

# The Effects of Animal-Assisted Therapy on Wounded Warriors in an Occupational Therapy Life Skills Program

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## ABSTRACT

Animal-assisted therapy (AAT) has gained much attention in civilian and military health care. Evidence supports its benefits with varied populations with diseases and disabilities, but no research has been done with injured or ill service members. This pretest, posttest nonrandomized control group study evaluated the effects of AAT on Warriors in transition (N=24) attending an Occupational Therapy Life Skills program with the long-term goal of improving their successful reintegration. Although significant differences were not found between the groups on most measures, anecdotal reports by participants and observers indicate that participants eagerly anticipated being with the therapy dogs, expressed pleasure and satisfaction with the experience, and regretted seeing it end. There were significant correlations between mood, stress, resilience, fatigue, and function at various measurement points. This is the first study to formally assess the benefits of AAT with wounded service members in garrison. Suggestions for future research are provided.

Since 2007, the US Army has managed the care of several thousand service members (SMs) with injuries and diseases through the US Army Wounded Warrior Program.<sup>1</sup> A major component of the Wounded Warrior program are the Warrior Transition Units (WTUs) located throughout the country. There are currently 29 Army installations with WTUs whose members have polytraumatic injuries with combined diagnoses including traumatic brain injury, posttraumatic stress, depression, burns, and limb amputations. Because of the complexity of these diagnoses, SMs may remain on active duty within the WTU for many months, up to 2 years, pending resolution of medical and other issues. It is the duty of SMs to heal, followed by either return to active duty or transition to veteran status. While at a WTU, SMs receive many services including Occupational Therapy (OT) Life Skills programs.

According to the Office of The Surgeon General, occupational therapists primarily provide services to wounded Warriors in transition (WTs) during the rehabilitation phase of the comprehensive transition plan with overlap in the earlier phases of assessment and goal setting.<sup>2</sup> According to this plan, the role of the occupational therapist and certified occupational therapy assistant is to:

assess all WTs and provide functional interventions as needed to improve WTs' physical, cognitive, psychological/behavioral, and vocational capacity to perform daily self-care, work and leisure activities. Occupational therapy services include professional interventions to promote WT goal setting, life skills development, advanced educational classes, consultation and coordinator for work rehabilitation, community and work reintegration activities.<sup>2(p1)</sup>

It is the goal of the OT Life Skills program to support the reintegration of WTs, either within the Army or in their return to civilian life. Interventions by occupational therapists in WTUs have primarily focused on life skills and work reintegration programs. The programs typically facilitate development of abilities in daily organization and time management; personal health including sleep, medication management, healthy eating and avoiding addictions; stress management and relaxation techniques; leisure exploration and development; communication and relationships; conflict resolution skills; money management; career exploration and planning; educational, prevocational and work readiness training; and vocational reintegration. Intervention strategies include psychoeducational programs, activity and task analysis, compensatory cognitive retraining,

biofeedback, adaptive skills training, rehearsal, routine and habit development, personal coaching, environmental modifications, and conflict resolution.<sup>3</sup>

Historically, life skills programs have been used in the treatment of acutely and chronically ill psychiatric patients in both civilian and military settings.<sup>4-8</sup> In 1974, Army occupational therapists established a Life Skills Development Program for psychiatric inpatients at the Eisenhower Army Medical Center, Fort Gordon, GA. This program was later considered an “evolving treatment approach” in occupational therapy.<sup>5(p35)</sup> Research on life skills programs has yielded positive effects for participants. One study examined the effects of a life skills program with homeless individuals residing in shelters or supportive housing.<sup>4</sup> This unique population presents with “diverse life skill needs related to living independently”<sup>24(p190)</sup> and often displays occupational performance deficits related to finances, housing, personal care, as well as difficulties associated with satisfying their basic needs and health concerns. The life skills program was uniquely designed to meet the needs of 3 distinctively different groups: (1) homeless youth without families or employment skills, (2) female victims of domestic violence in need of finance management, and (3) individuals with mental illness in need of food and nutrition knowledge and skills. Of the 73 attendees, 32 completed the program with a resultant 20 (62%) exhibiting increased mastery scores following completion of the program of significant difference between pre- and posttest scores. In a case study of a homeless youth, life skills such as communication skills, decision making, money management, study skills, as well as aspects of work and relationships, were provided by occupational therapists.<sup>8</sup> Upon completion of the life skills program, the individual was able to successfully implement specific skills in the real world. In another study, researchers measured the impact of a 12-week life skills program, the Bridge Program, for adults with psychiatric disabilities.<sup>9</sup> The researchers noted that many individuals with psychiatric disabilities whose symptoms were successfully managed with medications still lacked the requisite knowledge, skills, and confidence to pursue and gain access to college and technical education programs. On a postintervention survey, 86% of participants indicated that the Bridge Program facilitated improvement in academic skills and preparation for future educational pursuits; 12 of the 18 participants enrolled in higher education courses.<sup>9</sup> Finally, a series of 3 life skill program modules were provided to recipients of mental health services at the Royal Brisbane and Women’s Hospital (Australia).<sup>10</sup> Modules included education on nutrition, healthy eating, and the evaluation of food labels; identification of health risk factors; and

strategies by which to increase one’s participation in social, intellectual, creative, and physical activities. Initial feedback indicated that 34 of 35 participants found the program useful, interesting and educational.<sup>10</sup>

The strategies implemented in these programs focus on skill development, adaptation or compensation; the success of these efforts often depends upon the psychological and emotional well-being of the individual service member. Warriors in Transition experience multiple stressors as they receive medical care and process information critical to their future plans. The interaction between humans and animals, primarily dogs, has been demonstrated to promote relaxation, calm, and optimism in critical care medical settings, and reduce anxiety and fear in psychiatric patients.<sup>11</sup> The Delta Society, a recognized leader and research sponsor for animal-assisted therapy (AAT), defines the treatment as “a goal-directed intervention directed and/or delivered by a health/human service professional with specialized expertise, and within the scope of practice of his/her profession. AAT is designed to promote improvement in human physical, social, emotional, and/or cognitive functioning.”<sup>212(p1)</sup> The primary ways in which AAT occurs are: (a) as companions to individuals living independently, (b) in residential institutions for companionship and stimulation, and (c) as visitors in nonresidential settings for stimulation of interaction and interest.<sup>11</sup> The preferred choice of mammal used in AAT is the canine because dogs are very social, dependent, and trainable creatures.<sup>13</sup> They should be “alert, bright, happy, healthy, and playful without being too rowdy... even-tempered, good-natured, and willing to withstand travel and environmental stress.”<sup>213(p73)</sup>

Historically, the US military has promoted the therapeutic use of animals with wounded Soldiers. In the years that followed World War I, dogs were used with psychiatric patients at St Elizabeth’s Hospital in Washington, DC.<sup>11</sup> More recently, AAT dogs have deployed with US Army occupational therapists for prevention and restoration programs as part of combat and operational stress control (COSC) units in Iraq and Afghanistan.

The mission of the COSC unit is to prevent and treat behavioral health issues while in theater. Numerous studies have reported the benefits of AAT for people with a wide range of physical and psychological stress and diseases.<sup>14-18</sup> Despite the documented use of AAT across populations and settings, much of it is descriptive and exploratory with few well-designed systematic studies which measure program effectiveness, and there have been no such studies with injured or ill service members in garrison. The purpose of this study was to determine

if WTs who participated in AAT with dogs while attending Life Skills programs had improved mood states, decreased stress levels, increased resilience, lowered levels of fatigue, and improved daily function for reintegration and transition to the next stage of their life, as compared to WTs who did not interact with dogs. The long range goal of this research is to contribute to a base of evidence for use of AAT within the military. Specifically, this study attempted to answer the following research questions:

- Are there differences over a period of 8 weeks in mood state, stress levels, resilience, fatigue, and daily function between groups following participation in the standard of care (OT Life Skills programs) with and without AAT?
- Is mood, stress, and resilience related to the level of fatigue and daily function of WTs?



Wounded Warrior interacting with a therapy dog. Photo courtesy of the authors.

## METHOD

This study employed a quasi-experimental design with a pretest, posttest, nonrandomized control group (2×3) mixed model, repeated measures ANOVA). Participants were assigned to one of two group levels, the OT Life Skills program (control) and Life Skills program plus AAT (experimental). They completed outcome measures at 3 time periods: baseline, postintervention (4 weeks after baseline) and follow-up (8 weeks after baseline). The study was approved by the Brooke Army Medical Center Institutional Review Board for the Protection of Human Subjects.

## RECRUITMENT

Participants were recruited with flyers and by invitation of WTU staff. Exclusion criteria included pregnancy, dog allergies, open wounds, previous or concurrent participation in the Cognitive Behavioral Education Strategies program, concurrent participation in the Army

Center for Enhanced Performance (ACEP) program, concurrent participation in an equine therapy program, and daily interaction with their own dog. Inclusion criteria was status as a US service member assigned or attached to the WTU, at least 18 years of age, and able to read and speak English.

## MEASURES

The measurement tools were a demographic information form and standardized assessment measures for mood, stress, resilience, fatigue, and function.

Profile of Mood States (POMS). The POMS consists of 65 descriptors which measure 6 dimensions of mood:

1. Tension-anxiety
2. Depression-dejection
3. Anger-hostility
4. Vigor-activity
5. Fatigue-inertia
6. Confusion-bewilderment<sup>19</sup>

Items are measured on a 5-point scale where 0=not at all and 4=very often. Internal consistency has been reported for all items as  $\geq 0.90$ ; test-retest reliability ranges from 0.65 for the vigor scale to 0.74 for the depression scale.<sup>19</sup> The POMS has been used with a wide range of health conditions to assess mood state.<sup>20</sup>

Perceived Stress Scale (PSS). The PSS is a widely used instrument to measure one's perception of stress.<sup>21</sup> It consists of 10 items measured on a 5-point Likert scale with responses from 0=never to 4=very often. The questions ask about one's feelings related to general stress within the past month. Internal consistency has been established with Cronbach's  $\alpha=0.84-0.86$ ; test-retest reliability ranges from 0.55-0.85.<sup>21</sup> Concurrent and predictive validity have been established to global life-event scales as a predictor of stress.<sup>21</sup>

Connor-Davidson Resilience Scale (CD-RISC). The 25 items of the CD-RISC address self-rated dimensions of the construct of resilience.<sup>22</sup> Items are scored on a 5-point Likert scale where 0="not true all the time" and 4="true nearly all the time." The total scores range from 0-100 where higher scores indicate greater resiliency.<sup>22</sup> Internal consistency ( $\alpha$  coefficient) was found to be 0.89.<sup>22</sup> Item correlations ranged from 0.30 to 0.70 and test-retest reliability yielded an intraclass correlation coefficient of 0.87.<sup>22</sup>

Fatigue Scale. The Fatigue Scale is an 11-point numeric measure where 0=no fatigue and 10=worst fatigue

imaginable. A linear numeric scale is considered to be an acceptable method for measuring a unidimensional characteristic.<sup>23</sup>

Functional Status Questionnaire (FSQ). The FSQ is a comprehensive self-report of the patient's physical, psychological, social, and role functions.<sup>24</sup> There are 28 items found in 6 subscales:

1. Basic activities of daily living (ADL)
2. Instrumental ADL
3. Psychological function
4. Work performance
5. Social activity
6. Quality of interaction

The scales have demonstrated good reliability with established construct validity.<sup>24</sup>

The Occupational Self Assessment (OSA). The OSA consists of 21 self-report items to measure perceived level of competence and values about participation in everyday activities (occupational performance).<sup>25</sup> Clients rate how well they do activities such as "concentrating on my tasks" and "managing my finances" on a 4-point Likert-type scale where 1=lot of problems to 4=extremely well, and the importance of the activity to them where 1=not so important to 4=most important. Rasch analysis has demonstrated good construct validity of the competence scale<sup>26</sup> and consistency by 90% of participants with a wide range of disabilities.<sup>27</sup>

#### INTERVENTIONS

All participants attended Occupational Therapy Life Skills classes on stress management, communication/anger management, and healthy living for a minimum of 3 and up to 6 classes. The experimental group also received AAT for 30-minute sessions immediately after each Life Skills class, each session was on a 1:1 basis with a pet therapy team (ie, a dog and its handler). The AAT intervention was as follows: the handler instructed the participant in using basic dog obedience commands such as sit, stay, lie down, sit up, shake and fetch. After the participant was successful with administering 5 commands to the dog, the remainder of the 30 minutes was spent engaging in activities of the participant's choice, such as going for a walk on the facility grounds, sitting quietly and petting the dog, brushing the dog, and teaching the dog new tricks. All AAT sessions were supervised by research staff. Fidelity checks were conducted on the AAT intervention and OT Life Skills class to ensure consistency in delivery of interventions throughout the study.

#### DATA ANALYSIS

All data analysis was performed using SPSS\* version 16.0. Descriptive statistics were used to examine the data. Assumptions of normality and linearity were evaluated and data was screened for outliers. Independent samples *t*-test and chi-square analyses were performed to examine the demographic differences between the control and experimental group. Repeated measures ANOVA was used to identify differences among baseline, post, and follow-up scores of the POMS and OSA. Friedman's repeated-measures ANOVA was done to determine differences on the PSS, CD-RISC, FSQ subscales and Fatigue scale at the 3 measurement points. Assumption of sphericity was checked using Mauchly's test. In the presence of a significant overall test, pairwise comparisons were performed with the Wilcoxon-signed ranks test, with the *P* values adjusted using the Bonferroni correction to maintain an overall 0.05 comparison rate. Spearman's rank correlation coefficient was used to examine the relationship of stress, mood, and resilience to fatigue and function at baseline, post-intervention, and follow-up.

#### RESULTS

##### Participants

Based on the inclusion criteria, 27 service members volunteered, received and signed the informed consent document, and were assigned to one of the 2 groups. Three participants were not able to complete the study and dropped out after baseline measurement; their data were not included in the final analysis. A total of 24 subjects participated in the study. Demographic information is presented in the Table.

##### Between Groups

There were no differences over a period of 8 weeks in mood state, stress levels, resilience, fatigue, and most measures of daily function following participation in OT Life Skills classes with and without ATT. Significant differences were found for 3 subscales of the FSQ (where a higher score indicates improvement); psychological function (PF), work performance (WP), and quality of interaction (QI). Friedman's test for comparison of the FSQ-PF resulted in  $\chi^2(2)=7.9$  with  $P<.05$ . Psychological function was highest at baseline and lowest at the follow-up measurement period. Multiple comparisons indicate that there were no significant differences from baseline to post-intervention measurement or post-intervention to follow-up. Friedman's test for comparison of the FSQ-WP resulted in  $\chi^2(2)=18.86$  and  $P<.000$ . Work performance was lowest at baseline

\*Statistical Package for the Social Sciences, SPSS Inc, Chicago, IL



**THE EFFECTS OF ANIMAL-ASSISTED THERAPY ON WOUNDED WARRIORS IN AN OCCUPATIONAL THERAPY LIFE SKILLS PROGRAM**

Demographics of participants in the study.		
	OT Life Skills with AAT (n=12)	OT Life Skills (n=12)
Age in years – Average (SD)	37.08 (11.79)	35.5 (9.19)
Gender		
Male	10	7
Female	2	5
Active Duty	8	7
Reserve Component	4	5
Officer	2	3
Enlisted	10	9
Months in service [average] (SD)	124.08 (107.05)	118.5 (80.849)
Number of deployments		
1	6	5
2	6	4
More than 2	0	3
Months deployed [average] (SD)	16.42 (7.513)	16.71 (8.703)
Previous dog ownership		
Yes	9	10
No	3	2
Negative experience with dog		
Yes	1	2
No	11	10
Current dog ownership		
Yes	1	3
No	11	8
Primary medical condition		
Orthopedic	5	8
Behavioral Health	3	0
Other	4	4

and highest at the follow-up measurement period with multiple comparisons indicating significant differences between those two time points. Finally, for the FSQ-QI, Friedman’s test resulted in  $\chi^2(2)=23.48$  and  $P<.001$ . Quality of interaction was lowest at baseline and highest at the follow-up measurement period with multiple comparisons indicating significant differences among all measurement periods.

**Relationships**

Correlational analysis found significant relationships as follows: between stress and fatigue (baseline,  $r=0.624$ ), stress and occupational performance (OSA) (baseline,  $r=-0.717$ ; postintervention,  $r=-0.619$ ) and FSQ-PF (postintervention,  $r=-0.849$ ), stress and FSQ-QI (postintervention,  $r=0.691$ ); between mood and fatigue (baseline,  $r=0.596$ ), mood and occupational performance

(OSA) (baseline,  $r=-0.760$ ; postintervention,  $r=-0.882$ , follow-up,  $r=-0.772$ ), mood and FSQ-PF (baseline,  $r=-0.917$ ; postintervention,  $r=-0.657$ ), mood and FSQ-QI (baseline,  $r=0.717$ ); between resilience and occupational performance (OSA) (baseline,  $r=0.734$ ; postintervention,  $r=0.961$ ; follow-up,  $r=0.845$ ), resilience and FSQ-PF (postintervention,  $r=0.755$ ).

**COMMENT**

This is the first study to examine the use of AAT in conjunction with OT Life Skills programs as an intervention for wounded service members in a garrison environment. Despite the primarily nonsignificant results, there is anecdotal evidence that supports the value of the intervention with service members. During the study, several participants reported feeling more calm and at ease after working with the dogs. In addition, “the dogs” were often a topic of conversation among participants and other service members, staff, and family members who observed the pet therapy teams. Several Soldiers informed the Warrior Family Support Center Director that they enjoyed the dog sessions, looked forward to seeing the dogs again and regretted the conclusion of the study. The Director also expressed regret when the study ended as this was the only source of AAT for Soldiers at this facility.

The significance differences in scores on 3 subscales of the FSQ are of some interest. Psychological function (PF) scores decreased (got worse) whereas work performance



**Wounded Warrior walking with a therapy dog, accompanied by a certified handler. Photo courtesy of the authors.**

(WP) and quality of interaction (QI) increased. Although it is difficult to interpret this result with any confidence given the small sample size, it may suggest that over time (ie, the 8-week duration of this study), the barracks environment and circumstances surrounding medical procedures and appointments may contribute to feelings of being “downhearted and blue,” “down in the dumps,” and “nervous” (PF items). By contrast, Soldiers in the WTU are encouraged to enroll in work-readiness programs and attend education programs that may contribute to an improvement in WP scores. They may be more confident about their work performance over time despite feeling down and more nervous. Improved QI scores may be related to the decrease seen in PF scores; as wounded service members struggle with the emotional issues associated with recovery from illness and injuries, they have more individual and group interventions with WTU staff and behavioral health providers. Thus the number of interactions increases and the Soldier consequently feels less “isolated” and “irritable,” and more likely to get along “well with other people” (QI items).

The significant relationships between stress and fatigue, occupational performance, and psychological function suggest that as levels of stress increased, occupational and psychological function decreased. This may be explained by the demands placed upon wounded service members in a WTU. They report that they are constantly asked to complete satisfaction and climate surveys which are intended for program improvement. However, this constant bombardment of Likert-type surveys is considered “annoying” and “pointless” to some of the participants in the study. Since they are mandated by their chain of command to fill out the climate surveys, some admitted to not reading the questions and just circling numbers. At least 3 participants expressed annoyance with having to fill out 29 minutes worth of surveys as part of this study. Also worth noting is that at the follow-up measurement period, 3 participants in the experimental group verbalized having “a bad week” which may have influenced their scores. The explanation for increased stress and increased quality of interaction offered earlier may apply here as well.

Regarding the relationships between mood and other characteristics, it was noted that as mood improved, fatigue decreased and occupational performance and psychological function increased. This suggests that the better one’s mood, the less feelings of being “downhearted and blue” with an improved perception of one’s ability to sustain a pattern of occupational performance (ie, “concentrating on my tasks” and “managing my finances” which are OSA items) that is productive and satisfying. The unexpected relationship between decreased

mood and improved quality of interaction may be explained as noted earlier.

The relationships between resilience and occupational performance and psychological function suggest that as one is more resilient, he or she is also more able to manage daily life and feel more “calm” and “happy” (PF items). Interestingly, resilience and improved psychological function had a strong correlation at the postintervention period and were not significant at follow-up. This finding suggests that the impact of AAT might help strengthen these short-term relationships and that time may dissipate all benefits gained from AAT. It is possible that AAT primarily brings about reminiscence and comfort due to the immediate socialization that one experiences when interacting with pets. Recollection of memories related to past personal experiences with pets may provide a transient state of emotional well-being. It has been found that pets are a source of conversation and a means for reducing irritability and decreasing withdrawn behavior.<sup>28</sup>

#### LIMITATIONS

As noted earlier, the small sample size was a limitation in this study. A power analysis was done to determine the required sample size for 80% power. To find the minimum clinical difference between groups, 50 participants were needed; 25 in each group. Thus, our study sample was too small to detect significant differences. The lack of randomization was another limitation in this study. Participants who favored dogs were more likely to volunteer for the AAT group, whereas individuals who were not partial to dogs may have volunteered for the control group. However, according to the demographics of both groups, there were no significant differences in previous and current dog ownership and history of negative dog experiences.

In spite of screening and training of pet therapy teams, differences were noted by study staff in the AAT sessions where some pet handlers were more interactive than others. This variability may have been overcome by the irregular assignment of different pet therapy teams to participants at each session; that is, no effort was made to consistently have a participant with the same pet therapy team. Thus, differences in pet teams and the handlers may not have been a factor.

In addition, treatment sessions (both AAT and OT Life Skills classes) varied in number, with a range of 3 to 6 classes. This variability in treatment could contribute to the lack of benefit associated with the interventions. Based upon earlier suggestions that AAT may have more short-term benefits, the length of time from intervention

to postintervention and follow-up measurement (4 and 8 weeks, respectively) suggests that any benefits from the interventions may have dissipated by the time of assessment. This study also exclusively used self-report measures which may not have captured immediate benefits of the intervention and were reported by some participants as burdensome to complete.

### CONCLUSION

Recognition and management of service members' behavioral health symptoms have become a priority in the Army.<sup>29,30</sup> It is now recognized as critical to the quality of life of wounded service members which must be addressed at the WTU. Other research clearly supports the use of AAT and life skills training when provided separately.<sup>9,10,14,16,17</sup> Although this study clearly comes with limitations and the results should be interpreted with caution, it is important to note that it is the first research on the use of AAT in a garrison environment with wounded service members. Future research that considers limitations noted here, especially sample size, randomization, duration of time from intervention to assessment, participant burden in assessment, and control over variability of treatment sessions should be considered. Examination of the cause-effect relationships among the variables of stress, mood, resilience, fatigue, and function would be of great benefit. A mixed method approach that gathered qualitative data could further identify and examine anecdotally reported benefits of using AAT with the military population.

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