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SUMMARY WITH CRITICAL APPRAISAL

Canine and Equine Therapy for Mental Health: A Review of Clinical Effectiveness

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Questions or requests for information about this report can be directed to Requests@CADTH.ca

Abbreviations

CD-RISC	Connor-Davidson Resilience Scale
CRD	Centre for Reviews and Dissemination
GAD	generalized anxiety disorder
MDD	major depressive disorder
MeSH	Medical Subject Headings
PCL-M	PTSD Checklist-Military Version
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PTSD	post-traumatic stress disorder
RCT	randomized controlled trial

Context and Policy Issues

Animals have been used for medicinal and therapeutic purposes throughout much of the course of human history.[1,2] Formal research into the use of animals for therapeutic purposes being in the 1960s, where work investigating the use of pet psychotherapy for treatment of behavior disorder in children was published.[3] More recently, animals have been incorporated into a number of "animal-assisted interventions", including animal-assisted activities, animal assisted-therapy, and service animal programs. The most common forms of animal-assisted interventions for the treatment of mental health conditions involve dogs or horses, often described as canine or equine therapy (or hippotherapy), respectively.

Post-traumatic stress disorder (PTSD), anxiety disorders (including generalized anxiety disorder; GAD), and major depressive disorder (MDD) are common mental health conditions associated with disability, decreased quality of life, increased mortality, and economic burden.[4-9] PTSD is a persistent mental health condition that may occur in individuals who have experienced or witnessed a traumatic event, such as exposure to death, actual or threatened serious injury, or actual or threatened sexual violence.[10] GAD, which is estimated to affect approximately 1 in 40 Canadians aged 15 years and older per year,[11] is characterized by persistent and excessive fear, worry, and feelings of being overwhelmed.[12] Finally, symptoms of MDD (also known as clinical depression or major depression) include sadness, insomnia, loss of interest in hobbies, and feelings of worthlessness or guilt.[13] A formal diagnosis of MDD requires the persistence of symptoms over a period of at least two weeks. Treatment strategies for PTSD, GAD, and MDD often include clinical care with pharmacologic agents (e.g., antidepressants), psychotherapy, or a combination of both approaches.

The objective of the current report is to summarize and appraise the available evidence on the clinical effectiveness of canine therapy and equine therapy versus other forms of psychotherapy for the treatment of individuals with PTSD, GAD, MDD. This report compliments a 2012 CADTH Rapid Response Report[14] on the use of therapy dogs and horses for patients with mental health conditions.

Research Questions

1. What is the clinical effectiveness of canine therapy for patients with post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), or major depressive disorder (MDD)?

2. What is the clinical effectiveness of canine therapy as an adjunct to psychotherapy for patients with PTSD, GAD, MDD?
3. What is the clinical effectiveness of equine therapy for patients with PTSD, GAD, MDD?
4. What is the clinical effectiveness of equine therapy as an adjunct to psychotherapy for patients with PTSD, GAD, MDD?

Key Findings

One relevant non-randomized study was identified regarding the comparative clinical effectiveness of equine-assisted psychotherapy plus ongoing standard therapy versus ongoing standard therapy alone for the treatment of veterans with post-traumatic stress disorder. This evidence of low quality reported no significant differences in post-traumatic stress disorder symptom severity, psychological resilience, and salivary cortisol between the treatment groups after the six-week treatment protocol.

No evidence regarding the comparative clinical effectiveness of equine therapy versus psychotherapy for patients with generalized anxiety disorder or major depressive disorder was identified. Additionally, no evidence regarding the comparative clinical effectiveness of canine therapy (alone or as an adjunct to psychotherapy) versus psychotherapy for the treatment of patients with post-traumatic stress disorder, generalized anxiety disorder, or major depressive disorder was identified.

Additional research will be necessary to further evaluate the role of canine and equine therapy for the treatment of individuals with post-traumatic stress disorder, generalized anxiety disorder, or major depressive disorder.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including Medline, PsycINFO, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were animal-assisted therapy and patients with PTSD, MDD, or GAD. No filters were applied to limit the retrieval by study type. The search was also limited to English language documents published between January 1, 2014 and August 1, 2019.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients with post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), or major depressive disorder (MDD)
Intervention	Q1: Canine therapy (using companion/domestic dogs, certified therapy dogs, or certified service dogs) Q2: Canine therapy (using companion/domestic dogs, certified therapy dogs, or certified service dogs), as an adjunct to psychotherapy Q3: Equine therapy (using companion/domestic horses, certified therapy horses, or certified service horses) Q4: Equine therapy (using companion/domestic horses, certified therapy horses, or certified service horses), as an adjunct to psychotherapy
Comparator	Psychotherapy
Outcomes	Clinical effectiveness (e.g., changes in: interpersonal conflict and relationships, adaptive functioning, global functioning score, quality of life score, social skills, in stress response, ability to perform activities of daily living, ability to attend work/school/volunteering, symptoms [e.g., depression, mood, affect, illness perception]); Safety (e.g., risk of injury, adverse event)
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, and non-randomized studies

GAD = generalized anxiety disorder; MDD = major depressive disorder; PTSD = post-traumatic stress disorder.

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2014. Systematic reviews that had broader inclusion criteria than the present review were examined in detail to ascertain whether data could be extracted from a relevant sub-set of included studies, rather than excluding the systematic reviews entirely. If it was not possible to identify relevant primary studies upon detailed investigation the systematic review was excluded.

Critical Appraisal of Individual Studies

One reviewer critically appraised the non-randomized study using the Downs and Black checklist.[15] Summary scores were not calculated for the included study; rather, a review of the strengths and limitations of the study were described narratively.

Summary of Evidence

Quantity of Research Available

A total of 320 citations were identified in the literature search. Following screening of titles and abstracts, 284 citations were excluded and 36 potentially relevant reports from the electronic search were retrieved for full-text review. In addition, three potentially relevant publications were retrieved from the grey literature search for full-text review. Of these 39 potentially relevant articles, 38 publications were excluded for various reasons, while one publication, a non-randomized study,[16] met the inclusion criteria and was included in this report. Appendix 1 presents the PRISMA flowchart of the study selection. Additional references of potential interest are provided in Appendix 5.

Summary of Study Characteristics

One eligible non-randomized study[16] was identified and included in this review. No relevant health technology assessments, systematic reviews, meta-analyses, or randomized

controlled trials were identified. Detailed characteristics are available in Appendix 2, Table 2.

Study Design

One non-randomized study[16] was included regarding the clinical effectiveness of equine therapy as an adjunct to standard PTSD therapy for the treatment of individuals with PTSD. The study was a prospective, single centre, two-arm, parallel group trial. Patient recruitment occurred between January 2015 and January 2018.

Country of Origin

The non-randomized study was conducted in the United States.[16]

Patient Population

The non-randomized study[16] recruited veterans (≥ 18 years of age) with an existing diagnosis of PTSD, who scored ≥ 29 on the PTSD Checklist-Military Version (PCL-M), and who were enrolled in any type of ongoing, active therapy for their PTSD. The study excluded individuals who were unable to provide informed consent, were pregnant, were prisoners, or were receiving glucocorticoid therapy. A total of 21 participants were recruited, 20 of whom completed the study and were included in the analysis. The mean age of participants was 55.5 years and the proportion of female participants was 20%. Mean baseline PCL-M scores were 60.3 (SD = 9.7) in the equine-assisted therapy plus standard therapy group and 59.1 (SD = 14.9) in the standard therapy alone group. Participant comorbidities, mean time since trauma, and the type of trauma experienced by participants were not reported, although it was assumed that the trauma was military-related.

Interventions and Comparators

The non-randomized study[16] compared an equine-assisted psychotherapy as an adjunct to ongoing prescribed standard therapy to ongoing prescribed standard therapy alone. The equine program involved six one-hour sessions over the course of six weeks in groups of three or four individuals. Rather than involving the riding of horses, the therapy was comprised of deliberate techniques where the horses were metaphors in specific group-based experiences. All participants in the study were required to be enrolled in some sort of ongoing, active professional therapy for PTSD. No description of the ongoing therapy was provided; therefore, it is unclear what treatment participants in the control group received and if the standard therapy received by the two groups was of comparable content and quality.

Outcomes

The included study[16] monitored severity of PTSD symptoms, psychology resilience (defined as the ability of individuals to adapt positively in the face of trauma), and salivary cortisol. Severity of PTSD was measured using the PCL-M instrument, a 17-item self-report checklist. Each item is rated between 1 (not at all) and 5 (extremely).[17] The total score ranges from 17 to 85, with higher scores indicating increased PTSD symptom severity. The military version has slight variations in the instructions and wording of phrases referring to the index event. The PCL-M is well validated and has demonstrated internal consistency and test-retest reliability.[18] Psychology resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC). This self-report scale consists of 25-items, each of which is scored from 0 to 4. Total scores range from 0 to 100, with higher scores reflecting greater resilience. Literature supports its reliability and validity.[19] Salivary cortisol readings

were collected using a salivette swab collection device and were estimated using a commercial enzyme-linked immunosorbent assay.

Summary of Critical Appraisal

Additional details regarding the strengths and limitations of the included publication are provided in Appendix 3, Table 3.

The included non-randomized study[16] had clearly described objectives, interventions, controls, patient recruitment methodology, inclusion and exclusion criteria, clinical outcomes, and main findings. Details on baseline participant characteristics (e.g., age, sex, ethnicity, years of active duty, baseline PTSD scores) were included and were tested for statistically significant differences between groups at baseline. Although there were no statistically significant differences in the measured baseline participant characteristics, the study was at risk of confounding from unmeasured variables (randomizing patients to treatment arms would decrease the magnitude of this risk). Additionally, because this was an open-label study there was a risk for bias in either direction depending on the perceptions and expectations of participants and outcome assessors. This risk was partially mitigated for objective outcomes (i.e., salivary cortisol), but subjective outcomes were at increased risk (i.e., PTSD symptom severity, psychological resilience). The study authors did not conduct sample size calculations prior to patient recruitment and a total of 20 participants were included in the analysis. Due to the nature of the intervention, compliance with the assigned treatment appears to be reliable. The length of follow-up was consistent between the treatment and control groups (six weeks after treatment initiation); however, one patient was lost to follow-up and their characteristics were not described. Actual probability values (*P*-values) and estimates of random variability (standard deviations) were reported for all monitored outcomes, increasing the strength of reporting. The authors declared that they had no potential conflicts of interest and reported on their sources of funding (which was considered unlikely to have influenced the findings of the study).

Study participants, care providers, and health care settings appear to be representative of the "real-world" and inappropriate exclusion criteria were avoided, increasing the external validity of the study. However, this study conducted at a single-centre in the United States and the generalizability of the findings to other centres or countries is not clear.

Summary of Findings

The overall findings of the included study are summarized below. A detailed summary of the main findings is available in Appendix 4, Table 4.

Clinical Effectiveness of Canine Therapy

Post-Traumatic Stress Disorder

No relevant evidence regarding the clinical effectiveness of canine therapy (alone or as an adjunct to psychotherapy) for patients with PTSD was identified; therefore, no summary can be provided.

Generalized Anxiety Disorder

No relevant evidence regarding the clinical effectiveness of canine therapy (alone or as an adjunct to psychotherapy) for patients with GAD was identified; therefore, no summary can be provided.

Major Depressive Disorder

No relevant evidence regarding the clinical effectiveness of canine therapy (alone or as an adjunct to psychotherapy) for patients with MDD was identified; therefore, no summary can be provided.

Clinical Effectiveness of Equine Therapy

Post-Traumatic Stress Disorder

Evidence regarding the clinical effectiveness of equine therapy for patients with PTSD was available from one-non-randomized study.[16] Participants were allocated to receive equine-assisted psychotherapy as an adjunct to ongoing prescribed standard therapy or to ongoing prescribed standard therapy alone. The findings indicated that the two groups did not significantly differ with respect to PTSD symptom severity (as measured with the PCL-M), psychological resilience (as measured with the CD-RISC), or salivary cortisol post-treatment.

Generalized Anxiety Disorder

No relevant evidence regarding the clinical effectiveness of equine therapy (alone or as an adjunct to psychotherapy) for patients with GAD was identified; therefore, no summary can be provided.

Major Depressive Disorder

No relevant evidence regarding the clinical effectiveness of equine therapy (alone or as an adjunct to psychotherapy) for patients with MDD was identified; therefore, no summary can be provided.

Limitations

A number of limitations were identified in the critical appraisal (Appendix 4, Table 4), however, additional limitations exist.

The quantity of identified relevant literature was low. The evidence summarized in this review was limited to a single, open-label, non-randomized study that included a limited number of participants (20 individuals).[16] It is possible that the small sample size hindered the ability to detect a statistically significant difference between groups in the outcomes examined. Additionally, this study was at high risk for selection bias or bias due to confounding because participants were not randomized to treatment groups and it is possible that clinicians were selective in their assignment of participants to treatment arms.

Participants were self-selected into the identified study by responding to promotional flyers or through information provided in the University of New Mexico Veterans' Resource Center and the student veterans' association at the University of New Mexico. This method of recruitment may have resulted in enrollment of a motivated subset of individuals with PTSD who were more likely to engage in equine therapy. It is unclear if the results are applicable to a broader population that may be seen in clinical practice.

A potentially major limitation that should be considered when interpreting these results is that participants and outcome assessors were aware of treatment allocation in the included study. Given that a large number of outcomes reported were based on subjective questionnaires this may have created a risk for bias in either direction depending on the perceptions and expectations of the participants and clinicians involved.

The included non-randomized study[16] excluded participants less than 18 years of age; thus, the comparative clinical effectiveness of canine or equine therapy versus psychotherapy alone in children is unknown.

No evidence regarding the comparative clinical effectiveness of canine therapy (alone or as an adjunct to psychotherapy) versus psychotherapy for the treatment of patients with PTSD, GAD, or MDD was identified. Additionally, no evidence regarding the comparative clinical effectiveness of equine therapy versus psychotherapy for patients with GAD or MDD was identified.

The applicability of the evidence to Canadian settings is unclear as the clinical study was conducted in the United States. Furthermore, it may be difficult to generalize the results to females since the non-randomized study[16] enrolled a disproportionately higher number of males (80%), despite the higher prevalence of PTSD in women.[20]

As outlined in our inclusion criteria, only studies that directly compared canine or equine therapy (alone or as an adjunct to psychotherapy) to psychotherapy alone for the treatment of PTSD, GAD, or MDD were included in this report. Although the potential benefit of these therapies versus other comparators (e.g., waitlist, no treatment, pharmacotherapy) was outside of the scope of this report, there are several recently published or ongoing systematic reviews that used a more wide-ranging lens to review the literature on animal-assisted therapy for mental health conditions.[1,21-25]

Conclusions and Implications for Decision or Policy Making

This review was comprised of one non-randomized study[16] regarding the clinical effectiveness of equine therapy as an adjunct to standard therapy for the treatment of individuals with PTSD. No evidence was identified regarding the comparative effectiveness of canine or equine therapy versus other psychotherapies for the treatment of individuals with GAD or MDD.

Evidence of low quality reported no significant differences in PTSD symptom severity, psychological resilience, and salivary cortisol between participants treated with equine-assisted psychotherapy as an adjunct to ongoing prescribed standard therapy and participants treated with ongoing prescribed standard therapy alone. The findings of this report add to the literature summarized within a 2012 CADTH Rapid Response Report[14] on the use of therapy dogs and horses for patients with mental health conditions.

The limitations of the included study and of this report should be considered when interpreting the results. The findings of this review are highly uncertain due to the limited quantity of available evidence. Further research investigating the comparative clinical effectiveness of canine therapy and equine therapy versus psychotherapy in adults with PTSD, GAD, or MDD, especially through the use of large, methodologically-sound randomized controlled trials, would help reduce this uncertainty.

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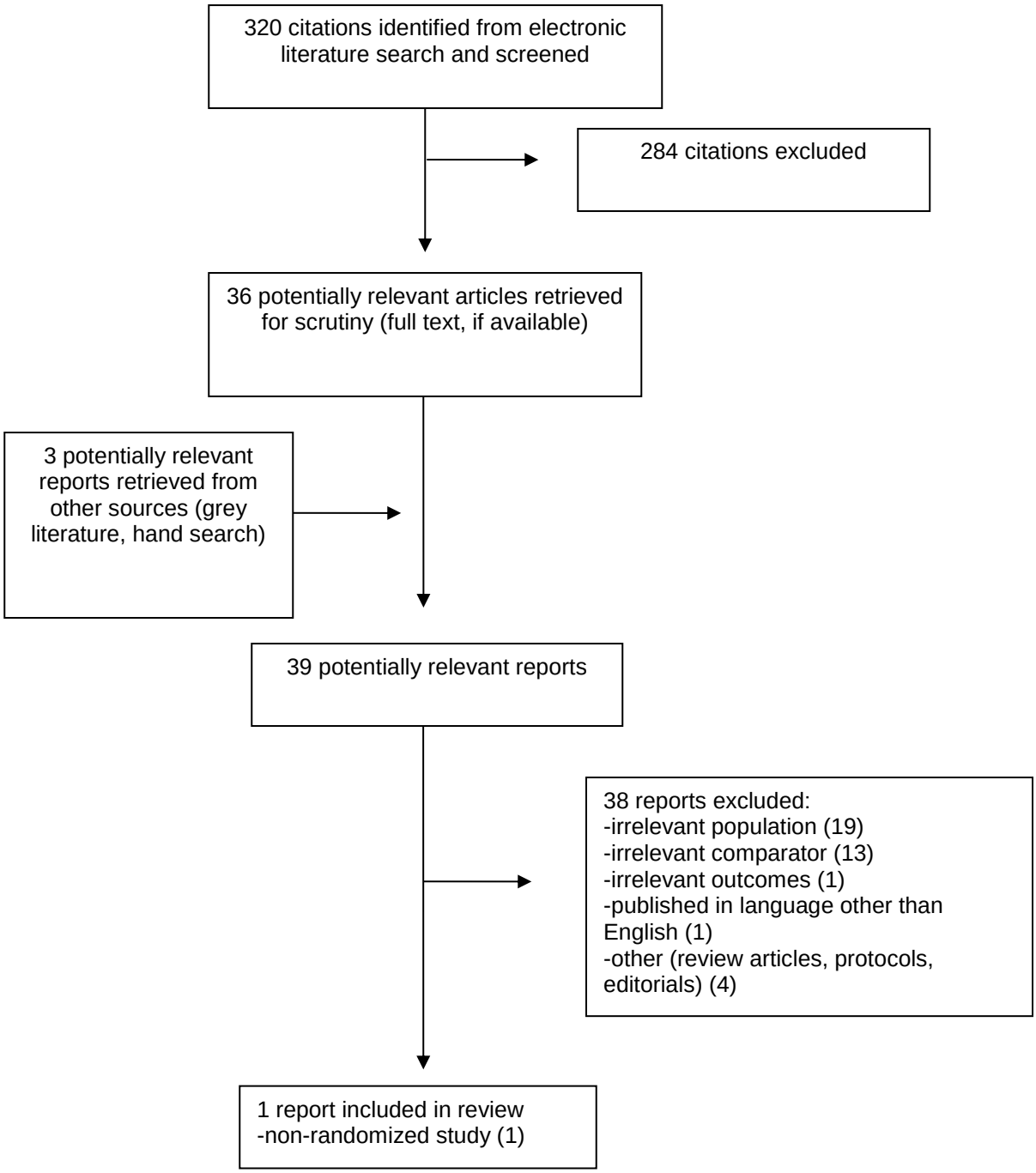
25. Kamioka H, Okada S, Tsutani K, et al. Effectiveness of animal-assisted therapy: A systematic review of randomized controlled trials. *Complement Ther Med.* 2014;22(2):371-390.

Appendix 1: Selection of Included Studies



Appendix 2: Characteristics of Included Publications

Table 2: Characteristics of the Included Primary Clinical Study

Study Citation, Country, Funding Source	Study Design, Objective, and Setting	Patient Characteristics	Intervention and Comparator(s)	Clinical Outcomes, Length of Follow-Up
Burton et al., 2019[16] United States **Funding source**: A grant from the University of New Mexico Health Sciences Center Clinical & Translational Science Center (#8UL1TR000041)	**Study design**: Prospective, single-centre, two-arm, parallel group, open-label, NRS **Objective**: To examine the potential efficacy of equine-assisted psychotherapy (EAP) as an adjunct to standard therapy compared to standard therapy alone for the treatment of veterans with PTSD. **Setting**: Participants were recruited using word of mouth, promotional flyers, through the University of New Mexico Veterans' Resource Center, and the student veteran's association at the University of Mexico.	**Inclusion criteria**: Veterans (≥ 18 years of age) with an existing diagnosis of PTSD who scored ≥ 29 on the PCL-M and who were enrolled in some sort of ongoing, active therapy for their PTSD. **Excluded**: Those who were who were unable to provide informed consent, were pregnant, were prisoners, were receiving antipsychotic medication, or were receiving glucocorticoid therapy. **Number of participants**: 20 (10 in the EAP group; 10 in the standard therapy group). **Mean age, years (SD)**: 48 (15) in the EAP group; 63 (13) in the standard therapy group. **Sex**: 80% male in the EAP group; 80% male in the standard therapy group. **Type of trauma**: NR; expected to be military-related. **Mean time since trauma**: NR. **Baseline PTSD severity**: Mean PCL-M score of 60.3 (SD = 9.7) in the EAP group; mean PCL-M score of 59.1 (SD = 14.9) in the standard therapy group. **Comorbidities**: NR.	**Intervention**: 6 weeks of EAP in addition to ongoing prescribed standard therapy. The EAP took place at a facility that was certified by the Equine Assisted Growth and Learning Association. Sessions were 1 hour in length and occurred once a week in groups of 3 or 4. Therapy did not involve riding the horses, instead deliberate techniques were utilized where the horses were metaphors in specific group-based experiences. **Comparator**: 6 weeks of ongoing prescribed standard therapy. Note: The study did not require participants to be undergoing a specific type or quality of pre-existing therapy, only that participants were enrolled in some sort of ongoing, active professional therapy for their PTSD. No description of the ongoing therapy was provided; therefore, it is unclear what treatment participants in the control group received and if the standard therapy received by the two groups was of comparable composition and quality.	**Outcomes**: - PTSD symptoms (measured with the PCL-M) - Psychological resilience (measured with the CD-RISC) - Salivary cortisol **Follow-up**: 6 weeks (post-treatment)

CD-RISC = Connor-Davidson Resilience Scale; EAP = equine-assisted psychotherapy; NR = not reported; NRS = non-randomized study; PCL-M = PTSD Checklist-Military Version; PTSD = post-traumatic stress disorder.

Appendix 3: Critical Appraisal of Included Publications

Table 3: Strengths and Limitations of Clinical Studies using the Downs and Black Checklist[15]

Strengths	Limitations
Burton et al., 2019[16]	
• The objectives, interventions, controls, and main outcomes were clearly described • Detailed methodology on patient recruitment and assessment of inclusion/exclusion criteria were included • Population characteristics (e.g., age, sex, ethnicity, years of active duty, baseline PTSD scores) were clearly described and were tested for statistically significant differences at baseline (there were no significant differences) • Compliance with the assigned treatment appeared to be reliable • Outcome measures were valid and reliable • The major findings of the study were presented in graphic form and clearly described • Length of follow-up was consistent between the treatment and control groups • Estimates of random variability (standard deviations) and actual probability values (*P*-values) were reported • The main findings of the study were presented in tabular form and clearly described • Study participants, care providers, and setting appeared to be representative of the population and care setting of interest • Sources of funding were disclosed and were unlikely to have had an effect on the findings of the study • The authors declared that they had no potential conflicts of interest	• Intervention assignment was not done at random (assignment was done sequentially to minimize cost and inconvenience for the EAP therapist); therefore, a number of uncontrolled factors may have contributed to the findings of the study • Study subjects in the intervention and control groups were not recruited over the same period of time (recruitment was done sequentially) • This was an open-label study with no blinding of study participants or outcome assessors • The characteristics of the patient lost to follow-up were not described (the individual was assigned to the control group) • A power calculation was not performed prior to patient recruitment to inform required group sizes (a calculation was conducted to determine the power of the study, but only after patient recruitment had occurred) • Low number of participants analyzed (20 total); the trial was insufficiently powered to detect relatively small between-group differences • Single-centre study (conducted in the United States); the generalizability to the Canadian setting is unclear

EAP = equine-assisted psychotherapy; PTSD = post-traumatic stress disorder.

Appendix 4: Main Study Findings and Authors' Conclusions

Table 4: Summary of Findings of the Included Primary Clinical Study

<table>
<tr><th>Main Study Findings</th><th>Authors' Conclusion</th></tr>
<tr><td colspan="2">Burton et al., 2019[16]</td></tr>
<tr><td>A prospective, single-centre, two-arm, parallel group, open-label, non-randomized study that assessed the potential efficacy of EAP as an adjunct to standard therapy compared to standard therapy alone for the treatment of veterans with PTSD.

Comparison of equine-assisted psychotherapy plus standard therapy (EAP) versus standard therapy alone (ST) with respect to several clinical outcomes
<table>
<tr><th rowspan="2">Outcome measure</th><th colspan="2">Intervention group</th><th rowspan="2">Statistical significance (P-value)</th></tr>
<tr><th>EAP (N = 10)</th><th>ST (N = 10)</th></tr>
<tr><td>PCL-M score (SD)</td><td></td><td></td><td></td></tr>
<tr><td>Pre-treatment</td><td>60.3 (9.7)</td><td>59.1 (14.9)</td><td></td></tr>
<tr><td>Post-treatment (6 weeks)</td><td>48.7 (12.7)</td><td>53.6 (15.4)</td><td></td></tr>
<tr><td>Mean difference*</td><td>-11.6 (10.6)</td><td>-5.5 (7.2)</td><td>0.1500</td></tr>
<tr><td>CD-RISC score (SD)</td><td></td><td></td><td></td></tr>
<tr><td>Pre-treatment</td><td>55.7 (6.2)</td><td>57.0 (16.6)</td><td></td></tr>
<tr><td>Post-treatment (6 weeks)</td><td>63.4 (15.8)</td><td>61.8 (15.8)</td><td></td></tr>
<tr><td>Mean difference*</td><td>7.7 (9.2)</td><td>4.8 (7.3)</td><td>0.4455</td></tr>
<tr><td>Salivary cortisol, µg/dL (SD)</td><td></td><td></td><td></td></tr>
<tr><td>Pre-treatment</td><td>0.32 (0.23)</td><td>0.27 (0.14)</td><td></td></tr>
<tr><td>Post-treatment (6 weeks)</td><td>0.33 (0.18)</td><td>0.40 (0.17)</td><td></td></tr>
<tr><td>Mean difference*</td><td>0.01 (0.28)</td><td>0.12 (0.25)</td><td>0.3243</td></tr>
</table>
*Mean difference was calculated by subtracting the pre-treatment score from the post-treatment score.

CD-RISC = Connor-Davidson Resilience Scale; EAP = equine-assisted psychotherapy; N = number of participants; PCL-M = PTSD Checklist-Military Version; SD = standard deviation.</td><td>"We conclude that a 6-week program of EAP offered to war veterans with PTSD for 1 hour per week for 6 weeks failed to produce a statistically significant difference in PTSD-related symptoms or in resilience when compared to a control group who continued their previously established PTSD therapies. Additionally, EAP does not appear to increase or statistically change morning salivary cortisol concentrations. Our results do suggest, however, that EAP may work as well as standard therapy with respect to these parameters among military veterans suffering from PTSD. Subjects also reported improvements in patience, trust, relaxation, and learned strategies to deal with stressful situations, anger, and frustration."[16] (p. 18)</td></tr>
</table>

EAP = equine-assisted psychotherapy; PTSD = post-traumatic stress disorder.

Appendix 5: Additional References of Potential Interest

Randomized Controlled Trials

Alternative Comparator – Wait list

Johnson RA, Albright DL, Marzolf JR, et al. Effects of therapeutic horseback riding on post-traumatic stress disorder in military veterans. *Mil Med Res*. 2018;5(1):3.
PM:29502529

Alternative Population – Patients with Social Anxiety Disorder

Alfonso SV, Alfonso LA, Llabre MM, Fernandez MI. Project Stride: An Equine-Assisted Intervention to Reduce Symptoms of Social Anxiety in Young Women. *Explore (NY)*. 2015;11(6):461-467.
PM:26386749

Alternative Population – Patients Not Diagnosed with Conditions of Interest

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