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Effects of training service dogs on service members with PTSD: A pilot-feasibility randomized study with mixed methods

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ABSTRACT

This pilot-feasibility randomized control trial examined effects of an adjunctive short-term service dog training program (SDTP) for service members in out-patient treatment for PTSD. Twenty-nine volunteer participants were randomly assigned to either the SDTP ($n = 12$) or waitlist ($n = 17$); 20 participants were available for post-treatment evaluation. SDTP protocol consisted of six structured one-hour sessions with a dog-trainer conducted over two weeks, intended to train a service dog to help a fellow Veteran. SMs completed symptom questionnaires (PTSD, insomnia, stress, depression, anxiety), and the SDTP group completed a post-intervention quantitative interview. Most effect sizes demonstrated moderate symptom reductions, both between-groups and within the SDTP group. Between-group effects were strongest for intrusive thoughts (Hedge's $g = -0.66$; 95%CI: $-1.72, 0.23$) and overall PTSD symptoms ($g = -0.45$; 95%CI: $-1.47, 0.45$); within-SDTP group effects were strongest for stress ($d = -1.31$, 95%CI: $-2.17, -0.42$), intrusive thoughts ($d = -0.78$, 95%CI: $-1.55, 0.01$) and hypervigilance ($d = -0.77$, 95%CI: $-1.48, -0.04$). Qualitative analyses indicated participants found SDTP in some ways challenging yet beneficial in multiple aspects of personal and social lives. Future work should examine optimal treatment parameters (e.g., duration, "dosing") when training dogs as an adjunct to other PTSD treatment.

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adjunct treatment; social
support

What is the public significance of this article?—This pilot-feasibility study investigated a program that teaches service members in therapy for PTSD how to train a service dog. Service members reported that the program was in some ways challenging, yet richly beneficial in multiple aspects of their personal and social lives. Service members also reported moderate symptom improvement over time and compared to a waitlist control group.

Post-traumatic stress disorder (PTSD) is debilitating and difficult to treat (Steenkamp et al., 2015). Although first-line treatments such as cognitive or exposure therapy consistently demonstrate moderate to strong improvements, long-term disability and treatment drop-out/attrition remain problematic (Steenkamp et al., 2015; Watkins et al., 2018). Therefore, additional attention has been given to other treatments, such as mindfulness training (Boyd et al., 2018) and treatment-adjuncts (Michael et al., 2019; Wynn, 2015). In our randomized pilot-study, we examined a service dog training program as an adjunct treatment for service members (SM) being treated for combat-related PTSD.

A growing body of anecdotal and observational reports of the efficacy of animal assisted therapy (AAT) for PTSD has resulted in increased patient demand for this treatment and highlighted the need for more scientific evidence of its efficacy (Ritchie et al., 2016). Models for AAT stem from a mix of experiential observations (Olmert et al, 2015; Yount et al, 2019), robust evidence that animals have a calming effect on people (Gee et al., 2021), some principles of attachment theory (Sable, 2013), and dogs' potential to provide non-judgment social support (Brooks et al., 2018). Within AAT, an emerging interest involves structuring both the dog training and patient-dog bonding processes to provide a therapeutic effect. Both processes involve social attachment and trust (Payne et al., 2015; Sable, 2013), and they are components of treatment programs for other populations such as inmates (Cooke & Farrington, 2014) and at-risk adolescents (Lahav et al., 2019). There have been four recent PTSD clinical trials using AAT for combat-related PTSD, and leveraging the dog training and/or the initial patient-dog bonding period (Bergen-Cico et al., 2018; Kloep et al., 2017; O'Haire & Rodriguez, 2018; Whitworth et al., 2019). These studies have all broadly supported the use of AAT for PTSD, but they have also tested a variety of

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Table 1. Previous service dog studies of Veterans with PTSD that emphasize the dog training and/or the initial patient-dog bonding period.

Study	Groups	Intervention			Findings
		Duration and delivery	Focus		
Kloep et al. (2017)	12 (treatment); no control (waitlist control).	3 week daily "intensive". Groups with 5–7 subjects.	Veterans taught dog care/handling, how to utilize dogs skill sets; accompanied dogs to public settings. Included "intense resilience, psychoeducational, and skills development program" including "psychoeducational format" (group interaction, daily journaling, life skills)	At 6 months, significant reduction in PTSD sx ($d = -3.8$) and increases in quality of life ($d = -1.6$).	
Bergen-Cico et al. (2018)	31 (dog training); 14 (waitlist control). Nonrandom allocation.	90-minute weekly sessions, for 12–18 months. Veterans paired with dog trainer.	"Veterans learn to care for their dogs and learn behavioral management and training skills"; attend public settings in new environments; "outings to enhance dog training and promote social engagement"	Significant between-group effect at 12-months on PTSD sx ($d = -0.3$), self-judgment ($d = -0.9$), stress ($d = -0.6$), and compassion ($d = 0.4$)	
O'Haire and Rodriguez (2018)	75 (dog training/provision); 66 waitlist. Nonrandom allocation.	3-week "training camp" followed by provision of service dog to home (duration varied).	During training, Veterans learned to "live with, care for, and maintain training".	Significant between-group effect on PTSD ($d = -0.7$), depression ($d = -0.9$), and on some quality of life measures (mental health, $d = 0.7$; psychological well-being, $d = 0.8$).	
Whitworth et al. (2019)	15 (dog training); 15 waitlist. Nonrandom allocation based on treatment site.	14-week program with 1-hour sessions in groups ≤ 10	Sessions cover: commands; walking up to others; pertinent laws; K9 CPR; commands with added distractions; public handling; scenarios with furniture; urban training; busy public retail setting; CGC.	Significant between-group effect on post-traumatic stress ($d = -1.1$), and sx of depression ($d = -1.6$) and anxiety ($d = -1.2$)	

Sx = symptoms.

AAT-related treatment protocols with varying program-philosophies (Table 1). Some of the trials were intended to prepare Veterans to take care of dogs at home (O’Haire & Rodriguez, 2018; Whitworth et al., 2019), whereas another included a psychoeducational component (Kloep et al., 2017). They demonstrate the need for service dog training programs as an adjunctive, but not necessarily as a primary treatment (O’Haire & Rodriguez, 2018).

Our study was executed in collaboration with the Warrior Canine Connection’s (WCC) Mission Based Trauma Recovery Program. Since 2011, the WCC has developed one such adjunctive service dog training program (hereafter referred to as SDTP) in multiple military medical facilities. Compared to other trials (e.g., Table 1), the SDTP in our study included a much shorter time-commitment (six one-hour service dog training sessions conducted with a dog trainer over a two-week period). The SDTP invites SMs in trauma treatment to help train service dogs meant for Veterans in need. Each session includes grooming/bonding, educational components, a longer training exercise, and, in the second week, one public field trip (Figure 1).

We executed a mixed-methods, pilot-feasibility, randomized control trial. The aims included examining the feasibility of SDTP as an adjunctive treatment modality among SMs diagnosed with PTSD, and exploring clinical outcomes associated with the treatment.

Methods

Recruitment & inclusion

The study was approved by the Institutional Review Board at Uniformed Services University of the Health Sciences, and executed on its installation. The sample included active duty, reserve, and National Guard SM from the Warrior Transition Brigade or other military treatment outpatient behavioral health clinics in the DC-metropolitan area. Participants had to be between 18 and 45 years of age, with a confirmed diagnosis of PTSD by a healthcare professional, and meet certain criteria on the PTSD Checklist Civilian Version (PCL-C) (Bliese et al., 2008; Weathers et al., 1993) (total score ≥ 18 , and “moderate” levels of at least one symptom on one of each of PCL-C’s three symptom categories). Exclusion criteria included: being pregnant; having overt heart disease; being in need of inpatient treatment; having active substance abuse disorder; having cognitive problems that limit the ability to understand study procedures/make informed consent (e.g., severe TBI); having fear of or allergy to dogs; having inability to walk or run; partaking in any other concurrent research protocols during this study.

Participants who met study criteria were provided informed consent. They received an overview presentation about the WCC SDTP. After a baseline evaluation, they were randomly assigned to the SDTP or waitlist control condition group by a research coordinator who previously did not interact with the participant and had

SERVICE DOG TRAINING PROGRAM		
Week 1 (3 sessions)		
10 minutes	Grooming & Bonding	Participants learn about and practice with the equipment necessary for dog grooming and training, as well as the service dog harnesses, leashes, and collars.
10 min	Educational Lecture	Participants learn about and practice using appropriate motivational tools for training including treat/food bags, physical contact, and tone of voice.
30 min	Training Exercise	Participants practice teaching <u>foundational skills</u> to the service dogs, including: Sit, Up, Down, Wait, Stay, Come, Lay down
10 min	Training Debrief	Participants and training instructors discuss participants’ reactions to training sessions and receive constructive feedback about their performance.
Week 2 (3 sessions)		
10 minutes	Grooming & Bonding	Participants continue practicing with the equipment necessary for dog grooming and training, as well as the service dog harnesses, leashes, and collars.
10 min	Educational Lecture	Participants continue practicing using appropriate motivational tools for training including treat/food bags, physical contact, and tone of voice.
30 min	Training Exercise	Participants practice teaching <u>advanced skills</u> to the service dogs, including: Open (door, cabinet), Touch (button), Provide balance (stairs), Pick Up Objects (e.g., fallen crutch), Field Trip
10 min	Training Debrief	Participants and training instructors discuss participants’ reactions to training sessions and receive constructive feedback about their performance.

Figure 1. Service dog training program intervention outline from the warrior canine connection.

a list of computer-generated random assignments. Additional assessments completed at baseline and post-treatment included blood draws and a treadmill running test to investigate physiological responses to dog-interactions; these are not included in this report.

Participant characteristics

Over 35 months, 48 patients were screened from three referral sites. Eleven were ineligible to participate, and eight met the screening criteria but were unable to follow up. The remaining 29 participants consented and were enrolled (Table 2). All participants were receiving individual therapy, and 93% were on at least one psychotropic medication. Other treatment modalities included group therapy (SDTP: 67%; waitlist: 24%), recreational/occupational therapy (SDTP: 25%; waitlist: 18%), and couple/family therapy (SDTP: 17%; waitlist: 18%); about a quarter were receiving combinations of these three treatment modalities (SDTP: 33%; waitlist: 24%).

Seventeen participants were in the waitlist group; six in the waitlist group did not come for the posttest visit (due to health issues, moving away, and/or lack of interest). Twelve participants were in the treatment group; two in the SDTP treatment group did not complete the sessions (one due to an upcoming surgical procedure, and another due to a physical accident), and one participant completed the SDTP sessions but did not come for the posttest to complete the post-assessment (due to a work schedule conflict). All other participants ($n = 9$) enrolled in the SDTP group completed the dog training assignment.

SDTP intervention

After the symptom baseline assessment, participants in the SDTP group attended six days of one-hour individual sessions of service dog training instruction over two weeks, which included a public outing during week two (Figure 1).

Measures

Questionnaires

Questionnaires covered demographics (including military service, deployment history, current PTSD treatments, and experience with dogs and pets, expectations/interest in the study), treatment feasibility, and outcomes. Primary and secondary outcomes were measured pre and post-treatment (see Table 3 for descriptive statistics). Group differences along demographics and symptom measures were not statistically significant (p 's > 0.05) at baseline.

Primary outcomes included the PCL-C (Weathers et al., 1993), a 17-item scale reflecting the symptoms of Posttraumatic Stress Disorder in the DSM-IV ($\alpha = 0.91$); the Pittsburgh Insomnia Rating Scale (PIRS: Moul et al., 2002), a 20-item questionnaire designed to assess sleep quality and difficulty ($\alpha = 0.90$); the Perceived Stress Scale (PSS: Cohen et al., 1983), a 10-item measure that assesses overall stress ($\alpha = 0.83$); the Patient Health Questionnaire-9 (PHQ-9: Kroenke et al., 2001), a 9-item measure of depressive symptoms ($\alpha = 0.90$); the Patient Health Questionnaire-15 (PHQ-15: Kroenke et al., 2002), a 15-item measure of somatic symptoms ($\alpha = 0.82$); the Profile of Moods States (POMS: Baker et al., 2002), a 37-item

Table 2. Participant characteristics (% or mean \pm SD).

Variables	Total ($n = 29$)	Waitlist Control ($n = 17$)	SDTP Treatment ($n = 12$)
Age, y	32 (7)	33 (8)	31 (7)
Male, n (%)	72%	64%	83%
Ethnicity			
African/Black	14%	12%	17%
Hispanic/Latino	10%	6%	17%
Caucasian/White	55%	71%	33%
Other or biracial	21%	12%	32%
Military Experience			
Duration of service, y	12 (7)	12 (7)	11 (7)
Sustained hostile fire	86%	82%	92%
Sustained head injury	59%	59%	58%
Number of previous combat Deployments (median)	2	2	3
Days since last PTSD diagnosis			
≤ 2 months	38%	29%	50%
2–3 months	31%	35%	25%
> 3 months	31%	35%	25%
Reasons for volunteering in study			
Spend more time with dogs	55%	65%	42%
Learn more about communicating with dogs	55%	53%	58%
Help train dogs to serve a fellow wounded warrior	69%	77%	58%
Explore alternative PTSD treatment modalities	93%	88%	100%

Table 3. Means (and standard deviations) of outcomes for the SDTP treatment and waitlist control groups at baseline and post-treatment.

Primary Outcomes (theoretical range)	SDTP Treatment		Waitlist Control	
	Baseline (n = 12)	Post-Treatment (n = 9)	Baseline (n = 17)	Post-Treatment (n = 11)
PTSD (PCL-C; 17–85)	60.1 (12.4)	58.1 (9.5)	61.5 (13.3)	63.3 (12.0)
Intrusive Thoughts (5–25)	17.8 (4.7)	16.1 (4.5)	19.5 (3.9)	19.3 (4.7)
Avoidance (7–35)	24.8 (5.8)	24.0 (5.4)	24.4 (7.0)	26.3 (5.8)
Hypervigilance (5–25)	18.9 (3.1)	18.7 (2.0)	18.9 (3.9)	19.4 (4.3)
Insomnia (PIRS; 0–60)	39.2 (12.6)	39.6 (8.8)	41.8 (7.8)	43.3 (10.0)
Stress (PSS; 0–40)	27.0 (3.2)	23.1 (6.7)	24.6 (3.8)	24.6 (3.8)
Depression (PHQ9; 0–27)	17.6 (5.6)	16.3 (5.6)	14.9 (7.1)	15.8 (5.5)
Anxiety (PHQ15; 0–30)	12.7 (6.2)	12.7 (3.7)	11.5 (5.0)	11.5 (3.4)
Secondary Outcomes				
Resiliency (CD-RISC; 0–100)	53.3 (19.6)	59.2 (10.8)	59.8 (11.7)	59.8 (9.2)
Social support (MOS; 0–76)	57.9 (19.1)	68.7 (10.4)	63.7 (20.6)	67.0 (21.7)
Mood disturb (POMS; 0–148)	40.6 (29.7)	43.2 (21.6)	38.5 (33.1)	47.5 (32.3)

survey that asks participants to rate adjectives to describe how they currently feel “right now,” and which yields a total mood disturbance score based on negative moods (i.e., fatigue, depression, anger, confusion, vigor, tension) and positive moods (i.e., vigor; $\alpha = 0.96$); the Connor-Davidson Resilience Scale ($\alpha = 0.91$) (CDRISC: Connor & Davidson, 2003); and a social support scale capturing different aspects of social support (emotional/information, tangible, affectionate, and positive social interaction; Medical Outcomes Study-Social Support ($\alpha = 0.96$) (MOS-SSS: Sherbourne & Stewart, 1991). For the MOS-SSS, participants are asked how often they can turn to 19 different sources of support should they need it, including support that is emotional/informational (e.g., “Someone to confide in or talk to about yourself or your problems”), tangible (e.g., “Someone to prepare your meals if you were unable to do it yourself”), affectionate (e.g., “Someone to love and make you feel wanted”), and positive and social (e.g., “Someone to have a good time with”).

Qualitative interview

Semi-structured interview questions were developed to assess the SDTP experience and inquire how participants incorporated dog training skills into their daily lives. The interview used open-ended, non-leading questions. Each 30–60 minute interview was audio-recorded and transcribed for thematic analysis.

Statistical analysis

Quantitative analysis

Descriptive findings from a custom treatment expectation questionnaire are summarized narratively. Given the pilot study format, inferential statistics have questionable value (Abbott, 2014), although summaries of

effect sizes and their confidence intervals are useful for summarizing results and planning future research. For symptom measures, effect sizes were calculated using a bias-correction based on the sample size, and with 95% confidence intervals. For post-treatment between-group effects, Hedge’s g was calculated with confidence interval using a non-central t -distribution (Goulet-Pelletier & Cousineau, 2018); for pre-post group changes, we used Cohen’s d with confidence intervals estimated using Cousineau and Goulet-Pelletier’s recent “lambda-prime” formula (Cousineau & Goulet-Pelletier, 2021).

Qualitative analysis

We were interested in the lived experiences of the participants as they were in the SDTP session. We allowed the participants to describe their experiences after taking part in the SDTP sessions. The experiences were still rich in the consciousness of the participant and the engagement of these experiences led to the development of rich descriptions in the interview. In this way, the participant’s experience with the SDTP is highlighted and emphasized. Descriptive Phenomenology Theory was used to interpret participants’ viewpoints and experiences with the SDTP sessions, and to bracket our biases. We followed the stages process (Giorgi, 2009): 1) a thorough reading of each transcript; 2) breaking and organizing data by translating meaning units into units of psychological experience through coding; and 3) summarizing data involving units of psychological experience. In this way, the researchers were not biased in interpretation of the interviewed product. These themes are depicted below using participant quotes from the interviews, which have been edited for readability (full unedited quotes are provided in Appendix).

Results

Expectations

For all participants, expectations prior to starting the SDTP treatment were high. After they were told about the SDTP, but before they were randomly assigned to their treatment group, participants were given a survey about their treatment expectations. Twenty-eight percent reported that the SDTP was “very logical”; 31% reported that the SDTP seemed “very successful” in raising the quality of their functioning, and 41% were “very confident” that they would recommend the SDTP to a friend with similar problems. After the SDTP intervention, 75% of the SDTP group completed a post-evaluation survey, which had similar questions as the treatment expectations survey. Most of the SDTP group participants had minor increases in expectations after the last SDTP session compared to their pre-SDTP expectations. However, two participants did express a decrease in their expectations that the treatment would produce improvements. Following the SDTP, all participants were “confident” that they would experience at least a 20% improvement in function if given the opportunity to continue participating.

Quantitative results

For self-reported outcomes, between and within-SDTP group effect sizes were mostly in the expected directions, demonstrating a pattern of lower post-study symptom scores in the SDTP group than in the waitlist group, and within-group (i.e., pre to post) improvements in the SDTP group but not in the waitlist group (Table 4). Between-group effect sizes were either modest (PTSD, sleep, stress) or minimal (depression, anxiety, social support, mood disturbance). Within-SDTP group effect sizes tended to be large (stress, PTSD symptoms, depression, sleep, resiliency) or modest (resiliency, mood). In

contrast, for the waitlist group, minimal pre to post changes were observed, with the largest changes being a modest decrease in intrusive symptoms and modest increase in anxiety.

Qualitative results

Four major themes emerged from the participants' experience with the SDTP: (1) Participants interest to take part in the study, (2) perceived view on the feasibility, frequency, and duration of the training program, (3) mental processes, and (4) social interactions.

Interest to take part in the SDTP sessions. Participants reported taking part in the study because they wanted to experience an alternative modality of treatment different from the conservative therapies that seemed to be ineffective. One reported being interested in the study because it “*seemed like nothing was going right.*” Another was interested due to “*suffering from panic attacks, lack of sleep, and night terrors. Going through therapy can only do so much. For a lot of people [affected by PTSD], especially Veterans, it [isolation] turns into a habit that becomes worse and worse. If you don't break that habit then nothing good is going to come out. I felt that doing this program, is giving things a chance.*”

Feasibility, frequency, and duration of sessions. Most participants reported that the first SDTP session was in some ways challenging. “*Trying to get the dog to pick one item and then bring it back to me was difficult. She had four things to choose from and one we had always used. I was having a hard time getting the dog to pick out the right object to bring back.*”

“*It's challenging because you want the dog to do whatever you say but you've got to find different ways to reinforce it and it takes all your attention. Focusing on*

Table 4. Between- (Hedge's g) and within- (Cohen's d) group effect sizes with 95% confidence intervals.

Primary Outcomes	Between Group	Within Group	
		SDTP ($n = 9$)	Waitlist ($n = 11$)
PTSD (PCL-C)	-0.45 (-1.47, 0.45)	-0.64 (-1.54, 0.27)	-0.08 (-0.58, 0.42)
Intrusive	-0.66 (-1.72, 0.23)	-0.78 (-1.55, 0.01)	-0.27 (-0.82, 0.30)
Avoidance	-0.23 (-1.21, 0.69)	-0.29 (-1.15, 0.58)	0.02 (-0.46, 0.49)
Hypervigilance	-0.19 (-1.16, 0.73)	-0.77 (-1.48, -0.04)	0.02 (-0.29, 0.34)
Insomnia (PIRS)	-0.37 (-1.38, 0.53)	-0.40 (-0.98, 0.21)	0.09 (-0.61, 0.80)
Stress (PSS)	-0.31 (-1.38, 0.53)	-1.31 (-2.17, -0.42)	0.14 (-0.53, 0.81)
Depression (PHQ9)	0.09 (-0.84, 1.05)	-0.54 (-1.24, 0.19)	-0.18 (-0.77, 0.41)
Anxiety (PHQ15)	0.05 (-0.89, 1.00)	-0.26 (-0.72, 0.21)	0.29 (-0.53, 1.11)
Secondary Outcomes			
Resiliency (CD-RISC)	0.06 (-0.88, 1.01)	0.60 (-0.18, 1.35)	-0.14 (-0.96, 0.69)
Social support (MOS)	0.09 (-0.84, 1.05)	0.60 (-0.07, 1.25)	-0.20 (-0.66, 0.27)
Mood disturb (POMS)	-0.14 (-1.11, 0.78)	-0.12 (-1.18, 0.95)	0.14 (-0.19, 0.46)

Effect sizes are either Hedge's g (between) or Cohen's d (within-group), as explained in methods. Negative values indicate decreases in scores relative to waitlist or baseline conditions.

that dog [not past experiences] and trying to figure out 'how do I communicate what I want this dog to do?' Then once they do it, you have this good feeling."

All but one participant had grown up with family dogs. No one had ever trained a dog and participants did not realize they could communicate so effectively with a dog. They also realized the responsibility of helping this dog become a successful service dog. It took participants a few sessions to remember and competently execute the training instructions. As the dogs grew to recognize and respect them, participants reported feeling joy and satisfaction. Most reported that by the sixth session, they felt a synchronicity with the dog that was very rewarding to both them and the dog. Eight participants said they would prefer if they could have more and longer SDTP sessions. "Every second with the service dogs was productive. There wasn't a time where I felt like this is taking so long. I wish this could be all day." "Every day I look forward to coming here and I want to continue doing this."

They also recommended continuing the program within the DoD: "I think that this treatment is effective. The DoD should take advantage of it to prevent suicide in the military. Although they [service members with PTSD] might not want to socialize with a human, if they could socialize with an animal that can brighten their day, then that would be effective."

Mental processes. Several participants reported having a positive experience with the SDTP sessions. They found the training sessions to be very informative and to effectively remove feelings of isolation. Participants reported more self-confidence, which they related to the dog listening to them. They were able to think and rationalize better emotionally: "If I have a day where I'm depressed or upset, when I went to work with Derrick [the dog], I noticed a change in my behavior. I wasn't in that state of mind anymore. It got me out of it. It helped me rationalize my situation. So it did help with my behavior." Study participants expressed feeling that being with the dog helped to take their minds away from graphic things in the past. Participants reported feeling less anxious, more relaxed, and happy: "My moods have changed when I am with Travis [the dog]. I can't wait to see Travis and that helps because I have major depression." Additionally, some participants experienced improved relationships with their spouse and children. "I've learned that I don't need to worry about other people so much; that I need to fix myself in order to have a better life because other people don't want to be around me when I'm a negative, nasty person. And I know that's what my wife was talking about this morning when she said it's helping. I told her, 'That means more to me than you telling me you love me.'" Another

participant incorporated the SDTP listening and communicating skills at home. He related learning not to repeat commands to the dog, but instead to wait a few seconds to see if the dog would respond. He now used the "3-second rule" to communicate more patiently with his children. He also listened more when his wife spoke to him instead of tuning her out. The 3-second rule helped him control his anxiety as well: "I used to be very snappy, just negative with my wife and I'm a nicer person . . . the house is a happier place because people aren't walking on eggshells, wondering when dad's going to start yelling . . . I have that 2-3 second pause now, where before it would be, bam!"

Social interactions. SDTP session field trips required participants to train dogs in public settings, thereby providing social well-being associated with various aspects of the intervention. Participants reported not worrying whether something bad would happen in crowded places and were able to comfortably greet strangers. Some reported that the dog acted like a buffer to the environment: "If I have to go anywhere, I'm more into my surroundings – everything that's happening, what people are doing, whether they're in front of me or behind me. But the dog was a distraction. It had me concentrate more and focus on him and his well-being [rather] than what was going on around me."

Another reported, "There are times where I can't stand younger children because I really don't like it when they run across me. It almost frightens me and I don't like being taken by surprise. So on the civilian side, if I were to go to a shopping mall and a child would do that, [it] would put me in a panic attack. But when I was with Derrick the dog and children came up because they wanted to pet Derrick, I didn't go into a panic attack, so I know that it does work."

Another participant reported being able to reconnect with friends and felt increased social support after the SDTP sessions: "I disconnected with a lot of people and I realize that. So I've tried to reconnect with a few of them. I'm still extremely guarded but I'm trying to push through it. . . . My good friend from the gym – I do jiu-jitsu – I've relied on her a lot and been really open with her. She makes sure I'm at the gym every day and checks in on me a lot. A couple of guys at the gym said I seem to be happier lately. I don't know how they can tell but [they] said I look good lately."

Another reported moving past fears of distrust of others after the two weeks of SDTP sessions: "I had two Afghan nationals in my class. If I attended class right after my deployment, I don't think that I would have reacted very well towards them. . . . Going through this treatment right now, even though I didn't like them

being in the class, I still gave it a chance. I even try to talk to them. . . . With the two weeks I noticed that I was friendlier. I just put a smile on my face. I did notice that working with Derrick [the dog], I was able to change my mood and how I approached certain people.”

Discussion

Among the SDTP group, all who completed it (ten of twelve) reported satisfaction with the program and that they would or had already recommended it to others. The results in Table 4 provide a sense of the direction and variability of primary and secondary self-report outcomes. Average effect sizes were in the range generally seen in clinical trials of first-line PTSD treatments (e.g., ~0.4–0.6; Steenkamp et al., 2015), although the small sample and large confidence intervals makes direct comparisons difficult. Results from qualitative interviews with participants in the treatment group indicated that patients had strong and positive responses to the program.

Many other providers have reported the potential therapeutic effects of the dog-training and patient-dog bonding processes on the symptoms of PTSD; while our study was underway, four other service dog trials of Veterans with PTSD were published (Bergen-Cico et al., 2018; Kloep et al., 2017; O’Haire & Rodriguez, 2018; Whitworth et al., 2019; Table 1). These studies have all demonstrated positive and moderate effects of service dogs on PTSD symptoms. Our study contributes to this evidence-base, and is unique in: testing a much shorter and focused (content-wise) intervention; randomly assigning subjects to a waitlist control; offering the meaningful purpose of helping a fellow Veteran; and including semi-structured interviews.

Qualitative results were particularly insightful to learn more about how dog training may improve PTSD symptomatology. In training, SMs must confidently and calmly lead their dogs into a busy public setting, which challenges them to remain in the moment, see the world through their dog’s eyes, and cope with events that might otherwise trigger fear and anger. We suspect that these exercises serve as finite stress-exposures and help SMs form a social connection – both are core or peripheral factors in many primary PTSD treatments (Schnyder et al., 2015). The SDTP provides these psychosocial opportunities while externalizing the SM’s attention to the dog’s point of view and offers a tangible and rewarding end goal. These exercises may be reinforced by the calming effects of interacting with dogs (Gee et al., 2021) and by dogs’ potential to provide non-judgment social support (Brooks et al., 2018). As demonstrated in the qualitative results, there was a problem-solving component to

training the dogs, and some exercises were challenging to the SM. Nonetheless, SMs reported that they were satisfied with the SDTP, they looked forward to sessions, and some had applied lessons learned from the training techniques or from the social connection to other areas of their lives. Some patients even reported what could be considered therapeutic breakthroughs regarding their relationships or patience to deal with stress. These benefits occurred despite not focusing on trauma – a central component of many first-line PTSD treatments (Schnyder et al., 2015), which, although important, is at times met with resistance (Guideline Development Panel for the Treatment of Posttraumatic Stress Disorder in Adults, 2017).

Many of the themes from our qualitative analysis reflect those reported by SMs in written survey responses after a 12–18 month AAT protocol (Bergen-Cico et al., 2018). These processes and effects likely occur to some degree in other AAT treatments. Other AAT treatments also often include many other goals (e.g., preparation for dog-ownership, O’Haire & Rodriguez, 2018), components (e.g., psychoeducation, Kloep et al., 2017), and modalities (e.g., group format, Whitworth et al., 2019). Compared to those programs, our SDTP intervention had a much lower time-commitment and the breadth of content was narrower. As such, our findings support the potential of integrating similar dog-training sessions into larger treatment programs with other components. The exercises in the SDTP also provide a way to “disguise” mental healthcare to the Veterans (Wynn, 2012), and potentially supply “quick wins” outside of the confines of traditional PTSD treatments or longer and more time-consuming treatment protocols.

Future research should investigate the “dosing” and scheduling of dog training programs, along with continuing to study long-term effects. Even if these sorts of interventions do not emerge as mainline PTSD treatments, they might provide relatively quick and low-risk improvements for patients struggling through treatment.

Limitations

The study is limited by the sample size as well as participant retention. It was often challenging to schedule SDTP and data collection sessions due to participants’ schedules. Although participants were able to continue with their existing therapies and treatments while they were in the SDTP sessions, we attempted to distinguish the SDTP effect from their standard treatment by including a “Treatment Only” control group. However, it was difficult to get the control group to return to complete the post-treatment assessment. We did not investigate the effect of

the SDTP trainer on participant experiences, which may be important for future work seeking to standardize these types of treatments. Furthermore, low support from the clinical referral, a common problem in clinical studies, hindered timely and full participant recruitment, even for our modest goals. Future studies might have more success with direct participant recruitment.

Conclusions

The current study shows that the SDTP offered acute beneficial experiences for the participants, as depicted in qualitative responses to the treatment and, to a lesser degree, in symptom and quality of life surveys. As such, we believe that this study contributes to the evidence demonstrating the potential for service dog training treatments of as little as a few weeks to serve as an adjunct for patients undergoing other therapies.

Data availability statement

Data were collected under a DoD research protocol. De-identified data can be shared upon contacting the author and forming a data sharing agreement with the institutions.

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