A RISK-BENEFIT ANALYSIS OF SERVICE DOG USE IN TREATING VETERAN PTSD PATIENTS

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Posttraumatic stress disorder (PTSD) can be defined as a debilitating chronic "disorder of pathological fear learning" (Sumner & Edmondson, 2018). Moreover, individuals develop PTSD after experiencing highly stressful (often life-threatening) incidents, so not surprisingly, many PTSD patients are veterans (Sumner & Edmondson, 2018). Currently, the PTSD treatment landscape is diverse, with guidelines from organizations like the American Psychiatric Association (APA) and the Veterans Health Administration and Department of Defense (VA/DoD), including both pharmacological and psychotherapeutic approaches (Watkins, Sprang, & Rothbaum, 2018). Medications frequently prescribed to treat PTSD include Sertraline, Paroxetine, Fluoxetine, and Venlafaxine, while common psychotherapeutic approaches are Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), and trauma-focused Cognitive Behavioral Therapy (CBT) (Watkins, Sprang, & Rothbaum, 2018). Notably, all three of these psychotherapeutic methods are "trauma-focused," meaning that they involve directly addressing the individual's memory of the traumatic event he or she experienced (and/or the emotions the event caused) (Watkins, Sprang, & Rothbaum, 2018). In the last few decades, another potential PTSD therapy has emerged: PTSD service dogs (PSDs). Interestingly, many clinical trials and literature reviews suggest that PSDs facilitate significant symptomatic improvement among veteran PTSD patients. Nevertheless, the challenges associated with implementing PSDs in this population combined with the questionable validity of the supporting studies indicate a need for more empirical evidence before making service dogs a first-line PTSD treatment.

A PSD differs from an emotional support or therapy dog largely because of its training; PSDs must undergo training to perform a range of tasks relevant to the psychological needs of a PTSD patient (O'Haire & Rodriguez, 2018). For example, a PSD may be trained to identify episodes of panic, to subsequently distract the veteran from panic, to accompany the veteran in

public (increasing his or her sense of safety in the public setting), and to awaken the veteran from nightmares (O'Haire & Rodriguez, 2018). Beyond specific tasks, a PSD may play the important role of "instilling a sense of confidence, safety, and independence in the veteran on a day-to-day basis" (O'Haire & Rodriguez, 2018). Due to the rigor of their training, as well as their clinical importance, PSDs are typically allowed in public by law. For instance, in the United States, the Americans with Disabilities Act (ADA) grants PSDs full public access (O'Haire & Rodriguez, 2018).

PSDs provide a wide variety of symptomatic improvements to veterans suffering from PTSD. A 2018 qualitative study found that PSDs can help decrease the hypervigilance (a heightened sensory 'awareness' or sensitivity that aims to detect movement or activity) that is characteristic of PTSD (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). One subject in the study explained:

> "He'll always put his head on my foot, and so I can relax until the weight of his head comes up. And then I'll know that there's someone entering the room. And I'll look to see. That way I don't have to be as alert. I don't have to be keeping my eyes open and watching all exits and entrances and stuff, because he always does that, because as an animal, he's always on alert. Even when his eyes are closed. So it takes away my need of being alert, a lot of the time." (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018)

PSDs, by nature, keep watch so their veteran companions can take a break from doing so. In decreasing hypervigilance, PSDs can mitigate the consequences this symptom has on veterans' daily lives, improving relationships and the ability to work and sleep (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). The symptomatic improvements PSDs provide,

however, extend beyond decreased hypervigilance. In the same 2018 study, many subjects referenced the improved sleep quality and duration PSDs facilitate. As many PTSD veterans experience nightmares that cause them to move and call out, PSDs are trained to recognize this movement and sound as abnormal and to respond by awakening the veteran. One subject described:

> "Once the dream starts I know I'm moving in my sleep. And I know I'm yelling out. And that's what he reacts to. He's like, wait a minute, something's wrong. And he's putting his cold nose right on my neck and it wakes me up." (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018)

Of course, improved sleep quality and duration can then facilitate other physical and psychological benefits in the patient.

Aside from improving hypervigilance and sleeping habits, PSDs can help veterans 'stay present' and avoid flashbacks of traumatic events. Some PTSD veterans claim that their PSD simply poking their hand with an (albeit slobbery) nose can prevent reexperiencing trauma (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Other veterans cite a similar phenomenon, whereby the PSD's physical presence and contact creates a calming and grounding effect. Researchers from the previously mentioned 2018 study summarize: "Veterans felt dogs could perceive escalating anxiety, even before the owner noticed physiological or psychological cues. Veterans increasingly relied on their dogs to sense changes in affect and disrupt cascading PTSD symptoms" (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018).

Fascinatingly, PSDs can also mediate reconnection between PTSD veterans and their loved ones. In fact, PTSD veterans commonly experience avoidance symptoms, that is, "feeling distant from others, distracted, emotionally numb, and generally shut down" (Yarborough,

Stumbo, Yarborough, Owen-Smith, & Green, 2018). Fortunately, PSDs can help bridge the gap between veterans and their family members that such avoidance symptoms forge. One veteran participant in the 2018 study explained:

> "It got to a point where I couldn't be close or affectionate to my wife. I couldn't give my kids a hug. Because [Dog is] always reaching to me with her paw, I'm forced to grab her paw. She loves her paw scratched. And by knowing how good that makes me feel, and how relaxed it makes me feel, it helped me to be affectionate to my wife and kids." (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018)

Clearly, PSDs, in aiding this reconnection, serve not only their direct owners, but also their relatives and friends.

The symptomatic benefits PSDs provide to their owners may be expected, but perhaps more surprising are the advantages PSDs provide *outside* of the scope of PTSD symptoms. Firstly, PSDs can increase a veteran's engagement with the community. A 2018 literature review uncovered that "dog ownership … increases social connections within the community and expands the support network for individuals over that of nonpet owners" (Hoisington, et al., 2018). Importantly, the authors of this review then emphasize that this increased involvement with the community (and resulting support network) improves mental health outcomes and decreases loneliness for PTSD patients (Hoisington, et al., 2018). Additionally, owning a PSD may encourage the veteran to exercise more frequently, directly influencing his or her wellbeing. Researchers of this same literature review summarized, "dogs can also directly influence mental health through a variety of ways (increased social connections, exercise, green space exposure, etc.)" (Hoisington, et al., 2018). Thus, PSDs positively contribute to their owners' wellbeing in addition to providing PTSD symptomatic support.

Perhaps the most serendipitous asset of PSDs is their potential to alter the human microbiome, culminating in positive effects on mental health through the brain-gut axis. Recall that every person is host to 10 trillion - 100 trillion bacteria and picks up more from the environment each day (Hoisington, et al., 2018). More specifically, the microbes forming the human microbiome can be acquired via human-to-human transfer, from the outdoors, from the "built environment" (indoors), and from animals, like *dogs* (Hoisington, et al., 2018). Notably, dogs not only contribute their own bacteria, but also carry outdoor and built environment microbes, thus increasing microbial exchange and exposure among humans (Hoisington, et al., 2018). Furthermore, the increased "bacterial richness in homes with dogs compared with those without dogs" (Hoisington, et al., 2018) observed is partially due to the fact that dog ownership increases the time that humans spend outdoors and with other humans (both of which increase acquisition of bacteria for the human microbiome) (Hoisington, et al., 2018).

Dogs' capacity to change the human microbiome is relevant to this discussion of PTSD, because we are currently experiencing a rise of inflammatory disorders-a category into which PTSD falls (Hoisington, et al., 2018). In Western societies, research suggests that individuals' immune systems undergo insufficient exposure to microbial diversity, causing a bias towards launching an immune response: a proinflammatory bias (Hoisington, et al., 2018). Moreover, many experts in this field uphold the 'Old Friends Hypothesis,' which postulates that people in Western societies are no longer in contact with the germs (or 'old friends') with which humans co-evolved and which used to suppress the human immune response (Hoisington, et al., 2018). Thus, individuals nowadays harbor an imbalance of the immune system, and this imbalance (and the resulting inflammation) are related to several psychiatric disorders, including PTSD (Hoisington, et al., 2018). In fact, in soldiers, higher levels of the inflammatory marker C-

reactive protein (CRP) in the blood predicts PTSD development (Hoisington, et al., 2018). Likewise, a 2017 study illustrated that PTSD patients have abnormally low counts of microbial species (Actinobacteria, Verrucomicrobia, and Lentisphaerae) that act as immunoregulators (Hoisington, et al., 2018). Evidently, a proinflammatory bias increases one's risk of PTSD.

Of course, prior scientific studies have already demonstrated the link that exists between the human microbiome and mental health. For example, researchers have shown that chronic, mild-moderate inflammation negatively impacts one's psychological wellbeing (Hoisington, et al., 2018). Curiously, in carrying 'old friend' germs, dogs (really all dogs, but most importantly PSDs) may restore immune system regulation in their human companions, improving mental health outcomes (Hoisington, et al., 2018). However, more research surrounding the validity of the 'old friends' hypothesis and its applicability to PSDs and PTSD veterans is needed. For instance, many of the studies supporting the claim that household dogs increase microbial diversity assume exposure to the dog(s) starts in infancy, but PTSD veterans are, obviously, adults. Thus, it is unclear as to whether the increased microbial exposure which would result from a PSD would provide the same immunoregulatory benefits as shown in these (early developmental) studies (Hoisington, et al., 2018). In addition, any further research into this topic must consider that PTSD veterans tend to spend more time inside the home (or built environment) and less time outdoors, leading to less bacterial exchange than the average adult has (Hoisington, et al., 2018). Nevertheless, PSDs' ability to increase diversity in the human microbiome (mitigating any proinflammatory bias) and consequently improve the mental health of PTSD veterans proves to be a fascinating result of human-dog companionship-one researchers must explore further.

Despite PSDs' promising outlook in the PTSD treatment landscape, significant challenges to implementing PSDs must be addressed. Firstly, the logistics of matching PSDs with veterans in need requires some thought. Many veterans join waiting lists for PSDs with inaccurate expectations, not fully anticipating the burdens dog ownership carries. A trainer from a PSD training organization describes, "veterans routinely [have] high expectations for service dogs and sometimes [underestimate] the level of work which training [requires]. As such, accurate expectation-setting is necessary from the beginning" (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Apart from unrealistic expectations, in matching PSDs to veterans, the unique circumstances of the veteran must be taken into account. In other words, the capability of the veteran to train and care for the dog must be sufficient for the pairing to be successful. Put simply by one PSD trainer, "Someone who says they can't get out of bed, or don't ever leave the house, is probably not a good fit. Having a dog is a lot of hard work. A highly trained dog can revert to a pet" (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Unfortunately, although clinical assessments of PTSD veterans can shed light on their fitness to care for a dog, some PSD trainers surveyed "expressed frustration that most clinicians fail to filter patients who are not ready or suitable for a dog," (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018) likely because of a lack of understanding as to what dog ownership and training entails. Undoubtedly, the placement of PSDs into veteran homes requires accurate expectation-setting and adequate (physical and mental) functionality among the veterans.

Another barrier to PSDs becoming a first-line PTSD treatment is cost; many veterans, especially those living on disability income, may not be able to afford the expenses associated with dog ownership. Oftentimes, veterans must cover the cost of travel to and from training

sessions in addition to the supplies necessary to care for the PSD long-term (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Fortunately, many PSD training organizations do not charge veterans for the PSDs themselves or the cost of training (estimated at $20,000 - $35,000 per dog) (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Regardless, "Initial costs of owning a service dog can be substantial and may be a hardship for veterans living on disability income" (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018).

Beyond the messy logistics of matching and financial requirements, there are also some unexpected challenges to PSD implementation. For example, many veterans with PSDs report that training causes stress and fatigue (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). In fact, in PSD training sessions, veterans must learn approximately seventy distinct commands spanning positioning, retrieval, tasks, and emergency actions (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). One veteran explained the difficulty of this process, claiming "[Learning the commands was] hard. I don't have a lot of short term memory. So I had to practice, practice, practice to keep it in my head" (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Furthermore, PSDs, when considered a clinical PTSD treatment, involve a therapeutic delay (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). This therapeutic "delay" may be due to the subtlety of the PSD's actions; because PSDs serve their owners with delicate gestures (like nudging the veteran when he or she starts to become anxious, and standing in between the veteran and a person he or she distrusts), the therapeutic effects (or benefits) of PSD use are not always immediately clear (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Moreover, introducing a PSD into a veteran's home may impact the veteran's entire family--especially his or her caregiver. Not surprisingly, when a

caregiver is accustomed to providing substantial care to the veteran, it can be difficult for this caregiver to experience a role shift as the veteran becomes more dependent on his or her PSD (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). Finally, a veteran's first attempts to use a PSD in public can further overwhelm individuals who already feel uncomfortable in public (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018). More specifically, a PSD's presence can generate unwanted attention from others as well as unwanted (potentially anxiety-inducing) questions from others (Yarborough, Stumbo, Yarborough, Owen-Smith, & Green, 2018).

Ultimately, the rapidly emerging PSD healthcare niche remains misunderstood; more empirical research must be undertaken to fully grasp the advantages and drawbacks of PSD use in PTSD veteran patients. First and foremost, "rigorous randomized controlled trials comparing veterans who receive service dogs with those who do not are due" (Stumbo & Yarborough, 2019). As well, future research into PSD use must control for confounding variables like self-selection bias and veterans' excessively positive expectations of PSDs in order to preserve validity (Stumbo & Yarborough, 2019). Furthermore, the studies and reviews currently available on PSD effectiveness are largely limited by small sample sizes (Hoisington, et al., 2018). Thus, there is a general need for studies with larger, more representative samples of PTSD veterans (with and without PSDs). There is also an acute need for studies investigating dog safety in PSD-veteran pairings (Hoisington, et al., 2018). A number of factors (such as mental instability of the veteran or veteran aggression) can put the assigned PSD at risk, and animal safety best-practice thus necessitates research in this area of animal wellbeing (Hoisington, et al., 2018). Overarchingly, PSDs represent a fascinatingly unique therapy option for PTSD veterans, but their novelty mandates further research.

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