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Virtual Equine-assisted Therapy (iEAT) to Reduce Depression, Anxiety, and Stress Symptoms

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Abstract

Depression, anxiety, and stress reduce the functions of people and lead to inconvenience in life. These symptoms were proved to be successfully alleviated through equine assisted therapy (EAT) which requires physical involvement. Unfortunately, in some circumstances where physical activities are restricted, such therapy is not possible. To overcome such shortfall, this paper attempted to compare the similarity of the traditional EAT with newly developed online equine assisted therapy (iEAT) implementing imagery techniques. A website was designed, represented the virtual (iEAT). Fifty non-clinical participants volunteer to participate and attended three different conditions, i.e., online, traditional and relaxation (control). Depression, anxiety, and stress - 21 (DASS-21) was used to measure the level of depression, anxiety, and stress for pre- and post-treatment. Repeated measures ANOVA revealed that iEAT and EAT can be used to reduce the symptoms similarly. iEAT could represent the alternative to traditional EAT reduce the depression, anxiety, and stress symptoms. Such alternative is important, especially during certain circumstances such as the pandemic today and cost-effective selection.
Keywords: Equine-Assisted Therapy, Functional Equivalence, Online, Depression, Anxiety, Stress

Virtual Equine-Assisted Therapy (iEAT) to Reduce Depression, Anxiety, and Stress Symptoms

Depression, anxiety, and stress are common problems among youth (Mueller & McCullough, 2017) and adolescents (Thapar et al., 2012). It would lead to less functioning (Shao et al., 2020) and inconvenience in life (Kious et al., 2018). Depression harms health and even leads to suicidal risk when a person feels a variety of negative emotions such as guilt, shame, loneliness, fear, and anger (Landi et al., 2020). In the 1800s, patients with depression, brain disorder and gout were advised to ride as a therapy (All & Loving, 1999). Thus, it is acknowledged that horses have been useful in gaining human, mental and physical benefits (Hausberger et al., 2008).

Equine-assisted therapy (EAT) has been suggested as a therapeutic technique that aims to promote changes in behaviour and to reduce symptoms of depression, anxiety, and stress. EAT is demonstrably effective in reducing symptoms of depression, anxiety, and stress8. McConnell (2010) further explained that EAT encourages personal exploration of feelings and behaviours which then allows the clinical analysis of feelings and behaviours by a professional or therapist. EAT is a therapy that involves an experiential element which includes, handling, grooming, riding, and driving. These activities have established a significant improvement to those patients with learning disabilities, mentally and physically disturbance, stress post-traumatic and other mental issues (Karol, 2007).

In contrast to the human therapy, horses are non-judgemental animals which do not have expectations or prejudice to people (Brandt, 2019). EAT, on the other hand, is an alternative type of therapy that uses horse in therapeutic intervention and explained its effectiveness through the experiential theory. Experiential theory (Dayton, 1994) explains that horses have been used as a catalyst and metaphor to allow the therapy issue. It is referring to a technique that incorporated with psychodrama and that the major route to change is through direct experiences (Klontz, 2004). The experiential theory would help the client resolve unfinished business through re-experiencing in role-playing, animal care and guided imagery (Holmes et al., 2012).

Using a virtual equine activity, it can provide a safe environment in delivering EAT. The fundamental theory of virtual reality has the same method as a recent study which provides the participants experience in virtual equine-assisted therapy to receive sensory information like the traditional equine-assisted therapy (Anderson, Annett, Bischof & Boulanger, 2010). Due to the pandemic, it has been a challenge to organise an EAT session because of their natural settings in an outdoor environment (Chaudhury & Banerjee, 2020). Other than that, people who had not seek for treatment may be in fear of judgemental remarks from therapists and unable to afford therapy. To overcome this issue, Anderson et al. (2010) suggested that EAT can be done virtually. Hence, using a new intervention of imagery equine-assisted therapy, we can simulate EAT in a safe environment.

Underpinning by the functional equivalence theory (Decety, 1996), imagery has the potential to act as a delivery format for traditional EAT to reduce depression, anxiety, and stress. The theory explains that the same neuron is activated during imagination and execution occurred (Tallon et al., 2020). It mentioned that functional equivalence is pioneered by Finke (1980), "one can think 4 of mental images as being functionally equivalent to physical objects or events" (p.113). Based on this theory, imagery as the tool to deliver the EAT is said to allow the client to feel immersed in virtual and sense a real physical interaction with horses. It should be noted that imagery works integrate a person's cognitive, emotional, and somatic effects (Weßlau et al., 2015). The equivalent might be said about its therapeutic application (Johnson, 1982).

Several studies have established the idea that mental imagery has been found in improving emotion in depression (Holmes et al., 2016), anxiety (Tallon et al., 2020) and stress (Nguyen & Brymer, 2018). The evidence for mental imagery in depression has been proved in cognitive behavioural therapy focusing on negative verbal thoughts (Görgen et al., 2015). Additionally, there was evidence found on how guided imagery has effectively produced a relaxing state to treat anxiety symptoms (Holmes & Mathews, 2005). Individuals with depression and anxiety experience difficulty imagining future events positively, hence mental imagery is more likely to act as a medium to plan and participate in these activities. According to Holmes et al., (2016) imagery-based representation of emotional knowledge in each of

these fields can be important in identifying and managing emotional distress in depression. There was an increasing depression, anxiety, and stress problem among adolescents, but engaging in health wellness by using imagery as a tool helped to overcome the issue (Weßlau et al., 2015).

Therefore, this study aims

1. To compare the similar effect of depression, anxiety, and stress symptoms on virtual (iEAT) to traditional (EAT) and to provide a deep investigation about how traditional therapy EAT alleviated depression, anxiety, and stress.

It was hypothesized that the iEAT and EAT would reduce the degree of depression, anxiety, and stress symptoms at a similar level.

Methods

To compare the virtual (iEAT) with traditional (EAT), the present study applies quantitative approaches in a repetitive measure of three situations, virtual, traditional and relaxation. A counterbalance order is employed to reduce bias.

Participants

There were 50 non-clinical participants, males and females who volunteered for this study. All participants were required to provide valid informed consent upon the agreement of their participation. They were informed that their participation is anonymous, and the result is used only for this study for academic publications and purposes. All participants attended three tests with a two-day gap interval in counterbalance order (Babbie, 2010). No equine-related experience was needed, and the study did not explicitly recruit only participants with major depressive symptoms. Only participants who completed all three treatments were included in the study.

Procedure

To compare virtual (iEAT) with traditional (EAT), the participants were randomly grouped into three main groups based on three different conditions: online, physical, and relaxation as the control group.

The participants had first received the information letter and had been briefly explained about the overall study. Those who agreed to participate, signed the consent form, and underwent the therapy in three different situations with two days25 intervals in between in counterbalance order.

During the online session, the participants were asked to visit the iEAT website (https://www.iequinetherapy.com/) and complete the session by using a smartphone or laptop with internet coverage. The website contains five videos of the main equine-assisted therapy activities: bathing, grooming, leading, and tacking up. The participants were asked to watch equine activities whereby each video consists of 5 to 10 minutes. The audio/video was displayed on the website upon clicking.

After the participants watched the videos, they were asked to read to form an image in their mind about all the activities each at their real-time. They are advised to try to involve all senses during the session; touched, sensed, and felt interacted with horses. Once they finished the imagery session, they rated the Depression, Anxiety, Stress Scale-21 (DASS-21) form and the questionnaires about their experience in performing imagery.

For the physical session, the participants completed the session at the stable and did the ground horse activity; grooming, bathing, tacking up, and leading horses. Each participant had experience in horse handling activity physically and interaction with the horse. The activities selected were based on the evidence from a previous study. Once they finish, they were asked to complete the DASS-21 form.

As for the relaxation session, the participants were seated in a room and relaxed or did any activity that was not involve any equine-assisted therapy within 20 minutes. After 20 minutes, the participants were asked to complete the DASS-21 form. At the end of their final visit, all of the participants have received cash as a token of appreciation in participating in the study and completed the feedback form.

Measures

Depression, Anxiety, Stress Scale-21. The DASS-21 is a 21-item questionnaire that measures depression, anxiety, and stress symptoms26. DASS-21 was thought to be the most appropriate measure of the symptoms. Each participant was given a short briefing before engaging in the physical horse activity and imagine the horse activity as instructed. The rating was made on a 3 Likert type scales ranging from 0 (*never*) to 3 (*almost always*). There are three subscales; depression, for items 3, 5, 10, 13, 16, 17, 21, anxiety, 2, 4, 7, 9, 15, 19, and 20 and stress 1, 6, 8, 11, 12, 14, and 18. Each scale has seven items, and the total score is based on sum up the items belonging to that scale. Higher scores indicate greater symptoms of depression, anxiety, and stress.

Data Analysis

The data were statistically described using some graphical analysis and numerical measures. To generalise the findings to a larger context, some statistical inferences were conducted which are primarily repeated measure analysis of variance (ANOVA) as well as post-hoc analysis of Bonferroni method. The repeated measure ANOVA and the Bonferroni post-hoc analyses aimed to examine the difference in therapy effectiveness measured in terms of depression, anxiety, and stress changes. Repeated measures ANOVA and Bonferroni test were run respectively in the R *stats* package27.

Results
Characteristic of the Participants

Fifty participants volunteered to participate in the study (7 males, 43 females; Aged: *M* = 1.54, *SD* = 0.61). There were no missing values in this study. As shown in Table 4.1, the total number of participants was (*N* = 50), the observed age of participants from 18 to 24 years old, 25 to 34 years old, and 45 to 54 years old. There were about (*N* = 24) participants who had experience with horses and (*N* = 26) without experience with horses. The details of the characteristics of participants are presented in Table 1 below.

Table 1
Characteristics of participants for iEAT intervention, traditional therapy, and relaxation therapy.

Variables	Frequency (N)	Percent (%)
Gender		
Male	7	14
Female	43	86
Age		
18-24	25	50
24-34	24	48
45-54	1	2
Status of employment		
Employment	13	26
Student	37	74
Marital Status		
Single	46	92
Married	4	8
Horse Experience		
Yes	24	48
No	26	52

Note. 50 participants underwent all three therapy conditions.

Virtual iEAT and traditional EAT effect on depression, anxiety, and stress symptoms

The result of the one-way repeated measures ANOVA revealed there was no significant difference between the DASS-21 score for depression symptoms between the physical, online, and relaxation therapy, $F(2,98) = 2.943$, $p = .0574$. Bonferroni post hoc analysis reported there was no significant difference in DASS-21 score in the online therapy and physical therapy compared to the relaxation therapy ($p > .05$).

Meanwhile for anxiety symptoms revealed there is no significant difference in DASS-21 between the conditions with $F(2,98) = 2.402$, $p > .1$. Bonferroni post hoc analysis also reported there is no significant difference found in physical, online, and relaxation situations ($p > .05$).

The post-hoc analysis for stress symptoms a significant difference between the three treatments using DASS-21, $F(2,98) = 5.469$, $p = .0056$. Hence, the Bonferroni post hoc analysis revealed that participants significantly differed in relaxation therapy ($p < .01$) compared to online and physical therapy ($p > .05$). The post hoc analysis and the average score in depression, anxiety, and stress symptoms between three treatments as stated in table 2 and figure 1 below.

Table 2
Post-hoc analysis in depression, anxiety, and stress between three treatments.

Treatment 1	Treatment 2	*p value*	*M*	*SD*
Depression				
Online	Physical	0.084*	11.06	3.48
Relaxation	Online	0.222*	10.52	3.36
Physical	Relaxation	1.000*	10.32	3.28
Anxiety				
Online	Physical	1.000*	11.76	3.91
Relaxation	Online	0.097*	10.86	3.39
Physical	Relaxation	0.459	11.42	3.87
Stress				
Online	Physical	0.014	13.20	3.81
Relaxation	Online	0.008	12.08	3.92
Physical	Relaxation	1.000*	12.14	3.31

Note. * = no significant difference in physical and online therapy at $p < .05$, *M* = mean, *SD* = standard deviation.
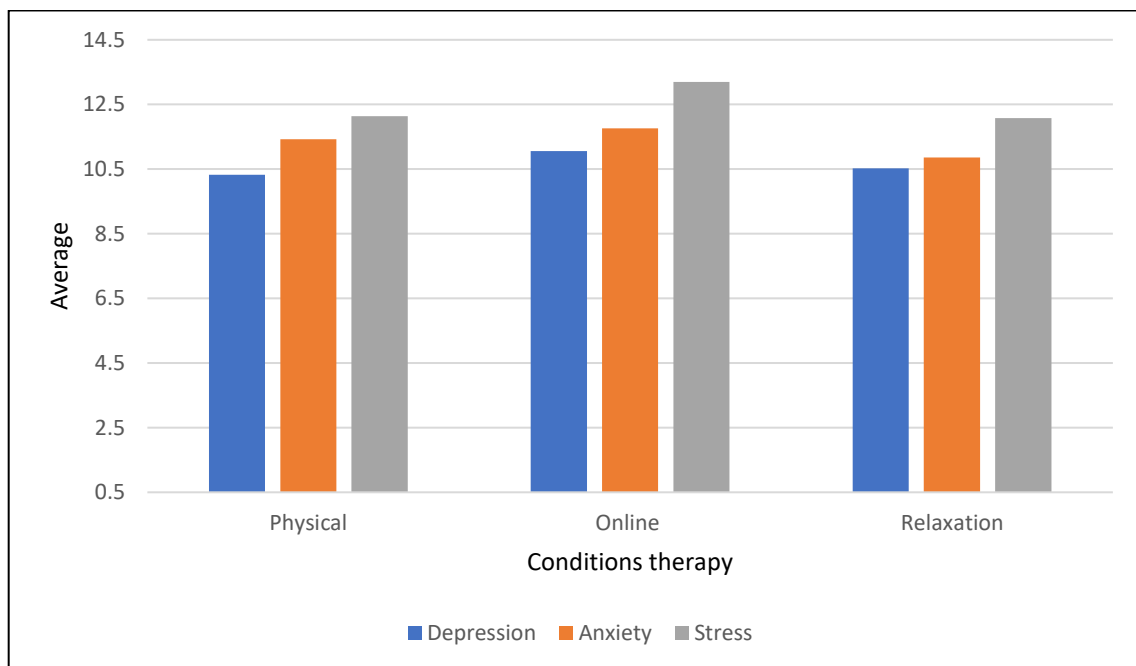

Figure 1. Bar graph for average depression, anxiety, and stress score in physical, online and relaxation therapy.

Discussion

The aim of the present study was to compare the effect of virtual (iEAT) to traditional EAT on depression, anxiety, and stress symptoms. The evidence from the recent study overall supports the hypotheses. The result of our study showed the iEAT intervention can reduce depression, anxiety, and stress symptoms using imagery techniques as explained in the functional equivalence theories. The virtual (iEAT) and traditional EAT may differ in many aspects, but the common goals are improving physical activity and function with depression, anxiety, and stress symptoms.

According to the findings, there is no significant difference in reducing anxiety and depression symptoms compared between virtual (iEAT) and traditional EAT indicating that virtual (iEAT) can be suggested to replace traditional therapy (EAT) regarding the imagery technique applied. This can be based on the functional equivalence theory as the horse therapy activity can enhance the real situation in daily life using the sense of auditory and visual during the imagery (Johnson, 1982).

The result has also shown a significant difference in reducing stress symptoms as this is found between virtual (iEAT) and control (relaxation). However, there was no difference in reducing the stress symptoms in participants found in physical and online treatment. This revealed that participants found engaging in relaxation activity to be significantly more helpful in reducing the stress symptoms than using either iEAT or EAT. The reason for this could be a non-judgmental from a horse and the focused awareness of the horse had encouraged the reduction of stress symptoms (Earles et al., 2015). This idea was supported by Klontz (2007) who found the reduction of stress and gave a positive impact in life settings. However, the findings derive from EAT training in online techniques and provided a non-confounded test of its effect.

Limitation

The limitation of the current study is the participants have more females than males. As this present study was randomly assigned to the participant. However, it is believed that gender would not contribute to the difference. If it does, future research needs to explore the difference between populations. Nevertheless, the occurrence of the Covid-19 outbreak also could give an impact on the data collection process, but this limitation was encountered, and the data collection was conducted smoothly until the end of the experiment.

Theoretical and Contextual Contribution

The results of the study suggest that virtual (iEAT) may be a useful addition to the traditional (EAT). The findings revealed that EAT reduces depression, anxiety, and stress symptoms whether in traditional delivery or virtual. As support, the virtual (iEAT) can useful during pre-therapy (Anderson, Annett, Bischof & Boulanger, 2010) to utilize more often in psychological treatment to treat and reduce early symptoms (Klontz et al., 2007). The data from this study suggest that using virtual (iEAT) can act as a stimulus to elicit the mental health issue for people with depression, anxiety, and stress symptoms. The results show there is no difference between imagery virtual (iEAT) and traditional (EAT) related to DASS-21 during intervention reported in coping with the symptoms. In which, in turn to the decrease of depression and anxiety symptoms beneficially gave impact to have better quality lives. The data also established the usability of online equine therapy based on participant's feedback in implementing imagery techniques in the therapy.It is also suggested that virtual (iEAT) can replace the traditional (EAT) under the circumstances and is found a cost-effective method for the EAT. Otherwise, it can also supplement the traditional (EAT). It is still unknown the effectiveness of virtual, traditional and relaxation therapy to treat mental health problems in a clinical setting. This finding opens an avenue for future research to focus on the suggested concern.

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