

Service Dogs: A New Prescription for Posttraumatic Stress Disorder

RUNNING HEAD: Service Dogs: A New Prescription

Jeffrey B. Nelson, MSIS (August 2014), CPM

Texas State University

Funding Sources: None

11100 Hidden Bluff Dr.

Austin, TX 78754

512-470-8130

jeffbn@gmail.com

Keywords: alternative, animal-assisted therapy, canines, dogs, military, PTSD, service dogs, soldier, TADSAW, TBI, treatment, veterans, warriors

Abstract

In 2010, Train A Dog, Save a Warrior (TADSAW) commenced operations in San Antonio, TX. Innovative in design and method, TADSAW set out to mitigate the effects of PTSD by pairing current and former military personnel with self-trained service dogs. While numerous therapies already existed for PTSD at the time of TADSAW's inception, most were unsatisfactory on account of their cost, side effects, or lack of empirical support. In an effort to address these limitations and simultaneously evaluate the efficacy of the TADSAW model, the author recruited fifty-four individuals from TADSAW facilities across the United States for participation in this study. Study participants completed the PCL-M, an instrument that measures PTSD severity among military personnel, either at program enrollment ($n = 36$) or completion ($n = 14$), with isolated exceptions ($n = 3$). PCL-M scores for program completers were, on average, 11.99 points ($p = .00024$) lower than those obtained from program enrollees, a decrease of 22.9%. These findings are compared against those obtained by McLay et al. (2012) for benchmarking and contextual purposes. Significance of results and recommendations for future research are discussed.

Abbreviations:

AAA – Animal-assisted activity; **AAT** – Animal-assisted therapy; **BAI** – Beck Anxiety Inventory; **BDI** – Beck Depression Inventory; **CAT** – Canine-assisted therapy; **DOD** – Department of Defense; **NEADS** – National Education for Assistance Dog Services; **OEF/OIF** – Operation Enduring Freedom/Operation Iraqi Freedom; **OTLS** – Occupational Therapy Life Skills; **PATT** – Public Access and Temperament Test; **PCL-M** – PTSD Checklist – Military Version; **PTSD** – Posttraumatic stress disorder; **TBI** – Traumatic brain injury; **TADSAW** – Train a Dog, Save a Warrior; **VA** – United States Department of Veterans Affairs; **VR** – Virtual reality; **VRET** – Virtual Reality Exposure Therapy; **WCC** – Warrior Canine Connection

Introduction

Posttraumatic stress disorder (PTSD) is a mental health impairment affecting an estimated 7.7 million American adults, annually (Kessler, Chiu, Demler, Walters [1]). Typically classified as an anxiety disorder, PTSD emerges in patients subsequent to their exposure to traumatic life events (Gill, Saligan, Henderson, & Szanton [2]). Individuals with PTSD suffer an overall decline in their physical and psychological health (Gill et al. [2]), and may experience any or all of the following symptoms: a reliving of the traumatic event, recurring or intrusive thoughts and dreams, desensitization of affect, and withdrawal from individuals, events, or activities linked with the triggering stimulus (Gill et al. [2]).

Prevalence reports of PTSD among the general populace vary from 2-4% (North [3]), with a figure of 3.5% having been settled on by Kessler et al. [1]. Irrespective of precipitating trauma or triggering event (Breslau et al. [4]), women are twice as likely as men to acquire PTSD (North [3]). Among combat veterans and active duty military personnel, researchers find contemporary PTSD rates four to five times higher than those expressed in the general population (Kulka et al. [5]). According to the National Vietnam Veterans Readjustment Study, 15.2% of male and 8.5% of female veterans suffer the effects of PTSD (Kulka et al. [5]). More recent figures compiled in the wake of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) are generally supportive, albeit at slightly higher levels. Burnam, Meredith, Tanielian, and Jaycox [6] placed the prevalence of PTSD and other mental health problems in OEF and OIF veterans at 18.5%. Considering that greater than 3.2 million U.S. soldiers have been deployed overseas or otherwise participated in military activities since 2001 (Contingency Tracking System [7]), these figures are both informative and sobering.

Medical costs linked to PTSD are sizeable. Patients tend to be large consumers of outpatient medical services (Dobie et al. [8]), as they frequently cope with more than one medical condition at a time (Boscarino [9]). PTSD comorbidity may include physical ailments, such as constant pain, heart disease, and autoimmune syndromes (Gill, Szanton, Taylor, Page, & Campbell [10]), and/or any number of psychological disorders (Breslau [11]). According to Breslau [11], greater than 80% of individuals with PTSD present with a second psychological disorder – depression, generalized anxiety disorder, substance abuse, and obsessive-compulsive disorder being the most frequent.

PTSD interferes with the normal biologic functioning of individuals while simultaneously impairing critical brain systems and structures (Gill et al. [2]). Beyond these complications, there is mounting evidence that PTSD induces inflammation throughout the immune system (Gill, Vythilingam, & Page [12]), perhaps explaining the myriad of health complications experienced by patients with PTSD (Boscarino [9]).

Traditional Treatment Options

Counselors and medical professionals seeking to mitigate the effects of PTSD have no shortage of treatment protocols from which to choose. One such option is the use of pharmaceuticals. Psychotropic drugs remain popular among practitioners and patients because they offer hope in a tangible, tactile form. Moreover, their effectiveness holds constant irrespective of the number of people who take them.

Separately, or in combination with pharmaceuticals, exposure therapy represents another approach to treating PTSD. Exposure therapy posits that PTSD is a learned (i.e., conditioned) response to trauma-laden stimuli (Litz & Roemer [13]). Treatment, therefore, endeavors to mitigate or extinguish the impact of the conditioned stimulus on the individual (Litz & Roemer

[13]). The unlearning of these autonomic and deeply engrained responses is far from easy, but it can be accomplished if the working bond between therapist and patient is strong; if avoidance behaviors during therapy sessions are recognized and discouraged; if accurate expectations of therapy both in the short-term and long-term are fostered; and if the ongoing therapeutic dialogue can catalyze novel understanding of both the trauma and its future ramifications (Litz & Roemer [13]).

In the aggregate, exposure therapy has demonstrated its efficacy (Litz & Roemer [13]), especially as a treatment for combat-linked PTSD (McLay, McBrien, Wiederhold, & Wiederhold [14]). Initially, researchers neglected to empirically examine the effectiveness of individual treatment programs or differing modalities of exposure therapy (Litz & Roemer [13]), but ten-plus years of war, and thousands of veterans and active duty military personnel with PTSD have helped to erase this initial oversight.

Following in this line of inquiry, McLay et al. [14] expounded on the benefits of exposure therapy, both with and without a virtual reality (VR) component. Ten active-duty soldiers in the Al Anbar Province, Iraq, underwent exposure therapy for a period up to 13 weeks, contingent upon deployment schedules and other military actualities (McLay et al. [14]). In spite of these obstacles, and a relatively small sample size ($n=10$), all study participants witnessed significant reductions in PTSD severity, as measured by the PCL-M (McLay et al. [14]). As detailed by these researchers, one participant even scored a 17 post-intervention, indicating no extant PTSD whatsoever. Overall, a statistically significant effect was found for treatment ($p < 0.001$), with participants in the VR exposure condition attaining a mean 67% reduction in PTSD severity as quantified by the PCL-M, and those in the prototypical exposure group achieving, on average, a 74% reduction in the same (McLay et al. [14]).

Two years later, McLay et al. [15] revisited the impact of virtual-reality exposure therapy (VRET); this time in insolation. Forty-two active duty military personnel began, and 20 completed, a regimen of biweekly virtual-reality exposure sessions lasting approximately 45 minutes each (McLay et al. [15]). The virtual environment placed soldiers behind the wheel of a Humvee to be driven alone or as part of a convoy down a desert highway. The virtual scenery was fashioned to resemble an urban environment in Iraq – hence its delineation: “Virtual Iraq” (McLay et al. [15]). All participants had a prior diagnosis of chronic PTSD, and at least some presented with treatment-resistant PTSD (McLay et al. [15]).

After a mean 10.3 treatment sessions, 75% of participants (study completers only) had entered a period of PTSD remission, as determined by the PCL-M. Moreover, these individuals had improved at least 50% versus their initial PCL-M score (McLay et al. [15]). At a 3-month follow-up, participant gains held steady, with 76% of respondents remaining free of PTSD according to diagnostic criteria set forth by the PCL-M (McLay et al. [15]).

The success of exposure therapy (whether virtual or traditional) should come as no surprise. Late in 2010, the Department of Defense (DOD) and the Department of Veterans Affairs (VA), in their *VA/DOD Clinical Practice Guideline*, reaffirmed exposure therapy as a principal approach for treating PTSD (Rauch, Eftekhari, & Ruzek [16]). Exposure therapy has demonstrated its efficacy in mitigating PTSD symptoms arising from a multitude of traumas (Rothbaum, Meadows, Resick, & Foy [17]), while also curtailing much of the comorbidity that frequently accompanies PTSD in the form of apprehension, depression, culpability, and/or anger (Foa et al. [18]). Considering these successes, it is little wonder that exposure therapy has been held up as the “gold standard” for treating PTSD (Rauch et al. [16], p. 679).

An Alternative Approach: Animal/Canine-Assisted Therapy

This ample supply of treatment protocols has not hampered the development of novel approaches to PTSD remediation. In particular, animal-assisted therapy (AAT) has garnered the attention of many, a far cry from its status in the field and literature just a few decades ago. According to Culliton [19], only 5 papers detailing the therapeutic benefits of animals existed in the literature prior to 1980, with a mere 20 more accumulating between 1980 and 1987. Of late, the standing of AAT has increased, with the Department of the Army, Acting Surgeon General, MG Gale Pollock, formally sanctioning the use of two service dogs in Iraq for purposes of stress relief in December 2007 (Ritchie & Amaker [20]).

While a variety of animals can and have been used for purposes of AAT, dogs tend to be the animal of choice among therapists, clinicians, and patients. The acclaimed ethologist Konrad Lorenz once remarked, “The bond with a true dog is as lasting as the ties of this earth will ever be” (Aydin et al. [21], p. 446). From a scientific perspective, dogs are preferred because they are social, reliant, and highly trainable (Arkow [22]). A good dog is intelligent, alert, and playful; equanimous, supportive, and resilient in the face of travel demands or environmental stress (Arkow [22]).

Recently, dogs have been the subject of a growing body of research. Stasi et al. [23] discovered that therapy animals can simultaneously assuage depressive symptoms and reduce overall blood pressure levels. Colombo, Buono, Smania, Raviola, and De Leo [24] confirmed these results in an investigation of 144 geriatrics, finding that AAT amended depressive markers and living conditions among study participants.

Since neither of these inquiries dealt exclusively with dogs, Le Roux and Kemp [25] elected to make canines the focus of their work. Under their direction, 16 individuals were randomly assigned to either a control group or an animal-assisted activity (AAA) group. All

study participants were over the age of 65, and were residents of a nursing home near Cape Town, South Africa (Le Roux & Kemp [25]). Individuals assigned to the AAA group received half-hour visits from a qualified therapy dog, once a week for six weeks; although the dog was always on a leash, members of the AAA group were free to talk to, groom, or pet the dog at will (Le Roux & Kemp [25]). Pre and post intervention, study participants completed the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI). Scores on these psychological inventories revealed a significant decrease in depression levels, and a non-significant decrease in anxiety levels, for those in the treatment condition (Le Roux & Kemp [25]). Had the authors utilized a larger sample size for their study, the observed decreases in anxiety (as quantified by the BAI) may well have risen to a level of significance.

Clearly, there is a mounting body of evidence pointing toward the efficacy of AAT broadly, and canine-assisted therapy, specifically. And yet, it is important to proceed with caution. Much of the available literature on this topic suffers from one or more significant limitations, and questions of validity are never far-removed.

A few recent studies have attempted to shift the focus of the AAT dialogue, eschewing anxiety and depression as topics of interest in favor of PTSD. In so doing, the participants of interest have also changed, from juveniles, prisoners, and the elderly to wounded warriors and veterans. Consistent with this new paradigm, Beck et al. [26] investigated the usefulness of CAT for transitioning warriors participating in an Occupational Therapy Life Skills (OTLS) program. OTLS programs seek to facilitate the reintegration of warriors, whether that be as a soldier or as a civilian (Beck et al. [26]). A total of 24 participants took part in this study, with half assigned to a traditional OTLS program, and half assigned to an OTLS program with an AAT component (Beck et al. [26]). Although two assessments of group progress took place (at 4 and 8 weeks), the

researchers were unable to detect statistical differences between the treatment and control conditions. They were some middling inclinations of a treatment effect, with three subscales (psychological function [decreased], work performance [increased], and quality of interaction [increased]) of the Functional Status Questionnaire registering as significant (Beck et al. [26]). But overall, the findings of this study were less than impressive. On a more positive note, many of the service members provided anecdotal accounts supporting the efficacy of AAT intervention, including reports that the dogs promoted feelings of tranquility and relaxation (Beck et al. [26]). Still, the sample size employed in this study prevented the realization of any significant, let alone groundbreaking, findings (Beck et al. [26]).

Ritchie and Amaker [20] may have said it best in their recent article, lauding the numerous personal accounts of dog-induced PTSD attenuation, while astutely acknowledging the inadequacy of these reports for purposes of resource allocation. What one is left with, then, is the paucity of controlled or even scientifically-based studies evaluating the efficacy of trained therapy dogs as a mitigation tool for PTSD. To be sure, preliminary work is afoot. National Education for Assistance Dog Services (NEADS), for example, recently commenced a two-year pilot study that places trained therapy dogs with combat veterans exhibiting signs of PTSD (Foreman & Crosson [27]). To date, the results of this inquiry appear promising, although publication has yet to occur (Foreman & Crosson [27]).

A similar story has unfolded in regard to a warrior-led dog-training program currently operating under the direction of the nonprofit Warrior Canine Connection (WCC). Originally conceptualized by social worker Rick Yount, the WCC program assigns military personnel previously diagnosed with PTSD to the role of dog trainer (Yount, Olmert, & Lee [28]). According to Yount et al. [28], this is exceedingly advantageous, as newfound expertise in the

skills (e.g., patience) of dog instruction may well promote concomitant benefits (e.g., emotional control, social competence, and/or heightened well-being) in the trainer himself/herself. Roughly 85 wounded warriors have participated in the WCC program, interacting in some capacity with the service dogs as they undergo their training (Yount et al. [28]). An earlier iteration of the WCC protocol, housed at a VA treatment facility, engaged 200 service members with canines, and ultimately placed five warrior-trained dogs with current or former military personnel (Yount et al. [28]).

Innovative in scope and approach, the WCC protocol suffers from many of the same limitations as its peers (e.g., small sample size and anecdotal evidence alone). Unless this changes, the WCC program is unlikely to differentiate itself, or garner serious attention from the research community. Harsh though it may be, systematic, empirical review is the only legitimate means by which a researcher can demonstrate efficacy and earn credibility.

Notwithstanding the numerous studies, articles, and opinion pieces that have been written on the topic, the evidence in support of CAT, particularly as a tool for PTSD remediation, is relatively weak. Personal testimonials and anecdotal accounts may suffice for some, but they are wholly insufficient for anyone employing a scientific frame of reference. As the number of veterans and active duty military personnel with PTSD increases, there will be an ever-expanding need for treatment. Only those approaches which have withstood the rigor of scientific evaluation will be deemed worthy of funding and/or resource allocation. This study seeks to add to both the PTSD and the CAT literature by providing initial, empirical support for the use and placement of self-trained, therapy dogs among warriors diagnosed with PTSD.

Method

Participants

Fifty-four individuals (44 males and 10 females) took part in this study. The average participant age was 42.07 years ($SD = 14.92$), and the average length of overseas deployment was 25.32 months ($SD = 26.86$). All but three participants had been deployed overseas.

Fifty-one of the participants were current or former enlisted personnel; one was a commissioned officer, and two failed to disclose their “present or last military rank.” The author made no attempt to gather other demographic information from study participants, including race or socioeconomic status. Given the pilot nature of this study, and the author’s desire to preserve anonymity, these variables were deemed dispensable.

Materials

The author gathered all data for this study by way of a two-part questionnaire. In part one, he asked participants to provide four basic pieces of demographic information: age (in years); gender; present or last military rank; and total time of overseas deployment (in months). In part two, he presented participants with the 17-item PCL-M inventory designed to quantify the current extent and severity of their PTSD.

Procedure

The author collected his survey data through the Train A Dog, Save A Warrior (TADSAW) program based in San Antonio, Texas. TADSAW is a 501c(3) nonprofit, founded by Bart Sherwood, which seeks to help veterans and active duty military personnel experiencing the effects of PTSD and/or traumatic brain injury (TBI). By pairing each of these “warriors” with a service dog, TADSAW endeavors to forge a bond of trust and reciprocity between the two, a

bond upon which the warrior can ultimately depend as he/she seeks to reintegrate into his/her daily routine.

TADSAW recruits clients primarily through its Internet website and word-of-mouth-advertising. From May 2013 to October 2013, the author worked with fifty-four TADSAW clients, asking them to complete the PCL-M inventory prior to the commencement of dog-training or upon completion of it. The majority of participants in this study completed the PCL-M only once (i.e., pre or post training), though a small minority ($n = 3$) did complete the inventory twice. Individuals who completed the PCL-M twice represent a special case, and the author will discuss the importance of these individuals below.

Prior to dog placement and training, TADSAW clients complete an application packet to determine their suitability for program participation. As part of this application process, potential clients must provide proof of their PTSD diagnosis by a licensed medical professional. Clients also indicate, during this pre-enrollment period, their preference in regards to dog-pairing. Current dog owners have the option of training/transforming their pets into service animals, or they may request placement with a new dog, typically one from a local shelter. Those without pets make use of this latter option.

Once an applicant has secured a dog, he or she commences with training. Training typically lasts ten to twelve weeks, but this is variable, depending on both the motivation of the client and the obedience of the dog. In many ways, this flexibility is the embodiment of the TADSAW approach, as no two clients have exactly the same needs. Still, certain key components must be included in any comprehensive dog-training program, namely obedience inculcation, proper appraisal and utilization of canine “body language,” and teaching of life skills necessary to assist the client in his or her daily routine (e.g., opening a door or retrieving a

newspaper). TADSAW-approved “master trainers” are always on hand to supervise and facilitate the acquisition of these benchmarks; nevertheless, it is imperative to remember that each client ultimately bears the responsibility for training his or her dog, and simultaneously fostering the canine-human bond upon which the program depends.

Given this study’s pre-post design, participants fell into one of three groups: those yet to begin training (with their dog), those who had already completed training, and those who enrolled and completed training during the course of this study. All study participants, irrespective of group, completed the two-page questionnaire described above. Individuals who enrolled and finished their training concurrent with the timing of this study completed it on two occasions ($n = 3$); all other individuals ($n = 51$) completed it only once.

With the consent of the TADSAW program director, pretreatment questionnaires became a standard part of the TADSAW enrollment process. Administration of post-treatment questionnaires was slightly more variable, but typically occurred in person at the time of the Public Access and Temperament Test (PATT) – TADSAW’s discharge and formal certification exam for warrior-dog teams – or shortly thereafter via email.

Results

The author collected 57 questionnaires during this study, 40 of which were pretreatment and 17 of which were post-treatment. Thirty-seven participants completed only a pretreatment questionnaire; fourteen completed only a post-treatment questionnaire; and three participants completed both. All gathered data was usable with the exception of one pretest.

The pretest group ($n = 39$) had an average score of 69.46 on PCL-M ($SD = 7.68$). The highest pretest score on the PCL-M was 82, and the lowest score was 52. The post-treatment group ($n = 17$), by contrast, had a mean score of 57.47 on the PCL-M ($SD = 15.17$). One

participant scored a 29 on the PCL-M post intervention, the lowest observed data point in the study. The high score on the PCL-M, post intervention, was 76.

To compare the pre and post-intervention groups, the author performed an independent groups t-test. A mean difference of 11.99 points was observed between groups. The author determined this difference to be statistically significant at an alpha level of .001 ($p = .00024$).

Participants who completed both the pre and post-treatment questionnaires represent a special case. These three individuals scored, on average, 71.00 on the PCL-M prior to the start of dog-training, and 65.67 upon their successful completion of it. This 5.33 point reduction in PTSD severity was not statistically significant as determined by a repeated measures t-test ($p = .338$). Among these participants, two witnessed a decrease (9 points each) in the severity of their PTSD subsequent to program completion. The other actually worsened, albeit marginally. His PCL-M score at program exit was 2 points higher than it was at program enrollment.

Discussion

Study participants who enrolled and completed TADSAW's dog-training program differed significantly from their counterparts who had yet to commence training. On average, these TADSAW "graduates" had PCL-M scores 22.9%¹ (11.99 points) lower than those obtained from their peers at program inception. Even at the most conservative alpha levels, this difference remained significant ($p = .00024$).

The TADSAW approach appears to be linked with a sizeable and robust reduction in PTSD severity among current and former military personnel. In absolute terms, the mitigating effects of dog training and dog placement are less than those reported by McLay et al. [15] in

¹ A score of 17 on the PCL-M indicates no measurable symptoms of PTSD. Because this is also the lowest score possible, the author subtracted 17 from pre and post-treatment scores prior to calculating percent differences. McLay et al. (2012) followed an identical procedure in reporting their results.

their study of virtual-reality exposure therapy. McLay et al. [15] documented an 18.80 point (50.3%) reduction in PTSD severity over the course of their study, which exceeds the 11.99 point reduction observed among TADSAW participants, over roughly the same time interval.

Notwithstanding this numeric disadvantage, the author believes the TADSAW protocol will prove itself equal, if not superior, to VRET for the long-term treatment of PTSD among current and former military personnel. One factor in support of this claim is the active and participatory nature of treatment at TADSAW. When a warrior assumes responsibility for training his or her own service dog, he/she gains not only a “battle buddy,” but also an added sense of confidence and self-efficacy, a point echoed by Yount et al. [28] in their discussion of a similar, warrior-led, dog-training program.

Once they are trained and placed, service dogs also exhibit distinct advantages in terms of both immediacy and proximity. A warrior’s service dog is always close at hand, even while asleep. Moreover, a dog’s instinctual abilities – heightened by training – make it possible for the animal to sense a warrior’s needs, often before they become apparent to the warrior himself or herself. As impactful as VRET might be in the moment, it is unlikely to offer either of these long-term benefits to participants. In addition, VRET is almost certain to lack the predictive capabilities of a trained service-dog, indivisibly linked and dutifully attuned to its owner.

Although promising, the findings of this study are preliminary, and must be viewed with caution. Additional research is imperative, both to verify these results and to address the multitude of unanswered questions they raise if true. As this work unfolds, three questions should occupy the majority of researchers’ time. First, does the presence of a self-trained service dog decrease the severity of PTSD in an individual across time? If it does, what happens to the magnitude of the effect with the passage of time (i.e., increase, decrease, or stay the same)?

Second, is there a cost savings associated with service dogs when compared with more traditional remedies for PTSD? In particular, do warriors with service dogs witness a decrease in the number of pharmaceuticals they consume across time? Third, is there a discernible quality-of-life improvement for the warrior once he or she completes TADSAW's (or a similar) dog-training regimen? This question is somewhat ambiguous, and can be approached from a variety of angles. Interviews and self-appraisals have been two of the more popular techniques, and the author believes this trend should continue. Given the subjective nature of quality-of-life assessments, the warrior's own feelings and judgments cannot be ignored, even if more impartial techniques for appraisal emerge. No one is in a better position to say how he or she feels than the warrior himself or herself.

Conclusions

The results of this study provide initial support for the TADSAW model. Warriors who trained their own service dogs scored significantly lower on the PCL-M than peers who had yet to begin training. This finding affirms and extends credibility to the work of previous researchers by incorporating objectivity, statistical techniques, and a larger sample size. Self-trained service dogs, it would appear, are a valid treatment option for individuals suffering the effects of PTSD.

Despite the nascence of research in this field, the author believes a paradigm shift is underway. Service dogs, particularly self-trained service dogs, have the potential to disrupt and reshape the standard treatment regimen for PTSD. Ten years from now, a prescription for a service dog may be as common as a prescription for a pharmaceutical.

References

1. Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62(6):617-27.
2. Gill J, Saligan LN, Henderson WA, Szanton S. PTSD: Know the warning signs. *Nurse Pract*. July 2009;34(7):30-7.
3. North CS. The Oklahoma City bombing study and methodological issues in longitudinal disaster mental health research. *J Trauma Dissociation*. June 2005;6(2):27-35.
4. Breslau N, Kessler RC, Chilcoat HD, Schultz LR, Davis GC, Andreski P. Trauma and posttraumatic stress disorder in the community: The 1996 Detroit area survey of trauma. *Arch Gen Psychiatry*. 1998;55(7):626-32.
5. Kulka RA, Schlenger W, Fairbank J, Hough R, Jordan B, Marmar C, Weiss D. Trauma and the Vietnam War generation: Report of findings from the National Vietnam Veterans readjustment study. New York: Brunner/Mazel; 1990. 322 p.
6. Burnam MA, Meredith LS, Tanielian T, Jaycox LH. Mental health care for Iraq and Afghanistan War veterans. *Health Aff*. May 2009;28(3):771-82.
7. Defense Manpower Data Center. Contingency Tracking System (CTS) Deployment File for Operations Enduring Freedom & Iraqi Freedom: CTS deployment file baseline report [Internet]. [Washington DC]. Available from www.dmdc.osd.mil/
8. Dobie DJ, Kivlahan DR, Maynard C, Bush KR, Davis TM, Bradley KA. Posttraumatic stress disorder in female veterans: Association with self-reported health problems and functional impairment. *Arch Intern Med*. 2004;164(4):394-400.
9. Boscarino JA. A prospective study of PTSD and early-age heart disease mortality among

- Vietnam veterans: Implications for surveillance and prevention. *Psychosom Med*. 2008;70(6):668-76.
10. Gill JM, Szanton S, Taylor TJ, Page GG, Campbell JC. Medical conditions and symptoms associated with posttraumatic stress disorder in low-income urban women. *J Womens Health*. February 2009;18(2):261-67.
 11. Breslau N. The epidemiology of trauma, PTSD, and other posttrauma disorders. *Trauma Violence Abuse*. July 2009;10(3):198-210.
 12. Gill J, Vythilingam M, Page GG. Low cortisol, high DHEA, and high levels of stimulated TNF- α , and IL-6 in women with PTSD. *J Trauma Stress*. December 2008;21(6):530-39.
 13. Litz BT, Roemer L. Post-traumatic stress disorder: An overview. *Clin Psychol Psychother*. October 1996;3(3):153-68.
 14. McLay RN, McBrien C, Wiederhold MD, Wiederhold BK. Exposure therapy with and without virtual reality to treat PTSD while in the combat theater: A parallel case series. *Cyberpsychol Behav Soc Netw*. February 2010;13(1):37-42.
 15. McLay RN, Graap K, Spira J, Perlman K, Johnston S, Rothbaum BO, Difede J, Deal W, Oliver D, Baird A, Bordnick PS, Spitalnick J, Pyne JM, Rizzo A. Development and testing of virtual reality exposure therapy for post-traumatic stress disorder in active duty service members who served in Iraq and Afghanistan. *Mil Med*. June 2012;177(6):635-42.
 16. Rauch SAM, Eftekhari A, Ruzek JI. Review of exposure therapy: A gold standard for PTSD treatment. *J Rehabil Res Dev*. August 2012; 49(5):679-88.
 17. Rothbaum BO, Meadows EA, Resick P, Foy DW. Cognitive-behavioral therapy. In: Foa EB, Keane TM, Friedman MJ, editors. *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies*. New York, NY: Guilford Press; 2000.

p. 320-25. 388 p.

18. Foa EB, Hembree EA, Cahill SP, Rauch SAM, Riggs DS, Feeny NC, Yadin E. Randomized trial of prolonged exposure for posttraumatic stress disorder with and without cognitive restructuring: Outcome at academic and community clinics. *J Consult Clin Psychol*. October 2005;73(5):953-64.
19. Culliton B. Take two pets and call me in the morning. *Science*. September 1987;237(4822):1560-61.
20. Ritchie EC, Amaker RJ. The early years. *US Army Med Dep J*. 2012;April-June:5-7.
21. Aydin N, Krueger JI, Fischer J, Hahn D, Kastenmüller A, Frey D, Fischer P. "Man's best friend:" How the presence of a dog reduces mental distress after social exclusion. *J Exp Soc Psychol*. January 2012;48(1):446-49.
22. Arkow P. *Animal-assisted therapy and activities: A study, resource guide and bibliography for the use of companion animals in selected therapies*. 10th ed. Stratford, NJ: Self-published; 2011. 189 p. Available from <http://www.animaltherapy.net/Publications.html>
23. Stasi MF, Amati D, Costa C, Resta D, Senepa G, Scarafioiti C, Aimonino N, Molaschi M. Pet-therapy: A trial for institutionalized frail elderly patients. *Arch Gerontol Geriatr*. 2004;38(Suppl 9):407-12.
24. Colombo G, Buono MD, Smania K, Raviola R, De Leo D. Pet therapy and institutionalized elderly: A study on 144 cognitively unimpaired subjects. *Arch Gerontol Geriatr*. March 2006;42(2):207-16.
25. Le Roux MC, Kemp R. Effect of a companion dog on depression and anxiety levels of elderly residents in a long-term care facility. *Psychogeriatrics*. March 2009;9(1):23-26.
26. Beck CE, Gonzales Jr. F, Sells CH, Jones C, Reer T, Wasilewski S, Zhu Y. The effects

of animal-assisted therapy on wounded warriors in an occupational therapy life skills program. US Army Med Dep J. 2012;April-June:38-45.

27. Foreman K, Crosson C. Canines for combat veterans: The National Education for Assistance Dog Services. US Army Med Dep J. 2012;April-June:61-62.
28. Yount RA, Olmert MD, Lee MR. Service dog training program for treatment of posttraumatic stress in service members. US Army Med Dep J. 2012;April-June:63-69.

Acknowledgements

The author conducted the research in this study under the IRB approval of Dr. Omar Lopez, Assistant Professor at Texas State University in the Department of Occupational, Workforce, and Leadership Studies. All participants in the study gave their informed consent prior to collection of any data, and received progress reports of the findings from this research study. The author would like to thank Dr. Omar Lopez, Dr. Steve Springer and Mr. Bart Sherwood—and especially the veterans who participated in the program—for making this research possible.

Statement of Responsibility

I, Jeffrey B. Nelson, am the sole author and researcher for this manuscript. I am responsible for all work contained within.