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SUICIDAL IDEATION AMONG UNITED STATES VETERANS: A SYSTEMATIC REVIEW

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SUICIDAL IDEATION AMONG UNITED STATES VETERANS: A SYSTEMATIC REVIEW

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Public Health

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by

Champagne Moore

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ABSTRACT

Objective: The goal of this study was to conduct a systematic review of suicidal ideation and associated factors among US veterans.

Methods: PRISMA guidelines for identifying and collecting published peer-reviewed articles were employed. Article characteristics were assessed, and trends were analyzed.

Results: Study results show that US veterans have higher rates of suicide as compared to non-US veterans. Among US veterans, the most common means of suicide was firearms, especially among males. Factors such as gun legislation was related to suicide rate among the population.

Conclusion: Veteran suicide prevention must be a public health priority. Prevention measures should further address sex differences, as well as policy considerations that perpetuate such rates.

ACKNOWLEDGEMENTS

To my beloved son. Everything that I do is for you to look up to, and to know and believe that you can do all things you set your mind to.

To my brothers and sisters in arms. This thesis is dedicated to the battle buddies that we have lost, and that we remain strong and beat the statistics.

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CHAPTER ONE

INTRODUCTION

Problem Statement

Suicide is a major issue in the United States (US). It can be defined as death caused by self-directed injurious behavior with intent to die as a result of the behavior (National Institute of Mental Health, 2019). On average, there are 129 suicides committed daily (National Institute of Mental Health, 2019). In 2017, it was ranked as the 10th leading cause of death in the US (American Foundation for Suicide Prevention, 2020). From 2001 through 2017, the total suicide rate increased 31% from 10.7 to 14.0 per 100,000 (National Institute of Mental Health, 2019). About 40,000 people commit suicide per year, and in the year 2017, 47,173 Americans committed suicide (American Foundation for Suicide Prevention, 2020). The rates of suicide are highest in middle-aged Caucasian males. In addition, males are 4 times more likely to die from suicide compared to females, but females attempt suicide 3 times more than males (McCarthy et al., 2009). Although suicide is an issue among all Americans, it has remained an ongoing conflict for military veterans.

Veterans are considered a unique and vulnerable population. During and after military service, soldiers face physical, mental, and social issues. Some of these issues may include depression, substance abuse, Post-Traumatic Stress Disorder (PTSD), military sexual trauma, homelessness (1in 4 Americans), and

trouble adjusting to civilian life (American Public Health Association, 2014). All of the issues that veterans face highly lead to the statistical estimates in 2010 which found that 22 veterans commit suicide daily (American Public Health Association, 2014). The suicide rates for veterans are 1.5% higher than civilian suicides, and the rate for female veterans nearly doubles in comparison to non-veteran females (Horwitz et al., 2019; Office of Mental Health and Suicide Prevention, 2018).

Although, there are different methods in which people commit suicide, firearms remain the leading method used in the US accounting for 52.1% of suicides (Hoffmire & Bossarte, 2014; Kaplan et al., 2009). It has been proven that more veterans use firearms to commit the act of suicide in comparison to non-veterans. In a study conducted using data from the 2003-2006 National Violent Death Reporting System (NVDRS), it was found that 84% of suicides by male veterans were committed with firearms compared to 55% of non-veteran males (Kaplan et al., 2009). In 2008, it was found that 38% of suicides among veteran women using the Veteran's Health Administration (VHA) services involved firearms, versus 30% of female non-veterans (McCarten et al., 2015). With their access, knowledge, and comfortability with using firearms, more veterans use firearms as their mechanism of choice to commit suicide (Hoffmire & Bossarte, 2014; McCarten et al., 2015). Given the disproportionate burden of suicide ideation, attempts, and completions among veterans, there is an imperative need

to address the key determinants of such behavioral outcomes, especially with the use of firearms.

Purpose of Study

The purpose of this study is to evaluate the determinants of suicidal ideation, attempts, and completions among US veterans through a systematic review.

Research Questions

1. What are the characteristics associated with suicidal behaviors (ideation, attempts, and completions) among US veterans?
2. What means of suicide is the most common among US veterans?
3. Are there differences in suicidal behaviors in male versus female US veterans?

Significance to Public Health

Evaluating the determinants of suicidal ideation, attempts, and completions among US veterans is important to the field of public health with hopes to reduce disparities and raise awareness to veteran suicide. This will be accomplished through a systematic review. Systematic reviews incorporate the results of multiple primary studies related to each other by using strategies that reduce biases and random errors with a goal of producing a reliable conclusion (Ganeshkumar & Gopalakrishnan, 2013).

The following MPH competencies will be met in the present thesis:

Competency 1: Perform effectively on interprofessional teams.

During this thesis, a team of professionals from various fields will be consulted with during data collection/analysis processes.

Competency 2: Interpret results of data analysis for public health research, policy or practice. Results of quantitative data analysis using SPSS software will be interpreted to address the role of firearms in relation to suicide amongst veterans.

Competency 3: Communicate audience-appropriate public health content, both in writing and through oral presentation. Appropriate public health content will be communicated in writing with the publication of this thesis. The oral presentation will include the defending of this thesis in front of peers, faculty, and public health professionals.

Competency 4: Evaluate interdisciplinary health behavior theories to promote health equity among vulnerable populations. This thesis will evaluate health behavior theories with the intentions of promoting health equity among the vulnerable population of veterans in accordance with suicide.

Competency 5: Apply negotiation and mediation skills to address organizational or community challenges. In this thesis, negotiation and mediation skills will be applied to address the community challenges of suicide amongst veterans.

CHAPTER TWO

LITERATURE REVIEW

Suicide Amongst Veterans

With the suicide risk of veterans being 22% higher than the risk for civilian adults in the US, it is indeed a public health issue (Kaplan et al., 2009; VHA Office of Suicide Prevention, 2016). The morbidity and mortality of suicide burdens society with economic costs, emotional trauma it may inflict on families, and the loss of potential years of life (Kaplan et al., 2009). With veterans being a vulnerable population, it is imperative to further study the characteristics, methods, and gender differences of suicides (committed and attempted) and suicidal behaviors amongst veterans.

Characteristics

There are some similarities and differences between the characteristics among veterans and non-veterans when it comes to suicidal behavior. A major distinction is the exposure to war that veterans may face. From experiences seen on the battlefield or just from being in the military alone, many veterans have PTSD or other mental disorders that may aid in them having suicidal ideations (Freeman et al., 2003; Miller et al., 2012; Valenstein et al., 2019).

A study performed by Freeman and colleagues (2003), studied 78 veterans in various rehabilitation programs in Veteran Affairs (VA) hospitals. The participants included veterans undergoing substance abuse addiction treatment and patients diagnosed with schizophrenia and PTSD. They were asked to

answer a weapons-use survey and they were measured on psychopathology. The results of the study indicated that the PTSD patients surveyed were found to have four times as many firearms as other subjects and reported significantly higher levels of potentially dangerous firearm-related behaviors than the other psychiatric subjects surveyed (Freeman et al., 2003).

With many young veterans being exposed to traumatic situations, and older war veterans dealing with the repercussions of war, certain age groups are more at risk to commit suicide. In a Cross-sectional study administered by Kaplan, Bentson and colleagues (2009), It was found that veterans aged 18-34, and over the age of 65 had the highest firearm suicide rates (Kaplan et al., 2009). The same study associated substance abuse, being married, and Caucasian as factors that contributed to using a firearm to commit suicide (Kaplan et al., 2009).

Firearms

Veterans are twice as likely than the general population to die by suicide (Anestis & Capron, 2016). A major part of the issue is that the veteran population is accustomed to using firearms, and when a firearm is used as a method of suicide it is successful majority of the time (Hoffmire & Bossarte, 2014). More than half of the suicide deaths in the US yearly are due to firearms, and it has been proven that suicide is about 5 times more likely in the home of gun owners (Anestis & Capron, 2016; Kaplan et al., 2009). Approximately half of all veterans are firearm owners. Out of the 45% of veteran firearm owners, 47% of them are

male and 34% are female. Compared to the general population, 22% own firearms (34% males, and 12% females) (Valenstein et al., 2019).

It was proven by Anestis & Capron (2016), that veterans tend to live in states without handgun legislation which correlated to some states having higher veteran suicide rates than others (Anestis & Capron, 2016). Due to accessibility, knowledge, and familiarity with weapons, firearms have been used as the primary method of suicide for veterans (Hoffmire & Bossarte, 2014; Kaplan et al., 2009; McCarten et al., 2015; Miller et al., 2012). According to the Veterans Health Administration (VHA) Office of Suicide Prevention in 2016, 68% of male veteran suicide deaths and 41% of female veteran suicide deaths involved firearms. In comparison to the general public, 57% of males and 31% of females committed suicide using a firearm in 2016; this proves that veterans are more likely than civilians to use a firearm as a suicide method (Centers for Disease Control Office of Statistics and Programming, n.d.).

A study conducted by Valenstein et al. (2019), discovered that out of 677 veterans receiving mental health care in 5 different US Department of VA facilities, 45.3% of veteran respondents reported having household firearms. 46.9% of the veterans with household firearms had suicidal thoughts and 55.6% had an actual suicide plan (Valenstein et al., 2019). The study discovered that many veterans receiving mental health care had readily available access to firearms. To reduce suicide in this population, it was suggested that there is a need for an increase of clinician-patient discussions/interactions about firearms

and suicide, and more health system efforts should be enforced to reduce firearm accessibility.

Males Vs. Females

Males. There is a definite correlation between veterans of both genders and firearms in association with suicide (Hoffmire & Bossarte, 2014; Horwitz et al., 2019; Valenstein et al., 2019). In the study conducted by Kaplan, Bentson and colleagues (2009), the NVDRS was utilized to assess the suicide rate of veterans in comparison to non-veterans from the time period of 2003-2006. It was found that the suicide rate of male veterans using a firearm was 81% higher compared to non-veteran males who committed suicide using a firearm (Kaplan et al., 2009). Male veterans aged 18-34 years old were found to use firearms to commit suicide 150% more times than non-veterans of the same age group (Kaplan et al., 2009).

It was also discovered that alcohol usage and health problems in males had an association to them committing suicide (Kaplan et al., 2009). Oddly enough, it was found that veteran males have a lesser chance of committing suicide due to depressed moods, substance abuse, or financial problems compared to civilian males (Horwitz et al., 2019).

Females. The suicide rates of females were found to be 3 times higher than non-veteran females (Kaplan et al., 2009). Based on the study conducted by Kaplan, Bentson, and colleagues (2009), firearms were utilized more as a means of suicide in older aged female veterans compared to younger female veterans

(Kaplan et al., 2009). The characteristics of veteran female suicides consisted of depressed moods and interpersonal issues which was consistent with the findings of civilian females, with the difference in that more veteran females used firearms as a suicide method (Horwitz et al., 2019). Compared to males, female occupations could also be considered as a factor in female suicides (Kaplan et al., 2009).

There is not a significant amount of literature that evaluates the determinants of suicidal ideation, attempts, and completions among US veterans, and the characteristics of female and male veterans. Through a systematic review, data will be accumulated to further assess the differences in suicidal behaviors in US veterans in association with the usage of firearms.

CHAPTER THREE

METHODS

Study Design

This study is a systematic literature review. A systematic literature review was used in order to critically assess and evaluate other research studies that addressed the relationship between veterans and suicide in relation to firearms. A systematic review uses a systematic method to collect secondary data. The method used includes utilizing pre-defined eligibility criteria and the review is conducted according to a pre-defined methodological approach as outlined in an associated protocol (PRISMA-P Group et al., 2015). The methods used in systematic reviews are put forth to minimize bias with an effort to produce reliable conclusions.

Data Source and Collection

To collect the data used in this study, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was used. A database using PRISMA was identified by searching through PubMed articles. The keywords used to specify the purpose of this study were “veteran”, “suicide”, and “firearm”. 17 articles populated from those keywords, but 8 were excluded due to not containing the adequate information and literature needed for this study. Full-text articles excluded with reasons were due to not focusing on the veteran

population. Full-text articles that were eligible for the study resulted in 9 articles, and the studies included quantitative data (Figure 1).

Data Analysis

A data analysis table (Table 1, Ch.4) was used to show the information that was collected from the articles. The information presented on the data analysis included 9 articles with the name of the authors and the publication dates. The table displayed how the primary variable of firearms and the secondary variable of suicide was defined in each article.

Table 2 (Ch.4), a second data analytic table was used to collect the primary results from each article used in the systematic review and any additional information. This table also included 9 articles with the names of the authors and the publication dates.

Ethics

This study does not employ human subject research.

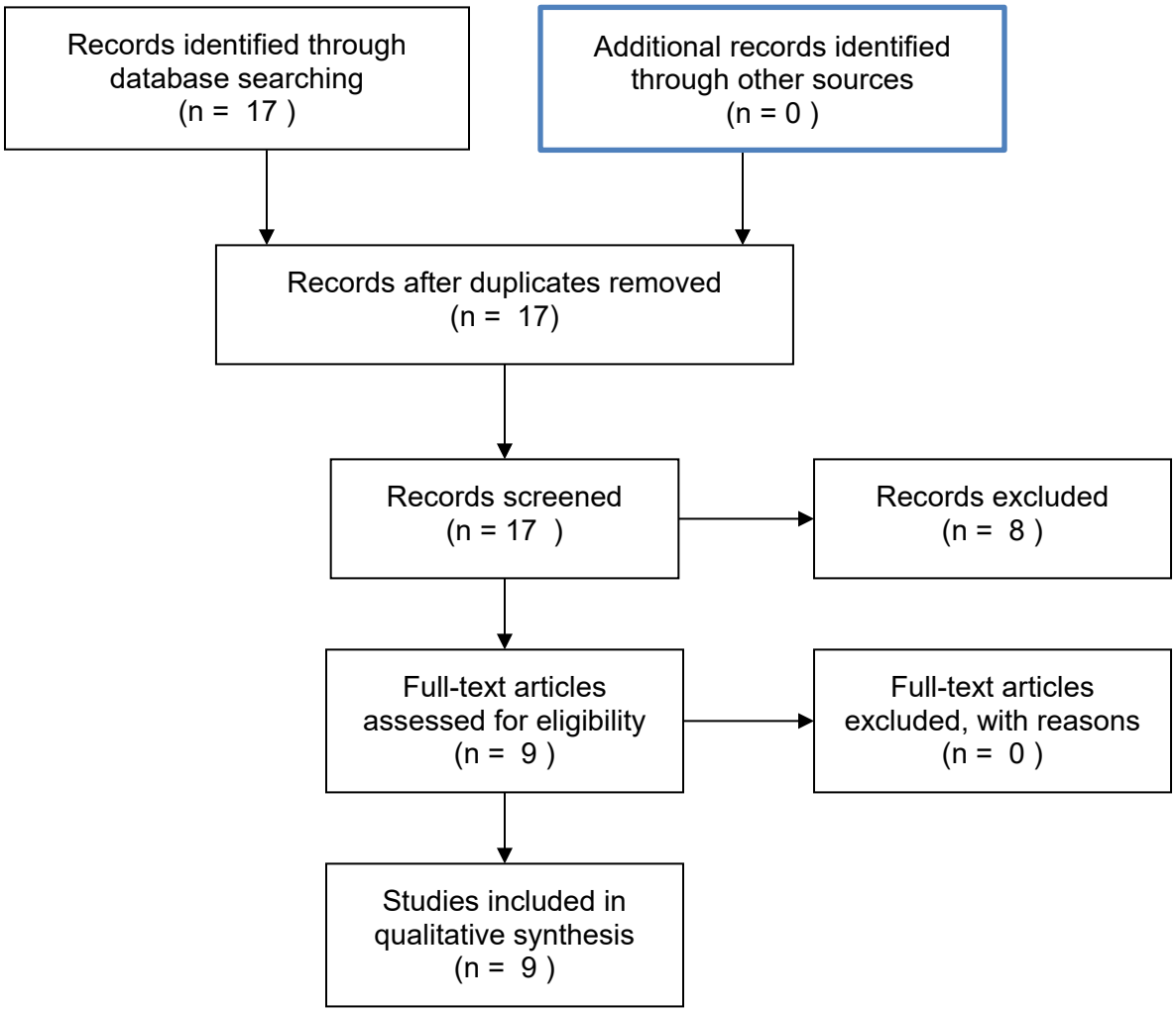

Figure 1. Systematic Review Flow Diagram using PRISMA

CHAPTER FOUR

RESULTS

The results of this study were analyzed in relation to the following research questions:

1. What are the characteristics associated with suicidal behaviors (ideation, attempts, and completions) among US veterans?
2. What means of suicide is the most common among US veterans?
3. Are there differences in suicidal behaviors in male versus female US veterans?

Study Identification Characteristics

The earliest publication date of articles included in this systematic review was 2003 while the latest was 2019. All of the studies were cross-sectional studies except one, which was a retrospective-cohort study. The settings and locations of the studies were similar in that they all were conducted in the US and that they used a component of the VHA, VA, National Violent Death Reporting System (NVDRS), or the Department of Defense (DOD) to produce results. Six studies used all veterans as the population, while two studies used civilians and veterans, and one study used only male veterans as their population.

Study Identification Results

Qualitative analyses of results show that firearms were a common means of suicidal attempt and completion among US veterans. Two studies found a unique theme where veteran population size (Anestis & Capron, 2016), and physical health problems (Horwitz et al., 2019) were also contributing factors to suicidal behavior among US veterans. In relation to other psychiatric subjects, one study found that veterans with PTSD had four times as many firearms in comparison and reported significantly higher levels of potentially dangerous firearm-related behaviors (Freeman et al., 2003). Two studies discovered that veterans who committed suicide were less likely to have substance use problems, depressed moods, or financial problems; and the act of suicide was found to be based on more of an acute situation rather than a long-term issue (Kaplan et al., 2009; Horwitz et al., 2019).

Two articles noted that majority of US male veterans with suicide completion were due to firearms while a similar trend did not persist among female US veterans (Kaplan et al., 2009; McCarten et al., 2015); but it was found that female veterans were more likely to commit suicide by firearm in comparison to female civilians (Hortwitz et al., 2019). In comparison to non-veterans, various studies found that the rate for veterans who committed suicide with a firearm was higher (Hoffmire & Bossarte, 2014; Hortwitz et al., 2019; Kaplan et al. 2009; Miller et al., 2012). One study did not see a similar trend in veterans suicide

overall in comparison to the suicide of non-veterans after accounting for demographics (Miller et al., 2012).

Additional trend analysis demonstrated that states without gun legislation had higher veteran populations, which indicated that veteran population size in a state was a predictor for a higher suicide rate (Anestis & Caprone, 2016). One study found that a significant linear trend for female veterans existed, but not for male veterans (McCarten et al., 2015). It was also found that high levels of aggression, impulsive and dangerous weapon use, and ready weapon availability were found to be significant factors in gun-related violence in the PTSD veteran patient population (Freeman et al. 2003). Demographics from one study resulted that younger veterans aged 18-34 years old and older veterans aged 65+, had the highest firearm and total suicide rates (Kaplan et al. 2009).

Table 1. Study Characteristics					
Author, date	**Population and sample size**	**Setting (hospital, nursing home, etc.)**	**Study type (case control, cross sectional, interview, etc.)**	**How was your primary variable defined? Firearm**	**How was your secondary variable defined? Suicide**
Freeman et al., 2003	78 Veterans	Various rehabilitation programs in VA hospitals	Cross-sectional	Firearm noted in weapons survey	Discusses suicide factors, but not suicide
Kaplan et al., 2009	28,534 suicide decedents	United States. National Violent Death Reporting System (2003-2006)	Cross-sectional	Firearm noted in National Violent Death Reporting System	Suicide noted in National Violent Death Reporting System
Kaplan et al., 2009	25,491 male and female suicide decedents aged 18 and older	United States. National Violent Death Reporting System (2003-6)	Cross-sectional	Firearm noted in National Violent Death Reporting System	Suicide noted in National Violent Death Reporting System
Miller et al., 2012	500,822 adult male veterans	United States. National Death Index (NDI)–linked National Health Interview Survey (NHIS)	Retrospective -cohort	Firearm noted in death certificate	Suicide noted in death certificate
Hoffmire & Bossarte, 2014	73,662 Veterans from 9 states	State and VA/ DOD databases	Cross-sectional	Firearm noted in death certificate	Suicide noted in death certificate
McCarten et al., 2015	39,408 Veterans from 23 states	Department of Veterans Affairs (VA) database of suicide mortality information	Cross-sectional	Firearm-specific suicide rates noted in death certificate	Mechanism-specific rates of suicide noted in death certificate
Anestis & Caprone, 2016	Veterans per 100,000	Publicly available databases	Cross-sectional	Firearm suicide rate	Suicide rate
Hortwitz et al., 2019	Veterans and civilians Total: 116,515 Veterans: 23,554	United States (National Violent Death Reporting System)	Cross-sectional	Firearm as noted in death certificate	Victim left suicide note/communication and recent disclosure of suicidal thoughts/plan
Valenstein et al., 2019	677 Veterans	VA Facilities	Cross-sectional	Household firearm	Suicidal ideations

Table 2. Results of Article Analysis		
Author, Date	**Primary Results**	**Additional notes/ Results**
Freeman et al., 2003	The PTSD patients surveyed were found to have four times as many firearms as other subjects and reported significantly higher levels of potentially dangerous firearm-related behaviors than the other psychiatric subjects surveyed.	High levels of aggression, impulsive and dangerous weapon use, and ready weapon availability may be significant factors in gun-related violence in the PTSD patient population.
Kaplan et al., 2009	Male and female veterans had higher firearm suicide rates than nonveterans.	Younger veterans aged 18-34 years old, and older veterans 65+ years had the highest firearm and total suicide rates.
Kaplan et al., 2009	Based on the population studied, firearms were used in 58.1% male suicides and in 31.2% female suicides. Firearm users may be reacting to acute situations when they commit suicide.	Men with a diagnosis of a mental health issue, suicide attempts, or alcohol problems were less likely to use firearms. Females with a treated diagnosed mental health illness, previous suicide attempts, and physical health issues had lower odds of using firearms.
Miller et al., 2012	The crude suicide rate for veterans was 26.2 and 18.8 per 100,00 for nonveterans.	After adjusting for age, race, and survey year, the risk of suicide was not significantly higher for veterans than nonveterans.
Hoffmire & Bossarte, 2014	Compared with non-veteran males, male veteran suicide decedents were 6% more likely to use firearms, and female veteran suicide decedents were 18% more likely to use firearms than non-veteran females.	Firearm suicide was found to be significantly more common among veterans than non-veterans.
McCarten et al., 2015	Accounting for 67% of all veteran suicides, 69% of male veteran suicides, and 40% female veterans; firearms were the most commonly used mechanism for suicide among veterans.	A significant linear trend for female veterans existed, but not for male veterans from the years of 2001-2002 to 2009-2010.
Anestis & Caprone, 2016	Veteran population size in a state was a predictor for higher suicide rate. Majority of veteran suicide rate was due to firearms.	States without gun legislation had higher veteran populations.
Hortwitz et al., 2019	In comparison to male civilians, male Veterans were more likely to commit suicide by firearm, and to have a contributing physical health problem. They were less likely to have substance use problems, depressed moods, or financial problems. Female veterans were more likely to commit suicide by firearm in comparison to female civilians.	Firearm use as a suicide method was a key distinguishing feature of Veteran suicide.
Valenstein et al., 2019	45.3% of veteran respondents reported having household firearms. 46.9% of the veterans with household firearms had suicidal thoughts and 55.6% had an actual suicide plan.	Out of all veteran respondents, only 27.5% total and 44% of those with recent suicidal ideation and household firearms had a firearm-related discussion with a clinician.

CHAPTER FIVE

DISCUSSION

Firearms were found to be the most common means of suicide for US veterans. States with large veteran populations, (in which were states that had no handgun ownership regulations), had higher suicide rates (Anestis & Capron, 2016). Many veterans may opt to live in states that do not have handgun legislation due to the fact that they get to freely use firearms like they are accustomed to do so in the military. In the future, if states with no gun legislation adopt specific laws regulating the access and exposure to handguns for its residents, the suicide rate may decline, especially amongst veterans.

Veterans with PTSD were found to own more firearms and possess more dangerous firearm behavior than veterans with other psychiatric illnesses (Freeman et al., 2003). The study showed that these groups of veterans scored higher in aggression and hostility than the other groups. These results are in consensus with the National Center for PTSD which addresses that high levels of intrusive memories, styles of coping (suppression), and anger and impulsivity all may lead to a veteran with PTSD committing suicide (National Center for PTSD, 2019). Screening veterans more thoroughly in their efforts to obtain gun licenses or more firearms should be strictly enforced with an effort to minimize suicide completions due to PTSD.

A higher number of veterans that have committed suicide had an increase in physical health issues in comparison to civilians (Horwitz et al., 2019). These

physical health issues could have been service related which is why their physical health was in worse condition. In the study conducted by Horwitz and his colleagues (2019), the health issues that the veterans encountered were not specified. Future studies should investigate the different physical health issues veterans may have faced before suicide, and if those health issues had an impact in their suicide decision.

It was observed that veterans who committed suicide were less likely to have substance abuse problems, depressed moods, or financial problems in comparison to civilians who committed suicide (Kaplan et al., 2009; Horwitz et al., 2019). This is an astounding find because it has been speculated that veterans deal with more substance abuse problems and depression than the normal population. Substance Use Disorders (SUD) in veterans have been known to aid in increased rates of suicidal ideation and attempts (Teeters et al., 2017). Studies have proven that military personnel use substances to cope with their lifestyle; and even one study showed that 30% of completed suicides were preceded by alcohol or drug use, and an estimated 20% of high-risk behavior deaths were attributed to alcohol or drug overdose (Department of the Army, 2010; Larson et al., 2012). The flaw within these studies is that they were conducted on personnel that were still in the military. This proves that there may be a difference between active military and veterans in terms of SUD. Future studies may be needed to observe the role of SUD in relation to veterans and suicides.

The characteristics of veterans that committed suicide with a firearm were found to be different than assumed. According to Kaplan and colleagues (2009), veterans aged 18-34 years of age and 65+ years of age held the highest suicide firearm rates. Among male veterans aged 18-34 was 150% higher than non-veteran males. Among female veterans aged 18-34 years old, their rate of suicide was 300% higher than non-veteran females in the same age group (Kaplan et al., 2009). These age groups can be justified by the periods of war that the veterans may have faced and the exposure of combat that they could have experienced. Flaws of the studies conducted were that these were cross-sectional studies and the researchers were not aware of the veteran's military experiences. Future studies should follow up with more history of the veterans and their experiences while in the military.

The characteristics of male veterans who used firearms as a means of suicide included males who were older in age, married, Caucasian, and who lived in the South Atlantic and Pacific division regions. Majority of the veterans also had a Blood Alcohol Content (BAC) level of > 0.08% at the time of their death, an acute crisis during the previous week, physical health problems, experienced the death of a relative, had a legal problem, or a job problem (Kaplan et al., 2009). Female firearm decedent veterans were more likely to be married, Caucasian, and live in the South Atlantic and Pacific regions. Higher percentages of female firearm decedents were reported to have had an acute crisis during the previous week, relationship problems, financial problems, and to

have experienced the death of a loved one. In comparison to males, a lower percentage of female firearm decedents were reported to have received a mental health diagnosis/ treatment and to have had a history of suicide attempts and physical health problems (Kaplan et al., 2009).

The lower percentage of females to have received mental health treatment, suicide attempts, and physical health problems could be due to their lower trauma exposure and less physical (non-combat) occupations. It can also be attributed to the different coping mechanisms that females and males share. The study conducted by Kaplan and colleagues (2009), was a cross-sectional study, therefore it was not able to capture the experiences of the veterans and their actual military history. Further studies should look into the differences in suicide attempts and ideations in male versus female veterans and why such differences occur.

It was found that majority of US male veterans with suicide completion were due to firearms (81%); this differed from female US veterans (Kaplan et al., 2009; McCarten et al., 2015). The rates of firearm suicide amongst female veterans increased disproportionately to the overall suicide rate increase from 2001 to 2010 (McCarten et al., 2015). Although, female veterans have more exposure to firearms than their non-veteran counterparts, it is still a rather uncommon means of suicide for them. It has been proven that women use less violent methods than men when committing suicide (Denning et al., 2000;

McCarten et al., 2015). This may be due to socialization, access to methods, emotions, and/or neurobiological factors.

Although female veterans used less-lethal mechanisms of suicide more than firearms, according to Kaplan and colleagues (2009), the odds of firearm use for female veterans was 1.6 times higher than civilian females when adjusting for race, age, marital status, and region of residence (Kaplan et al., 2009). Female veterans used firearms more times than female civilians, and they also held a higher suicide rate. Female veterans aged 18-34 years old, had a rate of suicide that was 300% higher than non-veteran females in the same age group (Kaplan et al., 2009). Future studies should focus on the other methods and mechanisms that female veterans use to commit suicide and their reasons for choosing.

As a collective, it was found that veterans commit suicide with firearms at a higher rate than non-veterans (Hoffmire & Bossarte, 2014; Hortwitz et al., 2019; Kaplan et al. 2009; Miller et al., 2012). After adjusting for demographics, firearm use among male veterans was 1.3 times higher than their counterparts and 1.6 times higher for female veterans compared to non-veteran females (Kaplan et al. 2009). The rate of firearm suicides was significantly higher among veterans (19.8/100 000 person-years) than among nonveterans (11.7/100 000 person-years) (Miller et al., 2012). Firearm use in veterans as a method to commit suicide can be justified by their availability, comfortability, and familiarity to weapons. Ownership of personal firearms in the household is more likely for

veterans, and a presence of a firearm in the home may increase the likelihood of suicide. Future studies should focus on the characteristics and justification of why the suicide rates of veterans are astoundingly higher than civilians and possible prevention methods to eradicate this phenomenon as much as possible.

Strengths and Limitations

Strengths of this study is that it is a systematic review. Using secondary data to produce reliable conclusions can definitely be an asset when it comes to identifying a health issue and attempting to find a solution. Using the key words of “veteran”, “suicide”, and “firearm” allowed for only articles that pertained to the topic at hand to be utilized. The studies that were used in this systematic review all used big data collection systems. This aided in each study having a large study population, which increased the accuracy and consistency of the data.

Limitations of this study included the limited number of articles that populated from the initial PubMed search using the PRISMA method. Studies in our indexed sources were not analyzed. The studies that were used were almost all cross-sectional studies which means that the researchers were only limited to data that was already collected.

Recommendations for Research and Practice

Further research should include looking more into the experiences of veterans and their actual military demographics such as Military Occupational Specialty (MOS), years they served, and if they experienced any combat related

trauma. This information would help to understand some of their history and to find themes as to which groups are committing suicide and why.

It is recommended that more policies and legislations on firearms should be adopted by states that are lacking specific laws regulating the access and exposure to handguns, in particular, the exposure to veterans with an effort to decrease the suicide rate. Screening veterans more thoroughly in their efforts to obtain gun licenses or more firearms should be strictly enforced. The VHA and VA should also obtain more screening measures to all veterans and not just those classified as having mental health issues. As indicative with the findings that most suicides committed by veterans are due to an acute crisis and not long-term mental health issues as expected (Kaplan et al., 2009).

With physical health issues being a major finding in issues that veterans faced before committing suicide, it is recommended that future studies should investigate the different physical health issues veterans may have faced before suicide, and if those health issues had an impact in their suicide decision. There is a limited amount of studies that reflect SUD amongst veterans. More studies need to be conducted to observe the role of SUD in relation to veterans and suicides. Gender was discussed in all of the studies and the differences in the statistics of the mechanisms of suicide were exposed, but there was not much discussion on differences in suicide attempts and ideations in male versus female veterans. More research should be done on why these differences occur.

Female veterans were found to use other mechanisms of committing suicide more so than firearms. Future studies should focus on the other methods and mechanisms that they were found to use and their reasons for choosing those methods. The rates of veterans committing suicide is unjustly higher than the civilian suicide rate. Future studies should focus on finding adequate prevention methods and more precautions that could be taken to eradicate veteran suicide and identify possible red flags before the act is committed as much as possible.

Conclusion

This systematic review identifies the characteristics associated with suicidal behaviors (ideation, attempts, and completions) among US veterans, the means of suicide that is the most common among US veterans, and the differences in suicidal behaviors in male versus female US veterans. It was proven that the rates of suicides amongst veterans are higher than the rates of civilian suicides. More preventative measures need to be put in place in order to suppress these statistics and decrease the act of suicide amongst veterans.

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