MEDITATION AS A PROTECTIVE FACTOR AGAINST SUICIDE IN THE US ARMY

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MASTER OF MILITARY ART AND SCIENCE
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by

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High suicide rates in the U.S. Army is the new norm. The U.S. Army has failed to reduce suicide rates despite its efforts and millions of dollars spent on suicide prevention. Meditation is an alternative and non-pharmacological practice that has great promise as a protective factor against suicide and suicidal behaviors in the U.S. Army. Scientific research supports the positive effects of meditation on the brain, reducing stress, increasing resiliency, assisting with the treatment of psychological disorders, and promoting general health. This paper discusses and explores the research behind suicide, meditation, and how meditation could be the answer to the perplexing questions surrounding suicide.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

MEDITATION AS A PROTECTIVE MEASURE AGAINST SUICIDE IN THE US ARMY, by Major Sochara Chumnoeur, 107 pages.

High suicide rates in the U.S. Army is the new norm. The U.S. Army has failed to reduce suicide rates despite its efforts and millions of dollars spent on suicide prevention. Meditation is an alternative and non-pharmacological practice that has great promise as a protective factor against suicide and suicidal behaviors in the U.S. Army. Scientific research supports the positive effects of meditation on the brain, reducing stress, increasing resiliency, assisting with the treatment of psychological disorders, and promoting general health. This paper discusses and explores the research behind suicide, meditation, and how meditation could be the answer to the perplexing questions surrounding suicide.

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ACRONYMS

CDC	Center for Disease Control and Prevention
DoD	Department of Defense
DoDSER	Department of Defense Suicide Event Report
fMRI	Functional Magnetic Resonance Imaging
MBCT	Mindfulness Based Cognitive Therapy
MBSR	Mindfulness-Based Stress Reduction
MMFT	Mindfulness-Based Mind Fitness Training
NVDRS	National Violent Death Reporting System
PTSD	Post-Traumatic Stress Disorder
TM	Transcendental Meditation
U.S.	United States

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CHAPTER 1

INTRODUCTION

> What we are trying to do is identify skills that we can give to our soldiers-intellectual, physical, spiritual – to build those skills into someone from the time they raise their hand, so that when stress hits, they are armed to deal with it.[1]
>
> — General Martin E. Dempsey

"This issue, suicides, is perhaps the most frustrating challenge that I have come across since becoming Secretary of Defense last year. Despite the increased efforts, the increased attention, the trends continue to move in a troubling and tragic direction."[2] This statement was made by Secretary of Defense Leon Panetta in June 2012 at the Department of Defense (DoD)/Veterans Affairs suicide prevention conference. The past fifteen years of warfare in the Middle East, frequent deployments, and the military's expanded operations around the world have imposed unexpected cognitive degradation and multidimensional stressors upon our service members. This results in a culture of elevated suicide rates and increased diagnosis of behavioral health disorders not seen in other wars, high divorce rates, and dependency on psychotropic and pain medicines.

Faced with diminishing resiliency and increased professional, social, and familial stressors, soldiers need new and better tools to cope and persevere through their silent struggles. In this pursuit of new and better tools, scientific research in the past few

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[1] Global Security, "Health Promotion Risk Reduction Suicide Prevention Report 2010," accessed April 19, 2017, http://www.globalsecurity.org/military/library/report/2010/army-red-book-2010.pdf.

[2] Leon E. Panetta, "Suicide Prevention" (Speech, Washington, DC, June 22, 2012), accessed September 1, 2016, http://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1686.

decades support the positive effects of meditation on the brain, reducing stress, increasing resiliency, assisting with psychological disorders, and promoting general health. This paper discusses and explores the research behind suicide and meditation and how meditation could be the answer to the perplexing questions posed by suicide. The purpose of this qualitative research case study is to evaluate meditation as a protective factor against suicide in the United States (U.S.) Army. Protective factors are factors that decrease the risks of suicide, therefore providing a shield from the harmful event.

Background: Suicide

The Center for Disease Control and Prevention (CDC) defines suicide as "death caused by self-directed injurious behavior with an intent to die as a result of the behavior."[3] Suicide is a serious and complex public health problem that takes the lives of nearly 800,000 people worldwide, annually.[4] It is a global phenomenon that has no borders, does not discriminate based on religion, culture, or sex. In the U.S., suicide continues to be the tenth leading cause of death for all ages. Since 2010, it is the second leading cause of death among people age 15-35 years of age and the fourth leading cause among adults age 35 to 44. Additionally, among adults over 18 years of age, 9.3 million reported having suicidal thoughts, 2.7 million made a plan, and 1.3 million attempted suicide. In 2012, over 494,169 were treated for self-inflicted injuries in the emergency

[3] Center for Disease Control and Prevention, "Suicide," August 2016, accessed September 24, 2016, https://www.cdc.gov/violenceprevention/suicide/definitions.html.

[4] World Health Organization, "Suicide," WHO Media Center, March 2017, accessed September 24, 2016, http://www.who.int/mediacentre/factsheets/fs398/en/.

departments in 2013.[5] According to the American Foundation for Suicide Prevention (AFSP), an average of 44,193 Americans died by suicide each year at a rate of 13.26 per 100,000 individuals in the U.S. population. The suicide epidemic is costing Americans an average of 44 billion dollars annually.[6]

Men account for 77.9 percent of all suicide, approximately three to four times more than women. Suicide is the seventh leading cause of death for males and the fourteenth leading cause for females. The most commonly used method of suicide by civilian men was firearms, accounting for 56.7 percent. Poisoning was the preferred method for women, accounting for 34.8 percent.[7]

The suicide rate continues to be an epidemic as reflected in the global and national suicide statistics. The U.S. military is not immune to this epidemic. The DoD has seen an increase in suicide rates since 2003, coinciding with combat operations in Iraq and Afghanistan. The number of suicides in the U.S. military increased from 197 in 2007 to 260 in 2008, the first year in which the suicide numbers exceeded 200. In 2012, the 321 service members committed suicide. The highest year on record for military suicide. Although there has been a slight decline in the numbers since 2012, suicides remain unacceptably high and continues to be a top priority for the DoD.

In 2008, the Department of Defense Suicide Event Report (DoDSER) was established to "standardize suicide surveillance efforts across the armed services (Air

[5] Center for Disease Control and Prevention, "Suicide."

[6] American Foundation for Suicide Prevention, "Suicide Statistics," 2015, accessed March 30, 2017, https://afsp.org/about-suicide/suicide-statistics/.

[7] Center for Disease Control and Prevention, "Suicide."

Force, Army, Marine Corps, and Navy) to support the DoD's suicide prevention mission."[8] Suicide data consistently shows that non-Hispanic, white males, under age 30 with ranks between E1 to E9, without a college degree, represent the majority of service members who committed suicide. The most common methods used to commit suicide were firearms, accounting for 68.3 percent, and hanging accounting for 24.9 percent. The most common behavioral health diagnosis identified in military suicide decedents were mood and adjustment disorders, accounting for 50.5 percent of all suicide reported. Failed relationships and administrative/legal issues present ninety days prior to the suicide events were the most cited psychological stressors. A history of at least one deployment was identified in 54 percent of service members who committed suicide. The U.S Army data is consistent with the armed services.

Suicide is a complex and dynamic issue at the forefront of the U.S. military and in particular, the U.S. Army for over a decade. While this epidemic is not unique to the military, suicide is a healthcare crisis which reduces readiness and needs to be surveilled, prevented, and eliminated. Efforts for prevention of suicide will be lengthy, multifaceted, and laborious. Prevention endeavors should integrate the efforts of families, scientists, academia, communities, and government services.

Background: Meditation

It is unclear when and where meditation originated, however it is a common belief that the earliest form of meditation dates back between 5000-3500 BC. This estimate was

[8] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report," accessed September 24, 2016, http://t2health.dcoe.mil/programs/dodser.

based on wall art discovered by archaeologists in what is now Pakistan and northwest India. The wall art depicts figures in positions with their eyes closed, who appear to be meditating.[9] Meditation is strongly rooted in Eastern religion across Asia. The formation and inclusion of meditation in Buddhism, Taoism, and Hinduism emerged between the fifth and sixth century.[10]

Although widespread in Eastern countries, meditation did not spread to western society until the 1960s. As meditation moved west to the U.S., it was taken out of its original religious context and made more secular. The secular use of meditation increased the audience by not limiting the use to a particular religion. Therefore, more westerners found comfort in trying and practicing it. Secular application also allowed opportunities for scientists and researchers to empirically explore the health benefits of meditation. These enabled clinicians to integrate evidence-based practice into treatment modalities across the healthcare spectrum.

The National Center of Complementary and Integrative Health defines meditation as a "mind and body practice that has a long history of use for increasing calmness and physical relaxation, improving psychological balance, coping with illness, and enhancing overall health and well-being."[11] Meditation is a practice that claims to restore calmness

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[9] Robert Puff, "An Overview of Meditation: Its Origins and Traditions," *Psychology Today*, July 2013, accessed April 9, 2017, https://www.psychologytoday.com/blog/meditation-modern-life/201307/overview-meditation-its-origins-and-traditions.

[10] Ibid.

[11] National Center for Complementary and Integrative Health, "Meditation: In Depth," NIH…Turning Discovery into Health, April 2016, accessed October 1, 2016, https://nccih.nih.gov/health/meditation/overview.htm.

and inner peace to produce a deep state of relaxation by focusing attention. Today, there are many different types of meditations being practiced. The most studied, and therefore generating the most existing data are transcendental and mindfulness meditation. In the clinical and research contexts, mindfulness meditation is described as "non-judgmental attention to experiences in the present moment."[12] This encompasses the control of attention to retain focus on the immediate experience and the ability to approach one's experience with openness and acceptance.[13] Transcendental meditation is a non-religious meditation practice that requires practitioners to sit quietly for 20 minutes with eyes closed, allowing the mind and body to achieve "restful alertness," and the mind to transcend thinking and achieve inner peace, without using any concentrative efforts.[14] This research study will not go into detail about these meditative practices beyond their general definition. Despite the many different types, the foundation of meditative practices centers on four elements: a quiet location, a specific, comfortable posture, a focused attention, and a positive attitude.[15] Some forms of meditation instruct the practitioner to become mindful of thoughts, feelings and sensations and to observe them in a nonjudgmental way.

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[12] Yi-Yuan Tang, Britta K. Holzel, and Michael I. Posner, "The Neuroscience of Mindfulness Meditation," *Nature Reviews: Neuroscience* 16 (April 2015): 214.

[13] Ibid.

[14] Brian Reese, "Overview of Outcome Data of Potential Meditation Training for Soldier Resilience," *Military Medicine* 176, no. 11 (November 2011): 1235.

[15] National Center for Complementary and Integrative Health, "Meditation: In Depth."

The mental and physical health and research communities have developed treatment modalities based on mindfulness meditation in the form of mindfulness-based cognitive therapy (MBCT) and mindfulness-based stress reduction (MBSR) programs. MBCT is an eight week, evidence based program that incorporates elements of cognitive-behavioral therapy with mindfulness based stress reduction meditation programs. MBSR is a formal eight-week program that guides individuals through calming the mind and body and teaches the act of being mindful, focusing on the present moment. In the 1990s, a small group of behavioral health psychologists, Zindel Segal, Mark Williams, and John Teasdale developed MBCT.[16] MBSR was developed by Jon Kabat-Zinn at the University of Massachusetts Medical School in 1979.

According to the National Center for Complementary and Integrative Health Interview Survey, eight percent of Americans or eighteen million Americans practice meditation in their daily lives.[17] Although becoming more mainstream in the US, meditation is still a new and foreign concept in the military. As results of new and emerging research are published, its benefits are no longer solely based on anecdotal data. Now, it is based on science and evidence. The results are widely published in multiple civilian and military professional and academic journals.

Research suggests that meditation plays a positive role in overall mental and physical health, brain health, attention, stress reduction, resiliency, and more. Faced with

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[16] Jennifer Lea, Louisa Cadman, and Chris Philo, "Changing the Habits of a Lifetime? Mindfulness Meditation and Habitual Geographies," *Cultural Geographies* 22, no. 1 (2015): 49-65.

[17] National Center for Complementary and Integrative Health, "Meditation: In Depth."

the complexities and difficulties of preventing and managing suicide, the DoD is reaching beyond its traditional approach and considering alternative forms of therapies. This is evident in its multi-million dollar investment into empirical research studying the benefits of meditation in the military population by the U.S. Army Medical Research and Materiel Command.

Statement of problem

The problem is, despite the implementation of training and awareness initiatives and treatment modalities by the DoD, suicide rates and suicide behaviors remain unacceptably high in the U.S. Army. Much focus and research both civilian and the military studies has been on finding risk factors and therapeutic modalities, but little on finding protective factors against the symptoms and behaviors that lead to suicide. There has been a growing body of research on meditation that could prove useful in determining if meditation is a beneficial tool against suicide. Meditation is a mind and body practice that can help soldier's mental fitness and agility, gaining resilience and improving psychological balance despite stress facing soldiers throughout their careers.

Purpose

The purpose of this qualitative research case study is to explore meditation as a protective factor against suicides in the U.S. Army through an analysis of the current documents published on the subject. The health benefits of meditation are well documented and researched. However, research related to using meditation as a protective factor against suicide is very limited. The results of this research may offer the

U.S. Army a new approach to suicide prevention and reduce suicide rates while improving mental resiliency and fitness.

Research Questions

This research study attempts to answer the following questions using a diverse range of peer reviewed professional and academic articles, professional writings, books, periodicals, and government websites.

1. What are the common characteristics of individuals and soldiers who committed suicide?

2. What are the benefits of meditation?

3. What role can meditation play as a protective factor against suicide in soldiers?

4. How can the U.S. Army use meditation as a dynamic tool to form and shape resilient and adaptable soldiers in an ever changing profession?

Methodology

This research is a qualitative case study of documents using Grounded Theory methodology and analysis. This methodology allows for greater contextual description and comparison of suicide, meditation, and the U.S. Army to elicit deeper meaning and understanding. Data was collected through EBSCOhost, books, periodicals, and official government and civilian public websites. Additional supporting data was extracted from dissertations and theses from the CARL Library database at Ft. Leavenworth, Kansas and internet web searches.

Significance of study

This research study is significant because it addresses the epidemic of suicide in the U.S. Army and offers meditation as an easy and inexpensive protective factor.

First, this research aims to educate soldiers, leaders, and clinicians regarding the non-traditional practice of meditation.

Second, this research will help the reader and professional soldiers understand the art and science behind suicide and meditation.

Third, this research may create insight into reducing the military healthcare cost.

Lastly, this study introduces meditation to soldiers as a tool that is inconspicuous and mobile for the promotion of mental and physical well-being. While meditation can be used anywhere, it is ideal for soldiers in a deployed setting while dealing with the stress of combat, the death of a fellow soldier, or any other stressors they may come across. Additionally, soldiers can practice meditation to help self-regulate when reaching out to others might be difficult.

Limitations

The following limitations apply to this research:

1. The author has personal or professional experience caring for soldiers who displayed suicidal behaviors and committed suicide and may have an emotional eagerness to find a solution which might bias the paper.

2. The findings of this research are limited to the academic articles on or related to the topic and does not include participant qualitative research.

3. The majority of the peer reviewed articles cited have a small sample size.

4. The author is an intermittent practitioner of meditation for the last four years, and may have some bias.

5. Some research cited is based on a civilian population sample.

6. Information gathered is limited to what is reported in the articles.

7. Time is a significant limitation that prevented the author from increasing the depth of this research study.

Assumptions

The following assumptions were made for the purpose of this research study:

1. The findings in the published research articles are based on the data collected and not reflective of the biases of the researchers.

2. The researchers and authors of documents used in this research are experienced and professionals in their specialty.

3. Participants in the research studies were honest when reporting their experiences.

4. The demographics of individuals committing suicide in the civilian population is reflective of the majority of soldiers despite other factors.

5. Meditation is a safe practice for all.

Definitions of Terms

The following definitions were used for the purposes of this study:

Meditation. "A mind and body practice that has a long history of use for increasing calmness and physical relaxation, improving psychological balance, coping with illness, and enhancing overall health and well-being."[18]

Mindfulness meditation. "Involves the development of awareness of present-moment experience with a compassionate, non-judgmental stance."[19]

Perfusion: the passage of blood through the brain.

Protective factor. Any factor that reduces the risk of suicide or acts as a shield against suicide.

Suicide attempt. "A non-fatal, self-directed, potentially injurious behavior with an intent to die as a result of the behavior; might not result in injury."[20]

Suicidal Behavior. Refers to suicidal ideations and suicide attempts.[21]

Suicidal ideation. Serious thoughts or plan about hurting or killing yourself.[22]

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[18] National Center for Complementary and Integrative Health, "Meditation: In Dept." NIH…Turning Discovery into Health, April 2016, accessed October 1, 2016, https://nccih.nih.gov/health/meditation/overview.htm.

[19] Britta K. Holzel, James Carmody, mark Vangel, Christina Congleton, Sita M. Yerramsetti, Tim Gard, and Sara W. Lazar, "Mindfulness Practice Leads to Increases in Regional Brain Gray Matter Density," NIH, January 30, 2012, accessed October 25, 2016, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3004979/.

[20] Center for Disease Control and Prevention, "Suicide."

[21] Ghanshyam N. Pandey, "Biological Basis of Suicide and Suicidal Behavior," *Bipolar Disorder*, no. 15 (January 2013): 524-541, accessed September 1, 2012, http://dx.doi.org/10.1111/bdi.12089.

[22] Center for Disease Control and Prevention, "Suicide."

Suicide. “Death caused by self-directed injurious behavior with an intent to die as a result of the behavior.”[23]

Summary

Suicide is a complex and demanding subject that is complicated by psychosocial, environmental, and genetic factors. Therefore, treatment and prevention efforts must be multi-facetted and holistic. This research explores meditation as one protective factor against the high rates of suicide in the U.S. Army.

[23] Ibid.

CHAPTER 2

LITERATURE REVIEW

> The mind precedes all things, the mind dominates all things, the mind creates all things.[24]
>
> — Buddha

Introduction

The purpose of this qualitative research is to explore meditation as a protective factor against suicide in the Army. There are accumulating studies on the topics of meditation and suicide as separate entities, however little is known about the association of both topics together. This literature review attempts to investigate the relationship between suicide and meditation further. This chapter is a review of the existing and most relevant research and documents on the topics of suicide and meditation.

Army Suicide versus Civilian Suicide

The past fifteen years of war have seen a dramatic increase of suicide among U.S. Army soldiers. Prior to the global war on terrorism, service members were less likely to die by suicide than civilians. Since 2006, the rate of suicide in the U.S. Army has been consistently higher than the civilian population. At one point, in calendar year 2012, the U.S. Army's suicide rate peaked at 30 per 100, 000 soldiers compared to the 2012

[24] Michael T. Treadway and Sara W. Lazar, "The Neurobiology of Mindfulness," in *Clinical Handbook of Mindfulness*, ed. Fabrizio Didonna (New York: Springer Science+Business Media, 2009), 46.

civilian suicide rate of 12.6 per 100,000 in the general population.[25] Logan and his team conducted a comparative study of U.S. Army decedents versus civilian suicide decedents to identify differences and inform military prevention efforts.[26]

Logan used Army suicide records from 2005 to 2010 from the DoDSER and compared it with the National Violent Death Reporting System (NVDRS) data. The NVDRS gathers the reporting from eighteen states on details related to suicide reports and the precipitating circumstances surrounding it. Therefore, the data is limited only to the incidents of the participating states.[27] Annually, the NVDRS collects over 10,000 civilian suicide incidents. The details of the NVDRS include precipitating factors such as current depressed moods, financial problems, current treatment of mental illness, history of suicide attempts, and intimate partner problems. Law enforcement and medical examiners death scene investigation reports are major contributors to the NVDRS. The DoDSER is the DoD's suicide surveillance program that collects and reports details related to a service member's suicide event. It provides many details regarding the soldier's military characteristics and history such as duty status, deployment history, and

[25] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report," accessed September 24, 2016, http://t2health.dcoe.mil/programs/dodser.

[26] Joseph E. Logan et al., "Precipitating Circumstances of Suicide Among Active Duty U.S. Army Personnel versus U.S. Civilians, 2005-2010," *Suicide and Life-Threatening Behavior* 45, no. 1 (February 2015): 65-77, accessed September 1, 2016, http://dx.doi.org/10.1111/sltb.1211.

[27] The participating states in the NVDRS are Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, Wisconsin, Ohio, and Michigan. Annually, the NVDRS collects over 10,000 civilian suicide incidents.

combat exposure, obviously not reported in the NVDSR. For the Army, behavioral health providers are responsible for submitting detailed information to the DoDSER system. This information includes medical and behavioral health records, investigative agency records, records related to the death, records from interview with supervisors, co-workers, friends, family members, clinicians, chaplains, and so forth.[28]

Logan linked 141 relevant shared characteristics from the NVDRS and DoDSER data in a multi-step process. The records selected from the NVDRS were based on predetermined variables: the same race and ethnicity, marital status, age, sex, manner of death, and more. Conditional logistic regression models were used to compare Army and civilian suicide decedents as it is related to demographic variables such as age, sex, race/ethnicity, place, and method of death. Logistics regression is a statistical procedure used by researchers to determine the influence of variables upon given response variables. "Multivariable conditional logistic regression modes were used to make comparisons with respect to location and methods of death, the precipitating circumstances of death, and the other preceding circumstances. Matched prevalence odd ratios were used to assess associations."[29] See table 1 for variables analyzed in NVDRS.

Data analysis revealed a commonality of characteristics of Army suicide decedents. A preponderance (86 percent) of Army's suicide decedents were the active duty or regular Army, 88 percent held enlisted ranks between Private to Sergeant First Class. Stressors such as an Article 15, being absent without leave (AWOL), separation

[28] Ibid.

[29] Ibid., 68.

and court martial proceedings, were reported in 20 percent of the Army decedents. The study estimated 46 percent of Army decedents had at least one deployments.[30] See table 2 for details.

Table 1. Precipitating and Other Preceding Circumstances of Suicide

Precipitating circumstances
Current depressed mood or mental health problem: decedent was perceived by self or others to be depressed or has been identified as having a mental health disorder or syndrome listed in the Diagnostic and Statistical Manual, version IV (DSM-IV)
Alcohol or other substance abuse problems or suspected intoxication: decedent was perceived by self or others to have a problem with, or to be addicted to, alcohol or other drugs. Or, the decedent was believed to be intoxicated at the time of death
Physical health problem: decedent was experiencing physical health problems that were believed to have contributed to the suicide (e.g., a recent cancer diagnosis or chronic pain)
Crisis during previous 2 weeks: a very current crisis or an acute precipitating event appeared to have contributed to the suicide. The crisis event must have occurred in the previous 2 weeks or be impending in the following 2 weeks (e.g., a trial for a criminal offense begins the following week)
Criminal or civil legal problems: decedent was facing criminal legal problems or civil legal problems (e.g., a child custody or civil lawsuit) that appeared to be associated with the suicide
Job problem: decedent was either experiencing a recent problem at work or was having a problem with joblessness
Financial problem: decedent was experiencing problems such as bankruptcy, overwhelming debt, or foreclosure of a home or business
Intimate partner problem: problems with a current or former intimate partner that appeared to have contributed to the suicide
Other relationship problem: problems with a family member, friend, or an associate (other than an intimate partner) that appeared to have contributed to the suicide.
Other relevant preceding circumstances
Current treatment for mental illness: decedent was currently receiving mental health treatment as evidenced by a current psychotropic medication or visited to a mental health professional in the previous 2 months
History of suicide attempts: decedent was known to have made previous attempts, regardless of the severity of those attempts
Person left a suicide note: decedent left a note, e-mail message, video, or other communication indicating an intent to die by suicide
Disclosed intent to die by suicide: decedent had previously expressed suicidal feelings to another person with time for that person to intervene; disclosure only at the time of the event, with no opportunity to intervene, is not coded as "disclosed intent to commit suicide"

Source: Joseph E. Logan et al., "Precipitating Circumstances of Suicide Among Active Duty U.S. Army Personnel versus U.S. Civilians, 2005-2010," *Suicide and Life-Threatening Behavior* 45, no. 1 (February 2015): 69, accessed September 1, 2016, http://dx.doi.org/10.1111/sltb.1211.

[30] Ibid., 69.

Table 2. Military Background Characteristics of U.S. Army Suicide Decedents

Characteristic	No. (%) with Characteristic[b] (N = 141)
Component	
Regular	121 (86)
Reserve	9 (6)
National Guard	11 (8)
Pay Grade	
E1–E2	14 (10)
E3	21 (15)
E4	40 (28)
E5	23 (16)
E6	14 (10)
E7	12 (9)
E8-E9	5 (4)
O1–10	8 (6)
W1–5 or other	4 (3)
Recent Military-Related Stresses	
Had any of the four stresses within 3 months of death:	28 (20)
Article 15, AWOL, and/or courts-martial proceedings	17 (12)
Administrative separation	11 (8)
Medical evaluation board	6 (4)
Not selected for promotion, schooling, or command	3 (2)
Deployment/Combat History	
Number of deployments:	
1–2	53 (38)
3 or more	11 (8)
Unknown	26 (18)
Known to have orders to deploy	10 (7)
Experienced direct combat	27 (19)
Within the last three deployments:	
Engaged in combat resulting in wounded	19 (13)
Sustained an injury resulting from combat	5 (4)
Witnessed killing	15 (11)
Killed others	13 (9)

Note. E, enlisted ranks; W, warrant officer ranks; O, commissioned officer ranks; AWOL, absent-without-leave.

[a]Data were provided from Department of Defense Suicide Event Report (DoDSER) and the Army Suicide Event Report.

[b]Percentages for each variable might not equal 100% because of rounding.

Source: Joseph E. Logan et al., "Precipitating Circumstances of Suicide Among Active Duty U.S. Army Personnel versus U.S. Civilians, 2005-2010," *Suicide and Life-Threatening Behavior* 45, no. 1 (February 2015): 70, accessed September 1, 2016, http://dx.doi.org/10.1111/sltb.1211.

The comparison and analysis of demographic characteristics showed virtually no difference between civilian and military decedents committing suicide in age groups, sex, and race/ethnicity. The study revealed 88 percent of all decedents were between the ages

of 18 to 39 years old, 96 percent were males, and over 70 percent were of non-Hispanic white race/ethnicity. One major difference noted was marital status. Furthermore, 64 percent of civilian decedents versus 33 percent of Army decedents were single, never been married.[31] See table 3 for details. Army suicide decedents (58 percent) that were married exceeded civilian decedents (22 percent) by 36 percent.

[31] Ibid.

Table 3. Demographics and Incident Characteristics for U.S. Army versus Civilian Suicide Decedents, 2005-2010

Characteristic	No. (%) with Characteristic		Matched Prevalence Odds Ratios, 95% Confidence Intervals[b]	
	US Army Suicide Decedents (n = 141)	Civilian Suicide Decedents (n = 563)	Crude	Adjusted for Race, Ethnicity, and Marital Status
Age (years)				
17–24	61 (43)	240 (43)	n/a	n/a
25–29	34 (24)	139 (25)	n/a	n/a
30–39	30 (21)	120 (21)	n/a	n/a
40–59	16 (11)	64 (11)	n/a	n/a
Mean (standard deviation)	28.0 (8.0)	28.0 (8.2)		
Sex				
Male	135 (96)	539 (96)	n/a	n/a
Female	6 (4)	24 (4)	n/a	n/a
Race/ethnicity				
White, non-Hispanic	101 (72)	430 (76)	**	n/a
Black, non-Hispanic	19 (13)	67 (12)	1.20 (0.67–2.12)	n/a
Hispanic	11 (8)	34 (6)	1.42 (0.67–2.99)	n/a
Other	10 (7)	28 (5)	1.61 (0.72–3.60)	n/a
Marital status				
Never married	47 (33)	360 (64)	**	
Married	82 (58)	124 (22)	7.75 (4.65–12.92)	n/a
Widowed, divorced, or separated	10 (7)	63 (11)	1.84 (0.83–4.10)	n/a
Location of death				
Residential area	98 (70)	423 (75)	**	**
Transport area (public roads, inside vehicle)	13 (9)	48 (9)	1.23 (0.65–2.34)	1.00 (0.49–2.01)
Recreational, commercial, or natural areas	14 (10)	69 (12)	0.87 (0.47–1.63)	0.89 (0.45–1.77)
Other[c]	12 (9)	20 (4)	3.18 (1.38–7.33)	3.23 (1.23–8.46)
Mechanism				
Firearm	89 (63)	317 (56)	**	**
Poisoning	13 (9)	41 (7)	1.11 (0.56–2.21)	1.18 (0.54–2.60)
Hanging, strangulation	25 (18)	165 (29)	0.51 (0.31–0.83)	0.50 (0.30–0.86)
Other	8 (6)	36 (6)	0.71 (0.31–1.62)	0.65 (0.26–1.64)

Note. n/a, not applicable.

[a]Data were provided by the National Violent Death Reporting System. Unknown values are not presented; therefore, variables might not total 100%.

[b]All odds ratios accounted for all variables in the match (i.e., state of injury, year of death, and age and sex of decedent). Civilian suicide decedents were the referent population.

**Identifies the referent level for each variable. For each variable, Army decedents with unknown values and their civilian matches were excluded from the comparison; no more than 5% of the groups were excluded because of unknown values. The odds ratios = odds of the exposure among Army decedents divided by the odds of the exposure among civilian decedents.

[c]Other specified locations of death included schools and sports/athletic areas.

Source: Joseph E. Logan et al., "Precipitating Circumstances of Suicide Among Active Duty U.S. Army Personnel versus U.S. Civilians, 2005-2010," *Suicide and Life-Threatening Behavior* 45, no. 1 (February 2015): 71, accessed September 1, 2016, http://dx.doi.org/10.1111/sltb.1211.

Precipitating and other preceding factors analyzed by the study included problems related to the decedents' job, mental health, alcohol and substance abuse, and intimate partner relationships. Data analysis noted 53 percent of Army soldiers compared to 64

percent civilian decedents had mental disorders. Furthermore, 54 percent of soldiers compared to 42 percent of civilians experienced intimate partner problems in the weeks and months prior to the suicide event. A more narrow difference was noted in alcohol and substance abuse (41percent Army vs. 48 percent civilian) and job problems (18 percent Army vs. 16 percent civilian).[32]

Logan and his team concluded that increased awareness is needed in the Army about warning signs and along with the promotion of disclosure by soldiers with suicidal intent or a previous history of suicidal attempts, in order to reduce suicide mortality. These recommendations are consistent with the efforts of the Army Ask, Care, Escort (ACE) Suicide Intervention Program. [33]

Department of Defense Suicide Event Report

In recognition of the rise of suicides among service members since 2001, the DoD launched the DoDSER in 2008 to collect comprehensive information about service members in all the armed services (Army, Air Force, Navy, and Marines) who committed suicide and the preceding factors that led to the suicide event. It is a collaborative effort among the DoD's Suicide Prevention and Risk Reduction Committee, the Services' DoDSER Program Managers, and the National Center for Telehealth and Technology. This standardize suicide surveillance was established to help the DoD and its armed services to collect, examine, and analyze, in real time, the data surrounding service

[32] Ibid.

[33] Ibid.

members' suicide event. The collection and dissemination of this data can help leaders, soldiers, and civilians refine and focus its preventative efforts and treatments.

Each service is tasked with the duties to report comprehensive details surrounding each suicide event to the DoDSER through official reports, interviews, and medical documents. The DoD offers each service instructions on coding, a computer based training program, and a web based form to report the event. Each calendar year of suicide data is available for the public to view. The annual report details the statistics of all the armed services in totality and each service separately. Several areas of interest include: history of psychological disorders, demographics, stressors, deployment history, methods of suicide. In addition to an annual report, a less detailed quarterly report is also published to track the data trend throughout the year.

The majority of Army statistics for analysis were obtained from the DoDSER annual and quarterly reports. It is important to include the data obtained directly from the DoD in this research. This allows the reader a greater understanding of the scope of suicide within the military population. Figure 1 depicts the comparison of suicide rates between American civilians, DoD Armed Services, and U.S. Army active duty. Information within the figure were obtained directly from the DoDSER annual reports, DoD, and CDC.

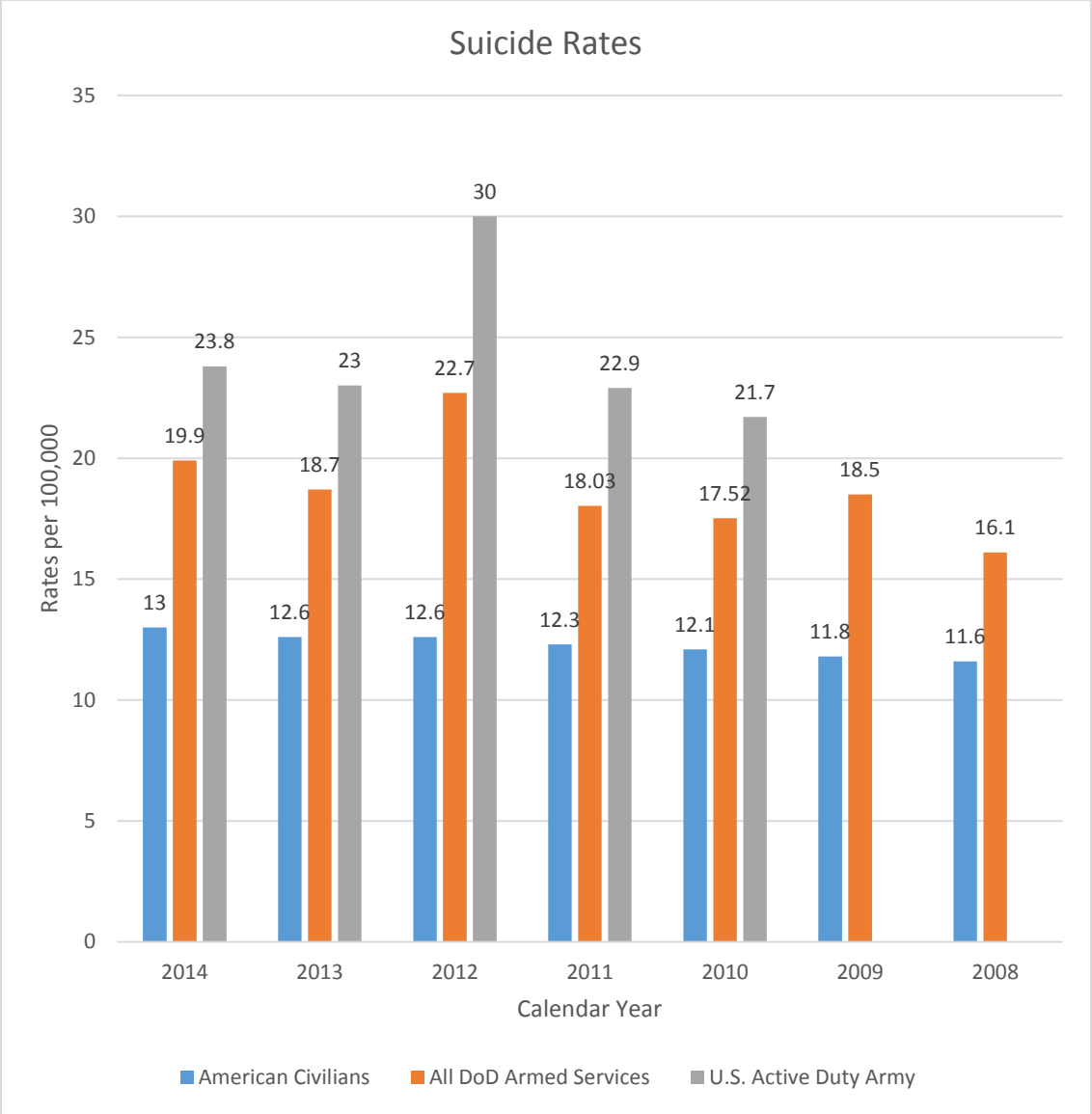

Figure 1. Suicide Rates of Civilians versus All Active DoD Armed Services versus U.S. Active Duty Army

Source: Rates of Suicide were obtained from DoDSER calendar year 2008 to 2015, DoD, and CDC.

The Human Brain

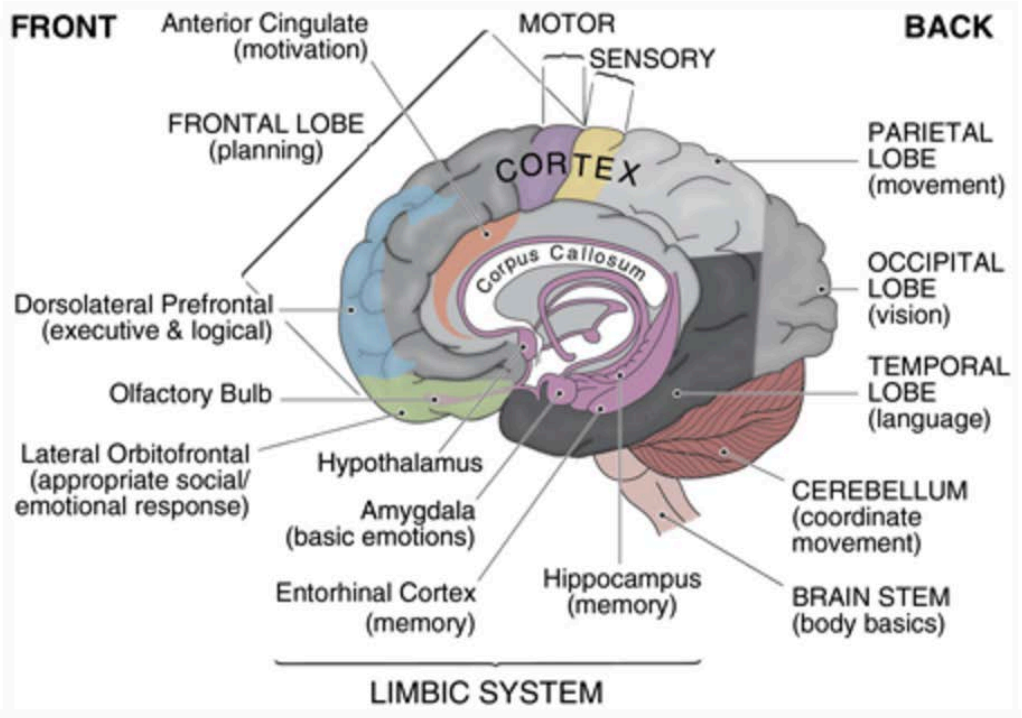

Figure 2. The Brain

Source: Brainwaves, "Your Brain and What it Does," accessed 5 April 2017, http://www.brainwaves.com/.

The brain is the most important and complex organ in the human body. It consists of more than 86 billion nerve cells (neuron), also known as the "gray matter" and billions more of nerve fibers (axons and dendrites), also known as the "white matter" that communicate in trillions of connections called synapses.[34] White matter affects learning

[34] Live Science, "Human Brain: Facts, Functions, and Anatomy," March 25, 2016, accessed September 1, 2016, http://www.livescience.com/29365-human-brain.html.

and brain function, while grey matter is in regions of the brain involved in memory, emotions, speech, decision making, and self -control. The brain coordinates thought, emotion, behavior, movement, and sensation within seconds. It weighs about 3.3 pounds and makes up about two percent of the human body weight.[35] This section will only provide a brief and relevant summary of the basic human brain anatomy and physiology to increase understanding related to the scientific literature review.

The cerebrum, the largest part of the brain, makes up 85 percent of the brain's weight. The outermost layer of the cerebrum is the cerebral cortex, the "gray matter" of the brain. Deep folds and wrinkles in the brain increases the surface area of the gray matter, so more information can be processed. The cerebrum is divided into two hemispheres. The brain's hemispheres are divided into four lobes: frontal, parietal, temporal, and occipital. The frontal lobe, located at the front of the brain, is associated with "reasoning, motor skills, higher level cognition, and expressive language."[36] The parietal lobe, located in the middle of the brain, is "associated with the processing of tactile sensory information such as pressure, touch, and pain."[37] The temporal lobe, located on the bottom section of the brain, encompasses the primary auditory cortex (important for interpreting sound and language we hear), the hippocampus (associated with memory). The occipital lobe, located in the back portion of the brain, is associated

[35] Mayo Foundation for Medical Education and Research, "Slideshow: How your Brain Works," April 20, 2016, accessed October 1, 2016, http://www.mayoclinic.org/brain/sls-20077047.

[36] Psychology: Very Well, "The Anatomy of the Brain," August 30, 2016, accessed March 27, 2017, https://www.verywell.com/the-anatomy-of-the-brain-2794895.

[37] Ibid.

with “interpreting visual stimuli and information.”[38] In addition to the four lobes, consist the brain stem and the cerebellum. The brainstem connects the spinal cord to the rest of the brain. It controls vital functions such as heart rate, blood pressure, and breathing. The brain stem is also a sleep control center. Lastly, the cerebellum, located at the base of the brain to the posterior is responsible for the combination of sensory information from the eyes, ears, and muscles to help coordination and balance.

Deep within the brain is the limbic system, the control center of emotional response. The limbic system consists of the thalamus, hypothalamus, amygdala, pituitary and the hippocampus. The thalamus acts as a gatekeeper for messages between the spinal cord and the cerebral hemisphere. The thalamus controls emotions, regulates the body’s temperature and controls urges such as eating and sleeping. The hippocampus sends memories to be stored in appropriate sections of the cerebrum and then recalls them when necessary.[39] “Amygdala is the integrative center for emotions, emotional behavior, and motivation.”[40]

Suicide, Meditation, and Brain

Despite the increase in research and attention on suicide and meditation, little is known about their association with the brain. The few and emerging studies are a promising beginning in discovering the neurobiological and neuroanatomy differences

[38] Ibid.

[39] Mayo Clinic, “Slideshow: How your Brain Works.”

[40] The University of Texas Health Science Center, “Amygdala-General Considerations,” accessed April 3, 2017, http://neuroscience.uth.tmc.edu/s4/chapter06.html.

that are specific to suicide decedents or those with suicidal behaviors. Functional brain imaging studies show changes in the structure and the function of the brain while people were in meditation. Brain imaging via Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) show regional brain functioning in people with suicidal behaviors and those practicing meditation. Computed Tomography and Magnetic Resonance Imaging can provide post mortem brain studies of those who have committed suicide. The neuroanatomical relationship can expose factors that may offer greater insight into the early identification, prevention, and focus treatments of suicidal behaviors.

Suicide and the Brain

In the article, "Structural and Functioning Neuroimaging Studies of the Suicidal Brain," Desmyter and his team found significant difference in MRI studies of subjects with a history of suicide from those with no history. The team noted a higher prevalence of white and grey matter hyperintensities in the frontal, temporal and/or parietal lobe. These hyperintensities are signal abnormalities in the white and grey matter of these regions of the brain. Grey matter hyperintensities are a representation of disruptive communication in critical neuroanatomic pathways. This can impair decision making process and predisposes the individual to impulsive behaviors and suicide.[41] Other findings included a reduced gray matter volume in the frontal lobes.

[41] S. Desmyter, C. van Heeringen, and K Audenaert, "Structural and Functioning Neuroimaging Studies of the Suicidal Brain," *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 35, no. 4 (June 1, 2011): 796-808, accessed September 1, 2016, http://dx.doi.org/10.1016/j.pnpbp.2010.12.026.

A common finding in functional neuroimaging in resting conditions of individuals with history of suicidal behaviors is a decreased perfusion in the prefrontal cortex. The prefrontal dysfunction is related to reduction in attention, problem solving abilities and greater response to negative emotions. This dysfunction may also reduce the ability to anticipate problems and lead to feelings of hopelessness. An accompanying inhibition and increased impulsivity caused by a decreased prefrontal perfusion might mean a greater risk of suicidal behavior.

Despite the scarcity of research on this topic, current findings are promising for spurring research on suicide. A better understanding of the neurobiology of suicide may help in developing more appropriate biomarkers and therapeutic agents which, in turn, may lead to more effective screening methods, early detection, effective management, and thus, the prevention of suicide.

Meditation and the Brain

Meditation is a dynamic process that empirical studies have found to positively affect multiple neuro pathways and regions of the brain. Functional neuroimaging techniques offer an opportunity to observe changes in regional brain activity and blood flow during meditation. Functional magnetic resonance imaging (fMRI), electroencephalogram (EEG), and positron emission tomography (PET) scan has been used in research to identify and characterize the brain regions that are active during a simple form of meditation. This section will be a literature review of three studies. The three studies collectively encompass the evaluation of practitioners of meditation through neuroimaging.

Sara Lazar, a neuroscientist at Massachusetts General Hospital and Harvard Medical School, and her team of experts were one of the first scientists to test the positive claims of meditation by looking at the brain through fMRI. The first published study by Lazar and her team in 2000, "Functional Brain Mapping of the Relaxation Response and Meditation," sought to "identify foci of activity that are modulated by a very simple form of meditation"[42] using fMRI. The study involved five right-hand participants (four out of the five were males), age 22-45 years old, with no history of psychiatric disorder. The participants had been practicing Kundalini meditation daily for four years. Kundalini meditation focuses on breathing, chanting of mantras, and yoga poses. The participants were instructed to perform a simple form of meditation with two, twelve minutes meditation sessions, preceded by a six minute control session during a 42 minute fMRI scan. Four participants were scanned twice during a single session while the fifth participant was scanned once.[43]

Two analysis were executed to describe regional fMRI responses in its totality. The first analysis revealed a significant increase in fMRI signal found during meditation in "putamen, midbrain, pregenusal anterior cingulate cortex, and hippocampal/ parahippocampal formation"[44] with significant activation observed in the "septum,

[42] Sara W. Lazar, George Bush, Randy L. Gollub, Gregory L. Fricchione, Gurucharan Khalsa, and Herbet Benson, "Functional Brain Mapping of the Relaxation Response and Meditation," *NeuroReport* 11, no. 7 (May 2000): 1581.

[43] Ibid.

[44] Ibid.

caudate, amygdala and hypothalamus in at least three subjects."[45] The second analysis "identified multiple foci of activation within prefrontal, parietal and temporal cortices, as well as in the precentral and post central gyri, and hippocampal/parahippocampal formation."[46]

Lazar and her team concluded that meditation enhances the activation of "neural structures involved in attention."[47] These structures included the lateral prefrontal and parietal regions and the limbic regions. The authors recommend future, focus experiments examining these specific regions.

A separate study by Lazar and a different team of scientists, "Meditation Experience is Associated with Increased Cortical Thickness," evaluated the changes in the brain's physical structure with meditation practices. Twenty experienced, physically and mentally healthy, western meditation practitioners were recruited from local meditation communities. "The meditation and controlled participants were matched for sex (meditators 65 percent male, controls 67 percent), age (meditators 38.2 years old, controls 36.8 years old), race (both groups 100 percent Caucasian) and years of education (meditators 17.3 years, control 17.4 years)."[48] The researchers used a computational approach to measure the thickness of the cerebral cortex from high resolution fMRI.

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[45] Ibid.

[46] Ibid.

[47] Ibid.

[48] Sara W. Lazar, et al., "Meditation Experience is Associated with Increased Cortical Thickness," *NeuroReport* 28, no. 16 (November 2005): 1894.

Analysis of the data determined there were no significant differences noted in the mean thickness of the entire cortex between the meditation and control participants for either hemisphere. However, in the statistical thickness-difference maps constructed using the Kolmogorov-Smirnoff statistics, revealed a "significant difference in the 'distribution' of thickness existed between groups across both hemispheres, and in each hemisphere separately. The findings indicate that the pattern of relative thickness across each hemisphere was different between groups."[49] It is well documented that as we age, our frontal cortex shrinks, making it difficult to figure things out and remember. The data shows in one region of the prefrontal cortex, 50-year-old meditators had the same amount of gray matter as 25 years old meditators.

Lazar concluded that routine meditation practice increases the cortical thickness in regions related to somatosensory, auditory, visual, and interceptive processing. "Further, regular meditation practice may slow age-related thinning of the frontal cortex."[50] The author suggests future longitudinal studies to investigate or verify this finding.

Skeptics of Lazar's 2005 study argued that the 50 years old participants may have had more gray matter before starting meditation. Therefore, Holzel, Lazar, and a new team of scientists performed a longitudinal study investigating pre and post changes in the brain's gray matter concentration of participants in an eight-week mindfulness base stress reduction (MBSR) course using fMRI.

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[49] Ibid., 1894.

[50] Ibid., 1895.

The control sample comprise of 17 participants with a mean age of 39 years old. They were recruited from individuals enrolled in four MBSR courses held at the Center for Mindfulness at the University of Massachusetts Medical School. Inclusion criteria included: good general physical and mental health, not on any medications, no meditation classes within the last six months, or "more than four classes within the last five years, or ten classes in their lifetime; 25 to 55 years old; no contra-indications for MRI scanning (i.e., metallic implants, claustrophobia; commitment to attend all eight classes and performed the prescribed daily homework."[51] The study sample consisted of eleven men and seven women. The majority (13) were of Caucasian ethnicity, two Asian, two African American, and one Hispanics.

The intervention was an eight week MBSR course that consist of eight weekly group meetings, each two and a half hours long with one day being six and a half hours. The training focused on building mindfulness capacity or "awareness of present-moment experiences with a compassionate, non-judgmental stance,"[52] through a body scan (the sequential, non-judgmental awareness of each region of the body and in totality), mindfulness yoga, and meditation. Additionally, participants were asked to practice mindfulness exercises at home with the assistance of a 45 minutes audio recording.

Data was collected from the Five Facet Mindfulness Questionnaire and high resolution fMRI scans of the brain. The Five Facet Mindfulness Questionnaire is a 39-item scale used to measure the five factors of mindfulness: observing, describing, acting

[51] Holzel et al., 3.

[52] Ibid.

with awareness, non-judging of inner experience, and non-reactivity to inner experience. High resolution fMRI data were obtained from participants scanned two weeks prior to the MBSR intervention and two weeks after. The control group was scanned two times. Each scan was approximately eight weeks apart. Whole brain analysis and specific brain region of interest were explored. The brain region of interest were the bilateral hippocampi and the insulae.[53]

Results of data analysis from the Five Mindfulness Questionnaire survey showed significant increases in the meditation group over the control group relating to the five factors of mindfulness. High resolution MRI imaging revealed "a small cluster in the left hippocampus with increased gray matter concentration"[54] post eight-week MBSR program. This was a region of interest. However, no significant changes in gray matter was noted in the insulae. In the control group, no change in gray matter concentration was noted pre or post the eight-week period. In the post-MBSR, whole brain analysis of the high resolution fMRI data for the entire brain, four clusters with increase grey matter concentration was noted. "One cluster was noted in the posterior cingulate cortex, in the left temporo-parietal junction, and two clusters in the cerebellum. . . . No regions showed a significant decrease in grey matter concentration following the MBSR intervention."[55] No change of gray matter concentration was noted in the control group from the first MRI scan to the second MRI scan eight weeks later.

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[53] Ibid., 5.

[54] Ibid.

[55] Ibid., 6.

Much research and reporting have proven the positive health benefits of meditation in the reduction of stress, improving the general quality of health, the reduction of symptoms of mental health disorders. Now, there is accumulating evidence objectively captured in EEGs, fMRI, and PET scans, on the positive influence of meditation on the brain. However, the literature exploring the effects of meditation on the brain largely comprise of a small number of those in the civilian population who are physically and psychologically healthy. Further areas of research are needed to validate the findings in Army soldiers and help scientist asses the functional significance in the brain of soldiers. This will connect behavioral and neuroimaging science and aid in developing early diagnosis, and in creating preventive treatment modalities

Psychological Disorders and Meditation

The DoD reports that over 50 percent of active duty soldiers who commit suicide had a current behavioral health diagnosis. Although there has been limited research in regards to the association of meditation in reducing suicides, literature and research addressing the clinical implications of meditation in behavioral health diagnosis were plentiful. These documents were used to add depth, relevance, and understanding to the complexity of the risk factors of suicide and inform its prevention and treatment modalities.

Khusid and Vythilingam published two articles in Military Medicine as part of a two-part series evaluating the "efficacy, mechanism, and safety of mindfulness meditation for mental health conditions frequently seen after return from deployments."[56]

[56] Marina A. Khusid and Meena Vythilingam, "The Emerging Role of Mindfulness Meditation as Effective Self-Management Strategy, Part 1: Clinical

The medical health conditions are: depression, post-traumatic stress (PTSD), anxiety, chronic pain, substance misuse, and insomnia. Methods of data collection included an exhaustive search of PubMed and Cochrane database to identify articles published up to August 2015 that were related to the predetermined key terms in both the civilian and military population. Research including civilian participants were included due to the scarceness of clinical research in the military population. The search yielded 1,523 citations related to key terms: meditation, mental training, and mindfulness.

A comprehensive review of the abstracts were based on the following inclusion criteria:

1. Participants: civilian, active duty, and veteran adults with documented diagnosis of conditions of interest (i.e. PTSD, anxiety disorders, pain, SUD, tobacco use, insomnia).[57]

2. Intervention: mindfulness meditation or group of mindfulness based intervention.[58]

3. Comparator: studies that use active comparator such as antidepressants, psychotherapy, or treatment as usual to meditation.[59]

Implications for Depression, Post-Traumatic Stress Disorder, and Anxiety," *Military Medicine* 181, no. 9 (September 2016): 961.

[57] Ibid.

[58] Ibid.

[59] Ibid.

4. Outcomes: change in symptomatology, relapse, quality of life, functional status, and mindfulness.[60]

5. Timing and setting: inclusion criteria were not limited by timing and setting.[61]

6. Study design: systematic reviews, meta-analysis, and RCTs with sample size greater than 10 subjects in the intervention groups. [62]

In total, 124 peer-reviewed journal articles were identified to be relevant and met the criteria as defined above. “Each key study was evaluated for scientific rigor and a level of evidence (LOE) was assigned the Strength of Recommendation Taxonomy (SORT) tool.[63] See Table 4 below.

[60] Ibid.

[61] Ibid.

[62] Ibid., 963.

[63] Ibid.

Table 4. Level of Evidence and Strength of Recommendation Taxonomy

Study Quality	Description for Treatment and Prevention Studies
LOE-1: Good-Quality Patient-Oriented Evidence	Systematic reviews, meta-analyses, or RCTs with consistently replicated findings High-quality individual RCTs: allocation concealed, blinding if possible, intention-to-treat analysis, adequate statistical power, adequate follow-up (greater than 80%), use of a specific active control
LOE-2: Limited-Quality Patient-Oriented Evidence	Systematic reviews or meta-analyses of lower-quality studies with inconsistent results Lower-quality clinical trials: small, nonrandomized, unconcealed allocation; not blinded; no intention-to-treat analysis; inadequate follow-up; use of nonspecific or inactive control
LOE-3: Other Evidence	Consensus guidelines, extrapolations from bench research, usual practice, opinion, disease-oriented evidence

TABLE III. Strength of Recommendation Taxonomy Adopted From Ebell et al, 2004

Strength of Recommendation (SOR)	Description
SOR A (Strong)	Recommendation on the basis of consistent and good-quality patient-oriented evidence
SOR B (Moderate)	Recommendation on the basis of inconsistent or limited-quality patient-oriented evidence
SOR C (Weak)	Recommendation on the basis of consensus, usual practice, opinion, disease-oriented evidence, or case series for studies of treatment or prevention

Source: Marina A. Khusid and Meena Vythilingam, "The Emerging Role of Mindfulness Meditation as Effective Self-Management Strategy, Part 1: Clinical Implications for Depression, Post-Traumatic Stress Disorder, and Anxiety," *Military Medicine* 181, no. 9 (September 2016): 963.

The results of the data analysis and recommendations by the researchers are as follows:

1. Adjunctive MBCT (mindfulness based cognitive therapy) is more effective than only treatment as usual in reliability reducing depression relapse rates. Further, adjunctive MBCT extended time to new relapse or recurrence in recovered patients with prior history of three or more episodes of recurrent depression. It effectively reduces the severity of depressive symptoms in remitted patients and those with active episodes.[64]

[64] Ibid.

2. Second, MBSR (mindfulness based stress reduction) is recommended as an adjunctive therapy to individuals with combat PTSD interested in self-management to decrease PTSD symptoms, improve mental health-related quality of life, and mindfulness skills.[65]

3. The data showed inconsistent direction of effect on anxiety symptoms, and at this time does not show that adjunctive mindfulness meditation provides added benefit compared to standard treatment alone in patient with general anxiety disorder.[66]

4. Mindfulness based interventions were efficacious in pain reduction, improvement in functional mobility and quality of life, and psychological benefits in acceptance and effective adjunct therapy for pain control. Initial results also showed promising results dealing with reduction of opioid analgesic cravings, dependency and usage.[67]

5. Mindfulness training for smokers was more effective than the American Lung Association's Freedom from Smoking treatment at reducing "cravings, stress, negative emotions, and experiential avoidance, and increasing mindfulness."[68]

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[65] Ibid.

[66] Ibid.

[67] Marina A. Khusid and Meena Vythilingam, "The Emerging Role of Mindfulness Meditation as Effective Self-Management Strategy, Part 2: Clinical Implications for Chronic Pain, Substance Misuse, and Insomnia," *Military Medicine* 181, no. 9 (September 2016).

[68] Ibid., 972.

6. Mindfulness based interventions were more effective in improving sleep, well-being, self -compassion, and mindfulness for chronic insomnia over the control population and those who received hygiene education.[69]

The authors admit the majority of mindfulness meditation trials were of limited quality due to methodological challenges, many were not conducted on service members, or combat veterans, and they had a small sample size. However, these two articles conclude that mindfulness meditation was as beneficial as adjunct therapy. This study when combined with future studies on mindfulness may provide further insight into meditation as a protective factor on soldiers who practice it before the emergences of signs and symptoms of psychological disorders and diagnosis.

Meditation and Habits

In the article, "Changing the Habits of a Lifetime? Mindfulness meditation and habitual geographies," Lea, Cadman, and Philo interviewed students and teachers of mindfulness meditation in order to understand how habits mediate and change reflective practices between the body and self. Habits are "the ways society becomes deposited in persons in the form of lasting disposition, or trained capacities and structured propensities to think, feel and act in determinant ways."[70] The paper focuses on the relationship

[69] Ibid.

[70] Jennifer Lea, Louisa Cadman, and Chris Philo, "Changing the Habits of a Lifetime? Mindfulness Meditation and Habitual Geographies," *Cultural Geographies* 22, no. 1 (2015): 51, accessed September 1, 2016, http://dx.doi.org/10.1177/1474474014536519.

between mindfulness meditation as it is currently being practiced within western health in the form of MBCT and MBSR.

Through careful and purposeful selection, four mindfulness meditation teachers and seven meditation students were selected to look at wandering and lengthy dialogue within one's habitual self and the ability to transform it to a form of positive self-reflexivity. Mindfulness meditation, MBCT, and MBSR were designed to address the negative mental patterns that is habitual in the sub-conscious or semi-conscious levels which create problems that "perpetuate stress, unhappiness, depression and dissatisfaction."[71] "Our habitual patterns of thought transform what might otherwise be a fleeting negative feeling/thought into a more enduring form of a negativity or rumination. Writings on mindfulness suggests that rumination does not solve our problems, but rather is likely to precipitate a 'cascade of mental events that draws us down into a depression.' The problem is not the feeling, but rather how the mind reacts to the feeling."[72] The key is to help the participant recognize the habitual patterns of their thoughts and intentionally shift their awareness to intervene before cascading down into depressive state. Mindfulness meditation is a tool to this change and intervention by encouraging focus on the present moment.

Below are some comments of the participants:

[71] Ibid., 55.

[72] Ibid.

1. “You know, a lot of us spend so much time flying out of our bodies, trying to be in the next place, trying to be in the last place, upset because, you know, we’re thinking in the past, we’re planning for the future, we’re not really present.”[73]

2. “A lot of my life I’ve just been running from one thing to another like in a frantic kind of excited way because I’m quite an…energetic sort of person…I was doing lots of different things…But I feel like I’d just been running from one thing to another and never stopping. And so this maybe has given me a chance to stop.”[74]

The study shows that mindfulness meditation can offer an immediate break from stressors of everyday life and work, as well as increase its awareness to respond to those stressors. Mindfulness meditation is a tool to this change and intervention by encouraging focus on the present moment. The objective is to “get out of our heads and learn to experience the world directly, experientially, without the relentless commentary of our thoughts.”[75]

Resiliency and Meditation

The American Psychological Association define resilience as a “process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress.”[76] In short, it is the ability to bounce back after a negative experience. Resilience

[73] Ibid.

[74] Ibid.

[75] Ibid.

[76] American Psychological Association, “The Road to Resilience,” accessed September 1. 2016, http://www.apa.org/helpcenter/road-resilience.aspx.

is not a trait that people either have or do not have. It involves behaviors, thoughts and actions that can be learned and developed in anyone. “Research suggests that resilient individuals approach life optimistically, energetically, with openness to experience, and positive emotionality.[77] They foster positive emotions through optimistic thinking, humor, and relaxation techniques. When resilient individuals experience negative effects, they are able to process information provided by the precipitating event, learn from it, and control their biological systems in such a way as to minimize the effect of the negative affect that they have experienced. This affective experience of mood is important element of psychological resilience.

In “Positive Emotions in Traumatic Conditions: Mediation of Appraisal and Mood for Military Personnel,” Riolli, Savicki, and Spain “examines the psychological impact of exposure to traumatic stress for military personnel, focusing on psychological resilience and its relationship to cognitive appraisal and mood.”[78] Participants included 632 soldiers from nine different Army units stationed in Baghdad and surrounding units. The majority were male (99 percent) with median age 25; 70.4 percent were Caucasian, non-Hispanic race; 56 percent were junior enlisted and 33% non-commissioned officers.[79]

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[77] Laura Riolli, Victor Savicki, and Everett Spain, “Positive Emotions in Traumatic Conditions: Meditation of Appraisal and Mood for Military Personnel,” *Military Psychology* 22 (2010): 209, accessed September 1, 2016, http://dx.doi.org/10.1080/08995601003638975.

[78] Ibid., 208.

[79] Ibid.

Four tools were used to measure psychological reaction, native resilience, appraisal of stress, and mood.

1. The Brief Symptom, a 53 item checklist measuring nine-symptom cluster scales and a summary of the Global Severity Index, was used to measure psychological adjustment.[80]

2. The Ego-Resiliency Scale, a 14-item scale with response based on a 4-point Likert scale, assessed the trait of psychological resilience (capacity to respond effectively to changing situational demands, especially frustrating or stressful encounters).[81]

3. The Appraisal of Life Events Scale assesses cognitive appraisal of stressful situations via three dimensions: Challenge, Threat, and Loss.[82]

4. Positive and negative mood were assessed with Positive and Negative Affectivity Schedule. Ten adjectives of positive and ten adjectives of negative moods were listed. Participants were asked to rate the extent of their mood over the past few weeks of their deployments. Surveys were distributed to the nine units with permission and coordination from the Commander. Data were collected over a month period during soldiers daily deployment work day in the summer 2004, 15 months after the declaration of major combat operations.[83]

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[80] Ibid., 213.

[81] Ibid.

[82] Ibid.

[83] Ibid., 213-214.

Data analysis revealed the following results:

1. Soldiers exposed to traumatic stress conditions in Iraq showed elevated psychological symptoms with specific increase in hostility, paranoia, and obsessive compulsion.

2. “Ego resilience was positively related to the appraisal of challenge, and inversely related to the appraisals of treat, and loss.” Thus, soldiers with higher resilience are more likely to view situations, even traumatic situations, more as challenges and less as threats or losses. These results echoed previous findings.[84]

3. Significant relationship between cognitive appraisal and psychological maladjustment exist. Therefore, traumatic stress is more severe, and producing harm and loss rather than threatening it.[85]

4. The Negative Affect subscale shows the greatest variance in the relations of traumatic stress as being intensely tinged with negative feelings.[86]

The authors conclude that positive mood and emotions may play an important role in dealing with stress, even traumatic stress. The authors admit the study’s limitations in it being cross-sectional and male-centric rather than longitudinal. Recommendations were made to track both males and females over an extended period of time, before and after exposure to traumatic conditions. Exposure to traumatic events are very common in the military population. Understanding the psychological reactions may help guide

[84] Ibid., 215.

[85] Ibid., 216.

[86] Ibid., 217.

individuals and care providers in identifying and creating positive events and emotions that is built upon one another in order to establish longevity. [87]

In "Overview of Outcome Data of Potential Meditation Training for Soldier Resilience," Brian Rees screened over 11,500 articles for modalities that were relevant to soldiers' resilience. Examples of modalities include biofeedback, transcendental meditation, mindfulness based meditation, or yoga. The methodology used was a comprehensive search of Medline database with predetermined inclusion and exclusion criteria. The inclusion criteria is: portability and inconspicuousness, does not require privacy or the cooperation of others, must be usable in austere environment without additional training or adjustment to soldiers uniform. The research article does not clearly define these criteria and the totality of the articles used. However, treatment modalities were evaluated and eliminated through multiple rounds of cuts.[88] The three modalities that met the author's criteria were transcendental meditation (TM), mindfulness, and progressive muscle relation (PMR).

Rees comparison and meta-analyses resulted in the following:

1. TM was more effective than progressive muscle relaxation in reducing blood pressure and the use of blood medications.

2. Mindfulness meditation was "more effective in decreasing distractive and ruminative thought behaviors than was PMR or control."[89]

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[87] Ibid., 219.

[88] Brian Rees, "Overview of Outcome Data of Potential Meditation Training for Soldier Resilience," *Military Medicine* 176 (November 2011): 1232-1242.

[89] Ibid., 1236.

3. TM showed increase in EEG coherence and faster habituation to stressful stimuli than compared to other groups.[90]

4. In older randomized studies, TM group had 23 percent less overall mortality, 30 percent less cardiovascular mortality, and 49 percent less cancer mortality than combined control.[91]

5. In 42 TM studies, the effects of TM was 3 times more compared to other groups in increasing self-actualization.[92]

6. In eight meta analyses of 579 studies of over 20,000 subjects, TM outperformed other modalities in improving psychological outcomes and decreased use of cigarettes, drugs, and alcohol.[93]

Rees concluded that meditation is more effective than progressive muscle relaxation in decreasing mortality, cardiovascular disease signs and symptoms, improving cognitive function, and reducing anxiety. The author admits the limitations in the efficacy of the research as it relates to comparison of only three modalities, resilience uniquely defined for the Army, some studies were not performed on American soldiers, or within the parameters cited in the evaluation.

Currently, the military is using two popular meditative programs: Mindfulness Based Stress Reduction (MBSR) and Mindfulness-based Mind Fitness Training (MMFT).

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[90] Ibid.

[91] Ibid.

[92] Ibid.

[93] Ibid.

Both are eight week programs that were created to introduce and teach mindfulness sitting meditation. MMFT was used by in Dr. Jha's pilot study of a detachment of 31 Marines Reservists. The Marines received MMFT training prior to deployment to Iraq and used it during their deployment. Each Marine reported individualizing their practice to fit their daily routine while in Iraq. [94]

The Marines who accepted and adapted the MMTF into their lives and practiced it regularly noticed they were able to "quiet their minds, fall asleep faster, and sleep more soundly"[95] during each day in deployment. While in their pre-deployment timeline, test measuring cognitive capabilities were done by Dr. Jha and her team before and after the MMFT. Those who spent time engaging in mindfulness exercise showed an improved cognitive performance. Therefore, enhancing the Marines' performance in a counter-insurgency environment in order to accomplish their missions. "Specifically, despite the real increase in stressors during the pre-deployment period, the Marines who engaged in more mind fitness training maintained the same perceived stress level and preserved or even improve their working memory capacity over their initial baseline."[96] In contrast, Marines who practiced minimal mindfulness fitness training reported an elevated level of stress and decline in working memory capacity. Working memory is "the part of short term memory that is concerned with immediate conscious perceptual and linguistic

[94] Elizabeth A. Stanley and Amishi Jha, "Mind Fitness: Improving Operational Effectiveness and Building Warrior Resilience," *Joint Forces Quarterly*, no. 55 (2009): 144-151.

[95] Ibid., 148.

[96] Ibid., 149.

processing."[97] Elevated stress and decreased working memory capacity are also associated with groups of individuals suffering from behavioral health diagnosis such as post-traumatic stress disease and major depression.

Dr. Jha's study suggest mind fitness training builds resiliency and improves service members' ability to bounce back quicker from cognitive degradation and the psychological injury caused by their operational stress and experiences. The study highlights "the parallel to physical fitness: just as building muscle requires repetitive physical exercise, improving cognitive and emotional performance requires engaging in mind fitness exercises in sustained, disciplined manner."[98]

Summary

This qualitative study seeks to explore meditation as a protective factor against suicide in the U.S. Army. This chapter reveals a gap in the body of literature and existing research about meditation as a protective factor in the civilian and military population. However, the review has exposed a large body of empirical literature supporting the two main topics of this qualitative study, suicide and meditation. This body of information can be compared and analyzed for relevancy and transferability in order to bridge the gap of knowledge that exist between the two topics. Furthermore, this research will enable the promotion of innovative thoughts and direction to solving a healthcare crisis and epidemic that is preventable.

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[97] Google, "Working Memory," accessed April 9, 2017, https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=working+memory.

[98] Stanley and Jha, 149.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

Suicide is a worldwide epidemic.[99] It is an epidemic that affects people in all societies, cultures, and religions. The U.S. and its' military are no exception. The purpose of this research is to explore the role of meditation as a protector factor against suicide in the U.S. Army. This is done through a qualitative research case study that is based in Grounded Theory methodology. This chapter will detail the qualitative research methodology that includes: basis for choosing a qualitative research, data collection, analysis, coding, research questions, role of researcher, standard quality of validity, and verification.

Basis for Choosing a Qualitative Research Methodology

Qualitative research "is an effort to understand situations in their uniqueness as part of a particular context and the interaction there."[100] A qualitative research methodology was selected to gain understanding, meaning, and connection in order to explain the impact of meditation on the complex social and cultural epidemic of suicide

[99] World Health Organization, "Suicide."

[100] Michael Patton, "Quality in Qualitative Research: Methodological Principles and Recent Developments" (Invited address to Division J of the American Educational Research Association, April 1985), 1.

in the U.S. Army. Therefore, qualitative research can help bring to light "how all the parts work together to form a whole."[101]

Characteristics of Qualitative Research

Sharan Merriam writes that "qualitative research is an umbrella concept covering several forms of inquiry that helps us understand and explain the meaning of social phenomena with as little disruption of the natural setting as possible."[102] Essential characteristics of qualitative research are: "the goal of eliciting understanding and meaning, the researched as primary instrument of data collection and analysis, the use of fieldwork, and inductive orientation to analysis, and findings that are richly descriptive."[103] This research met the characteristics mentioned by Merriam through eliciting meaning and understanding of the complexity of suicide and meditation, the population, and possible reasons for suicide. This qualitative research further attempts to gain understanding in the social and scientific benefits of meditation.

Data Collection

Three commonly used data collection and selection strategy in qualitative research are interviews, observations, and documents. All three methods of data collection were done in a systematic way as "guided by questions, educated hunches, and

[101] Sharan Merriam, *Qualitative Research and Case Study Application in Education* (San Francisco, CA: Jossey-Bass Publishers, 1998), 6.

[102] Ibid., 5.

[103] Ibid., 11.

emerging findings."[104] Glaser and Strauss comparatively state the following of library and fieldwork: "When someone stands in the library stacks, he is, metaphorically, surrounded by voices begging to be herd. Every book, every magazine article, represents at least one person who is the equivalent to the anthropologist's informant or the sociologist's interviewee. In those publications, people converse, announce positions, argue with range of eloquence, and describe scenes in ways entirely comparable to what is seen and heard during field work."[105]

The principle form of data collection for this qualitative research is document analysis. Documents in the context of this study refers to academic based research journal articles, books, newspaper articles, dissertations and theses, and on line data retrieved from official government, private, and public websites. Document search and collection were done using the following key words: suicide, meditation, aoldiers, and a combination of any two or more of the key words. The first focus was collecting documents on suicide in society, in the U.S. military, and the U.S. Army. The second focus was on the pros and cons of meditation. The third focus was on the association between benefits of meditation and the needs of soldiers. Lastly, data collection focused on the main context of the research study, meditation and suicide.

The generalization of the key word search (suicide, meditation, soldiers) allowed the researcher to gain initial collection and understanding of the scope of information currently available. The search resulted in over two thousand documents and resources.

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[104] Ibid., 120.

[105] Barney Glaser and Anselm Strauss, *The Discovery of Grounded Theory* (Chicago, IL: Aldine, 1967), 163.

Then, the process of elimination and authentications of the documents were assessed. Merriam writes: "It is the investigator's responsibility to determine as much as possible about the document, its origins and reasons for being written, its author, and the context in which it is written."[106]

Authentication of the documents collected for this study started with asking the following questions:

- Is the document complete, as originally constructed?
- Has it been tampered with or edited?
- Who was/is the author?
- What was he trying to accomplish? For whom was the document intended?
- What were the maker's sources of information? Does the document represent an eyewitness account, a secondhand account, a reconstruction of an event long prior to the writing, interpretation?
- To what extent was the writer likely to want to tell the truth?
- Do other documents exist that might shed additional light on the same story, event, project, program, or context? [107]

The majority of the documents collected and analyzed in this research study came from official government websites and reports such as the Center for Disease and Control Prevention and DoDSER. Academic and professional research studies were extracted from peer review journals such as Military Medicine, Neuroreport, and Psychiatry Research. An unofficial online verification of the journals, authors, and researchers' biography, expertise, experience were done to ensure validity and legitimacy.

[106] Merriam, *Qualitative Research and Case Study*, 121.

[107] Egon Guba and Yvonna Lincoln, *Effective Evaluation* (San Francisco, CA: Jossey-Bass, 1981), 238-239.

Data Analysis

Kevin Shea writes, "Analysis is about bringing order to chaos. It is an opportunity for the researcher to look at all the disparate pieces of data and attempt to make sense of them and see if any patterns emerge."[108] This develops into the identification of recurring themes, categories, and patterns that is the foundation for answering research questions.

Grounded Theory analysis was used in this research study. It is a constant comparative analysis that "uses categories, properties, and hypothesis that are the conceptual links between and among the categories and properties."[109] These comparisons are constantly made until a theory is formulated that is grounded in data and emerges as Grounded Theory. Grounded Theory starts with categories followed by properties, a core category, and a hypothesis.

This research study was divided into two main categories: suicide and meditation. The U.S. Army was identified as a core category. Properties for suicide were titled demographics, 'methods of suicide', 'psychological disorder', 'stressors and marital status', and 'deployment history.' Properties for meditation were titled the brain, resiliency, and 'psychological disorders'. As the core category, the U.S. Army was a "the central defining aspect of the phenomenon to which all other categories, and hypothesis are related or interconnected."[110] A hypothesis was generated through this methodology

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[108] Kevin P. Shea, "The Effects of Combat Related Stress on Learning in an Academic Environment: A Qualitative Case Study," (Ph.D. diss., Kansas State University, 2010), 56.

[109] Sharan Merriam and Elizabeth Tisdell, *Qualitative Research: A Guide to Design and Implementation* (San Francisco, CA: Jossey-Bass, 2016), 288.

[110] Ibid., 299.

of constant comparison of categories. The researcher hypothesize that meditation can serve as an effective protective factor against suicide in the U.S. Army.

"Data analysis is the process of making sense out of the data. And making sense out of the data involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read-it is a process of making meaning."[111] This research study did this through constant comparison of category through the Grounded Theory methodology.

Coding

"Coding is nothing more than assigning some sort of shorthanded designation to various aspects of your data so that you can easily retrieve specific pieces of the data."[112] Three phases of coding were used during data collection and analysis. The first phase was open coding, which is marking data that may be suited for the study early in data collection. Axial coding is the second phase in which categories and properties relations are refined. The third phase is selective coding. In this phase, the hypothesis was developed.

This research study used all three phases in the coding process. Early in data coding, numbers of suicide throughout the last 15 years were coded for civilians, DoD military services and the U.S. Army, the benefits of suicide, and so forth. Axial coding connected the category and properties of suicide with that of meditation and over time periods. For example, the brain structure and functionality is important in both suicide

[111] Ibid., 202.

[112] Ibid., 199.

and meditation. After selective coding, the U.S. Army was picked as the core category over the U.S. military services and a hypothesis was developed.

Research Questions

This qualitative research case study attempted to answer the following questions by using relevant documents as the primary source in answering the following questions:

1. What are the common characteristics of individuals and soldiers who committed suicide?

2. What are the benefits of meditation?

3. What role can meditation play as a protective factor against suicide in soldiers?

4. How can the U.S. Army use meditation as a dynamic tool to form and shape resilient and adaptable soldiers in an ever changing profession?

Role of the Researcher

Sharan Merriam discusses three essential characteristics of a researcher in her book, *Qualitative Researcher and Case Study Applications in Education:* tolerance for ambiguity, sensitivity, and good communication skills. [113] The researcher for this study experienced a need for greater tolerance of ambiguity. "Throughout the research process-from designing the study to data collection, to data analysis-there are no set procedures or protocols that can be followed step by step . . . . The very lack of structure is what makes this type of research appealing to many, for it allows the researcher to adapt to unforeseen events and change direction in pursuit of meaning." Initially, the lack of structure and

[113] Merriam, *Qualitative Research and Case Study*, 20.

ambiguity allowed for more freedom of movement for the researcher in the topic, however, as the researcher started writing and managing data for analysis, structure and procedure were wanted and needed.

In this qualitative research case study, the researcher and the computer are the primary instruments for gathering and analyzing data. A computer search using EBSCOhost, Medline, and PubMed online database, the Combined Arms Research Library' Masters in Military Art and Sciences database, and official government websites were primarily used to collect data relevant to this research topic. The researcher attempts to make sense and meaning of the data collected, formulate themes and patterns, and determine gaps.

Standard of Quality and Verification

Merriam and Tisdell discussed eight strategies that are used to increase the standard of quality and verification of a qualitative study. These strategies include: triangulation, member checks/respondent validation, adequate engagement in data collection, researcher's reflection and engagement, peer view/examination, audit trail, thick, rich descriptions, and maximum variation.[114] The three strategies used in this research study are triangulation, adequate engagement in data collection, and peer examination or peer review.

Triangulation is the use of various forms of data collection, data, means of observation and analysis, and comparison to increase the standard of quality and credibility. Patton states, "triangulation, in whatever form, increases credibility and

[114] Merriam and Tisdell, *Qualitative Research*, 258.

quality by countering the concern (or accusation) that a study's findings are simply an artifact of a single method, a single source, or a single investigator's blinders."[115]

This research study used triangulation to establish credibility, standard of quality, and validity. Multiple different resources were used during data collection. Civilian

(public and private) and government resources such as the Center for Disease Control, the DoD official websites, EBSCO host, official university websites were used to collect supporting data and statistics on suicide and meditation. Research data were extracted from multiple different academic and peer reviewed journals, books, and magazines done by multiple different researchers who were experts in their fields: Neuro Report, Journal of Depression and Anxiety, Journal of Clinical Psychology, Military Medicine, Journal of Alternative and Complimentary Medicine, and Journal of Traumatic Stress. Also, multiple researchers and scientists such as Lazar, Khusid, Treadway, and Tang were authors of more than one research articles and documents used in this research study.

Adequate engagement in data collection was the second strategy used to establish credibility, standard of quality, and validity in this research. This strategy asks the question of how many documents is enough in this research. Merriam writes, "the best rule of thumb is that the data and emerging findings must feel saturated; that is, you begin to see and hear the same things over and over again, and no new information surfaces as you collect more data."[116] The key term search yielded over 2,000 resources, however

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[115] Michael Patton, *Qualitative Research and Evaluation Methods*, 4th ed. (Thousand Oaks, CA: Sage, 2015), 647.

[116] Merriam and Tisdell, *Qualitative Research*, 248.

approximately fifty documents were selected and collected for further review on the subject of suicide, meditation, and the military or U.S. Army. The researcher stopped data collection when recurring themes and information were repeated in subsequent resources and noted in analysis. Time was also spent looking for variation to assist in a comprehensive understanding of suicide, meditation, and the role of meditation in the Army. This was done through looking for data to support the negative influence of meditation and in comparing similarities and difference between civilian and military suicide. Only one research was found among hundreds that showed meditation negatively influence one participant. The researcher also found similarities in risk factors between civilians and soldiers and the difficulties in management of suicide for both populations.

The third strategy used to establish credibility is peer examination or peer review. As a graduate student writing a thesis, this process is built in the researcher's thesis committee. The researcher's thesis committee consists of two Masters prepared advisor and one Doctoral advisor. Additionally, informal peer review committees and two Masters prepared license clinical social workers with over ten years of experience each in military behavioral health specialty were recruited in the researcher's writing and editing process.

To establish credibility, high standards of quality and verification, attention and focus must be made in how data are collected, analyzed, interpreted, and presented. Firestone writes, "the quantitative study must convince the reader that procedures have been followed faithfully because very little concrete description of what anyone does is

provided. The qualitative study provides the reader with a depiction in enough detail to show that the author's conclusion 'make sense."[117]

[117] William Firestone, "Meaning in Method: The Rhetoric of Quantitative and Qualitative Research," *Educational Research 16*, no. 6 (1987): 19, accessed March 1, 2016, http://files.eric.ed.gov/fulltext/ED292816.pdf.

CHAPTER 4

ANALYSIS

> The strength of the U.S. military has always been dependent upon the strength of the soldiers within its ranks. The strength of individual soldiers-cognitive functioning and physical capability of soldiers-these are the most critical elements to overall military health and resilience.[118]
>
> — Melissa Myers

Introduction

The purpose of this qualitative research case study is to explore meditation as a protective factor against suicide in the U.S. Army. The qualitative standard of quality and verification was based on three strategies: triangulation, adequate engagement in data collection, and peer examination or peer review. The data analysis is presented in this chapter. It is organized and tailored to answering the four research questions posed in chapter one.

What were the common characteristics of individuals and soldiers who committed suicide?

Suicide is a complex and dynamic public health issue that exist in the civilian and military culture. Data collection and analysis generated themes related to both, U.S. civilians and military personnel. The themes were noted in demographics, methods and location of suicide, behavioral health diagnosis, and stressors preceding the suicide event.

[118] Melissa Myers, "Improving Military Resilience through Mindfulness Training," U.S. Army, June 1, 2015, accessed September 5, 2016. https://www.army.mil/article/149615/Improving_Military_Resilience_through_Mindfulness_Training.

Deployment history is a military characteristic that sets the service members apart from the civilian population.

In 1999, the suicide rate per100,000 in the U.S. population was 10.5. There have been slight successive increases since then with a rate of 10.9 per 100,000 in 2005 and a peak of 13.26 per 100,000 in 2015. The actual number of deaths by suicide is much more profound. In total, 44,193 Americans committed suicide in 2015 compared to 32, 637 in 2005, and 29, 199 in 1999. It is estimated that approximately 22 percent of suicide decedents within the civilian population are veterans.[119]

The DoDSER reports 260 service members died of suicide in 2008 across the armed services. This was the first year the number of suicide in the armed services reach above 200. In 2012, the total DoD suicide number peaked at 321 service members. In 2015, 266 total service members committed suicide, down from 274 in 2014.[120] For the U.S. Army: 165 active duty soldiers died in 2012, 124 died in 2014, 120 died in 2015.[121] After just three quarters of reporting in 2016, 202 service members committed suicide. Ninety-three of the 202 suicides were Army soldiers.[122] These numbers would be higher

[119] Sally C. Curtain, Margaret Warner, and Holly Hedegaard, "Increase in Suicide in the United States, 1999-2014," Center for Disease Control and Prevention, April 2016, accessed September 1, 2016, https://www.cdc.gov/nchs/products/databriefs/db241.htm.

[120] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report CY 2008 -2014."

[121] Ibid.

[122] Keita Franklin, "Department of Defense Quarterly Suicide Report: Calendar Year 2016 3rd Quarter," Defense Suicide Prevention Office, accessed April 5, 2017, http://www.dspo.mil/Portals/113/Documents/DoD%20Quarterly%20Suicide%20Report%20CY2016%20Q3%20final.pdf?ver=2017-01-13-120054-257.

if these numbers included Army National Guard and the Army Reserves. See figure 3 for more details.

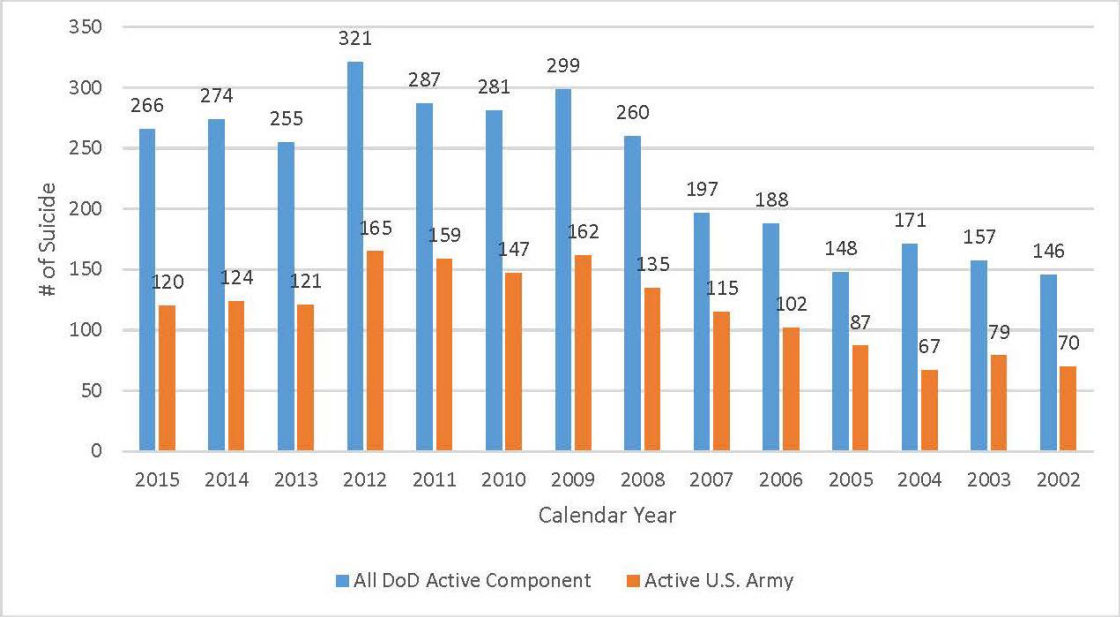

Figure 3. Number of Suicide for all Active Duty DoD Service Members versus U.S. Active Duty Army Soldiers

Source: Data was obtained from DoD.

Demographics

Many commonalities exist in the analysis of demographics and characteristics of suicide decedent within civilian and military populations. Data from the CDC and DoDSER revealed a higher percentage of suicide in the following categories shared by Americans and service members: age, sex, race, ethnicity, and marital status. In both populations, 17-39 year olds had the highest suicide rates. DoDSER data across the services suggest that an average of 71 percent of soldiers who commit suicide were under

30 years of age in calendar year 2008 to 2014.[123] Males were three to four times more likely to commit suicide while females were more likely to attempt suicide. The majority of suicide decedents were married, followed by single and never been married. Non-Hispanic white males were the race with the highest rates of suicide. According to the CDC, suicide is the second leading cause of fatal death in the U.S. for age group 25-34 and the third leading cause of fatal deaths for age group 15-24 for calendar year 1999-2015.[124]

More specific analysis in this section compared the demographics and service characteristics of suicide across the active duty armed services to the active duty Army. See table 5 below for comparison of demographics and service characteristics available through DoDSER annual report for calendar year 2008 to 2014. The available data is consistent among the services and the Army. Across the services, over 90 percent of those who committed suicide were males. Calendar year 2012 was an exception as only 76 percent of military suicide decedents were males. In the Army, males consistently average over 90 percent of suicide decedents since 2009. This is in line with the majority of the military population being male. Across the DoD services, approximately 90 percent of suicide decedent were enlisted soldiers with rank of E1 to E9, and

[123] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report CY 2008 -2014."

[124] Center for Disease Control and Prevention, "Suicide: Data Sources," accessed January 3, 2017, https://www.cdc.gov/violenceprevention/suicide/datasources.html.

approximately 91percent were active component military for the calendar year 2008 to 2014.[125]

In the Army, for calendar year 2008 to 2014, approximately 85 percent of soldiers who committed suicide were enlisted soldiers with the rank of E1 to E9 and approximately 88 percent were active duty Army. The data showed, on average, slightly over 50 percent of the armed services suicide decedents were married for calendar year 2008-2014. Only in 2012 was there a slight deviance in which more suicide decedents were single, never been married than married (42 percent). In the Army, this slight deviance was noted in 2008. Single, never married soldiers comprise of 44 percent of suicide decedents compared to 43 percent married.[126]

Table 5. Joint Data Across the Armed Services Calendar Year 2008-2014 in Percent

Calendar Year	2014	2013	2012	2011	2010	2009	2008
Males	94	94	76	95	95	97	95
White/Caucasian	72	76	68	77	80	80	76
Non-Hispanic	88	92	74	94	*	*	*
<30 yrs. of age	62	67	81	79	73	70	68
High School Grad or <	72	81	51	77	79	83	76
Enlisted E1-E9	83	90	88	92	95	*	*
Married	52	51	42	54	50	51	54
Active Component	93	91	95	89	91	92	88

* Data not available.

Source: Data obtained from DoDSER.

[125] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report CY 2008 -2014."

[126] Ibid.

The data collected from the CDC and the DoDSER depicts many similarities in demographics and characteristics among civilians and military personnel. Some of these characteristics include sex, race and ethnicity, age groups, level of education, and marital status. Therefore, statistical data and analysis obtained maybe transferable across the civilian and military population. Additional similarities exist across the armed services and the Army. The data suggests that male, lower-enlisted, active duty soldiers comprise the majority of suicide decedents in the Army.

Methods of Suicide

Statistical analysis of the method of suicide used by decedents concluded overwhelmingly that firearms was the preferred, followed by suffocation (including hanging). A small percentage of the civilian and military population preferred poisoning as a method of suicide. The statistics on firearm includes military, non-military, and unknown source of firearms. It is also important to note that the majority of firearms used by military suicide decedents were non-military issued.

In 2014, 50 percent of civilians used firearms to commit suicide, while 26.7 percent used suffocation/hanging, and eight percent used poison (drugs, alcohol, or other substance). There is a statistical increase noted from civilian data in 1999. In 1999, 56.8 percent civilians used firearms, 18.9 used hanging/suffocation, and 16.7 percent used poisoning as their method to commit suicide.[127]

[127] Sally, Warner, and Hedegaard, "Increase in Suicide in the United States, 1999-2014."

Across the armed services in 2014, 68.3 percent used firearms, 24.9 percent used hanging/suffocation, and three percent used poisoning as their method of suicide compared to 58.3 percent used firearms, three percent used hanging/suffocation, 3.4 percent used poison as the preferred method to commit suicide in 2009.[128]

In the Army, 75 percent of Army suicide decedents used firearms, while 20.3 percent used suffocation, and two percent used poisoning as a method of suicide in calendar year 2014. Compared to data from 2009, the use of firearms in the Army rose by 15 percent from 59.5 percent to 75 percent in 2014. There was minimal statistical significance in hanging. However, it is important to note that the method of poisoning to commit suicide decrease from 4.6 percent in 2009 to two percent in 2014 percent.[129]

Behavioral Health Diagnosis

The most commonly noted circumstances of suicide decedents are known to have a psychological disorder. Mood disorder was the most common diagnosis in both, civilian and military population. The second and third most common diagnosis in civilians were bipolar and anxiety disorder. The second most common diagnosis for military personnel was adjustment disorder.

In 2014, 49.8 percent of all DoD service members who committed suicide had a behavioral health history. This was an increase from 42 percent in 2012. In the Army, 57.8 percent of suicide decedents had a behavioral health history, up from 53.6 percent in

[128] Department of Defense National Center for Telehealth and Technology, "Department of Defense Suicide Event Report CY 2008-2014."

[129] Ibid.

2012. Specific behavioral health diagnosis reported include: mood disorder, anxiety disorder, adjustment disorder, personality disorder, psychotic disorder, and sleep disorder. Other behavioral health related concerns such as substance abuse, sleep disorder, traumatic brain injury, and prior history of self-harm were also followed. For all service members who committed suicide, mood disorder was the most documented diagnosis, followed by adjustment disorder, substance abuse, and anxiety disorder. Mood disorder encompasses bipolar, major depression disorder, dysthymic disorder, and other forms of mood disorder. In 2014, 26.3 percent of military suicide decedents had a documented diagnosis of mood disorder, up from 17.1 percent in 2010. The Army's average was about one to two percent higher for mood disorder from 2010 to 2014. Adjustment disorder was the second highest documented behavioral health disorder noted in military suicide decedents. In 2014, 28.9 percent of decedents had documented diagnosis of adjustment disorder, a decrease from a peak in 2012 of 37.4.[130]

Stressors and Marital Status

The top three stressors documented 90 days prior to the suicide events were failed intimate relationship, friend and family stressors, and administrative/legal issues. Friend and family stressors included spouse and family deaths and illnesses, while administrative and legal problems included court Martials, Article 15s, medical boards, and civil/legal problems. Failed relationships or intimate partner relationships were the most frequently cited psychological stressor 30-90 days preceding the suicide event in both civilian and military population. In the civilian population, job, financial and

[130] Ibid.

criminal legal problems followed failed relationships in stressors. The second most common stressor in the military and Army population was administrative and/or legal issues.

In 2014, failed intimate relationship encompassed 42 percent of service members who commit suicide, up from 38.8 percent in 2013. This is a significant decrease from 50.8 percent in 2009. Following failed intimate relationship as a psychological stressor are administrative and legal problems. Administrative and legal problems encompassed over 30 percent of service members who committed suicide in 2012-2014, down from 41percent in 2009.[131] There was minimal statistical significance between the total percentages of military personnel compared to Army soldiers exhibiting 'failed relationship' and 'administrative/legal problem' stressors. 'Friends and family' stressors occurred in less than 15 percent of suicide decedents.

According to calendar year 2014 DoDSER data, 52 percent of military suicide decedents were married, 37.7 percent were single, never been married, and 10 percent were divorced. These numbers were consistent with the rates from 2011-2013. However, for the Army, the suicide rate for married soldiers dropped slightly from 59.1 percent in 2013 to 58.6 percent in 2014. For single, never been married soldiers, the rate decrease from 30.4 percent in 2013 to 26.1 in 2014. The divorce rates for Army suicide decedents increased from 9.6 percent in 2013 to 14.8 percent in 20014. In 2009, the divorce rate for Army suicide decedents was 6.9 percent.

[131] Ibid.

Deployments

Deployment in this research refers to duties of American soldiers outside the U.S. in the most recent deployment location: Iraq, Afghanistan, and Kuwait. This theme is not applicable to civilians. However, data on civilians who have previously served in the military were not collected. Therefore, this section will analyze deployment history for active duty military service members and soldiers from 2008 to 2014.

In 2014, 54.4 percent of service members across the armed services (Army, Navy, Air Force, and Marines) were deployed at least one time to Iraq, Afghanistan, or Kuwait compared to 66.5 percent in 2013, and 48 percent in 2008. In the Army, 67.2 percent of soldiers who committed suicide had at least one deployment in 2014, slightly above 66.5 percent in 2013, and significantly higher than the 48 percent noted in 2008.[132] It is important to note that a 12 percent drop in deployment history of soldiers who commit suicide in 2014. Additionally, less than 20 percent of service members who commit suicide had direct combat experience. Direct combat experience refers to events that resulted in juries or casualties, witnessing of killing in combat and seeing dead bodies, and being directly involve in killing others.

Summary

The complexity of suicide and preceding factors are multifaceted and multifactorial. It is false to conclude that only one factor plays a role in the path to suicide rather than multiple factors. It was originally thought that deployments history is the greatest risk factor in the predictors of suicide in the military population. However, the

[132] Ibid.

data in for 2013 and 2014 shows that the number of suicide remains high despite a 12% drop in deployment history of service members. Additional statistical analysis is needed to determine a pattern and develop a new hypothesis.

What are the benefits of meditation?

Meditation and the Brain

The last few decades have shown a significant interest in meditation from the scientific and healthcare community. Western meditation and science have separated meditation from its eastern and religious origin. Meditation has been reported in research studies to produce positive psychological effects. This has generated the development of psychotherapeutic programs involving different forms of meditation. In the last 10 years, the neuroscience community has taken a tremendous interest in how meditation affects the brain structure and function. In a review and analysis of scientific articles and research study, results are suggesting positive physical and functional changes that meditation has on the brain. This section will discuss the existing research behind meditation's effect on the brain.

Two National Institute of Health funded studies, led by Lazar and in 2005 and Holzel in 2011, suggest the adult brain has the capacity for neuro plasticity as a result of meditative training. Evidence for both study was collected through MRI imaging of participants' brains. In the 2011 study, Holzel and his team compared MRI brain images of sixteen healthy participants before and after they underwent an eight-week mindfulness-based stress reduction (MBSR) program. Results of the whole brain analysis suggests "four clusters with significantly greater gray matter concentration at the Post

compared to the Pre time-point in the MSRB group."[133] The four regions are located in the posterior cingulate cortex, temporo-parietal junction (TPJ), hippocampus, and the cerebellum in located in the brain stem. The posterior cingulate cortex is an area of the brain that is involve in "mind wandering and self-relevance."[134] Structural changes in this region can affect attention and cognition. Leech and Sharp (the role of the PCC in cognition and disease) referenced their previous study that "abnormal posterior cingulate cortex function following traumatic brain injury, which predicts attentional impairments."[135]

The hippocampus is involved in learning, cognition, memory, and emotional regulation. The increase in gray matter in the hippocampus may suggest improved individual ability to regulate emotion. The temporo-parietal junction is associated with the conscious experience of self and body, empathy, compassion, and social cognition. The increase gray matter at the temporo-parietal junction suggests that meditation can help cultivate self-compassion and empathy, while dysfunction of the temporo-parietal junction can lead to pathological consequences. Additionally, the post whole brain scan noted a decrease in size of the amygdala in the participants of the MSRB program. This

[133] Britta K. Holzel, James Carmody, Mark Vangel, Christina Congleton, Sita M. Yerramsetti, Tim Gard, and Sara W. Lazar, "Mindfulness practice Leads to Increases in Regional Brain Gray Matter Density," NIH Public Access: Author Manuscript, January 30, 2009, accessed October 25, 2016, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3004979/, 6.

[134] Ibid.

[135] Ibid.

decrease in amygdala size is important in managing anxiety, fear, and stress.[136] These results affirm that the adult brain has the capacity for plasticity as a result of meditative training.

A separate 2011 study by researchers at Yale University School of Medicine suggest that meditation decreases brain activity when our minds are wandering. Mind wandering is correlated with the default neural networks in the prefrontal and posterior cingulate cortices and is associated with unhappiness, rumination, and worrying. The study suggests across all mindfulness meditation conditions, the prefrontal and posterior cingulate cortices were less active in meditators than controls and the deactivation of the amygdala. This resulted in meditators report of significantly less episodes of mind wandering.[137]

The results of these three studies suggest the positive impact of meditation on the brain. Further correlation can be made on the psychological and physical health and well-being of individuals who practice meditation or use it as part of a psychological therapeutic program.

Meditation and Psychological Disorder

In the U.S., meditation practices have steered away from its traditional religious association to a more holistic health promotion activity. A 2014 Agency for Healthcare

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[136] Ibid.

[137] Judson A. Brewer, et al., "Meditation Experience is Associated with Differences in Default Mode Network Activity and Connectivity," *Proceedings of the National Academy of Sciences* 108 no. 50 (December 2011): 20254-20259, accessed March 14, 2017, www.pnas.org/cgi/doi/10.1073//pnas.1112029108.

Research and Quality Comparative Effectiveness review concluded that "mindfulness meditation is beneficial in reducing consequences related to psychological stress, including depression, substance abuse and pain."[138] Due to the increasing evidence generated through empirical research on the benefits of meditation, the civilian and military healthcare community have integrated the practice into the management and treatments of medical and behavioral disorders such as PTSD, depression, sleep disorders, cardiovascular diseases, and cancer. More than any other specialty, the behavioral health professional community has embraced the practice of meditation.

In four separate controlled longitudinal, pilot, and qualitative analysis of meditation on veterans with PTSD, the results suggests reduction in PTSD, depression, and anxiety symptoms. All four studies suggest that meditative treatment modalities served as an effective adjunctive, non-pharmacologic, and therapeutic self-management tool for soldiers and veterans diagnosed with PTSD. These studies would later be supported by Khusid and Vythilingam findings in 2016. In a two-part series, Khusid and Vythilingam evaluated the efficacy, mechanism, and safety of mindfulness meditation as an effective self-management strategy for soldiers and veterans. In soldiers with behavioral health diagnosis such as depression, PTSD, and anxiety, the findings suggest that adjunctive MBCT or MBSR are more effective than treatment as usual in reducing depression relapse, reduce severity of depression and PTSD symptoms, improve general mental health. The evidence did not support the recommendation for or against the use of

[138] Marina A. Khusid and Meena Vythilingam, "The Emerging Role of Mindfulness Meditation as Effective Self-Management Strategy, Part 1: Clinical Implications for Depression, Post-Traumatic Stress Disorder, and Anxiety," *Military Medicine* 181, no. 9 (September 2016): 961.

mindfulness-based interventions for anxiety disorder.[139] The study does not suggest mindfulness based treatment be the only or primary form of treatment modality for the above mentioned disorders.

Additional research in the field of behavioral health have explored the effects of meditation on psychotropic medication use, substance abuse, and insomnia. One study suggests that patients with PTSD or anxiety disorder who practice meditation regularly experienced a reduction in medication reliance, stabilization or cessation. These results were coupled with the reduction of psychological symptoms.[140] Another study focusing on the role of meditation in substance use disorder was found inconsistent and inconclusive, however the researcher promotes its potential for treating substance abuse disorder.[141] Khusid and Vythilingam review on meditation as a self-management strategy in substance misuse suggest that mindfulness training for smokers is effective as an adjunct therapy with pharmacotherapy in maintaining and promoting abstinence and reducing cravings.[142]

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[139] Ibid.

[140] Vernon A. Barnes, Andrea Monto, Jennifer J. Williams, John L. Rigg, "Impact of Transcendental Meditation on Psychotropic Medication Use among Active Duty Military Service Members with Anxiety and PTSD," *Military Medicine* 181, no. 1 (January 2016): 56-63.

[141] Elias Dakwar and Frances R. Levin, "The Emerging Role of Meditation in Addressing Psychiatric Illness, with a Focus on Substance Use Disorder," *Harvard Review Psychiatry* 17, no. 4 (2009): 254-267, accessed September 12, 2016, http://dx.doi.org/10.1080/10673220903149135.

[142] Marina A. Khusid and Meena Vythilingam, "The Emerging Role of Mindfulness Meditation as Effective Self-Management Strategy, Part 2: Clinical Implications for Chronic Pain, Substance Misuse, and Insomnia," *Military Medicine* 181, no. 9 (September 2016): 969-975.

Sleep disturbance is a common issue for most soldiers in the military. There is minimal empirical research investigating the efficacy of meditation in the military population. However, several randomized control studies in cancer patients and survivors has shown that MBSR significantly improved sleep quality and duration and reduced mood disturbance. These few studies highlight the benefits of meditation in sleep disturbance or insomnia.

The presented research showed that meditation is not the magic treatment for these behavioral health disorders. However, the benefits are noted and documented by research. It is an effective adjunctive, non-pharmacologic, and therapeutic form of self-regulations for soldiers and veterans today.

Meditation and Stress

Stress refers to various physiological and cognitive states that are short term or chronic. Short term stress can be caused by irritability, excessive worrying and hyper-arousal, while chronic stress can be associated with occupations, terminal illness, or the existence of a psychological disorder.[143] Meditation enhances cognitive change and self-management skills that "promotes the awareness of all emotional and cognitive events as they occur in the present, individuals can recognize the warning signs of tension build up. Once they have acquired these skills of 'metacognitive insight,' controlling previously difficult safety behaviors and cognitions become more manageable."[144]

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[143] Istvan Schreiner and James P. Malcolm, "The Benefits of Mindfulness Meditation: Change in Emotional States of Depression, Anxiety, and Stress," *Behaviour Change* 25, no.3 (2008): 156-168.

[144] Ibid., 158.

What role can meditation play as a protective factor against suicide in soldiers?

Measures taken to prevent suicide includes all factors that decrease the probability of suicide among individuals at elevated risk. As risk factors increase the likelihood for suicide and suicidal behaviors, protective factors decrease the probability and possibility of those risk factors. Protective measures against suicide have been less studied and researched, therefore, viewed with skepticism. However, this is slowly changing as research is emerging through recent studies of the protective factors of military families, unit cohesion, and supportive leadership.[145]

There is no empirical research study to date addressing the topic of meditation as a protective factor against suicide in both the civilian and military community. This could be due to the ethical and legal challenges that arise for researchers that prevent them from conducting control experiments or research which may increase the risk of suicide in participants. Despite the absence of the relationship between these two topics in the scientific community, the current evidence can be used to initiate control studies that are both ethical and safe.

Knock's article, "Suicide among Soldiers," reviewed the psychological risk and protective factors among soldiers. It briefly reviews the topic of protective factors and its benefits. However, there were no mention of meditation. Even though this is the case, the article stresses the importance of protective factors and the need for more research in this realm. The three protective factors the article addresses were related to having strong

[145] Matthew K. Knock, et al., "Suicide Among Soldiers: A Review of Psychosocial Risks and Protective Factors," *Psychiatry* 76, no.2 (Summer 2013): 97-125, accessed September 12, 2016, http://dx.doi.org/10.1521/psyc.2013.76.2.97.

social support (family, friends, unit cohesion, supportive leadership), psychological protective factors (resiliency, character strength, hope, sense of meaning and purpose), and mental health treatments. Meditation connects two of the three factors as it is recommended as an adjunct therapy in behavioral health treatments, and it promotes psychological well-being and resiliency through promotion of executive functioning.

How can the DoD utilize meditation as a dynamic tool to form and shape resilient and adaptable soldiers in an ever changing profession?

In the U.S. military, meditation remains an anomaly and not appropriate in a world of decisive action. However, the past 15 years the U.S. has seen an alarming trend with the increased diagnosis of behavioral health disorders and suicide in its armed services. The DoD is exploring new options in the human domain that would not be categorize as standard.

Data analysis of documents has shown that meditation is safe. Among the hundreds of documents reviewed, there were only one documented incidence in which the participant who had a preexisting behavioral health diagnosis had an adverse effect to practicing meditation. The session triggered worsening psychological symptoms. Despite this, the majority of research studies and documents collected and analyzed determined that meditation is safe and beneficial to the practitioner if done regularly.

Analysis of multiple documents concluded that meditation is an effective tool for resilience. “Resilience has been described as the ability to overcome stress and maintain an effective level of appropriate behavior or performance when confronted by

challenges"[146] or "the ability to bounce back from negative emotional experiences during stressful situations."[147] The military profession requires its personnel to be physically and psychologically resilient. History has shown that the military's focus is more on physical resiliency than psychological resiliency. This is evident through the well-known and well enforced Army wide physical fitness programs with published manuals and guides, mandatory bi-annual physical fitness test, and weight control programs. However, psychological resiliency programs remain an anomaly in the Army as its requirement is not mandatory or seen Army wide.

The comprehensive soldier fitness program (CSF) launched in 2009 is the most well-known psychological resiliency program in the Army. However, according to Psychology Today, there is no empirical evidence that supports the positive benefits of the comprehensive soldier fitness program claimed by the Army and its' leaders as of March 2011. According to the article, the existing research is flawed.[148] The suicide rates published by the DoDSER validates this. In 2009, 162 Army soldiers committed suicide. The numbers of soldiers that committed suicide peaked in 2012 to 165, three years after

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[146] Amishi P. Jha, Scott L. Rogers, and Alexander B. Morrison, "Mindfulness Training in High Stress Profession: Strengthening Attention and Resilience" in *Mindfulness-Based Treatment Approaches: Clinician' Guide to Evidence Base and Application*, ed. Ruth A. Baer (eBook: Elsevier Inc, 2014), 347-365, accessed September 23, 2016, http://dx.doi.org/10.1016/B978-0-12-416031-6.00015-3.

[147] Laura Riolli, Victor Savicki, and Everett Spain, "Positive Emotions in Traumatic Conditions: Meditation of Appraisal and Mood for Military Personnel," *Military Psychology*, no. 22 (20120): 205, accessed September 12, 2016. http://dx.doi.org/10.1080/08995601003638975.

[148] Roy Eidelson, "The Dark Side of Comprehensive Soldier Fitness," *Psychology Today*, March 25, 2011, accessed March 27, 2017, https://www.psychologytoday.com/blog/dangerous-ideas/201103/the-dark-side-comprehensive-soldier-fitness.

the implementation of CSF. The latest DoDSER stated that 120 soldiers in 2015 committed suicide. This is a decrease of 42 soldiers. However, there is no empirical evidence that this is a direct result of the CSF.

The sustained, unacceptable high level of suicide persists in the Army despite the multiple resiliency, stress reduction, and suicide prevention programs. Some examples include the comprehensive soldier fitness (CSF), the composite life cycle program, and the suicide prevention campaign. The current research and data on meditation has positively shown an increased resiliency in individuals who meditate. This resiliency is associated with meditation enhancing the "core cognitive systems of attention and working memory."[149] Selective attention and working memory are components of executive functioning. Executive functioning is "broadly defined as the set of abilities needed to achieve and maintain goal-directed behavior."[150] Working memory capacity is "the capacity to selectively maintain and manipulate goal-relevant information without getting distracted by irrelevant information over short intervals."[151] Working memory is used by all in our everyday lives, from keeping in mind where the keys are located to remembering who our waiter is at a restaurant.[152]

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[149] Jha, Rogers, and Morrison, 347.

[150] Ibid., 348.

[151] Ibid.

[152] Ibid.

Selective attention involves "voluntarily directing and restricting attention to only the most task-relevant information out of currently available experiential inputs."[153] An example is watching our child play baseball. When he is up to bat, we focus our attention to him and resist distractions of other noise and players. Meditations role in strengthening executive functioning can be critical for cognitive control and emotional regulation, components that are lacking in suicidal decedents and individuals who exhibit chronic suicidal behaviors.[154]

Data collection has revealed documents that show the DoD is looking outside the military traditional scope of practice into alternative approaches to resiliency and behavioral health treatments. The DoD is currently funding a multi-million-dollar project using mindfulness meditation to improve military resilience. This project is run by Dr. Amish Jha, a neuroscientist and an associate professor of psychology at the University of Miami. She investigated mindfulness training effects on individuals in high stress situations such as military service members and lawyers. Dr. Jha's most recent research examined mindfulness training with service members in the U.S. military. The project's name is the Schofield Barracks Training and Research on Neurobehavioral Growth (STRONG). The Schofield Barracks Training and Research on Neurobehavioral Growth project studies mindfulness training in order to improve situational awareness and reduce stress measured through brainwave activity and cognitive behavioral tools. This training

[153] Ibid., 349.

[154] Ibid.

suggests that meditation helps improve service member's preparation for high-stress combat situations while also improving cognitive resilience and performance.

Currently, the military is using two popular meditative programs: Mindfulness Based Stress Reduction (MBSR) and Mindfulness-based Mind Fitness Training (MMFT). Both are eight week programs that were created to introduce and teach mindfulness sitting meditation. Mindfulness-based Mind Fitness Training was used by in Dr. Jha's pilot study of a detachment of 31 Marine Reservists.

The Marines who accepted and adapted the Mindfulness-based Mind Fitness Training into their lives and practice it regularly noticed they were able to "quiet their minds, fall asleep faster, and sleep more soundly"[155] during each day in deployment. Those who spent time engaging in mindfulness exercise showed an improved cognitive performance. Therefore, enhancing the Marines' performance in a counter-insurgency environment in order to accomplish their mission. "Specifically, despite the real increase in stressors during the pre-deployment period, the Marines who engaged in more mind fitness training maintained the same perceived stress level and preserved or even improved their working memory capacity over their initial baseline."[156] In contrast, Marines who practiced minimal mindfulness fitness training reported an elevated level of stress and decline in working memory capacity. Elevated stress and decrease working memory capacity is also associated with groups of individuals suffering from behavioral

[155] Elizabeth A. Stanley and Amishi Jha, "Mind Fitness: Improving Operational Effectiveness and Building Warrior Resilience," *Joint Forces Quarterly*, no. 55 (2009): 148.

[156] Ibid., 149.

health diagnosis such as post-traumatic stress disease and major depression. Dr. Jha's study suggests mind fitness training builds resiliency and improves service members' ability to bounce back quicker from cognitive degradation and the psychological injury caused by their operational stress and experiences.

Summary

Meditation is not a solution or remedy for all the difficulties or diseases a soldier experience, but there is ample evidence that it may be beneficial for most who practice it regularly. The anecdotal benefits proclaimed by many are being researched, tested, and verified by scientist and researchers in the civilian and military population. The early results are promising for all who practice any form of meditation.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

> The greatest frustration, the greatest frustration, is that there are no easy answers here . . . there are no quick fixes . . . there are no simple solutions to the problem of suicide. But that doesn't mean that we can't do more to prevent it from happening. We can do more. And together, we will do more to prevent it.[157]
>
> — Leon E. Panetta, "Suicide Prevention."

Overview of the Study

This qualitative research case study explored meditation as a protective factor against suicide in the U.S. Army. This final chapter is a summary of the purpose and problem statement, review of the research methods, interpretations of the findings, recommendations, and closing statements.

Restatement of the Problem and Purpose

This qualitative research case study addressed the problem of sustained high rates of suicides in the U.S. Army. These high suicide rates continue year after year despite the Army's prevention efforts in the last fifteen years. Therefore, the purpose of this research is to explore meditation as a protective factor against suicide in the U.S. Army. Despite the volume of research and information on suicide and meditation, very minimal data exist to date on the relationship between the two and meditation as a protective factor.

[157] Leon E. Panetta, "Suicide Prevention," (Speech, Washington, DC: June 22, 2012), accessed September 1, 2016, http://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1686.

This research study is an initial attempt to bridge the gap between suicide, meditation, and the U.S. Army.

Review of the Research Methodology

This qualitative research case study used documents as a main source for data collection and Grounded Theory methodology for data analysis. Grounded Theory methodology allowed greater contextual description and contextual transferability of suicide and meditation to elicit deeper meaning and understanding.

Interpretations of Findings

The data presented in chapter two and four suggest that meditation holds great promise in being an effective protective factor against suicide in the U.S. Army. The research of suicide and meditation in civilian and military populations show overlapping similarities in the demographics, characteristics, and risk factors of suicide decedents. Therefore, the majority of data and findings generated from research in the civilian population are germane to the Army.

The findings suggest that meditation is overwhelmingly safe for practice by all soldiers in the U.S. Army. There was only one study that stated otherwise among thousands. The research reported one incident in which meditation triggered worsening symptoms of a participant with a mood disorder. This was a rare and isolated incident. The benefits are widely supported by empirical research and published in academic and professional journals. The emerging research on the brain shows surprising evidence of the positive effects of meditation on cognition, mood, and attention. Army researchers can build on these studies and mirror the methodology in the soldier population.

Documented benefits of meditation include the promotion of overall mental and physical health, increased resiliency and self-management skills, positive stress management and reduction, improve attention, and mindfulness.

A recent reduction in force and budget have challenged the Army to find more efficient and effective methods to ensure readiness in its soldiers. These methods must have longevity to ensure soldiers are mission ready, now and for life. If the Army or DoD cannot do better than the present, the suicide rate will continue to remain at an unacceptable level. The loss of even one soldier in a unit to suicide is felt by all.

Meditation is an inexpensive, preventative, and protective practice that may prove to be an effective tool for the Army to make significant progress in reducing the numbers of suicides and behavioral health diagnosis in its organization. The cost of caring for soldiers and families who have committed suicide, have suicidal behaviors, and risk factors has put an even greater strain on an already overstressed military healthcare system. The cost benefits of implementing meditation as a standard in the Army still needs to be assessed, surveilled, and estimated. However, prevention will always prove to be less expensive than treatment or management. Michael Baker writes, "medical care and disability will be the second-largest expense of the war, estimating (as of 2008) this will cost ultimately $700 billion and will represent the primary long- term expense of the conflict."[158] Not only is suicide a healthcare crisis, but also a financial crisis. However,

[158] Michael S. Baker, "Casualties of the Global War on Terror and Their Future Impact on Health Care and Society: A Looming Public Health Crisis," *Military Medicine* 179, no. 4:348 (2014): 348-355.

more research is needed to investigate the cost and benefits of implementing meditation Army wide compared to the current military healthcare cost.

Other implications of meditation maybe imbedded in the future goals of the Army's force management initiative. In 2012, Secretary of Defense Leon Panetta announced a new defense strategy that envisioned the U.S. military "will be smaller and leaner, but it will be agile, flexible, rapidly deployable, and technologically advanced. It will be a cutting edge-edge force."[159] Chief of Staff of the Army, General Mark A. Milley, states in his 2017 posture statement for the U.S. Army:

The first component of readiness, manning, is about people--the core of our Army and keystone to innovation, versatility, and combat capabilities. Unlike other Services that derive power from advanced platforms, the collective strength of the Army is people. America's Army must recruit resilient, fit people of character and develop them into quality soldiers. After recruitment, the Army develops men and women into competent Officers, Non-Commissioned Officers, and soldiers who possess combat skills and values essential to the profession of arms.[160]

At the core of this initiative is the physical and psychological health and well-being of each individual soldier.

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[159] Leon E. Panetta, "Statement on Major Budget Decision," (speech, The Pentagon, January 26, 2012), accessed April 2, 2017, http://archive.defense.gov/Speeches/Speech.aspx?SpeechID=1647.

[160] Mark A. Milley, "2017 Posture Statement for the U.S. Army," February 24, 2016, accessed May 6, 2017, https://www.army.mil/article/163561.

Unexpected Findings

The researcher explored the topic of suicide and meditation with limited background knowledge. The first unexpected finding was the high level of complexity of suicide and suicide research at the DoD, national, and international level. It is a worldwide epidemic that sees no dividing borders, culture, and religion. The findings were promising as the scientific community is taking notice. Research and treatment modalities are constantly being explored to address this issue.

The second unexpected finding was the emerging science behind meditation. This researcher did not expect to find the depth of research that was done in the scientific and academic community on the topic of meditation. One of the most significant finding was in the neuro anatomy and physiology of the meditative brain. Early studies have shown great promise that meditation actually helps to positively change the structure of the brain.

The third unexpected finding was associated with the DoD and the U.S. Army. The DoD has taken notice of the suicide and behavioral health issues of service members that is a direct result of the last fifteen years of conflict. Millions of dollars have been invested in the research of alternative treatment modalities.

Recommendations

Suicide is a highly complex and demanding field of research and prevention. Special challenges include sample size, methodology, design, and ethical considerations. Controlled research studies have proved challenging in testing protective factors. There are significant ethical concerns related to increasing the risk factors of suicide in

participants in order to test interventions. Inversely, intervention studies are essential in order to determine which risk factors can be manipulated to alter the outcome.

Research question three could not be answered as data behind testing meditation as a protective factor against suicide in the Army or the civilian population was non-existent. Therefore, the first recommendation is to develop a control qualitative and ethically sound research study testing specific forms of meditation as a protective factor against suicide and suicidal behaviors that will build on the body of knowledge in this research. A second recommendation includes a larger sample size with the following participants: 'deployed versus no deployment,' 'males versus females,' and 'combat versus noncombat.'

A third recommendation for future study is related to the brain. Empirical studies on the meditative brain in civilian adults shows great promise in the capability and capacity of the brain in neuro plasticity through training. Therefore, this researcher recommends further research using fMRI scans to study soldiers' brain who currently have chronic suicide ideations prior to and after meditation focus interventions.

Lastly, this researcher recommends an Army wide program promoting the awareness, education, and practice of a meditative program that is named and tailored to the unique culture of the U.S. Army. This would include the integration of a fifteen-minute meditation based mind fitness practice within the current daily Army physical fitness program and training. Making mind fitness a priority and a standard will allow exposure and acceptance as a routine practice. The measure of success can be evaluated concurrently with the DoDSER surveillance of suicide rates.

Due to time limitations, this qualitative study did not specifically differentiate the different types of meditative practices. It also did not compare, in detail, the Army's suicide problem with that of the other armed services (Air Force, Navy, Marines). This is another field of study that is open to research and exploration.

Discussion

Suicide is a global epidemic. The U.S. and the DoD is not immune. The stressors and challenges of intense operations and warfare in the last fifteen years have revealed significant signs of strain on the U.S. Army and its soldiers. The evidence is in the suicide statistics, unprecedented number of soldiers diagnosed with behavioral health disorders, divorce rates, and the high cost of military healthcare.

Much of the focus in civilian and military academic and professional research has been on risk factors and treatment modalities. However, very little on protective factors that decrease risk factors before any signs of suicide ideations and/or behaviors appear. This research offers one protective factor in combating the issue of suicide in the U.S. Army. It is not intended to promote meditation as the miracle tool against suicide or solve the Army's suicide epidemic. There is currently no published research study that tests the hypothesis of meditation as a protective factor for suicide in the civilian or military sector. Therefore, this research is a starting point for future researchers to build and expand off of.

When meditation is learned and practice regularly, the benefits can be exponential. It is a simple practice that can be learn by anyone who is open and accepting. The longevity and strength of benefits are based on the frequency of practice. Meditation is a tool that soldiers can carry and use in garrison, on deployments, and at

home. It has no form or shape. It can be practiced individually or as a group. It can be practiced discretely by soldiers in any part of the world without fear of being judged or scrutinized in order to help improve their focus, sleep, concentration, and professional, and personal relationships.

The Army has long focused on physical fitness as its main form for overall health. This is evidence by daily mandatory unit physical training and promotion of individual training. However, a few years after the start of Operation Enduring Freedom and Operation Iraqi Freedom, the Department of Defense (DoD) experienced a significant rise in suicides across all its armed services. Accompanying the high rates of suicide were suicidal ideations, attempted suicides, behavioral health diagnosis, and drugs and alcohol addictions.

In response to the rising suicide rates, the DoD created a suicide prevention campaign, mandated annual training across the services, developed support hotlines, improved veteran affairs mental health services, and increased healthcare spending for programs and research in hopes to reverse the upward trend. Although the increased suicide rates decrease from its peak in 2012, the numbers remain unacceptably high.

This research study looked into meditation as a plausible alternative to tackling the suicide epidemic in the Army. This starts with prevention and reducing significant risk factors in soldiers. Meditation is offered as the main protective factor in this research study. The medical research and associated correlation evidence is hopeful and plausible. “Research has shown that the more mentally fit a person’s brain is, the quicker that person is able to recover from stress, to solve complex problems and to better handle

high-demanding environments."[161] Meditation "can help enhance the military's capacities to operate in complex environments while simultaneously protecting against the stressors inherent in them."[162] Meditation can immunize against stress by buffering the cognitive degradation of stress inoculation training and by permitting more adaptive responses to and interpretation of stressors. Equally as important, it helps soldiers manage and adapt to the stressors at home as they balance their two very different worlds. Meditation is protective because it reduces risk factors and builds resilience, leading to faster recovery from cognitive degradation and psychological injury in any stressful environment or situation.

In Closing

Suicide is a serious and complex public health epidemic that takes the lives of over 800,000 people globally, over 40,000 people in the U.S., and over 250 active duty service members annually. It is a global phenomenon that has spread across borders, religion, culture, and sex. In the U.S., suicide continues to be the tenth leading cause of death among people of all ages and the second leading cause of death among people age 15-35 years old. The issue of suicide has been at the forefront of the U.S. military and the Army for over 15 years. The active duty U.S. Army has a consistently higher suicide rate than any other armed services or the American civilian population since the start of the

[161] Melissa Myers, "Improving Military Resilience through Mindfulness Training," U.S. Army, June 1, 2015, accessed September 5, 2016, https://www.army.mil/article/149615/Improving_Military_Resilience_through_Mindfulness_Training.

[162] Stanley and Jha, "Mind Fitness," 145.

global war on terrorism. Suicide is a healthcare crisis that needs to be surveilled, prevented, and eliminated.

This qualitative research case study adds to the current body of knowledge by introducing meditation as a protective factor against suicide in the Army. The research highlighted and compared the similarities between the civilian and military suicide epidemic, the benefits of meditation as supported by empirical research, and offered a connection between suicide and meditation that can be beneficial in the prevention of suicide. The complexity of suicide prevention entails risk and protective factors spanning the fields of medicine, epidemiology, sociology, psychology, criminology, education, legal, military, and economics. Meditation is not meant to be the solution or remedy to the suicide epidemic in the Army, but its potential in benefitting soldiers and reducing the suicide rate is very promising.

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