

**Horses and Humans Research Foundation  
Final grant reporting**



**Effects of Equine Assisted Activities on PTSD Symptoms, Coping Self-Efficacy,  
Emotion Regulation, and Social Engagement in Military Veterans**

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1. Full summary of research project results and findings.

**Project Description**

The study investigated to what extent participation in a structured, six-week therapeutic horseback riding (THR) program was associated with decreased Post-Traumatic Stress Disorder (PTSD) symptoms, as well as improved self-efficacy, emotion regulation, and social engagement among veterans. Veterans were randomly assigned to participate in the six-week THR program either without a wait control period or assigned to a six-week wait control period prior to the six weeks of riding. We expected that no changes would occur during the six-week wait control period. We hypothesized that compared with their baseline levels; participants in the six-week THR program would have decreased PTSD symptoms, as well as improved self-efficacy, emotion regulation, and social engagement after the six-weeks.

Veterans, age 18 years or over, who were out of active military service (not serving in reserve units), diagnosed with PTSD/TBI or both according to ICD-9 diagnostic codes, weighed less than 250 pounds, were able to walk at least 25 feet without the assistance of a person (but potentially with assistive devices), and who were willing to interact with and ride a horse, were invited to participate in the study. A total of 40 veterans enrolled in the study. Two individuals were later excluded due to issues with their eligibility criteria, thus they did not participate in THR. Participants who were assigned to the wait control period group took part in data collection six weeks before riding, three weeks before riding, immediately before the first riding class, at week three of their riding classes, and following their final class. The treatment group without a wait control period completed

data collection immediately before the first riding class, at week three of their riding classes, and following their final class.

### **Data Collection Instruments**

Post-Traumatic Stress Disorder (PTSD) was measured using the PTSD Checklist – Military Version (PTSD; Weathers et al., 1999). It measures major symptoms of PTSD including anxiety and re-experiencing of traumatic situations. Self-efficacy was measured using the Coping-Self Efficacy Scale (CSES; Chesney, Neilands, Chambers, Taylor & Folkman, 2006). The CSES measures the use of problem-centered coping, belief in the ability to stop unpleasant emotions and thoughts, and praying and/or meditative behaviors. Emotion regulation was measured using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS measures non-acceptance, goals, impulse, awareness, strategies, and clarity. Social engagement was measured with the Social and Emotional Loneliness Scale for Adults – Short Version (SELSA; DiTommaso, Brannen & Best, 2004). The SELSA includes three subscales for romantic, family, and social loneliness. The scores for the outcome measures are presented in Table 1 below.

### **Progress and Findings**

The study is completed and quantitative data analysis has been conducted. The sample was comprised of 32 males (84.21%) and six females (15.79%). The average age was 54.35 years ( $SD = 12.85$ , range: 29 – 73). Military branch service consisted of the following ( $n=36$  due to some participants not wishing to specify their service branch): 17 (47.22%) had served in the Army, 9 (25%) in the Marines, 8 (22.22%) in the Navy, 4 (11.11%) in the National Guard, and one (2.78%) had served in the Air Force. There was an average number of 1.79 deployments (range: 0 – 10,  $n = 36$ ).

As predicted, no significant changes were found for any outcome measure during the wait control period, indicating that changes in outcome measures were due to the THR rather than other extraneous factors.

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**Table 1.** Mean Scores for Each Outcome Measure Across Time

| Outcome Measure                      | 6 Weeks Before THR (n = 13)                           | 3 Weeks Before THR (n = 12)                           | Week 1 of THR (n = 29)                                | Week 3 of THR (n = 23)   | Week 6 of THR (n = 19)  |
|--------------------------------------|---|---|---|--|---|
| PTSD<br>Possible range:<br>17 – 85   | <i>M</i> = 56.75<br>( <i>SD</i> = 17.00)<br>21 – 75   | <i>M</i> = 56.82<br>( <i>SD</i> = 13.37)<br>31 – 78   | <i>M</i> = 59.90<br>( <i>SD</i> = 18.40)<br>29 – 118  | <i>M</i> = 53.22<br>( <i>SD</i> = 13.84)<br>28 – 82*<br><b><i>p</i> = .005</b> | <i>M</i> = 47.00<br>( <i>SD</i> = 14.67)<br>26 – 78**<br><b><i>p</i> = .009</b> |
| CSES<br>Possible range:<br>0 – 260   | <i>M</i> = 114.71<br>( <i>SD</i> = 63.48)<br>5 – 255  | <i>M</i> = 110.64<br>( <i>SD</i> = 57.40)<br>35 – 255 | <i>M</i> = 115.59<br>( <i>SD</i> = 50.55)<br>20 – 236 | <i>M</i> = 116.09<br>( <i>SD</i> = 50.68)<br>34 – 209                          | <i>M</i> = 130.21<br>( <i>SD</i> = 51.84)<br>29 – 234                           |
| DERS<br>Possible range:<br>36 - 180  | <i>M</i> = 113.69<br>( <i>SD</i> = 28.92)<br>58 – 149 | <i>M</i> = 109.25<br>( <i>SD</i> = 20.56)<br>58 – 147 | <i>M</i> = 106.00<br>( <i>SD</i> = 29.60)<br>43 – 163 | <i>M</i> = 108.65<br>( <i>SD</i> = 21.46)<br>67 – 147                          | <i>M</i> = 99.42<br>( <i>SD</i> = 18.31)<br>70 – 132                            |
| SELSA<br>Possible range:<br>15 - 105 | <i>M</i> = 47.67<br>( <i>SD</i> = 12.12)<br>15 – 62   | <i>M</i> = 48.25<br>( <i>SD</i> = 15.11)<br>21 – 74   | <i>M</i> = 50.38<br>( <i>SD</i> = 11.92)<br>20 – 72   | <i>M</i> = 53.52<br>( <i>SD</i> = 13.70)<br>28 – 85                            | <i>M</i> = 57.00<br>( <i>SD</i> = 10.29)<br>42 – 80                             |

Veterans participating in the THR had statistically significant decreases in their PTSD symptoms over the six-week THR program. Symptoms significantly decreased between baseline and week three,  $F(1,17) = 10.678, p = .005^*$ , and also between week three and week six of riding,  $F(1,17) = 8.750, p = .009^{**}$ . Eighteen of the 23 veterans (78%) who completed data collection at baseline and after three weeks of THR showed a decrease in PTSD symptoms, while 18 out of 19 (94.74%) who completed data collection at baseline and six weeks showed a decrease (thus in the predicted direction but not reaching statistical significance). The decrease in numbers of veterans completing data collection was caused by drop-out of participants due to health issues, moving their residence, or changes in life schedules preventing them from continuing in the study. One participant dropped out because she thought that the horse she was matched with did not like her.

While there were no statistically significant changes in the CSES, DERS, or SELSA scores during the riding period, the changes in the CSES (self-efficacy) and the DERS (emotion regulation) did change in the hypothesized directions. These trends indicate that participants did obtain benefits from the THR but given the small sample size it may not have been possible for the findings to reach statistical significance with these instruments.

The results of this study provide evidence that a THR program contributed to a decrease in PTSD symptoms. Veterans benefited by decreasing their PTSD throughout the study period; and the benefit increased the longer an individual was in the riding period. Further investigation is needed to learn more about the changes we saw in self-efficacy and emotional regulation. We continue to analyze the extensive and very rich array of qualitative data from the participants' weekly riding diaries, which we think may help to

shed light on the trends we found in these outcome variables. Qualitative analysis is an incredibly laborious and time consuming task. We will share these findings with HHRF when this analysis is completed.

One universal finding was that all participants who completed the study thoroughly enjoyed the THR experience, interaction with the horses, camaraderie with other veterans, and interaction with the study volunteers, staff, and staff of the riding centers. The VA is funding THR for veterans through their recreation therapy program. Several participants from our study have continued THR through this mechanism and others are now doing volunteer work as side walkers or leaders at the riding center where we conducted the study. These are also very gratifying outcomes.

2. A summary that can be posted to the research page of the HHRF web site (if different than #1)

The study investigated how much a six-week therapeutic horseback (THR) program was associated with decreased Post-Traumatic Stress Disorder (PTSD) symptoms, as well as improved self-efficacy, emotion regulation and social engagement among U.S. military veterans. Veterans participated in a six-week THR program. A control group delayed their riding so they could be studied for 6 weeks before THR and then during and after THR.

The sample was comprised of 32 males and six females. The average age was 54.35 years. Veterans had served in the Army, Navy, Marines, National Guard, and Air Force with an average of 2 deployments each.

While PTSD symptoms decreased from the very beginning of the THR program, the most significant decreases over the six-week THR program occurred between the third and 6<sup>th</sup> weeks of the program. While there were no statistically significant changes in self-efficacy, emotion regulation, or social engagement during the riding period, changes in these factors were in the hypothesized directions.

The results of this study provide clear evidence that a THR program contributed to a decrease in PTSD symptoms. Veterans benefited by decreasing their PTSD throughout the study period; and the benefit increased the longer an individual was in the riding period. They also expressed great enjoyment of interacting with the horses, learning to ride, as well as camaraderie with other veterans and with staff of the study and riding center.

3. Time line, show completed items and any changes/difficulties in completing the listed items from the original application noted and explained.

The project timetable was virtually obliterated repeatedly by the degree of VA approvals needed, the recurrent addition by the VA of more layers of approval, debate, responses to VA requests for more information, and the length of time it took for VA reviews to be completed. This was an excruciating experience, which the PI regularly shared with the

HHRF. Once the study was approved, there were also amendments that had to be made based on new VA information, and approval of these took an inordinate length of time. We also experienced 4 detailed VA reviews of the project even after approval. Please see further elaboration in Item 5 below.

4. Budget: final budget expenditures, with any variations from the original submitted application budget noted and explained.

#### Financial Report as of 12-30-15

| Item   | Budgeted           | Expended           |
|--|--------------------|--------------------|
| <b>PERSONNEL</b>                             |                    |                    |
| Principle Investigator                       |                    |                    |
| <b>TOTAL PERSONNEL</b>                       | \$24,793.00        | \$26,003.49        |
| <b>OPERATIONS</b>                            |                    |                    |
| Supplies (Postage, Printer Labels, T-shirts) | \$484.00           | \$1,048.98         |
| Travel (Fuel)                                | \$507.00           | \$88.54            |
| Posters                                      | \$216.00           | \$208.99           |
| Client Expenses                              | \$24,000.00        | \$22,650.00        |
| <b>TOTAL OPERATIONS</b>                      | \$25,207.00        | \$23,996.51        |
| <b>TOTAL</b>                                 | <b>\$50,000.00</b> | <b>\$50,000.00</b> |

Our Project Coordinator graduated from her Master's degree program in public health at the University of Missouri during the middle of the study. She left to begin her first job as an epidemiologist at the Arizona State Health Department. Because this occurred at such a critical juncture in the study, the PI assumed many of these duties, thus the expenditure report shows a greater expenditure on the PI's salary than was originally budgeted. We were blessed with several student helpers who volunteered with the study, so the expenditure for Student Research Assistants is lower than originally budgeted. Because we had to alter recruitment materials after we began recruitment (per description in Item 5 below), we had greater expenditure in this area than expected. We were able to use the University car for travel to the local riding center, so we had fewer fuel expenditures than originally anticipated.

5. Summary of any complications or challenges that have been encountered and how they have been addressed.

The main challenges hinged on VA processes and approvals which are not only incredibly cumbersome and inefficient, but seem designed to prevent research with veterans. The PI kept the HHRF apprised of the trials associated with this whole process and very much appreciate the support received. Here is but one example: Before the

study could begin, all study staff had to be approved as Without Compensation employees of the VA (WOC's). Very lengthy materials—including the life history of each staff member back to Primary School years had to be submitted only in hardcopy, a criminal background check conducted, and fingerprinting done. All of these materials were lost twice by the VA. Lack of response to the approvals was viewed by the PI as consistent with how long everything at the VA takes. We thus lost time waiting only to find that the materials had been lost and had to be re-delivered. At some point in the horrific review and approval process, it was determined by the VA that every volunteer (even side walkers and horse leaders) and staff member at the riding centers would also have to be WOC approved! This resulted in the PI having to attend multiple meetings, providing rationale as to why that requirement would be completely untenable, and eventually it was abandoned.

Another example was when the VA animal safety committee required that the riding centers (all PATH accredited) would have to be inspected by the VA inspector to be sure that the horses are well cared for. Getting this completed took a great deal of time.

Finally, and perhaps the most classic and frustrating example occurred when the VA R&D approval committee wanted to discuss the fact that we would include a trot in the THR curriculum. This resulted in more delays of our approvals and the PI & Co-I having to attend the VA R&D committee meeting (22 members) to counter the conventional wisdom that veterans in our study would sustain significant injuries while their horses trotted in our detailed curriculum in a then VA-inspected, PATH accredited riding center, with a horse leader and 2 side walkers per veteran. This process would have been problematic enough, but it extended to cause us an inability to recruit participants for the two riding centers in the St. Louis area because veterans there were not treated at the Columbia, MO VA thus the Columbia VA would not assume liability for their care if they were injured, and the Columbia VA does not have a collaborative care/research agreement with the St. Louis VA. This significantly limited our sample size.

Once we started recruitment, we encountered 2 veterans who contacted the VA by phone to express their annoyance that they had received an invitation in the mail about a study involving PTSD. The VA Information Officer reported this to the VA Research & Development Department, and also to the federal Office of Research. This resulted in a great deal of the PI's time spent responding to the charge that we had violated the veterans' confidentiality by sending them VA-approved study materials in the mail. We were found not to have been in violation, but had to revise our materials anyway and send them back through the university IRB and VA review and approval processes, which delayed our recruitment even more than it had been delayed by the original approval of all study materials and procedures.

These are but a few examples of the challenges we experienced in working with the VA. Fortunately, we kept the light at the end of the tunnel in our belief that the study was worthwhile, would help veterans, and would be a delight to finally conduct—and it was.

6. Share detailed plans for submitting material for publication; summaries of findings with the public.

Preliminary results of this study were shared at the 24th Annual Conference of the International Society for Anthrozoology in Saratoga Springs, New York in July of 2015.

The PI has to date given 3 presentations at local Columbia service organizations reporting the study findings. She has been asked to present at the VA hospital to professional staff. She and a study staff member (Jessica Bibbo) have presented the study at 2 recent HHRF podcast events. We expect many other presentations during 2016, and always acknowledge HHRF for funding the study.

We are currently refining the first manuscript reporting study findings. We have targeted the *Journal of Rehabilitation Research and Development* because it produces 10 issues per year, is an open access journal with a broad scope including mental health rehabilitation, reaching a wide audience. It is sponsored by the VA so many professionals in the VA system will read our findings. It also has a strong impact factor of 1.43 making it a respected journal. We aim to have the manuscript submitted by the end of January, 2016.

7. Invoice signed by grant manager for expenses incurred (for the remaining 50% of grant award) Attached.
8. Photos from research project activities that can be used in HHRF public marketing and outreach materials (such as newsletters, annual report, press release, etc.) Include a photo release form from all participants that includes HHRF in the listing of those permitted to us the photos for public outreach (sample can be supplied upon request).

It is outside of VA regulations for us to submit to HHRF, any signed photo releases from veterans in the study. We have these documents on file and along with all study documents. All of them must be kept double locked in our office for 7 years after which time they must be submitted to the VA for final disposition. We have taken many photographs (de-identified) during the course of the project, and can share these as requested. We have previously shared with HHRF, the video created by the University of Missouri, College of Veterinary Medicine's External Relations Department. We will send under separate copy, a DVD of this video for HHRF's use.

The PI wishes to thank HHRF for your wonderful support of this project, and all of the additional terrific work that you do. Our team is very grateful for this support and the opportunity to work with HHRF!

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