicide during the incident.
Description	Field	Text	A brief, detailed description of the incident. Write the description in your own words. Please do not copy-paste text from any source. DO NOT INCLUDE THE NAME OF THE SHOOTER.
Date	Field	Number	The date of the first day the incident occurred. In cases where there are multiple days involved please input the date of the first day the incident occurred.
Date - Detailed	Field	Text	The date, including the day of the week, when the incident occurred.
Day of Week	Field	Text	The day of the week on which the incident occurred.
Shooter Name	Field	Text	The full name of the shooter(s); first, middle and last name. Note: Never display the name of the shooter on any visual public interface. Do not place the name in the description field.
Number of shooters	Field	Number	Number of shooter perpetrators involved in the incident
Shooter Age(s)	Field	Number	Shooter(s) age at the time of the incident. In cases where there are multiple shooters involved please select the AVERAGE NUMBER between the ages.

Average Shooter Age	Field	Number	The average age of all shooters involved in the incident	
Shooter Sex	Field	Text	The sex of the shooter(s).	
Female	Variable	Text	Gender-related variable	Examples
Male	Variable	Text	Gender-related variable	
Shooter Race	Field	Text	The race or ethnic background of the shooter(s). Categories based 2000 US Census Bureau survey.	Essex, Chittenden County, Vermont
White American or European American	Variable	Text	Those having origins in any of the original peoples of Europe, the Middle East, or North Africa.	
Black American or African American	Variable	Text	Those having origins in any of the racial and ethnic groups of Africa.	
Native American or Alaska Native	Variable	Text	Those having origins in any of the original peoples of North, Central and South America, and who maintain tribal affiliation or community attachment.	Redwood City
Asian American	Variable	Text	Those having origins in any of the original peoples of the Far East, Southeast Asia, and the Indian subcontinent; frequently specified as Chinese American, Korean American, Indian American, Filipino American, Vietnamese American, Japanese American, etc.	California
Native Hawaiians or Other Pacific Islander	Variable	Text	Those having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.	16
Some other race	Variable	Text	Respondents may write how they identify themselves if different from the foregoing categories. Responses have included Mestizo, Creole, and Mulatto, which are generally considered to be categories of multi-racial ancestry, such as African and European, but, write-in entries reported in the 2000 census also included nationalities, such as South African, Moroccan, Belizean, Mexican, Puerto Rican,	0

			Cuban, as well as other mixed-race terms like Wesort, mixed, interracial, and others. 95% of the people who report in this category are of Hispanic and Latino origin.	
Two or more races	Variable	Text	Those who check off and/or write in more than one race. There is no option labeled "Two or more races" or "Multiracial" on census and other forms; people who report more than one of the foregoing six options are classified as people of "Two or more races" in subsequent processing. Any respondent may identify with any number, up to all six, of the racial categories.	
Unknown	Variable	Text	There are no current records on the shooter's race	
Type of Gun - Detailed	Field	Text	Detail information about the guns(s) involved in the incident. Please state the name and the type of gun (shotgun) as well as the caliber if possible. Caliber: diameter of the barrel, or the diameter of the projectile Pistols = Handgun Rifle = A rifle is a firearm designed to be fired from the shoulder; it has a barrel or barrels less than 16 inches in length Shotgun = designed to be fired from the shoulder; it has a barrel or barrels less than 18 inches in length http://www.atf.gov/files/publications/download/p/atf-p-5320-8/atf-p-5320-8-chapter-2.pdf http://www.atf.gov/firearms/guides/identification-of-nfa-firearms.html#m-2-carbine	
Type of Gun - General	Field	Text	General gun categories reflecting the gun(s) type involved in the incident. Handgun = Handgun, pistols, revolver Rifle = A rifle is a firearm designed to be fired from the shoulder; it has a barrel or barrels less than 16 inches in length. Shotgun = designed to be fired from the shoulder; it has a barrel or barrels less than 18 inches in length http://www.atf.gov/files/publications/download/p/atf-p-5320-8/atf-p-5320-8-chapter-2.pdf	17
Shotgun	Variable	Text	Type of gun-related variable	
Rifle	Variable	Text	Type of gun-related variable. Includes carbines	MM/DD/YYYY

Handgun	Variable	Text	Type of gun-related variable. Includes pistols, revolvers.	Friday, December 14, 2012
Multiple guns	Variable	Text	Type of gun-related variable, More than one-gun type	Friday
Number of Shotguns	Field	Number	The number of shotguns used during the incident.	Mark James Robert Essex
Number of Rifles	Field	Number	The number of rifles used during the incident.	
Number of Handguns	Field	Number	The number of handguns used during the incident.	25
Total Number of Guns	Field	Number	The total number of guns used during the incident.	
Number of Automatic Guns	Field	Number	The number of automatic gun(s) used. Need to verify which types	Male
Number of Semi-Automatic Guns	Field	Number	The number of semi-automatic gun(s) used. Need to verify which types.	
The fate of Shooter at the scene	Field	Text	A general category describing the fate of the shooter at the time of the incident.	
Deceased	Variable	Text	The fate of shooter related variable	White
Custody	Variable	Text	The fate of shooter related variable	
Escaped	Variable	Text	The fate of shooter related variable	
Fate of Shooter	Field	Text	A general category describing the fate of the shooter following the incident	
Deceased	Variable	Text	The fate of shooter related variable	
Custody	Variable	Text	The fate of shooter related variable	
Escaped	Variable	Text	The fate of shooter related variable	
Shooters Cause of Death	Field	Text	The general cause of death at the time of the incident.	
Killed	Variable	Text	Cause of death related variable	
Suicide	Variable	Text	Cause of death related variable	.12-gauge pump-action shotgun
Not applicable	Variable	Text	The shooter did not die during the incident	Shotgun

School Related	Field	Text	Was the incident school-related; did the main incident take place in a school, yes or no?	
Yes	Variable	Text	School-related, variable	
No	Variable	Text	School-related, variable	
Place Type	Field	Text	A general category of the location where the initial or main incident occurred.	1 Shotgun and 2 Rifles
Park/Wildness	Variable	Text	Outdoor places for recreation.	0
Place of worship	Variable	Text	Facilities that provide an environment where community members come to worship with other members of the community.	0
Government facility	Variable	Text	A facility that houses local, state, or federal government services/representation.	2
Military facility	Variable	Text	A facility that houses military training/services/representation.	5
Medical/Care	Variable	Text	A facility that provides medical services and cares for people in the community.	2
College/University/Adult education	Variable	Text	A facility of higher education, public and private learning	0
Public transportation	Variable	Text	A private or public transit facility or vehicle.	Deceased, Arrested, Escaped
Residential home/Neighborhood	Variable	Text	A housing unit or neighborhood which houses people of the shooter's community.	
Restaurant/Cafe	Variable	Text	A restaurant or cafe business.	
Retail/ Wholesale/Services facility	Variable	Text	A business facility dedicated to retail wholesale or services.	
Entertainment venue	Variable	Text	A facility that provides entertainment for the general public.	
Street/Highway	Variable	Text	A residential/main street or highway.	
Primary school	Variable	Text	A facility that provides a preprimary and primary, public, and private education.	
Secondary school	Variable	Text	A facility that provides secondary, public, and private education.	

Company/Factory/Office	Variable	Text	A facility where people work during a similar time period; an individual business dedicated to the management of other chains; factory.	Killed, Committed suicide
Hospitality Facility	Variable	Text	A hotel, motel, resort, or other facility-related to hospitality.	
Unknown	Variable	Text	The place where the incident was committed was not found in public documentation relating to the event.	
Relationship to Incident Location	Field	Text	The shooter's relationship to the place where the initial shooting occurred or place where the main shooting occurred.	
Place of residency	Variable	Text	The place where the shooter, or someone he knew, resided before or at the time of the incident. This place could be a house, apartment unit, or neighborhood where the shooter resided.	No
Place of business/employment	Variable	Text	The place where the shooter or someone he knew, conducted business, was employed, had a business transaction or relationship before or at the time of the incident.	
Place of recreation	Variable	Text	The place where the shooter or someone he knew, spend their recreational time, at the time of the incident.	
Place of schooling	Variable	Text	The place where the shooter or someone he knew, went to school, before or at the time of the incident.	Medical/care facility
Local government	Variable	Text	The place where the shooter's local government resides.	City or Co. parks & fields, open spaces, playgrounds. National parks & forest
None	Variable	Text	No apparent relationship to the place.	Church, community center (used for religious services).

Unknown	Variable	Text	The relationship the shooter or his victim/s had to the place where the incident occurred is unknown to us.	City hall, social security office, courthouse.
Targeted Victim/s - Detailed	Field	Text	Detail description of the initial targeted victim/s involved in the incident.	Navy yard, military base
Targeted Victim/s - General	Field	Text	A general category used to classify the initial targeted victim/s involved in the incident.	Hospital, clinic, nursing home.
Family	Variable	Text	The shooter's family member/s or the shooter's former or current, partner's family member/s.	University, College, Vocational, or Institutes
Romantic partner	Variable	Text	The shooter's, estranged or current, romantic partner at the time of the incident.	Bus, train, shuttle, taxicab, transit station, airport.
Colleague/Workmate/Business acquaintance	Variable	Text	The shooter's former, or current, colleague at the time of the incident or the shooter's former or current, partner's colleagues. Shooter's former, or current, business acquaintance at the time of the incident	House, apartment, houseboat, mobile home.
Students/Classmates/Teacher	Variable	Text	The shooter's former, or current, schoolmate/s or students at the time of the incident. The shooter's former or current teacher/professor at the time of the incident	
General public	Variable	Text	The targeted victims appear to have been random targets.	Retail wholesale examples: shopping centers, retail stores (clothing, pet store, food store), market. Retail services examples: car

				wash, beauty salon, dry cleaning, laundry mat.
Racial/Religious group	Variable	Text	The shooter's targeted victim/s was based on race and/or religious beliefs.	Cinema, nightclub, theater, circus, sports venues.
Government	Variable	Text	The targeted victims are local, state or federal government employees, such as policeman, military, etc.	Residential street
Social	Variable	Text	The victim/s relationship to the shooter at the time of the incident was based on a current or previous social relationship between the victim and the shooter, or someone the victim knew. This social relationship was built outside or inside a school facility. Includes neighbors	Preschool, elementary school, junior high school
Unknown	Variable	Text	Information about the victim/s and their relationship to the shooter is unknown to us.	High school
Possible Motive - Detailed	Field	Text	Detail description of the potential motive for the shooting. What did the shooter think and/or feel before the shooting, why did the shooter start shooting, and who was the main target.	
Possible Motive - General	Field	Text	The general category of potential motives for the shooting.	
Mental illness	Variable	Text	The potential motive for the shooting could be attributed to the mental health problem/s.	
Neurological disorder	Variable	Text	The potential motive for the shooting could be attributed to any disorder of the body nervous system, such as brain tumor, brain damage, brain dysfunction, brain injury and epilepsy	
Political/Religious ideals	Variable	Text	The potential motive for the shooting could be attributed to political or religious ideals.	The place the incident occurred was the shooter's girlfriend's home.

Legal dispute	Variable	Text	The potential motive for the shooting could be attributed to a legal dispute.	
Financial difficulties	Variable	Text	The potential motive for the shooting could be attributed to financial hardship.	The club, school dance, sporting event, restaurant, social events (house parties).
Race	Variable	Text	The potential motive for the shooting could be attributed to targeting a particular racial group	
Drug use	Variable	Text	Potential motive for the shooting could be attributed to drug use	
Rejection	Variable	Text	Potential motive for the shooting could be attributed to social rejection.	
Grief	Variable	Text	Potential motive for the shooting could be attributed to grief.	
Retribution	Variable	Text	Potential motive for the shooting could be attributed to retribution.	
Expulsion/Suspension	Variable	Text	Potential motive for the shooting could be attributed to getting expelled from school/university/college/institute, and other social learning groups and institutions, organizations.	
Domestic dispute	Variable	Text	Potential motive for the shooting could be attributed to a domestic dispute.	
Terminated/Denied/Reprimanded	Variable	Text	Potential motive for the shooting could be attributed to getting terminated from work, denial of status, being reprimanded or punished for the workplace, or other behavior.	
Financial dispute	Variable	Text	Potential motive for the shooting could be attributed to financial non-legal disputes.	
Harassment	Variable	Text	Potential motive for the shooting could be attributed to the shooter being harassed, bullied by others.	
Failure	Variable	Text	Potential motive for the shooting could be attributed to a sense of failure or failure at a sport, game, school grade, etc.	

Social dispute	Variable	Text	Potential motive for the shooting could be attributed to social disputes. A social dispute could be a dispute over a girl, a dispute over power, a dispute over masculinity, or anything related to gender and society.	
Unknown	Variable	Text	Unknown or Under investigation so the status may be changed	
Multiple motives	Variable	Text	Potential motive for the shooting could be attributed to multiple motives.	
Gender	Variable	Text	Potential motive for the shooting could be attributed to targeting a particular gender group	
Robbery	Variable	Text	Motive appears to be robbery. This indicates the shooting was a secondary motive. Indicates a depreciation value of '2'	
History of Mental Illness - Detailed	Field	Text	Detail description of any known mental illness history the shooter may have had during the time of the incident.	
History of Mental Illness - General	Field	Text	An indication of whether the shooter had a mental illness during the time of the incident.	
Yes	Variable	Text	History of mental illness-related variable	
No	Variable	Text	History of mental illness-related variable	The shooter did not agree with the local political elections, so he decided to shoot everyone at a local government office.
Unknown	Variable	Text	Unknown or Under investigation so the status may be changed	
Data Source 1	Field	Text	The data source link 1	
Data Source 2	Field	Text	The data source link 2	
Military Experience	Field	Text	An indication of whether the shooter had previous military experience	
Yes	Variable	Text	Previous military experience related variable	

No	Variable	Text	Previous military experience related variable	
Unknown	Variable	Text	Unknown or Under investigation so the status may be changed	
Class	Field	Text	An indication of the number of victims and fatalities, as well as the time span and location of the incident and any mention of gang or drug-related activity	
Mass Shooting (MS)	Variable	Text	3 or more people shot (not including the shooter, do not need to be fatalities). Usually a single location, but possibly multiple locations. Single incident (did not occur over more than a single day). Motive appears to be indiscriminate. Not identified as gang or drug-related by media.	
Spree Killing (SPK)	Variable	Text	3 or more fatalities (not including the shooter). Multiple locations. May consist of multiple incidents but over a relatively short time span. No *cooling-off period* between shootings.	1. Shooter was denied tenure, therefore, he decided to shoot his colleagues. 2. Shooter was terminated from work, therefore, he decided to shoot his boss.
Serial Killing (SEK)	Variable	Text	Multiple fatalities in multiple locations over a long period of time. May include a significant 'cooling-off period' between incidents.	
Gang or Drug-Related (GD)	Variable	Text	Shooting incidents where media or police reports tie the incident to gang or drug-related activities.	The shooter was bullied for years so he decided to shoot his harasser.
Family Murder-Suicide (FMS)	Variable	Text	Shooting incidents where family members (or non-platonic friends) are the primary targets and the shooter commits suicide.	The shooter got a failing grade, so he

				shot his teacher.
Depreciation	Field	Number	Field to indicate uncertainty regarding the details of a case or depreciation of a case as a result of information that surfaces after the initial data collection began	The shooter was in dispute with another man, over a girl so he decided to shoot and kill three people.
0	Variable	Number	'0' indicates the case clearly does not fit the criteria for inclusion in the database	
1	Variable	Number	'1' indicates the case clearly fits the criteria for inclusion in the database	
2	Variable	Number	'2' indicates there is uncertainty regarding the details of the case;	
History of Mental Illness - General	Field	Text	An indication of whether the shooter had a mental illness during the time of the incident.	
Yes	Variable	Text	History of mental illness-related variable	
No	Variable	Text	History of mental illness-related variable	
Unknown	Variable	Text	Unknown or Under investigation so the status may be changed	
Data Source 1	Field	Text	The data source link 1	
Data Source 2	Field	Text	The data source link 2	
Military Experience	Field	Text	An indication of whether the shooter had previous military experience	
Yes	Variable	Text	Previous military experience related variable	
No	Variable	Text	Previous military experience related variable	
Unknown	Variable	Text	Unknown or Under investigation so the status may be changed	
Class	Field	Text	An indication of the number of victims and fatalities, as well as the time span and location of	

			the incident and any mention of gang or drug-related activity	
Mass Shooting (MS)	Variable	Text	3 or more people shot (not including the shooter, do not need to be fatalities). Usually a single location, but possibly multiple locations. Single incident (did not occur over more than a single day). Motive appears to be indiscriminate. Not identified as gang or drug-related by media.	
Spree Killing (SPK)	Variable	Text	3 or more fatalities (not including the shooter). Multiple locations. May consist of multiple incidents but over a relatively short time span. No *cooling-off period* between shootings.	
Serial Killing (SEK)	Variable	Text	Multiple fatalities in multiple locations over a long period of time. May include a significant 'cooling-off period' between incidents.	
Gang or Drug-Related (GD)	Variable	Text	Shooting incidents where media or police reports tie the incident to gang or drug-related activities.	
Family Murder-Suicide (FMS)	Variable	Text	Shooting incidents where family members (or non-platonic friends) are the primary targets and the shooter commits suicide.	
Depreciation	Field	Number	Field to indicate uncertainty regarding the details of a case or depreciation of a case as a result of information that surfaces after the initial data collection began	
0	Variable	Number	'0' indicates the case clearly does not fit the criteria for inclusion in the database	There are definitely drugs/gangs involved
1	Variable	Number	'1' indicates the case clearly fits the criteria for inclusion in the database	
2	Variable	Number	'2' indicates there is uncertainty regarding the details of the case;	Shooting is not the primary motive, it's a robbery. Or there is disagreement about

gang/drug
involvement