2017

Canine-Assisted Therapies Among U.S. Veterans with Post Traumatic Stress Disorder: An Integrative Review of The Literature

Olivia A. Kondos
University of Central Florida

Canine-Assisted Therapies Among U.S. Veterans with Post Traumatic Stress Disorder: An Integrative Review of The Literature

by

Olivia A. Kondos

A thesis submitted in partial fulfillment of the requirements
for Honors in the Major Program in Nursing
in the College of Nursing
and in the Burnett Honors College
at the University of Central Florida
Orlando, FL

Summer Term, 2017

Thesis Chair: Dr. Angeline Bushy

ABSTRACT

A sizeable number of U.S. veterans of all ages experience post-traumatic stress disorder (PTSD) which can impact their quality of life; physically, mentally and socially. Consequences of PTSD are associated with physical and emotional disabilities, including ideation of self-harm and even suicide. Increasingly, animal-assisted therapies (AAT) are used to treat PTSD and other physical and behavioral conditions in veterans. Over the decades, AATs have used dogs, cats, horses, and dolphins among other animals. The purpose of this integrative review is to examine the use of AAT focusing on canine assisted therapy (CAT) among veterans diagnosed with PTSD. The methodology involved database searches, including MEDLINE, PubMed, PsychInfo, EBSCOhost, along with textbooks and popular media published from 2000 to 2016. Associated with the lack of more recent research, relevant articles published before 2000 were included in the review. Search terms included, 'veterans,' 'service dogs,' 'service animals,' 'animal-assisted therapy,' 'canine therapy,' 'PTSD,' 'post-traumatic stress disorder,' 'psychiatric,' 'U.S. veterans,' 'equine therapy,' 'horse therapy,' 'pet therapy,' and 'military veterans.' A total of ten relevant studies were identified which focused on the use of AAT among veterans diagnosed with PTSD. Different populations diagnosed with PTSD and other behavioral and psychiatric health conditions using AAT were examined as well. These articles were read, analyzed, and synthesized. Results of the review offer some support that AAT has psychological, physiological and psychosocial benefits for some populations across the lifespan with various diagnoses. Consistent and conflicting findings along with gaps in the literature are highlighted. Limitations and implications for nursing practice, research, policy and education also are noted in this thesis.

DEDICATION

For all the brave men and women who are serving
And have served this beautiful country,

For all the individuals battling with combat-related PTSD,

And especially for my parents who have taught
Me to reach for nothing less than the stars.

ACKNOWLEDGEMENTS

Thank you Dr. Angeline Bushy and Dr. Leslee D'Amato-Kubiet for being such supportive and encouraging chair and committee members as well as mentors throughout this literature review journey.

Dr. Leslee D'Amato-Kubiet, thank you for encouraging me to seize every opportunity that has been presented to me through Honors in the Major. With your enthusiasm for student success, I have been able to achieve my academic goals and am better prepared as I move forward in my nursing endeavors.

To my thesis chair, Dr. Angeline Bushy, thank you for your valued input and suggestions throughout this review, as well as military expertise and knowledge pertaining to this topic. Your love and dedication to the U.S. military is inspiring. Thank you for your service.

To my supportive parents, thank you for your unfailing love and encouragement, always.

TABLE OF CONTENTS

INTRODUCTION

A variety of health conditions and disorders include animals in the therapeutic treatment plan. Horses, dogs, cats and even dolphins are identified in the literature focusing on AAT. Health conditions and disorders that commonly use AAT include, among others, autism, down syndrome, multiple sclerosis, substance abuse, depression, and PTSD. Of all veterans returning to the United States after deployment in Iraq and Afghanistan, it is estimated that at least 24% experience post-traumatic stress disorder, a condition which impairs quality of life (Lanning & Krenek, 2013). According to the U.S. Department of Veterans Affairs (VA), PTSD is associated with experiencing a highly stressful event which can be psychologically traumatizing to the individual. Weeks, months and even years post discharge, the veteran can experience 'flashbacks' which include visual, emotional and physical sensations like those experienced during the actual event (VA, 2016b).

Furthermore, a veteran may even feel that his or her life and sometimes the lives of others are endangered. The veteran often experiences feelings related to lack of control over potential traumatic situations such as sexual abuse or homicide at war (VA, 2016b). In combat, military personnel often are exposed to life-threatening situations that can result in severe injuries or death. Traumatizing events while serving include being shot at, witnessing friends being injured or killed, or some other person(s) in the immediate environment. Alarming statistics indicate that out of every 100 veterans who served in Operations Iraqi Freedom or Enduring Freedom, 11% to 20% experience PTSD (VA, 2016b). Among returning veterans, PTSD has been linked to suicide, homicide and a decreased quality of life that can impact physical, mental and emotional health. Animal-assisted therapies, specifically canines, and on occasion equine therapies are used

with increased frequency to treat PTSD in veterans and sometimes active duty soldiers (Eugene, 2016).

BACKGROUND

The strongest factor related to suicidal ideation and suicide attempts in veterans with PTSD is combat-related guilt (VA, 2015c). The VA estimates that at least 20 veterans commit suicide every day (VA, 2016a); equating to approximately 140 suicides per week; or, about 7,300 deaths by suicide each year. The rate of suicide among the veteran population is shocking and devastating for families, loved ones, as well as other veterans. Mental health treatment protocols have been funded by the VA and the Department of Defense (DOD) as well as by other military service organizations. Yet, many veterans, for assorted reasons, elect not to seek help and treatment often due to the negative stigma associated with behavioral and psychiatric disorders (Lanning & Krenek, 2013).

Use of animals as part of supportive therapy for individuals has been documented for centuries and as early as 1792 at the Quaker Retreat in York, England (Pandzic, 2012). Dogs, cats, horses, dolphins, and many other animals are becoming increasingly popular along with cognitive and behavioral therapy for U.S. veterans experiencing PTSD and other behavioral and related physical conditions. In addition to veterans, therapy animals can be beneficial to individuals of all ages with other conditions. Canines (dogs), for example, are used in acute and long-term care facilities to relax and bring joy to individuals of all ages, enhance social skills, and lower blood pressure and heart rate.

Interestingly, the InSitu Foundation (2015) explains that human experts usually can first detect cancer in the later stages (stages 3 and 4) associated with a distinct odor noted on the individual's breath. However, dogs with their highly-developed sense of smell, have been reported to detect cancer much earlier, sometimes as early as stage 0. Dogs' heightened ability to

smell odors in parts per trillion enables them to smell cancer cells in the earliest stages of cancer. Experts speculate this highly-developed sense of smell in canines is an evolutionary defense mechanism that enables the animal to sense early on if something is going to happen to its owner. Which, in turn, could interfere with the master's ability to provide food and shelter to the dog (InSitu Foundation, 2015). The recent finding related to canine's ability to detect cancer in humans reinforces that animals could possibly sense changing physiological conditions (i.e., hypoglycemia, seizures) and emotional conditions (i.e., flash backs) in humans. In turn, CAT could in some cases be incorporated into an individual's treatment plan; in this case veterans diagnosed with PTSD.

Use of dogs as a complimentary therapy include making scheduled visits to individuals in acute and extended care facilities to promote healing and satisfaction with health care. Utilization of CAT in the treatment plan of individuals diagnosed with depression results in less fatigue and improved general health (Mayo Clinic, 2016). One study entitled, "Animal-Assisted Therapy in Patients Hospitalized with Heart Failure" (Cole, Gawlinski, Steers & Kotlerman, 2007) found that a 12-minute visit with a therapy dog improved heart and lung function in clients (N = 76) diagnosed with heart failure in acute care facilities. This outcome was achieved by the clients petting and touching the animal which, in turn, decreased the individual's anxiety, pulse rate and blood pressure by interrupting the release of hormones, such as epinephrine and norepinephrine (Cole et al., 2007). Autism Spectrum Disorder (ASD) is yet another condition that often includes the use of therapy dogs with children to improve cognition, skill deficits, social interactions, communication, and sensory perception. Exposure to a therapy dog may also help a child with autism relax in an overly stimulating environment (Gabriel, 2016). Krause-Parello and Kolassa

(2016) found animal therapy significantly lowered blood pressure and heart rate among elderly people (N = 28) in a community setting. This study suggested community health nurses could perhaps incorporate the use of canines and other companion animals into treatment plans to improve social and cardiovascular health, as well as empower self-care skills among clients they care for in the home and community setting (Krause-Parello & Kolassa, 2016). In other words, therapy dogs are used to manage adult cardiovascular conditions, ASD among children, as well as PTSD among veterans in acute care, long term care and home settings.

There are numerous articles in the popular media as well as in professional publications regarding the use of CAT among veterans, however research evidence on its effectiveness is limited. The purpose of this integrative literature review is to examine studies focusing on the use of CAT among veterans to inform health care providers, nurses specifically, of this treatment modality to manage psychological and physiological conditions. Table 1 provides operational definitions of terms used throughout this thesis.

PROBLEM STATEMENT

The purpose of this integrative review is to examine literature focusing on canine therapy among U.S. veterans diagnosed with post-traumatic stress disorder (PTSD).

METHOD

Relevant research articles were identified, read, analyzed and synthesized by the author to better understand the use of animal therapies to manage PTSD in U.S. veterans. MEDLINE (EBSCOhost), PubMed, PsychInfo (EBSCOhost) were among the databases searched to identify and locate relevant articles pertaining to this topic area. The search was limited to articles published in academic journals from 2000 to 2016, with inclusion of textbooks and articles published before 2000 which the author believed to be of significant value to this integrative review. Key search terms included 'veterans,' 'service dogs,' 'service animals,' 'animal-assisted therapy,' 'canine therapy,' 'PTSD,' 'post-traumatic stress disorder,' 'psychiatric,' 'U.S. veterans,' 'pet therapy,' 'equine therapy,' 'horse therapy,' and 'military veterans.' Inclusion criteria for the search included: 1) articles published in the English language; 2) articles published from 2000 to 2016; and, 3) use of animal therapy for veterans to manage PTSD and other behavioral, psychiatric and physical health conditions. Exclusion criteria includes articles published in a language other than English (See Appendix: Figure 1).

Each article was evaluated for relevance to the problem area then carefully critiqued. Appendices, Table 2 summarizes each reviewed research study including sample size, purpose, interventions, methodology, and key findings. Subsequently, all the article critiques were synthesized. Consistent and inconsistent findings were extracted and gaps in the literature were identified. Recommendations for future research along with implications for nursing research, practice, policy, and education as well as limitations were noted.

RESULTS & DISCUSSION

Ten pertinent research studies focusing on veterans and other populations were analyzed that described psychological, physiological and psychosocial outcomes of CAT. These studies showed the presence of an animal, either as a companion animal or as a trained therapy animal, had psychological, physiological and psychosocial benefits for populations across the lifespan who were diagnosed with various conditions. Of the ten studies that were examined, eight showed improved psychological symptom management in individuals who had been exposed to AAT (Barker & Dawson, 1998; Brown, 2017; Earles, Vernon & Yetz, 2015; Hoffmann, Lee, Wertenauer, Ricken, Jansen, Gallinat & Lang, 2009; Hunt & Chizkov, 2014; Lass-Hennemann, Peyk, Streb, Holz & Michael, 2014; Moore, 2013; Stern, Donahue, Allison, Hatch, Lancaster, Benson, Johnson, Jeffreys, Pride, Moreno & Peterson, 2013). While three studies found physiological benefits in individuals including decreased blood pressure, decreased heart rate, and an overall increase in exercise (Allen, Shykoff & Izzo, 2001; Krause-Parello & Kolassa, 2016; Stern et al., 2013). One study focusing on veterans with PTSD (N=30) found individuals were more comfortable interacting and associating with other people while in the presence of a dog (Stern et al., 2013).

The literature indicated that the psychological benefits of animal therapy (canine and equine therapy) included decreased anxiety, depression, and emotional distress as well as increased mindfulness and a sense of safety and security (Barker & Dawson, 1998; Brown, 2017; Earles et al., 2015; Hoffmann et al., 2009; Hunt & Chizkov, 2014; Lass-Hennemann et al., 2014; Moore, 2013; Stern et al., 2013). Improved task performance and decreased blood pressure, heart rate and physiological stress, as well as increased exercise were physiological benefits of animal

therapy (Allen et al., 2001; Krause-Parello & Kolassa, 2016; Stern et al., 2013). Psychosocial benefits included improved social wellness and improved interactions with other human beings (Krause-Parello & Kolassa, 2016; Stern et al., 2013).

A research article entitled, "Pet Ownership, but Not ACE Inhibitor Therapy, Blunts Home Blood Pressure Responses to Mental Stress," investigated the effectiveness of pet companionship, specifically canine companionship, compared to a pharmacologic intervention in reducing blood pressure among study participants (N = 48) with highly stressful occupations who had been diagnosed with stage 2 hypertension (Allen et al., 2001). Although the participants in this study were not veterans, study participants' experiences were similar in nature. However, these findings may also be appropriate for veterans as more than 30% are estimated to also have hypertension (Melter, 2015). Veterans as well as active military personnel who have been exposed to multiple combat situations are approximately 33% more likely than the general public to develop hypertension. Specifically, veterans who witnessed death of another person while in combat are 50% more likely to develop hypertension (Melter, 2015). This study found one anti-hypertensive medication (Lisinopril) only reduced the resting blood pressure in study participants. Including the presence of an animal more effectively reduced participants' blood pressure which probably was attributable to the physiological response to reduced stress (Allen et al., 2001).

An article entitled, "The Effects of Animal-Assisted Therapy on Anxiety Ratings of Hospitalized Psychiatric Patients," compares the effects of CAT versus recreational therapy on hospitalized individuals (N = 230) with a psychiatric diagnosis (i.e., mood disorder, psychotic disorder, substance abuse disorder, etc.) (Barker & Dawson, 1998). This study did not

specifically focus on veterans with PTSD. The DSM-5 lists PTSD as a psychiatric diagnosis that often is associated with acute and chronic behavioral and psychiatric conditions (American Psychiatric Association, 2013). Coupled with PTSD, veterans often are diagnosed with other psychiatric and behavioral conditions including mood disorders, acute psychosis and substance abuse. Barker and Dawson's (1998) study demonstrated that CAT significantly reduced anxiety levels among individuals diagnosed with mood disorders (bipolar, depressive, and other mood disorders), psychotic disorders (schizophrenia, schizoaffective disorder, and other psychotic disorders), and other psychiatric disorders, whereas recreational therapy only significantly lowered anxiety among individuals with a mood disorder. Neither therapy, i.e., CAT or recreational intervention, reduced anxiety among individuals with substance abuse disorders. However, the researchers noted this finding might be associated with the small sample size; or, participating in only one therapy session; or, the effects of physiological response to substance withdrawal and subsequent anxiety (Barker & Dawson, 1998).

Two dissertations using qualitative methodologies focused on the sense of well-being and the lived experience of veterans with PTSD entitled, respectively, "Examination of Veteran Experiences with Service Animals and Animal Assisted Therapy: A Case Study," (Brown, 2017) and "Animal-Assisted Therapy for United States Veterans with Posttraumatic Stress Disorder" (Moore, 2015). Brown's case study with a veteran ($N = 1$) diagnosed with PTSD found that a service canine improved the participants' overall sense of well-being and provided a sense of safety and security that was not provided by a human companion. The service animal in this case study provided a sense of safety and predictability for the veteran. Additionally, the companion canine by barking, alerted the veteran who tended to be hypervigilant when another person was

approaching or if something out of the ordinary was occurring (Brown, 2017). Moore's qualitative research approach also found veterans (N = 8) with service canines reported having decreased anxiety and hypervigilance. Thus, these veterans were better able to complete activities of daily living after receiving their psychiatric service dog (Moore, 2015).

Only one research study focused on the outcomes of equine-assisted therapy among individuals with PTSD and anxiety (N = 16) entitled, "Equine-Assisted Therapy for Anxiety and Posttraumatic Stress Symptoms" (Earles et al., 2015). Equine therapy, sometimes referred to as equine-assisted psychotherapy, incorporates grooming, haltering, riding, feeding, and leading horses as a therapeutic intervention for a variety of conditions. With equine therapy, interactions between an individual and a horse are observed by a mental health professional in a therapeutic session. Consistent with reports on the effects of canine therapy, horses have been found to improve an individual's self-confidence, interpersonal relationships, emotional self-awareness, self-control and empathy (CRC Health, 2015). The researchers found that mindfulness among participants increased after six weeks of equine-assisted therapy intervention. Furthermore, depression, anxiety, PTSD-related symptoms, emotional distress and alcohol use were significantly reduced among participants as well. Despite several positive outcomes associated with equine therapy, participants showed no improvement in physical health, coping strategies, optimism, social support, perceived self-efficacy, or life satisfaction (Earles et al., 2015).

Depression among veterans with PTSD is a common clinical finding and PTSD and depression often are identified as comorbidities (VA, 2015a). A study conducted in Germany, "Dog-assisted Intervention Significantly Reduces Anxiety in Hospitalized Patients with Major Depression," (Hoffmann et al., 2009) focused on the use of canine therapy among hospitalized

individuals diagnosed with major depression (N = 12). Results of this study demonstrate that the presence of a dog significantly reduced anxiety among study participants. Participants in the control group without exposure to a dog, did not show a change in anxiety level (Hoffmann et al., 2009).

A randomized control trial entitled, "Are Therapy Dogs Like Xanax? Does Animal-Assisted Therapy Impact Processes Relevant to Cognitive Behavioral Psychotherapy?" (Hunt & Chizkov, 2014) investigated outcomes of a canine companionship's presence on emotional arousal and cognitive change during a traumatic writing experiment with undergraduate college students between the ages of 18 and 28. Study participants (N = 107) were randomly assigned to one of four groups. The first group was assigned to write an essay about a traumatic event in the presence of a dog; the second group was assigned to write an essay about a traumatic event with no dog present. The third group was assigned to write an essay on a neutral topic in the presence of a dog (describing features of the room in which they were placed); and, the fourth group was assigned to write an essay on the same neutral topic without a dog present (describing features of the room in which they were placed). With study participants in the first group, the presence of a dog did not alter the traumatic content of their essays and did not interfere with emotional processing. However, the presence of a dog resulted in study participants recalling the traumatic event as being less distressing and traumatizing. Participants in both groups having a dog present reported having less anxiety and dysphoria. Also of note, in the experimental group with the presence of a dog, participants' follow-up depressive symptoms decreased (compared to baseline) (Hunt & Chizkov, 2014). These findings cannot be generalized to the population of veterans with PTSD. However, the symptoms presented by participants in this study reflect

clinical manifestations experienced by many veterans with PTSD such as anxiety, dysphoria, and depressive symptoms, which could possibly be improved with the presence of a companion canine.

A research study evaluating the physiological benefits of canine companionship and interaction entitled, “Pet Therapy: Enhancing Social and Cardiovascular Wellness in Community Dwelling Older Adults” (Krause-Parello & Kolassa, 2016) focused on the cardiovascular and social wellness of older adults (N = 28). Measurement outcomes included heart rate and blood pressure among study participants before and after canine exposure therapy. Findings from this study are significant for veterans with PTSD, as well as those with undiagnosed PTSD since a growing number of veterans are aging with declining cardiovascular health exacerbated by ongoing stress. Socialization among older veterans may also be impaired with PTSD associated with hypervigilance, along with fear and distrust of others when in public settings. This study found older adult participants who took part in the pet visitation program increased their weekly activity, felt more empowered regarding their health behaviors and had decreased heart rates and blood pressures (Krause-Parello & Kolassa, 2016).

A randomized control trial entitled, “Presence of a Dog Reduces Subjective but Not Physiological Stress Responses to an Analog Trauma,” (Lass-Hennemann et al., 2014) examines the effects of dogs on anxiety and stress among healthy adult females (N = 80) while viewing a traumatic film clip in Germany. This study included three experimental and one control group. Participants in all four groups watched the film with either a live dog present, a toy dog present, a ‘friendly’ human present or alone. Blood pressure cuffs and ECG monitors were attached to all study participants prior to the start of the film; subsequently, measured before, during and after

the film. Various questionnaires were administered before and after watching the film to measure anxiety levels and assess mood changes among participants. Results of the study indicated the presence of both the live dog and a 'friendly' human reduced participants' perceived stress and other negative emotional effects (Lass-Hennemann et al., 2014). Consistent with the other reviewed articles, participants in this study were not veterans with PTSD, but rather healthy adult females. Again, results from this study cannot be generalized to veterans with PTSD, however, one can speculate that viewing the traumatic film clip may have triggered similar feelings of stress and anxiety among female subjects that is like those experienced by veterans having war-related flashbacks.

The final article reviewed for this integrative review is entitled, "Potential Benefits of Canine Companionship for Military Veterans with Posttraumatic Stress Disorder (PTSD)" (Stern et al., 2013) which surveyed U.S. veterans diagnosed with PTSD (N = 30) who adopted dogs to evaluate the self-reported effectiveness of canine companionship on their psychological status. Survey results revealed that veterans felt less lonely, depressed, and worried about personal safety and the safety of their families. Participants also reported feeling calmer since adopting their companion dog. Other physiological benefits of having a companion canine included engaging in more physical activity by walking the animal an average of 49 minutes each day. Veterans also reported, since receiving their companion dog, they find it easier to interact with other individuals—a definite psychosocial benefit of animal therapy. Overall, this study reveals that companion dogs may relieve a certain degree of psychological distress for a veteran as well as improve perceived physiological well-being (Stern et al., 2013).

Based on this review of ten research studies focusing on the use of AAT (canine and equine therapy), consistent findings include improved symptom management among all populations, some of which included veterans with PTSD. All study participants exposed to AAT experienced either improved psychological symptoms, psychosocial symptoms or experienced greater physiological well-being. Although therapy animals are becoming increasing popular as a means of psychotherapy, more research on the topic is needed. Many individuals, including mental health professionals, believe that animals can reduce distress whether it be a short interaction or a long-term relationship, however, some researchers are uncomfortable with how popular animal therapy has become since it has surpassed scientific evidence (Brulliard, 2017).

Conflicting and inconclusive findings in the literature review are noted here. There is no significant difference in the reduction of anxiety levels among psychiatric inpatients that participated in recreational therapy and those who participated in CAT (Barker & Dawson, 1998). The article which evaluated outcomes of equine therapy found no significant improvements in coping strategies, optimism, social support, life satisfaction, general perceived self-efficacy, or physical health among individuals diagnosed with anxiety and PTSD (Earles et al., 2015). In another study, the presence of a canine was found to be as effective as the presence of a human during the viewing of a traumatic film clip (Lass-Hennemann et al., 2014).

Gaps noted in the literature include very few studies pertaining to the use of CAT among U.S. veterans diagnosed with PTSD. Most of the research studies reviewed studied populations other than U.S. veterans with PTSD, and had a very small sample size—with the smallest sample

size of $N = 1$ in a case study; thus, findings cannot be generalized to U.S. veterans with PTSD or other populations.

IMPLICATIONS FOR NURSING PRACTICE

The findings of this integrative review of the literature focusing on U.S. veterans diagnosed with PTSD has implications for nursing research, practice, education and policy. Each of these will be discussed in the next sections of this thesis.

Research

Few original research articles were found that specifically focus on the use of CAT for U.S. veterans with PTSD. Seven articles investigated the uses of CAT and pet companionship on populations other than veterans with PTSD, including adults in highly stress jobs, hospitalized psychiatric individuals, adults diagnosed with acute depression, anxiety and PTSD, undergraduate college students, and elderly adults in the community setting. The findings from this integrative review suggest CAT with or without prescriptive therapy may be a viable treatment option for veterans and other populations. However, quantitative studies with a larger sample size that yield empirical data are needed to generalize findings to manage stress and other PTSD comorbidities in veterans such as reducing hypervigilance, improving social interaction skills and increasing physical activity. Research, specifically focusing on the psychological, physiological and psychosocial uses of CAT for veterans as well as other appropriate populations, is needed. Finally, evidence is needed related to the costs and quality of CAT.

Practice

Practicing nurses in hospital and community settings should be aware that CAT could be an effective treatment modality to manage psychological, physiological, and psychosocial symptoms for certain individuals having a variety of diagnoses. With that in mind, nurses should advocate for regularly scheduled CAT sessions for select individuals in acute care and extended

care settings as well as in the community. Not only can animals, a pet specifically, brighten an individual's outlook on life and put a smile on a face, but could also promote healing and physical activity. Animal therapy has shown to lessen depression and fatigue and provide a sense of optimism for clients in an acute care setting (Mayo Clinic, 2016). While trained therapy animals may bring joy to a sick individual, family and friends that participate or sit in on the therapy sessions also report feeling better (Mayo Clinic, 2016). Additionally, the nurse must take into consideration the costs and care responsibilities of owning an animal when planning individual care plans.

Education

Both nurses and veterans should be educated on the potential role of CAT as a viable treatment option to manage physiological and psychological symptoms. Nurses can learn more about CAT through continuing education (CE) programs and through reading internet sites pertaining to the topic. Advance Healthcare Network for Nurses offers an online CEU regarding animal-assisted interventions (Bensing, 2017). The goal of this CEU is to, "…provide the latest information to nurses about animal-assisted interventions (AAI) in healthcare facilities and other venues" (Bensing, 2017, http://nursing.advanceweb.com/Continuing-Education/CE-Articles/Animal-Assisted-Interventions.aspx). Another strategy to expose nurses to AAT, CAT specifically, is having a certified therapy animal handler provide an in-service presentation on AAI. Healthcare professionals who specialize in AAI and a nurse who is familiar with animal therapy can educate veterans with PTSD in an acute care setting, rehabilitation facility, the community or home setting. Accredited AAT agencies are located in larger cities to which an interested veteran with PTSD can be referred to by the nurse.

Policy

Anecdotally, as well as in the popular media, companion animals, especially dogs, have reported benefits for some veterans with physical and psychological conditions. Due to the lack of supporting quantitative evidence, the VA does not procure therapy dogs for veterans who include assistive animals in their treatment plan. To address this deficit, studies by VA researchers are currently underway to measure the use of this treatment modality for PTSD (VA, 2015b). Subsequently, if evidence supports the effectiveness of CAT on the management of PTSD in veterans, the VA's website subtly suggests veterinary care for the dogs of veterans could be a feasible option at some point in the future. It is important to stress, after screening for appropriateness in veterans and other populations, providing an animal occurs with an outside organization specializing in this service. For example, a local animal shelter partnering with a correctional facility in which select prisoners volunteer to keep the dog over a period of time to train the dog. In turn, these dogs are placed and closely monitored with carefully screened individuals. In the private sector, third party payers (i.e., insurance companies) usually do not cover animal assisted therapy. Such therapy generally is provided by volunteers who bring an animal into a health care facility for individuals' enjoyment. In other cases, an organization trains the animal for a population such as the visually or hearing impaired. While it is highly doubtful that third party payers will ever include assistive animals as a benefit, nurses should be aware of nonprofit organizations that offer animal therapy. Likewise, for health care facilities that allow for scheduled animal visits (acute, long term, psychiatric settings), it is important to establish realistic policies that safely facilitate this treatment modality for clients and staff as well as the animal.

LIMITATIONS

Several limitations of this integrative literature review focusing on U.S veterans with PTSD are noted. While the literature indicates various types of animals are used with AAT, all but one study focused on canine therapy. Most of the studies (N = 10) had a very small sample size and one dissertation consisted of a case study. Anecdotal reports and the popular media often feature articles describing the role of companion animals and animal therapy. Yet, no articles were found that provide empirical evidence on beneficial uses of CAT among U.S. veterans diagnosed with PTSD. Therefore, more original research on the use of CAT among this population is needed.

CONCLUSION

This thesis summarizes findings from an integrative literature review of ten articles focusing on the uses of CAT among U.S. veterans diagnosed with PTSD and other populations. Discussed herein are consistent and inconsistent findings along with gaps in the literature. Implications for nursing research, practice, education and policy are also highlighted. The need for further quantitative research studies on the use of CAT among U.S. veterans diagnosed with PTSD is suggested as well.

APPENDIX

Table 1: Operational Definitions of Terms

Psychological	Relating to, affecting, or arising in the mind associated with cognitive functions (Merriam-Webster Dictionary, 2005).
Physiological	Relating to physiology which is a branch of biology focusing on functions of living matter and their physical components (Merriam-Webster Dictionary, 2005).
Psychosocial	Relating to social aspects of mental health (Merriam-Webster Dictionary, 2005).

Figure 1: Consort Diagram

Key Search Terms = Canine Assisted Therapy, Pet Therapy, Veteran*, PTSD or Post Traumatic Stress Disorder

Limiters = English language, peer-reviewed, time frame specified

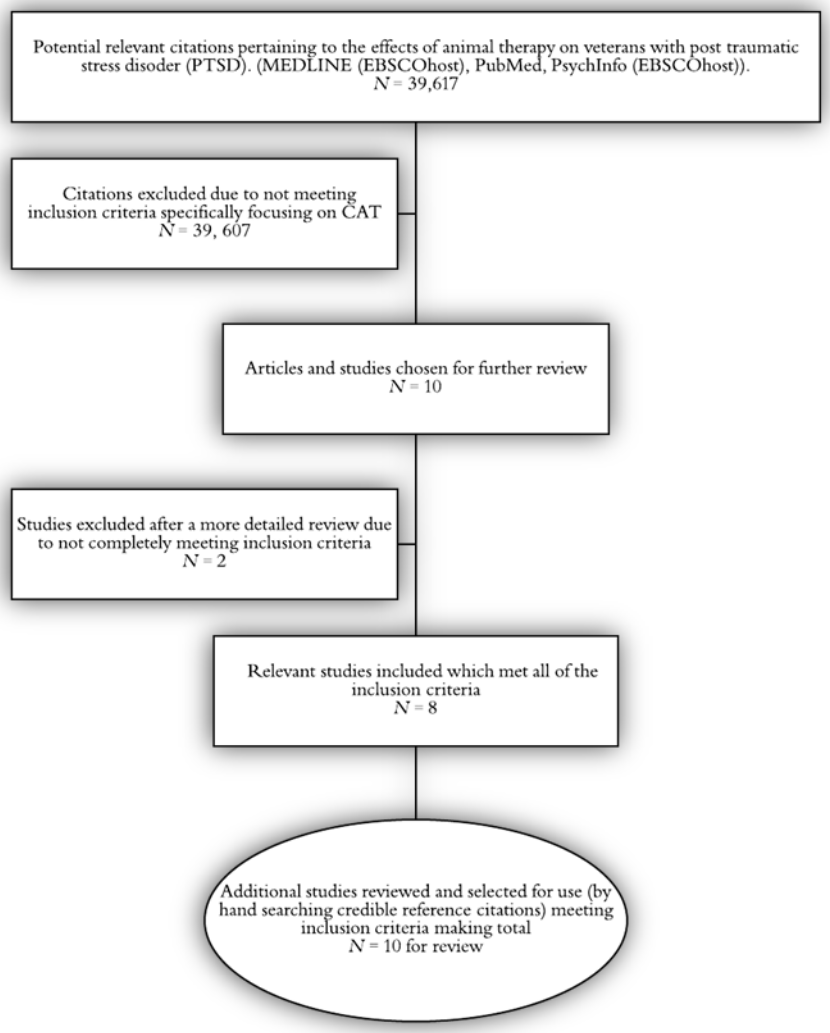

Table 2: Summary of Reviewed Research Articles

Author(s) Year Location	Study Design and Purpose	Sample Size	Interventions	Screening Measures	Data Collection Method	Key Findings and Limitations
Allen, K. Shykoff, B. E. Izzo, J. L. 2001 United States	Randomized Controlled Crossover Design Study The purpose of this study is to evaluate the effects of pet therapy along with drug therapy on cardiovascular responses to physiological stress in hypertensive individuals, compared to drug therapy alone.	*N* = 48 *n* = 24 *(Experimental group with drug and pet therapy)* *n* = 24 *(Controlled group with only drug therapy and no pet therapy)*	Of the 48 participants, an experimental group and a control group were formed. During the experiment, the experimental group was treated with Lisinopril 20mg/d and acquired a pet. The control group was only treated with Lisinopril 20mg/d. After one month of observation, all participants took a baseline mental stress session. After six months of treatment with either Lisinopril and pet companionship, or just Lisinopril,	Participants had uncomplicated stage 2 hypertension (resting blood pressure ≥ 160/100 mm/Hg) and highly stressful occupations.	Outcomes such as heart rate and blood pressure of the participants were measured using a portable Propaq monitor and were automatically recorded each minute during the experiment. Plasma renin activity was also measured.	This study demonstrates that pets significantly reduce physiological stress responses and improve task performance of their owners. The study results also show that ACE inhibitor therapy (Lisinopril 20mg/d) only reduces resting blood pressure in hypertensive individuals and that pet therapy helps to reduce physiological stress responses as well as blood pressure. The researchers explain that there are many

			a second mental stress session was completed.			imitations to the study. The study did not include a placebo group that could have possibly strengthened the study. All participants had type 2 hypertension before the start of drug and pet therapy, therefore the use of pet therapy six months before drug therapy with Lisinopril was not possible. Another limitation to the study is that the effects of pet therapy were only evaluated in the home setting and the findings cannot be generalized to other stressful environments such as a work office.

Barker, S. B. Dawson, K. S. 1998 United States	Pre- and Posttreatment Crossover Design Study The purpose of this study is to examine the effects of CAT sessions and recreational therapy sessions on psychiatric conditions in hospitalized psychiatric individuals.	*N* = 230 *n* = 93 *(CAT session)* *n* = 137 *(Therapeutic recreation session)*	Pre-and posttreatment anxiety ratings were compared among participants who received both CAT and recreational therapy. CAT sessions were held once a week for about 30 minutes with the therapy dog and its owner. During therapy sessions, the therapy dog would roam around the therapeutic setting freely while the dog's owner would talk to the participants about the therapy dog and encourage them to talk about their own pets.	Participants were hospitalized psychiatric individuals with an array of psychiatric conditions, including mood disorders, psychotic disorders, substance use disorders and other disorders.	The state scale of the State-Trait Inventory was used throughout this study to measure participants' anxiety levels before and after both therapy sessions.	This study shows there is no significant difference in anxiety levels between both therapy groups. However, data shows that among the participants who participated in recreational therapy sessions, only psychiatric individuals with mood disorders experienced a significant decrease in anxiety. Data also reveals that of those who participated in CAT sessions, anxiety was significantly decreased in psychiatric individuals with mood disorders, psychotic disorders

			Recreational therapy sessions were held the day after the CAT sessions and included leisure resource awareness presentations, education on how to spend leisure time, and art and music activities.			and other disorders. Data also reveals that anxiety levels among individuals with substance use disorders were not significantly reduced after either recreational or CAT session. Limitations are not clearly stated within the text but are alluded to.
Brown, M. 2017 United States	Case Study Research Design The purpose of this case study is to examine the effects of therapy dogs on the sense of well-being in veterans with PTSD.	*N* = 1	To gather information on the participant regarding sense of well-being and the participant's perceived effects of animal therapy on his PTSD, an interview lasting no more than two hours was conducted. The interview was conducted via	The researcher anticipated for there to be eight to ten veteran participants for this study, however only one participant was obtained. This veteran participant met the	Data were collected using a semi-structured interview, comprised of nine questions. The interview was audio-recorded and after transcription of the audio coverage, a program called NVivo was used to code the data.	Results conclude that animals may provide a sense of safety and security for veterans with PTSD, that a human may not be able to provide. Dogs can alert the veteran if someone is approaching or bark if something is wrong, making situations more predictable for

			telephone and asked questions such as, “How long ago were you diagnosed with PTSD?” “Describe life before your service dog/CAT.,” “Describe life with your service dog/receiving CAT.,” and more. At the end of the interview, additional information such as symptom reduction and feelings before and after CAT were addressed and obtained.	inclusion criteria of being between the age of 18-50 years of age, and has been diagnosed with PTSD. The participant obtained a service dog through an organization that specializes in training dogs for veterans.	Coding allowed for extraction of themes and commonalities in the interview.	veterans. Limitations to the case study include having only one participant to interview and using a series of news clips of veterans discussing their service dogs. More participants are needed to improve the reliability and generalization of study results. With the use of news clips from the internet of veteran interviews discussing their service dogs, the researcher was unable to control the types of questions asked, therefore it is possible the questions asked

						during these interviews produced a favorable response. The study also did not include any female participants; the veteran interviewed by the researcher and the veterans in the news clips were all males. It is possible that bias is a limitation to the study as well since the researcher conducted the interview as well as coded the interview data. It is suggested that a second person help code the data to minimize or eliminate bias.
Earles, J. L. Vernon, L. L. Yetz, J. P.	Crossover Design Study	*N* = 16 All	Before the participants began the study, they	To be eligible to participate in this study,	Many data collection methods were	Results of the study show that participants'

2015 United States	The purpose of this study is to investigate the effects of equine therapy on individuals with anxiety and PTSD and to test the hypothesis that the Equine Partnering Naturally program would reduce PTSD symptoms, anxiety and depression and increase mindfulness, but not affect coping and support mechanisms, in participants.	participants took a baseline questionnaire a few weeks before beginning equine therapy to compare the effects of equine therapy on them after completing the last session, using a posttest questionnaire; therefore, all participants served as their own control.	received a pretest questionnaire. The study intervention was conducted once a week for six weeks at an equine facility, with sessions lasting two hours. Participants were divided into three groups with five to six participants in each group. During session 1, participants met the horses they would be working with and developed improved listening skills, concentration, and noncritical self-awareness. In Session 2, participants learned how to communicate and interact non-	participants had to have at least one traumatic event listed on the Life Events Checklist and have PTSD symptoms, with a minimum score of 31 on the PTSD Checklist Specific.	used for this study. To measure and assess physical and psychological health in participants, the 17-item LEC for trauma history, 17-item PCL-S, 18-item Trauma Emotion Questionnaire, 9-item Patient Health Questionnaire measuring depression, 7-item Generalized Anxiety Disorder Scale, 10-item Alcohol Use Disorders Identification Test, and 15-item Somatic Symptom Severity Scale of the Patient Health Questionnaire were used. To	depression, anxiety, PTSD symptoms, alcohol use and emotional distress were significantly reduced after the six equine therapy sessions. Mindfulness of participants also increased after the sessions, as predicted. There were no significant improvements in coping strategies, optimism, social support, life satisfaction, general perceived self-efficacy, or physical health. Limitations to the study include the lack of a control group which provides the possibility that the results and effects

			verbally with their horses and learned the effects of body language and boundaries in relation to this powerful animal. Participants learned how to halter the horse and how to deal with stressful situations in session 3. In session 4, participants learned how to back a horse up and how to lead them, as well as setting relationship boundaries and creating safe spaces. Participants learned how to stay focused when in a distracting situation in session 5. Session		assess the participants' mindfulness, social support, and coping strategies, the 39-item Five Facet Mindfulness Questionnaire, 14-item Proactive Coping subscale of the Proactive Coping Inventory, 15-item Social Support Scale, 9-item General Perceived Self-Efficacy Scale, 5-item Satisfaction with Life Scale, and 10-item Life Orientation Test-Revised were used.	were not from the equine therapy. The study also lacks follow-up data on the participants. All participants could continue any current medication regimen or treatments, which may have interfered with the results. One other limitation of the study is that participants were encouraged not to comment on each other during treatment which could be why there was no significant improvement in social support.

			6 consisted of all participants reviewing the skills they had learned throughout this regimen, and worked on stillness and stability from within.			
Hoffmann, A. O. M. Lee, A. H. Wertenauer, F. Ricken, R. Jansen, J. J. Gallinat, J. Lang, U. E. 2009 Germany	Controlled Crossover Design Study The purpose of this study is to test whether the presence of a friendly dog would decrease anxiety in hospitalized individuals diagnosed with acute depression.	*N* = 12 Participants served as their own controls by participating in a therapy session in the presence of a dog and in the absence of a dog.	Two 30-minute interview sessions were conducted with the participants. All participants participated in each session, however, some participants were assigned to the session with a dog and the others were assigned to the session without the dog, and then switched sessions. The experimental, or treatment session	Participants were hospitalized individuals, diagnosed with acute depression, and met DSM-IV criteria for unipolar major depression.	The State-Trait Anxiety Scale was used to measure anxiety levels in participants before and after interventions. To test the influence of the dog in the interview, the Wilcoxon test was used.	The results of the study demonstrate that the presence of an animal, a dog in this instance, significantly reduces anxiety in those diagnosed with acute depression, whereas the control group with no dog present showed no significant change in anxiety. Limitations to this study include a small sample size,

			consisted of interaction with a friendly dog and the research assistant, and the control group consisted of interaction with only the research assistant. Pre-and posttests measuring participants' anxiety levels were completed before and after each session.			potential bias, and the measurement of effects on anxiety rather than depression. Bias may have been present since the study was a crossover design and used the same participants as the experimental and control group. Only measuring the anxiolytic affects and not the antidepressant effects of the study may not lead to long-term changes in the participants.
Hunt, M. G. Chizkov, R. R. 2014 United States	Randomized Controlled Trial The purpose of this study is to evaluate and investigate the impact of a	*N* = 107 *n = Trauma essay in the presence of a dog* *n = Trauma essay in the presence of*	All participants completed the Beck Depression Inventory, NEO Five-Factor Inventory, and Lexington Attachment to Pet Scale questionnaires	Participants were undergraduate college students between the ages of 18 and 28, and were only excluded from the study	Several instruments were used for this study, including the Beck Depression Inventory, NEO Five-Factor Inventory, Lexington	Findings from the study suggest that dogs do not interfere with emotional processing, however they may make the recalling of traumatic memories less

	dog's presence on emotional arousal, cognitive change and the content of trauma narratives during an expressive writing paradigm.	*no dog* *n = Control essay in the presence of a dog* *n = Control essay in the presence of no dog* Actual participants in each four groups is not specified within the text, therefore the numbers are unknown.	prior to beginning the study. Participants in the experimental groups wrote about a traumatic event or experience in their life. One experimental group had a dog present during the essay, and one group did not. Participants in the control groups wrote about the rooms in which they were placed during the study. They were instructed to write in detail the spatial aspects of the rooms. One control group had a dog present during the essay, and one group did not. All participants	if they were allergic to or had a specific phobia of dogs.	Attachment to Pet Scale, Spielberger State Anxiety Inventory, and the Positive and Negative Affect Scale. Essays were transcribed and analyzed using the Linguistic Inquiry and Word Count (LIWC) program which categorizes words into variables and psychological categories. The severity of trauma written about in the essays was scored by two raters that were blind to the experimental conditions and outcomes.	distressing and unpleasant. Both groups with a dog present report less anxiety and dysphoria. The trauma writing group with a dog reported a decrease in symptoms of depression from baseline to follow-up. One limitation to the study is the use of generally healthy young adults which makes generalizing the findings to cognitive behavioral therapy in clinically distressed individuals difficult. Another limitation is that self-selection of participants was likely. Anxiety

			completed the Spielberger State Anxiety Inventory and Positive and Negative Affect Scale questionnaires immediately after the writing sessions. Two weeks after the first writing session, follow-up questionnaires were administered including the Beck Depression Inventory, Spielberger State Anxiety Inventory, and Positive and Negative Affect Scale questionnaire.			levels and dysphoria were not measured at baseline, creating another limitation to the study. A final limitation of the study is that the researchers did not rate the interaction between the participants and dogs, and did not quantify the amount of time the participants spent with the dogs.
Krause-Parello, C.A. Kolassa, J. 2016 United States	Crossover Design Study The purpose of this study is to evaluate	*N* = 28 All participants received both treatments,	Participants of the study engaged in two therapy sessions; one session with a dog and its handler,	Participants were eligible for participation if they met all three	Multiple tools were used to measure outcomes and collect data. To measure stress	Based on results, pet therapy programs for older adults in communities has the potential to

	blood pressures and heart rates among older adults before and after canine interaction with a handler and before and after interaction with a human volunteer only.	therefore each participant served as their own control.	and one session with a volunteer and no dog. Each session lasted about an hour and were scheduled one week apart from each other. During the sessions, general, leisurely conversations took place. Changes in blood pressure and heart rate among participants were measured and evaluated before each type of session began, and 2 minutes after the conversations ended.	inclusion criteria which were, residing in independent housing, able to communicate in the English language, and enrolled in the Caregiver Canines Therapy Dog Program.	among participants, the perceived stress scale was used. To measure participants' attitudes towards pets, the pet attitude scale was used. The Social Support Strategy Indicator measured human social support among participants. A single, simple question, "How would you rate your health?" was asked to assess perceived health status. A Reli On Easy Wrap Automatic Blood Pressure Monitor used to measure blood pressure and heart rates of participants was used as well.	improve and support social and cardiovascular wellness as well as self-health empowerment for this population. Limitations of this study include findings that were unable to be generalized due to sample demographics, age and living arrangements; for example, some participants were living with others that could have interfered with results. Another limitation is that participants were already enrolled in the Caregiver Canines Therapy Dog Program. A small sample size is another

						limitation to the study. One final limitation is that some survey responses were incomplete, resulting in missing and incomplete data.
Lass-Hennemann, J. Peyk, P. Streb, M. Holz, E. Michael, T. 2014 Germany	Randomized Controlled Trial The purpose of this study is to investigate effects of canines on anxiety and stress among individuals during exposure to "traumatic stressors."	*N* =80 *n* = 20 *(Experimental group that watched a traumatic film clip with a dog)* *n* = 20 *(Experimental group that watched a traumatic film clip with a toy dog)* *n* = 20 *(Experimental group that watched a*	Each experimental group was introduced to either the dog, toy dog, or friendly human that would accompany them throughout the traumatic clip prior to the start of the film. The control group engaged in conversation with the experimenter for about two minutes prior to the start of the film, however the experimenter did not stay	Participants were restricted to healthy adult females that did not smoke, had a BMI of 20-50 kg/ m^2 and used oral contraceptives to reduce menstrual cycle related hormonal status on the study. All participants were also encouraged to refrain from exercise,	To measure participants' changes in anxiety levels, the German version state scale of the STAI was used. The German version of the PANAS was used to assess changes in mood before and after the experiment. Blood pressure was measured three times during the experiment; once before the film, during the film, and once after the film,	Study results show that the presence of a dog during traumatic stressors reduces subjectively experienced stress and negative affect, however, scores with the dog accompanied group were comparable with those of the friendly human group. Two limitations of the study include a strictly female sample, and the inability to transfer

		traumatic film clip with a friendly human) *n* = 20 *(Control group that watched a traumatic film clip alone)*	throughout the film. Before starting the traumatic film, all participants were attached to blood pressure cuffs, ECG monitors and completed the PANAS and STAI-A questionnaires. Participants also provided the first saliva sample at this time. The experimental groups were then accompanied by the dog, toy dog, or friendly human and the film clip began. Throughout the video physiological data was measured. After the film ended, blood pressure and heart continued to be	alcohol, and caffeine three hours before beginning the experiments.	using a DINAMAP V100 device. Heart rate was measured using a standard lead-II ECG. Cortisol levels were measured using saliva samples collected with Salivette tubes, once before the start of the film and four times after the film ended. The German version of the STAI-T was used to measure trait anxiety in participants. The Pet Attitude Scale was also used to assess participants' general attitudes towards pets.	findings to those diagnosed with PTSD.

			monitored for three minutes. Participants completed another PANAS and STAI-S questionnaire, and saliva samples were obtained 15, 30, 45 and 60 minutes after the film ended.			
Moore, A. 2013 United States	Qualitative Research Design Study The purpose of this study is to examine the lived experiences of U.S. veterans and the effects of CAT on their PTSD.	*N* = 8	Eight U.S. combat veterans diagnosed with PTSD using a psychiatric service dog are interviewed using an interpretive phenomenological analysis approach to evaluate the intervention.	U.S. combat veterans diagnosed with PTSD related to combat and/or military sexual assault, enrolled in a nonprofit program in the Southeast region of the U.S. that pairs veterans with psychiatric service dogs.	All eight interviews were transcribed using the interpretive phenomenological analysis approach.	All veterans interviewed reported that their psychiatric service dog helped reduce anxiety and hypervigilance, and made them feel safe to where they could go out in public and complete activities of daily living. Limitations include a small sample size, and all participants were between the

						ages of 30-51, Caucasians, and middle class except one. The researcher only had one interaction via phone call with each participant.
Stern, S. L. Donahue, D. A. Allison, S. Hatch, J. P. Lancaster, C. L. Benson, T. A. Johnson, A. L. Jeffreys, M. D. Pride, D. Moreno, C. Peterson, A. L. 2013 United States	Retrospective Cohort Study The purpose of this study is to evaluate self-reported benefits of nonservice canine companions in veterans with PTSD.	*N* = 30	All participants were veterans with PTSD that were currently being seen at two Veterans Affairs Outpatient Clinics and expressed interest in taking part of the study, or expressed benefiting from canine companionship. Participants simply completed six questionnaires and sent them back to the researchers via mail or in person.	Participants were U.S. military veterans with a primary diagnosis of PTSD that expressed having benefited from living with a canine.	Six questionnaires were used to collect data and identify the effects of canine companions on veterans with PTSD. The Beck Depression Inventory, Second Edition, Dog Information Sheet, Dog Relationship Questionnaire, Lexington Attachment to Pets Scale, PTSD Checklist-Military Version, and Veterans 36-item Short Form Health Survey	Veterans reported feeling less lonely, less depressed, calmer, and less worried about their own safety and the safety of their families since their companion dog came to live with them. They also reported that they receive more exercise and walk their companion dogs on an average of 49 minutes per day. Veterans also find it easier to interact and be with other humans since the arrival of their dog.

					and Health Behaviors Questionnaire were used.	This study only interviewed veterans who reported that their canine companion had helped them, which makes generalizing the data difficult. The study did not include veterans younger than mid-thirties, which also limits the study's results. Participants may have had memory deficits that could have altered results as well, however these deficits were not addressed. One more limitation to the study is that none of the participants received cognitive processing therapy or prolonged exposure therapy.

REFERENCES

Allen, K., Shykoff, B.E. & Izzo, J.L. (2001). Pet ownership, but not ACE inhibitor therapy, blunts home blood pressure responses to mental stress. *Hypertension, 38*(4),815-820.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5.* Washington, D.C: American Psychiatric Association.

Barker, S. B. & Dawson, K. S. (1998). The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. *Psychiatric Services, 49*(6), 797-801. doi:10.1176/ps.49.6.797

Bensing, K. (2017). Animal-assisted interventions. Retrieved from http://nursing.advanceweb.com/Continuing-Education/CE-Articles/Animal-Assisted-Interventions.aspx

Brown, M. (2017). Examination of veteran experiences with service animals and animal assisted therapy: A case study. *Dissertation Abstracts International*, *77*.

Brulliard, K. (2017). Therapy animals are everywhere. Proof that they help is not. Retrieved from https://www.washingtonpost.com/news/animalia/wp/2017/07/02/therapy-animals-are-everywhere-proof-that-they-help-is-not/?utm_term=.461a87b2d574

Cole, K., Gawlinski, A., Steers, N. & Kotlerman, J. (2007). Animal-assisted therapy in patients hospitalized with heart failure. *American Journal of Critical Care*, *16*(6), 575-586.

CRC Health. (2015). What is equine therapy? Retrieved from http://www.crchealth.com/types-of-therapy/what-is-equine-therapy/

Earles, J. L., Vernon, L. L. & Yetz, J. P. (2015). Equine-assisted therapy for anxiety and posttraumatic stress symptoms. *Journal of Traumatic Stress, 28*(2), 149-152. doi:10.1002/jts.21990

Eugene, T. (2016). Animal-assisted therapy can help with PTSD. *Army Magazine*, *66*(2), 7.

Gabriel, K. R. (2016). Animal therapy for children with autism spectrum disorder. *Exceptional Parent, 46*(4), 30-32.

Hoffmann, A.O.M., Lee, A.H., Wertenauer, F., Ricken, R., Jansen, J.J., Gallinat, J. & Lang, U.E. (2009). Dog-assisted intervention significantly reduces anxiety in hospitalized patients with major depression. *European Journal of Integrative Medicine, 1*(3), 145-148.

Hunt, M.G. & Chizkov, R.R. (2014). Are therapy dogs like Xanax? Does animal-assisted therapy impact processes relevant to cognitive behavioral psychotherapy? *Anthrozoos, 27*(3), 457-469.

InSitu Foundation. (2015). Can dogs smell cancer? Retrieved from http://dogsdetectcancer.org/can-dogs-smell-cancer/

Krause-Parello, C. A. & Kolassa, J. (2016). Pet therapy: Enhancing social and cardiovascular wellness in community dwelling older adults. *Journal of Community Health Nursing, 33*(1), 1-10. doi:10.1080/07370016.2016.1120587

Lanning, B. A. & Krenek, N. (2013). Examining effects of equine-assisted activities to help combat veterans improve quality of life. *Journal of Rehabilitation Research & Development, 50*(8), vii-xiii. doi:10.1682/JRRD.2013.07.0159

Lass-Hennemann, J., Peyk, P., Streb, M., Holz, E. & Michael, T. (2014). Presence of a dog reduces subjective but not physiological stress responses to an analog trauma. *Frontiers*

in Psychology, 5, 1010. http://doi.org/10.3389/fpsyg.2014.01010

Mayo Clinic. (2016). Pet therapy: Man's best friend as healer. Retrieved from http://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/pet-therapy/art-20046342

Melter, Z. (2015). Veterans & active duty military need to be especially vigilant about high blood pressure. Retrieved from https://helloheart.com/military-veterans-hypertension/

Merriam-Webster's Collegiate Dictionary (11th ed.). (2005). Springfield, MA: Merriam-Webster.

Moore, A. (2015). Animal-assisted therapy for United States veterans with posttraumatic stress disorder. *Dissertation Abstracts International, 75*.

Pandzic, I. (2012). Animal-assisted therapy and PTSD. *U.S. Naval Center for Combat and Operational Stress Control (NCCOSC).*

Stern, S. L., Donahue, D. A., Allison, S., Hatch, J. P., Lancaster, C. L., Benson, T. A., Johnson, A.L., Jeffreys, M.D., Pride, D., Moreno, C. & Peterson, A. L. (2013). Potential benefits of canine companionship for military veterans with posttraumatic stress disorder (PTSD). *Society & Animals*, *21*(6), 568-581. doi:10.1163/15685306-12341286

U.S. Department of Veterans Affairs (VA). (2015a). Depression, trauma, and PTSD. Retrieved from https://www.ptsd.va.gov/public/problems/depression-and-trauma.asp

U.S. Department of Veterans Affairs (VA). (2015b). Dogs and PTSD. Retrieved from https://www.ptsd.va.gov/public/treatment/cope/dogs_and_ptsd.asp

U.S. Department of Veterans Affairs (VA). (2015c). Suicide and PTSD. Retrieved from http://www.ptsd.va.gov/public/problems/ptsd-suicide.asp

U.S. Department of Veterans Affairs (VA). (2016a). Facts about veteran suicide. Retrieved from https://www.va.gov/opa/publications/factsheets/Suicide_Prevention_FactSheet_New_VA_Stats_070616_1400.pdf

U.S. Department of Veterans Affairs (VA). (2016b). How common is PTSD? Retrieved from http://www.ptsd.va.gov/public/PTSD-overview/basics/how-common-is-ptsd.asp