

People and Animals: The International Journal of Research and Practice

Volume 3 | Issue 1

Article 3

2020

Are Nurses Joining the Ride? Equine-Assisted Activities and Therapies Review

Khalid Bandar Almasloukh
Binghamton University, kalmasl1@binghamton.edu

Pamela Stewart Fahs
Binghamton University, psfahs@binghamton.edu

Follow this and additional works at: <https://docs.lib.purdue.edu/paij>



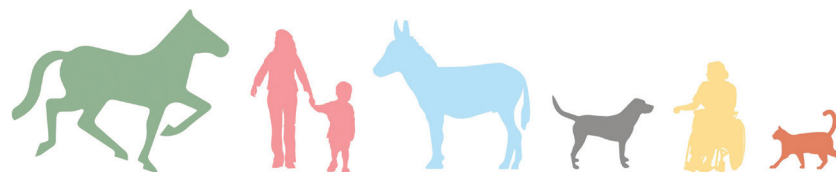
Part of the [Alternative and Complementary Medicine Commons](#), and the [Nursing Commons](#)

Recommended Citation

Almasloukh, Khalid Bandar and Fahs, Pamela Stewart (2020) "Are Nurses Joining the Ride? Equine-Assisted Activities and Therapies Review," *People and Animals: The International Journal of Research and Practice*: Vol. 3 : Iss. 1, Article 3.

Available at: <https://docs.lib.purdue.edu/paij/vol3/iss1/3>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.



People and Animals: The International Journal of Research and Practice

Volume 3 | Issue 1 | ISSN: 2575-9078

(2020)

Are Nurses Joining the Ride? Equine-Assisted Activities and Therapies Review

Khalid Bandar Almasloukh¹ and Pamela Stewart Fahs¹

Keywords: equine-assisted activities and therapies, therapeutic horse riding, nursing, rural

Abstract: Background: Equine-assisted activities and therapies (EAAT) is a rapidly growing practice that is described as therapeutic and entertaining. Complementary therapies such as EAAT are gaining acceptance as the health care needs of the population are changing.

Method: This systematic review draws from four databases. The final review included 52 articles.

Purpose: To explain what is known about EAAT and identify literature gaps. Nursing and rural perspectives are included in the analysis and recommendations.

Findings: There are more than eight types of EAAT and different organizations around the world are providing certification for EAAT. Rural communities and organizations may benefit from the availability of EAAT programs. Although hippotherapy research tends to have stronger study designs, most of the reviewed studies were descriptive, not randomized-control trials. Lack of evidence regarding the effect of EAAT prevents some health care providers from referring their clients to EAAT and allows insurance companies to avoid reimbursing for this alternative therapy.

Recommendations: More research is needed. Although sociologists, psychotherapists, and physiotherapists are using this complementary therapy and publishing in this field, nurses have made minimal contributions to date. As an avenue for improving health, nurses should consider conducting EAAT research.

Introduction

This systematic review analyzes three years of research on equine-assisted activities and therapies

(EAAT). The aim of this review is multifaceted: to (a) identify terms used in the research, (b) critique the scientific merit of the research, (c) identify what is known and where gaps exist in the literature, and

(1) Binghamton University

(d) discuss how nursing as a discipline may contribute to and benefit from EAAT.

Equine-assisted activities and therapies (EAAT) is one of the broadest and most encompassing terms and is utilized throughout this review. One organization (Professional Association of Therapeutic Horsemanship International [PATH Intl.], n.d.a) defines different types of EAAT as shown in Table 1. Furthermore, some authors used other terminologies and definitions

as shown in Table 2. Standardized definitions for EAAT types between PATH Intl. and other organizations are under consideration (R. Braun, personal communication, September 23, 2018).

There is a long history of interactions between humans and horses. The popularity of utilizing horses in interventions to improve health has been increasing in the last few decades, although the science of EAAT effectiveness is relatively young. Identification

Table 1 PATH Intl. List and Definitions of EAAT

Type	Definition
Equine-Assisted Activities (EAA)	"Equine-assisted activities are any specific center activity, e.g., therapeutic riding, mounted or ground activities, grooming and stable management, shows, parades, demonstrations, etc., in which the center's clients, participants, volunteers, instructors and equines are involved."
Equine-Assisted Therapy (EAT)	"Equine-assisted therapy is treatment that incorporates equine activities and/or the equine environment. Rehabilitative goals are related to the patient's needs and the medical professional's standards of practice."
Equine-Assisted Learning (EAL)	"Equine-assisted learning (EAL) is an experiential learning approach that promotes the development of life skills for educational, professional and personal goals through equine-assisted activities."
Equine-Facilitated Psychotherapy (EFP)	"EFP is defined as an interactive process in which a licensed mental health professional working with or as an appropriately credentialed equine professional, partners with suitable equine(s) to address psychotherapy goals set forth by the mental health professional and the client."
Hippotherapy	"The American Hippotherapy Association, Inc., defines hippotherapy as a physical, occupational or speech therapy treatment strategy that utilizes equine movement. The word hippotherapy derives from the Greek word hippos, meaning horse. The term hippotherapy refers to the use of the movement of the horse as a treatment strategy by physical therapists, occupational therapists and speech/language pathologists to address impairments, functional limitations and disabilities in patients with neuromotor and sensory dysfunction. This treatment strategy is used as part of an integrated treatment program to achieve functional goals."
Interactive Vaulting	"Interactive Vaulting is an activity in which the students perform movements on and around the horse. These movements can be very simple such as sitting without holding onto the surcingle or a more elaborate vaulting position move such as kneeling or standing on the horse. It all depends on the individual needs of the vaulter."
Therapeutic Driving	"Carriage Driving offers students with physical, mental, sensory or emotional disabilities the rewards of interaction and control of a horse or pony while driving from a carriage seat or in their own wheelchair in a carriage modified to accommodate their wheelchair."
Therapeutic Riding	"Therapeutic riding is an equine-assisted activity for the purpose of contributing positively to the cognitive, physical, emotional and social well-being of individuals with special needs."

Note. Adapted from Professional Association of Therapeutic Horsemanship International (PATH Intl.). (n.d.a). With permission. Retrieved from <https://www.pathintl.org/resources-education/resources/eaat/193-eaat-definitions#vaulting>

Table 2 Terms as Defined in the Literature

Type	Definition	Reference
Hippotherapy	"Defined as a physical, occupational or speech therapy treatment strategy that utilizes equine movement, usually as part of an integrated treatment program to achieve functional outcomes."	(Homnick et al., 2015, p. 119)
Equine-Assisted Interventions (EAI)	"Equine-assisted interventions (EAI) is the collective term used to refer to programs incorporating the role of the horse to provide rehabilitative and educational benefits to the participant."	(Kendall et al., as cited in Tan & Simmonds, 2018, p. 760)
Equine-Assisted Psychotherapy (EAP)	"A collaborative treatment method facilitated by a qualified mental health professional, an equine specialist and one or more horses working together with the client to achieve the client's therapy goals."	(EAGALA, as cited in Wilson et al., 2017, p. 19)
Equine-Assisted Activities and Therapy/ies (EAA/T, EAAT)	A term that included EAA and EAT. PATH Intl. (n.d.) uses EAAT as most inclusive term for EAA and EAT.	(Yoo et al., 2016) EAAT used also by PATH Intl. (n.d.a)
Equine-Facilitated Mental Health (EFMH)	Not found	(Ferruolo, 2016)

of the benefits of EAAT goes back to Hippocrates who described horseback riding as a "universal exercise" (as cited in Anderson & Meints, 2016). However, according to one source, "While there is no doubt regarding the increasing popularity of equine based interventions with practitioners and clients, there is a serious risk of this popularity outstripping the science" (Nelson et al., 2016, p. 352).

Lack of supporting evidence of EAAT may have a range of effects that leads some clients and health care providers to avoid utilizing what may be an effective intervention. Until there is solid scientific evidence of a therapy, insurance plans will seldom reimburse for that intervention (Wilson et al., 2017). Nursing has an opportunity to contribute to knowledge development through theory, research, and application in practice.

Research Question

The main question for this review was derived from the goal to find and expand knowledge about EAAT as it relates to nursing and rural populations. Therefore, the research question is: What is known about

EAAT from a nursing and rural perspective for vulnerable populations?

Method

This systematic review covers peer-reviewed studies from 2015 to mid-2018. The review is limited to peer-reviewed academic journals published in English. The English-only criterion was chosen since only one author is multilingual; however, some studies did occur in primarily non-English-speaking countries (e.g., Korea). Databases searched include CINAHL Complete, MEDLINE with Full Text, PsycINFO, and Social Sciences Full Text. The search terms were: Equine assisted therapy OR horse n5 health OR horse n5 therap* OR therapeutic horseback riding OR hippotherapy. Utilizing "n5" shows the articles that included the searched terms when the terms (horse and health) are within five words from each other.

Initially, 109 articles were found (see Figure 1). Duplicates (24) were removed. Exclusion of an additional 35 articles occurred for the following reasons: nonresearch, editorials, systematic reviews, unrelated to EAAT, and non-English. The focus of

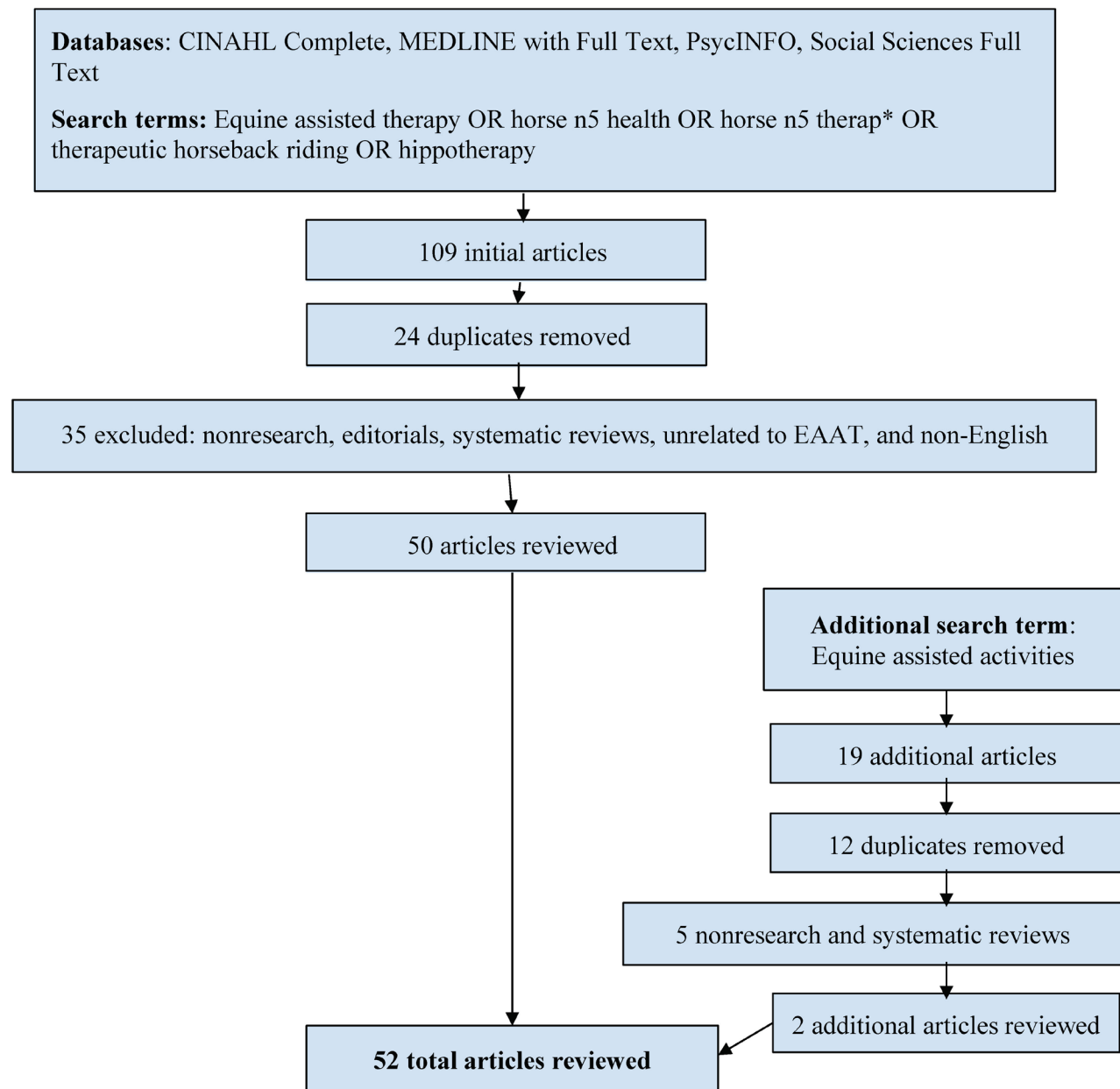


Figure 1. Systematic review process.

this review is engaging with the horse to treat the human, thus articles on the treatment of horses were excluded. Finally, 50 articles were reviewed; those not cited elsewhere in the text or tables are noted by an asterisk in the references.

An additional search was conducted using the keyword equine-assisted activities in the same four databases and applying the same inclusion and exclusion criteria. Nineteen English peer-reviewed academic

journal articles were found. Twelve of these articles were duplicates or already included in the initial search. After conducting a manual review of each remaining article, five articles were excluded for the following reasons: not research, meta-analysis, or systematic review. Only two additional articles were included (Hauge et al., 2015; Hyun et al., 2016).

Quantitative, qualitative, and mixed methods articles were included in this review. A hierarchy of

levels of evidence was used for deciding the inclusion for review as well as part of the critique of each article (Fineout-Overholt et al., 2010). The hierarchy consists of seven levels. Levels one and five, quantitative and qualitative systematic reviews and meta-analysis articles, and level seven, expert opinion articles, are excluded. All remaining levels are included.

Results

In summarizing what is known about EAAT, it became clear that multiple terms were used in the literature. Anderson and Meints (2016) and Tan and Simmonds (2018) referred to PATH Intl. definitions and classifications. A number of other authors mentioned PATH Intl. (Garner & Rigby, 2015; Llambias et al., 2016; Mueller & McCullough, 2017; Wilson et al., 2017; Yoo et al., 2016). In addition, Lac (2017), who is in the discipline of psychology, identified as a PATH Intl. instructor.

Equine-assisted activities and therapies is described as supplemental, complementary, adjunct, or alternative treatment that aims to provide additional benefits to the client (Davis et al., 2015; Yoo et al., 2016). No article considered EAAT as the main or primary intervention for health problems. In other words, no author recommended that EAAT replace any common medical interventions such as medication or surgery. Five studies described EAAT as joyful and as an entertainment activity that simultaneously provides therapeutic benefits (Davis et al., 2015; Dunlop & Tsantefski, 2017; Guerino et al., 2015; Hajjar et al., 2016; Tan & Simmonds, 2018). Indeed, EAAT is an additional recreational activity that may assist in meeting therapeutic goals.

Although EAAT is considered as supplemental therapy, it may involve enhancing parts of vital organs and overall systems such as the cardiovascular and respiratory systems, and the brain. Costa et al. (2015) reported that hippotherapy enhanced the inspiratory and expiratory strength in children (ages 7–13 years old) with Down syndrome. However, the difference was not statistically significant. Participants ($N = 41$) were divided between experimental

($n = 20$) and control groups ($n = 21$). No power analysis was reported. The lack of significance may be due in part to the low sample size.

A statistically significant difference was noticed in cardiovascular measurements including heart rate and blood pressure between rest and during the horse riding for youth with and without cerebral palsy (CP) (Rigby et al., 2017). Moreover, Cabiddu et al. (2016) illustrated that one session of hippotherapy produced a statistically significant difference on heart rate variability in clients with neurological disorders in a physiologic study using portable telemetry.

In addition to the effect on the cardiovascular system, EAAT may improve the neurological system. Yoo et al. (2016) showed that EAAT enhanced brain function and connectivity for children with attention deficit hyperactivity disorder (ADHD) as evident with resting-state functional magnetic resonance imaging (rs-fMRI). Hyun et al. (2016) conducted a similar study that used functional MRI to examine the difference in brain connectivity for 12 healthy children and 12 children with ADHD after receiving EAAT for 4 weeks and found that brain connectivity improved for both groups in addition to improvement in gait and balance.

Organizations

A few organizations provide EAAT certifications. Those organizations include PATH Intl., Equine-Assisted Growth and Learning Association (EAGALA), American Hippotherapy Association, Equine-Assisted Mental Health, and Gestalt Equine Institute of the Rockies (Garner & Rigby, 2015; Nelson et al., 2016; Wilson et al., 2017; Yoo et al., 2016). Each of these organizations has its own programs, history, and clients. For example, the American Hippotherapy Association (founded in 1992) provides specific therapeutic programs through physical, occupational, and speech specialists (Hyun et al., 2016).

There are two international nonprofit organizations, PATH Intl. and EAGALA, with some similarities and some differences between these entities (Wilson et al., 2017). For instance, EAGALA provides programs that allow individuals to engage with horses

but not for riding, promoting ground-based work, and seems to specialize in psychotherapy interventions. The organization PATH Intl. provides therapeutic horse riding (THR), hippotherapy, and vaulting programs. Some countries may have their own national organizations, such as the Equine-Assisted Psychotherapy Institute in South Africa, Equine Psychotherapy Australia (Johns et al., 2016), and the Korean Ministry of Agriculture (Yoo et al., 2016).

Age Range and EAAT

Only one study used a subject as young as three years old (Tan & Simmonds, 2018). Three articles used 4 years as the start age of the client (Cabiddu et al., 2016; Kwon et al., 2015; Llambias et al., 2016). The highest participant study ($N = 123$) included stroke survivors ages 50–75 years old (Bunketorp-Kall et al., 2017). The upper age limit identified in the literature was 70, the maximum age for three studies (Davis et al., 2015; Schneider & Harley, 2016; Schroeder et al., 2018). Thus, the usual riders' ages range from 4 to 70 years old.

Risks and EAAT

Most authors focus on the potential benefits from participating in EAAT, while a few described the potential risks, considering EAAT as a double-edged sword (Dunlop & Tsantefski, 2017). Davis et al. (2015) stated at the end of the article that a horse may cause negative outcomes that might expand beyond physical injuries to include financial and time burdens, as well as stress. Kwon et al. (2015) reported two participants falling, which led one participant to drop out; however, no serious injuries such as fracture or brain injury developed as sequelae to the falls.

Journals Publishing EAAT Studies

Although some journals published more than one article about EAAT in the reviewed period (see Table 3), many journals published only one article. This low rate of publication on the topic may indicate there is room for more journals to publish EAAT

Table 3 Journals with EAAT Articles

Name of the Journal	Number of Articles
<i>Journal of Autism and Developmental Disorders</i>	3
<i>Journal of Alternative and Complementary Medicine</i>	2
<i>Journal of Creativity in Mental Health</i>	2
<i>Research in Developmental Disabilities</i>	2
<i>Journal of Psychology in Africa</i>	2

work. No dominant journal that focuses on EAAT emerged in this review, raising the question, is there a need for an EAAT-focused research journal?

Scientific Merit

One of the reasons why a journal may refrain from publishing in the field of EAAT is the scientific merits of the work. Although the highest and the lowest levels of evidence, levels one and seven, are excluded in this review (Fineout-Overholt et al., 2010), most of the articles are clustered in the lowest included level, level six, utilizing the hierarchy of levels of evidence. Twenty-one articles are qualitative or descriptive studies, level six. The rest of the articles are divided between levels two, three, and four. Conducting research at a higher level of evidence should lead to more publishable EAAT manuscripts. Since all reviewed articles were in peer-reviewed journals, some scientific merit is assumed.

An obvious area of concern is research with low sample sizes. Articles' sample sizes in this review range from 1 to 123 participants. There is only one study that had 123 participants, and the next highest sample size is 105, followed by 92 participants. Around half of the studies ($n = 25$) use sample sizes that did not exceed 20 participants. One author (Carlsson) published three qualitative articles over three different years (Carlsson, 2017, 2018; Carlsson et al., 2015), using the same or very similar four clients and three staff members to answer different

research questions from videotaped sessions and interviews.

Hippotherapy among all other types of EAAT seemed to have the most developed research with specific and well-designed studies. This research even extended to examine the surface and differences between the real horse and the automated simulated horse. Many included the term “hippotherapy” in the title of the article (Antunes et al., 2016; Cabiddu et al., 2016; Costa et al., 2015; Flores et al., 2015; Guerino et al., 2015; Kwon et al., 2015; Pham & Bitonte, 2016; Rigby et al., 2017). Those articles tend to have the larger sample sizes, 92, 41, and 40 participants, compared to other articles in this review (Costa et al., 2015; Kwon et al., 2015; Pham & Bitonte, 2016).

Diagnoses and EAAT

Many studies showed the use of EAAT as an intervention for a specific diagnosis, including autism, ADHD, CP, and posttraumatic stress disorder (PTSD). Several authors studied the relationship between EAAT and autism (Anderson & Meints, 2016; Borgi et al., 2016; Gabriels et al., 2015; Llam-bias et al., 2016; Tan & Simmonds, 2018). Attention deficit hyperactivity disorder (ADHD) was another commonly studied diagnosis in the EAAT research (Garcia-Gomez et al., 2016; Jang et al., 2015; Yoo et al., 2016). Furthermore, CP was a frequently studied diagnosis in this field (Ammann-Reiffer et al., 2017; Antunes et al., 2016; Kwon et al., 2015; Rigby et al., 2017). Finally, PTSD was commonly discussed (Earles et al., 2015; Merkies et al., 2018; Mueller & McCullough, 2017; Steele et al., 2018).

At least one study showed a positive result associated with EAAT in treating PTSD (Earles et al., 2015). However, Mueller and McCullough (2017) compared the PTSD symptoms between an intervention group and a control group, while the intervention group received equine-facilitated psychotherapy that included ground-based and mounted activities, and the control group received a standard intervention. The decrease in the PTSD symptoms was not significant compared to the control group, although

both groups had a significant decrease in symptoms post 10-week interventions.

Some studies suggested veterans and military professionals may gain benefits from participating in EAAT. These benefits include improving self-esteem, trust, and decreasing psychological issues (Ferruolo, 2016). Moreover, Steele et al. (2018) conducted a study on 85 military and veteran participants who suffer from combat trauma and showed statistically significant improvement in PTSD, depression, and negative effect of traumatic military experiences. The intervention included EAAT and other types of alternative and complementary therapies such as yoga and writing. Finally, Steele et al. (2018) suggested the importance of equine use in this therapeutic program using a variety of alternative and complementary therapies.

Another diagnosis is ADHD. Although Garcia-Gomez et al. (2016) conducted a government-funded classical experimental study in Spain on 18 children with ADHD and recommended the engagement in horseback riding as sport and not as therapy, there is some evidence for using EAAT for ADHD. Three different quasi-experimental studies in Korea that used advance physiologic assessment such as functional MRI supported the engagement in EAAT for people with ADHD for its therapeutic effect (Hyun et al., 2016; Jang et al., 2015; Yoo et al., 2016). On the other hand, Garcia-Gomez et al. (2016) utilized fewer advance assessment scales. Thus, the evidence that supports the engagement in EAAT for ADHD population is prominent.

EAAT and Psychological and Social Wellness

A few articles aimed to examine the relationship between EAAT and two specific psychological disorders: depression and anxiety (Alfonso et al., 2015; Earles et al., 2015; Ferruolo, 2016; Wilson et al., 2017). Authors showed a statistically significant decrease in social anxiety, anxiety symptoms, and depression. According to the findings from therapists, EAAT decreases undesirable behavior and improves confidence, assertiveness, and self-esteem (Wilson et al., 2017).

Schneider and Harley (2016) conducted a study that showed a comparison between horseback riding and skiing for 35 individuals who have physical disabilities. Depression scores, using the Beck Depression Inventory (BDI-II), decreased significantly in both groups. Horseback riders had more statistically significant benefits in feeling more hopeful, social, confident, and in self-esteem, and skiers were more likely to take risks. Finally, Schneider and Harley (2016) suggested that when programs offer EAAT, they provide better mental health than when programs do not provide equine activities.

Beyond the psychological benefits of EAAT, some authors focused on social benefits including developing the social network, improving social awareness, and seeking social help when needed. Anderson and Meints (2016) suggested the use of EAAT in reducing social dysfunction, although no statistically significant difference was found in a sample of 15 children and adolescents with autism spectrum disorder. Borgi et al. (2016) stated that EAAT improved social functioning during problem-solving. In one experimental study, EAAT improved social support seeking when needed ($p \leq 0.0002$) (Boshoff et al., 2015). A qualitative study showed improvement in social aspects of (a) feeling comfortable around people, (b) being able to make friends including finding a best friend, (c) being friendly, and (d) being a successful team member (Dunlop & Tsantefski, 2017). Hauge et al. (2015) explained that being around horses in a farm environment has some challenges that necessitate the need to work as a group to overcome these challenges, which leads to the development of a supportive environment.

In a case study of two girls ages 18 and 21 years old, who were sexually abused during their childhood and developed limitations as a result of the sexual abuse experience, hippotherapy showed improvement in physical and social aspects of their health (Guerino et al., 2015). Socialization and improving communication were benefits that riders and volunteers in therapeutic horseback riding gain (Davis et al. 2015; Hajjar et al., 2016). In this review, social benefits from participating in EAAT are supported by many authors in addition to those

mentioned above (Jang et al., 2015; Nurenberg et al., 2015; Schneider & Harley, 2016; Tan & Simmonds, 2018; Tsantefski et al., 2017; Wilson et al., 2017).

In addition to improved psychological and social aspects of life, EAAT may improve communication and speech (Gabriels et al., 2015). A study of 116 children with autism spectrum disorder used classical experimental design and several instruments including the Vineland Adaptive Behavioral Scales—2nd edition (VABS-II), Systematic Analysis Language Transcripts (SALT), Aberrant Behavior Checklist—Community (ABC-C) for social aspects and speech, and the Social Responsiveness Scale (SRS). This study found that EAAT significantly improved socialization, social communication, number of used words, and new words (Gabriels et al., 2015). Indeed, in other studies, EAAT enhanced communication skills for riders and volunteers (Hajjar et al., 2016; Johansen et al., 2016). There are a number of speech therapists who use EAAT for their clients (Pham & Bitonte, 2016). In contrast, Anderson and Meints (2016) stated that EAAT still can be used for social dysfunction, although there was no statistically significant improvement noted in communication and socialization as detected by the Vineland Adaptive Behavior Scale (VABS) on 15 children with autism spectrum disorder. Larger sample sizes may help resolve the conflicting findings in studies.

Theories, Concepts, and Scales

A few theories are used in research in EAAT. For example, attachment theory was used in a qualitative study that aimed to describe the relationship between a client who suffered from substance use disorder and EAAT intervention (Kern-Godal et al., 2016). This study reports that the client viewed the horse as a friend who provides mutual respect, acceptance, understanding, and interaction; the client saw the horse as listening when the client talked, and as helping the client to understand his/her emotion more clearly. These findings are similar to Lac's (2017), who used the existential integrative theoretical framework for a female client who suffered from anorexia nervosa. Lee and Makela (2018) explained

that EAAT provides a holistic framework utilizing systems theory.

Although the Roy adaptation model (RAM), a theory in nursing, was not discussed and mentioned per se in any article in this review (Roy, 2009), RAM's elements, including adaptation and stimulation, were found. Adaptation measuring scales were found frequently in this review. Three different studies measure adaptation using one scale, VABS, with two versions (Anderson & Meints, 2016; Borgi et al., 2016; Gabriels et al., 2015). The stimulation concept appears in the review. For example, Garner and Rigby (2015) considered therapeutic horseback riding beneficial because it produces pelvic muscle stimulation. Moreover, Guerino et al. (2015) concluded that hippotherapy was effective and can produce physical, cognitive, emotional, and social stimuli. Johns et al. considered the horse as a catalyst for healing (2016).

Several concepts beyond adaptation were mentioned frequently in this review. These concepts include coping, satisfaction, self-esteem, self-efficacy, mastery of fears, and persistence. For example, a study measured coping and life satisfaction for 39 boys (ages 14–18 years old) using instruments of the Coping Orientations to the Problems Experienced Scale (COPE) and Satisfaction with Life Scale (SWLS). The study showed statistically significant improvements in coping and satisfaction, and p values less than .0001 and less than .0055, respectively (Boshoff et al., 2015). Dunlop and Tsantefski (2017) identified improved self-efficacy and mastery of fears in a qualitative study of children ($N = 33$) ages 7–13 who suffered from problematic parental substance use (PPSU). Finally, Hauge et al. (2015) showed how persistence improved in relation to self-esteem, self-efficacy, and perceived social support when a quantitative study on 25 adolescents engaged in horseback riding and stable working for 4 weeks was conducted.

There are several indications that suggest a nursing researcher may study EAAT within the RAM framework (Roy, 2009). First, concepts including adaptation, coping, and stimuli are extensively found in both EAAT and RAM literature. Second, RAM has been used in animal activities and therapies (AAT)

research. The International Association of Human-Animal Interaction Organizations (IAHAIO) defined AAT as “a goal oriented, planned and structured therapeutic intervention directed and/or delivered by health, education or human service professionals, including e.g. psychologists and social workers” (IAHAIO, 2018, p. 5). Although the definition did not explicitly address nurses in comparison to psychologists and social workers, nurses as well as multidisciplinary teams may study AAT based on RAM. For example, M. R. Banks, from the nursing discipline, and W. A. Banks, from medicine, found a statistically significant decrease ($p = .001$) in loneliness for nursing home elders after AAT (Banks & Banks, 2002). Similarly, Calvert (1989), from the nursing discipline, reported a decrease in loneliness in nursing home residents who engaged with the puppies and kittens in a study guided with RAM. Third, over the years many nursing authors used RAM to guide studies that utilized exercises and physical activities for different age groups and diagnoses (Buckner et al., 2007; Reis et al., 2013; Tallier et al., 2017). A visual representation may assist the reader in conceptualizing the possible relationship of human-animal interactions and RAM. Figure 2 shows the flow of three consecutive steps in RAM, starting with stimuli from EAAT, with flow through the four adaptation modes (physiologic-physical, self-concept-group identity, role function, and interdependence), resulting in behavior that may generate new stimuli.

The concept of living authentically was defined as living according to one's beliefs, values, and standards (Jacobsen as cited in Lac, 2017). According to Lac (2017) in a single case study for a female with anorexia nervosa, when she talked, expressed her feelings, and interacted with the horse she understood that she had personal value in life, and this allowed her to live authentically. Kirby and Lac (as cited in Thomas, 2017) stated that one of the healing components in using horses was the authentic relationship between the client and the horse. This was consistent with another single qualitative case study of an adult with a psychiatric diagnosis who suffered from neglect because of the client's parent's drug abuse; expressing authentic self and assertiveness

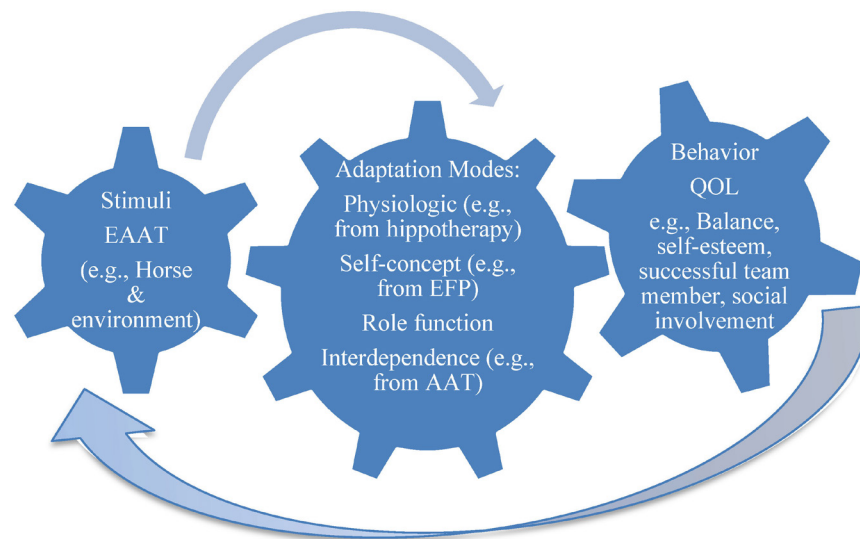


Figure 2. Representation of interaction of EAAT and Roy's adaptation model.

were considered as benefits from using horse-aided psychotherapy (Johansen et al., 2016).

In addition to the VABS that was used in three studies, there were three different scales used in more than one study. The Satisfaction with Life Scale was used in two different studies; each of these studies used other scales with this measure of life satisfaction (Boshoff et al., 2015; Earles et al., 2015). Nurenberg et al., (2015); and Schneider and Harley (2016) both utilized the Pet Attitude Scale–Modified along with other scales. Finally, other authors used a scale or scales that were not found in other reviewed articles; this may be due to the wide variations between topics of the articles.

Rural Area

Brown and Schafft (2019) defined *rural areas* conceptually as natural spacious places with smaller population sizes and more challenges compared to urban areas. This description of rural areas seemed consistent with some of the reviewed articles. Authors who studied the youth population with PTSD mentioned the environmental effect of being in the rural area and how that may increase the sense of autonomy (Mueller & McCullough, 2017). Alfonso et al. (2015) studied social anxiety in young women and explained that being in a remote area that is not

crowded may have some effect; therefore, Alfonso et al. (2015) suggested considering the environmental factor as a variable in future research. Kern-Godal et al. (2016) explained that EAAT is often provided in a rural-like setting. Finally, Hauge et al. (2015) described the EAAT environment as agricultural areas that have challenges.

Yoo et al. (2016) stated that EAAT instructors were certified from Food and Rural Affairs at the Korean Ministry of Agriculture. Similarly, Nelson et al. (2016) mentioned an Australian rural support organization that provides EAAT services.

Rural context may affect EAAT and clients, and a healthy rural environment may be associated with healthier horses and individuals. Theoretically, according to Roy (2009), situations are connected to contextual stimuli. The IAHAIO explained the One Health concept and stated that the health of the human in a location relates to the health of the animal and the health of the environment in the location (2018).

Standardization, Equipment, and Financial Burden

A few studies examined the importance of standardization in EAAT. For instance, Borgi et al. (2016) showed statistically significant improvement

in adaptation and social functioning when the researcher used standardized equine-assisted therapy. This standard provides specific activities, specific sequence, and specific duration of each activity. Similarly, Nurenberg et al. (2015) showed that EAAT in a psychological context was beneficial for aggressive psychiatric clients when researchers used standardized practices. Nelson et al. (2016) critiques large variations and less standardization among centers and stated that, after reviewing three centers that had EAGALA certification, only one center followed the EAGALA standards strictly.

One area that needs standardization is terminologies. This review found multiple definitions and used EAAT to refer to various terminologies (Tables 1 and 2). The IAHAIO has also noted the use of varying terminologies in different types of human-animal interactions in general and has developed standardized global definitions for some vital terms to fill some gaps in theory, practice, and research (2018). The IAHAIO (2018) defined the term animal-assisted activity (AAA) as “a planned and goal oriented informal interaction and visitation conducted by the human-animal team for motivational, educational and recreational purposes” (p. 5). The use of a standardized definition may allow nurses and other professionals to discuss AAA from a wider perspective. For example, Johnson, from the nursing discipline, studied AAA and stated that AAA “meets the National Institutes of Health definition of mind-body intervention complementary therapy” (Johnson et al., 2008, p. 226).

Standardization may need to go beyond terminology. Clearly identifying operational definitions of factors such as type, duration, and sequencing of activity would help in the comparison of research across studies. Contextual factors such as horse breed and equipment are areas where further research may be warranted. No evidence was found that illustrated the optimal horse breeds for each therapeutic purpose. Hauge et al. (2015) worked with cold blood horses, Norwegian and Icelandic breeds, for a study in Norway. On the other hand, Nelson et al. (2016), after reviewing five centers in Australia,

stated that one center was working with nine Arabian horses. Cabiddu et al. (2016) used a surcingle with horse blanket for 12 children ages 4–12 years old who had neurological disorders in order to maximize the clients’ benefits from the warmth and multidimensional movement of the horse. A surcingle is a tool that allows riding without the saddle and may have a handle to allow the rider to hold on. Kwon et al. (2015) used soft saddles for 46 children with CP to maximize the contact between the horse and child. Studying horse breed, the effect of the horse’s warmth, multidimensional movement, and other aspects as yet under- or unstudied may provide a clearer understanding of EAAT.

Financial issues were frequently mentioned, yet there was no information about the cost-effectiveness and total income and expenses for EAAT. For example, Nurenberg et al. (2015) stated that EAAT requires a lot of resources including financial resources. Pham and Bitonte (2016) conducted a survey that was completed by 40 centers in Southern California showing that financial barriers like the lack of health insurance to fund hippotherapy were the main obstacles that prevent rehabilitation centers from using hippotherapy. Nelson et al. (2016) explained that government funding, community organizations, and grants are needed to make EAAT accessible. Schroeder et al. (2018) showed that the lack of funds and qualified staff were the main logistical problems in offering EAAT. Studying the cost-effectiveness of EAAT is one of the recommendations from this review.

In addition to the cost-effectiveness recommendation, examining the relationship between EAAT and other dimensions of wellness within various fields is suggested. For instance, most studies focused on disciplines of physical therapy, occupational therapy, psychology, or social work, yet there are multiple health care disciplines working with clients who could benefit from EAAT. There was no reviewed study that measured the effect of EAAT on other dimensions of wellness such as financial, intellectual, spiritual, and environmental wellness. Focusing on these dimensions of wellness may show other benefits from EAAT.

Recommendations and Summary for Practitioners

Research is needed with a stronger sample size and design. The therapeutic benefits of EAAT have potential; however, a preponderance of evidence is needed for providers to have confidence in referrals and have insurance coverage for EAAT services. Conducting research studies about EAAT with the utilization of a defined theory is needed, especially since Nelson (2016) challenges the idea of one clearly defined theory behind EAAT. Namely, the use of a theoretical framework such as RAM to guide research in EAAT may lead to stronger scientific research.

Similarly, studying EAAT in relation to the environmental factors such as rural status may lead to stronger research in general. Alfonso et al. (2015) and Mueller and McCullough (2017), who studied the youth population, mentioned the possible positive effect of being in a rural, remote, or uncrowded area. According to Hauge et al. (2015), environmental challenges may result in some social developmental opportunities. Thus, studying the relationship between environmental effect (rurality) and EAAT may lead to a clearer perspective by identification of a variable seldom studied in this review. Rural communities may also gain from EAAT facilities if high-quality programs for complementary therapy become available. Rural EAAT centers add to available services in a rural area. Additionally, EAAT may help a rural economy, albeit in a small way.

Dunlop and Tsantefski (2017) showed that children ages 7–13 years old who suffered from problematic parent substance use enjoyed hugging, touching, petting, and kissing the horse. Using horses for other programs such as the free hug program and patting the pet program may lead to the positive outcomes such as improved quality of life (QOL) that these programs seek. Studying the effect of EAAT on health and QOL in general was recommended. Schneider and Harley (2016) conducted a quasi-experimental study in Canada on 35 individuals with disabilities and suggested focusing on the impact of horses from a larger perspective (such as well-being, QOL, and sense of self). This review indicated a wealth of

knowledge when vulnerable populations engage in EAAT mainly with four diagnoses (autism, ADHD, CP, and PTSD). Studying the relationship between EAAT and QOL for other common populations such as diabetic clients, cancer survivors, and the geriatric population may be appropriate based on the risks and potential benefits.

Nursing and EAAT

Although EAAT was not discussed extensively in nursing, types of AAA were discussed in nursing history. For example, Florence Nightingale wrote to nurses: “A small pet is often an excellent companion for the sick, for the long chronic cases especially. A pet bird in a cage is sometimes the only pleasure of an invalid confined for years to the same room. If he can feed and clean the animal himself, he ought always to be encouraged to do so” (1860, p. 103). Nowadays, both a bird and a horse are considered domesticated animals that can be used as a form of AAA (IA-HAIO, 2018). Similarly, a nurse may assist a client to enjoy seeing, riding, and grooming the horse to facilitate adaptation and enhance QOL (see Figure 2).

From this review there were no articles found in CINHAI Complete, a database specifically for nursing. Nurses are well prepared to study interventions that may improve health and QOL. Research and evidence-based practice are topics that are included in nursing education. Master’s degree nurse practitioner (NP) programs such as psychiatric NP may find benefits from offering an elective course about EAAT since there is evidence that EAAT can reduce psychological distress and authors in psychology studied EAAT (Alfonso et al., 2015; Earles et al., 2015; Ferruolo, 2016; Wilson et al., 2017). Nurses developing new knowledge and testing theory in line with their PhD education can add to EAAT research.

There are questions about how much education in EAAT is needed to adequately prepare an individual to work in this field. Johns et al. (2016), after interviewing a therapist, stated that a 12-month program was not adequate. Selby (as cited in Johns et al., 2016) stated that EAAT will gain popularity if doctors refer to programs and this will happen if there are

postgraduate training programs offered by organizations such as universities. Nurse practitioners also refer patients, as do other disciplines.

Educating nurses about EAAT has the potential to expand nurses' roles and the profession to meet clients' needs. Some nursing schools provide elective classes for pet therapy for nursing students including Oakland City University and San Antonio School of Nursing (Himot & Chesnay, 2016). Furthermore, PATH Intl. (n.d.b.) provides specific certification for colleges and universities that teach EAAT.

Nurses with previous experience with horses are likely to be interested in learning more about EAAT. Combining interest and experience with scientific knowledge may produce unique professional nurses who can assist clients to engage in EAAT.

To conclude, knowledge of EAAT may provide some benefits to the nursing profession as well as those in the health care system. Indeed, EAAT organizations such as PATH Intl. and EAGALA may find it beneficial to the equine profession or their organizations to produce a specific course for nurses since nurses have a wide perspective on health and how to help clients. Nurses are prepared to participate in research and can add to producing a stronger scientific base on EAAT. Finally, a nurse should advocate for clients to have access to appropriate therapies that may enhance clients' QOL. Nurses need to join the ride.

Acknowledgments

There is no funding for this systematic review. The first author is a nurse and a certified therapeutic riding instructor from PATH International.

References

References marked with an asterisk were included in the review but not cited in the text.

- Alfonso, S. V., Alfonso, L. A., Llabre, M. M., & Fernandez, M. I. (2015). Project stride: An equine-assisted intervention to reduce symptoms of social anxiety in young women. *Explore: The Journal of Science & Healing*, *11*, 461–467. <https://doi.org/10.1016/j.explore.2015.08.003>
- Ammann-Reiffer, C., Bastiaenen, C. H. G., Meyer-Heim, A., & van Hedel, H. J. A. (2017). Effectiveness of robot-assisted gait training in children with cerebral palsy: A bicenter, pragmatic, randomized, cross-over trial (PeLoGAIT). *BioMed Central Pediatrics*, *17*, 1–9. <https://doi.org/10.1186/s12887-017-0815-y>
- Anderson, S., & Meints, K. (2016). Brief report: The effects of equine-assisted activities on the social functioning in children and adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *46*, 3344–3352. <https://doi.org/10.1007/s10803-016-2869-3>
- Antunes, F. N., do Pinho, A. S., Kleiner, A. F. R., Salazar, A. P., Eltz, G. D., de, Oliveira, A. A. Jr., . . . Pagnussat, A. S. (2016). Different horses' paces during hippotherapy on spatio-temporal parameters of gait in children with bilateral spastic cerebral palsy: A feasibility study. *Research in Developmental Disabilities*, *59*, 65–72. <https://doi.org/10.1016/j.ridd.2016.07.015>
- Banks, M. R., & Banks, W. A. (2002). The effects of animal-assisted therapy on loneliness in an elderly population in long-term care facilities. *Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, *57*(7), M428–M432. <https://doi.org/10.1093/gerona/57.7.m428>
- Borgi, M., Loliva, D., Cerino, S., Chiarotti, F., Venerosi, A., Bramini, M., . . . Cirulli, F. (2016). Effectiveness of a standardized equine-assisted therapy program for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *46*(1), 1–9. <https://doi.org/10.1007/s10803-015-2530-6>
- Boshoff, C., Grobler, H., & Nienaber, A. (2015). The evaluation of an equine-assisted therapy programme with a group of boys in a youth care facility. *Journal of Psychology in Africa*, *25*(1), 86–90.
- Brown, D. L., & Schafft, K. A. (2019). Rurality in metropolitan society. *Rural people and communities in the 21st century: Resilience and transformation* (2nd ed., pp. 3–18). Polity.
- Buckner, E. B., Simmons, S., Brakefield, J. A., Hawkins, A. K., Feeley, C., Kilgore, L. A. F., . . . Gibson, L. (2007). Maturing responsibility in young teens participating in an asthma camp: Adaptive mechanisms and outcomes. *Journal for Specialists in Pediatric Nursing*, *12*(1), 24–36.
- Bunketorp-Kall, L., Lundgren-Nilsson, A., Samuelsson, H., Pekny, T., Blomve, K., Pekna, M., . . . Nilsson, M. (2017). Long-term improvements after multimodal rehabilitation

- in late phase after stroke: A randomized controlled trial. *Stroke (00392499)*, *48*, 1916–1924. <https://doi.org/10.1161/STROKEAHA.116.016433>
- Cabiddu, R., Borghi-Silva, A., Trimer, R., Trimer, V., Ricci, P. A., Italiano Monteiro, C., . . . Carvalho, E. M. (2016). Hippotherapy acute impact on heart rate variability non-linear dynamics in neurological disorders. *Physiology & Behavior*, *159*, 88–94. <https://doi.org/10.1016/j.physbeh.2016.03.012>
- Calvert, M. M. (1989). Human-pet interaction and loneliness: A test of concepts from Roy's adaptation model. *Nursing Science Quarterly*, *2*, 194–202. <https://doi.org/10.1177/089431848900200409>
- Carlsson, C. (2017). Triads in equine-assisted social work enhance therapeutic relationships with self-harming adolescents. *Clinical Social Work Journal*, *45*, 320–331. <https://doi.org/10.1007/s10615-016-0613-2>
- Carlsson, C. (2018). Equine-assisted social work counteracts self-stigmatisation in self-harming adolescents and facilitates a moment of silence. *Journal of Social Work Practice*, *32*(1), 17–30. <https://doi.org/10.1080/02650533.2016.1274883>
- Carlsson, C., Ranta, D. N., & Traeen, B. (2015). Mentalizing and emotional labor facilitate equine-assisted social work with self-harming adolescents. *Child & Adolescent Social Work Journal*, *32*, 329–339. <https://doi.org/10.1007/s10560-015-0376-6>
- Costa, V. S. F., Silva, H. M., Alves, E. D., Coquerel, P. R. S., Silva, A. R. D., & Barros, J. F. (2015). Hippotherapy and respiratory muscle strength in children and adolescents with Down syndrome. *Fisioterapia em Movimento*, *28*, 373–381. <https://doi.org/10.1590/0103-5150.028.002.AO18>
- Davis, D. L., Maurstad, A., & Dean, S. (2015). My horse is my therapist: The medicalization of pleasure among women equestrians. *Medical Anthropology Quarterly*, *29*, 298–315. <https://doi.org/10.1111/maq.12162>
- Dunlop, K., & Tsantefski, M. (2017). A space of safety: Children's experience of equine-assisted group therapy. *Child & Family Social Work*, *23*, 16–24. <https://doi.org/10.1111/cfs.12378>
- Earles, J. L., Vernon, L. L., & Yetz, J. P. (2015). Equine-assisted therapy for anxiety and posttraumatic stress symptoms. *Journal of Traumatic Stress*, *28*, 149–152. <https://doi.org/10.1002/jts.21990>
- Ferruolo, D. M., (2016). Psychosocial equine program for veterans. *Social Work*, *61*(1), 53–60. <https://doi.org/10.1093/sw/swv054>
- Fineout-Overholt, E., Melnyk, B. M., Stillwell, S. B., & Williamson, K. M. (2010). Evidence-based practice step by step. critical appraisal of the evidence: Part I: An introduction to gathering, evaluating, and recording the evidence: Part I. *American Journal of Nursing*, *110*(7), 47–52.
- Flores, F. M., Dagnese, F., Mota, C. B., & Copetti, F. (2015). Parameters of the center of pressure displacement on the saddle during hippotherapy on different surfaces. *Brazilian Journal of Physical Therapy / Revista Brasileira De Fisioterapia*, *19*(3), 38–44. <https://doi.org/10.1590/bjpt-rbf.2014.0090>
- *Frederick, K. E., Hatz, J. I., & Lanning, B. (2015). Not just horsing around: The impact of equine-assisted learning on levels of hope and depression in at-risk adolescents. *Community Mental Health Journal*, *51*, 809–817. <https://doi.org/10.1007/s10597-015-9836-x>
- Gabriels, R. L., Pan, Z., Dechant, B., Agnew, J. A., Brim, N., & Mesibov, G. (2015). Randomized controlled trial of therapeutic horseback riding in children and adolescents with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *54*, 541–549. <https://doi.org/10.1016/j.jaac.2015.04.007>
- Garcia-Gomez, A., Rodriguez-Jimenez, M., Guerrero-Barona, E., Rubio-Jimenez, J. C., Garcia-Pena, I., & Moreno-Manso, J. (2016). Benefits of an experimental program of equestrian therapy for children with ADHD. *Research in Developmental Disabilities*, *59*, 176–185. <https://doi.org/10.1016/j.ridd.2016.09.003>
- Garner, B. A., & Rigby, B. R. (2015). Human pelvis motions when walking and when riding a therapeutic horse. *Human Movement Science*, *39*, 121–137. <https://doi.org/10.1016/j.humov.2014.06.011>
- Guerino, M. R., Briel, A. E., & Araujo, M. D. R. (2015). Hippotherapy as a treatment for socialization after sexual abuse and emotional stress. *Journal of Physical Therapy Science*, *27*, 959–962. <https://doi.org/10.1589/jpts.27.959>
- Hajjar, D. J., McCarthy, J. W., Benigno, J. P., & Chabot, J. (2016). “You get more than you give”: Experiences of community partners in facilitating active recreation with individuals who have complex communication needs. *AAC: Augmentative and Alternative Communication*, *32*, 131–142. <https://doi.org/10.3109/07434618.2015.1136686>
- Hauge, H., Kvaalem, I. L., Enders-Slegers, M., Berget, B., & Braastad, B. O. (2015). Persistence during tasks with horses in relation to social support,

- general self-efficacy and self-esteem in adolescents. *Anthrozoös*, 28, 333–347. <https://doi.org/10.2752/089279315X14219211662010>
- Himot, L., & Chesnay, M. D. (2016). Pet therapy in nursing. In M. D. Chesnay & B. A. Anderson (Eds.), *Caring for the vulnerable: Perspectives in nursing theory, practice, and research* (4th ed., pp. 311–319). Jones & Bartlett Learning.
- Homnick, T. D., Henning, K. M., Swain, C. V., & Homnick, D. N. (2015). The effect of therapeutic horseback riding on balance in community-dwelling older adults: A pilot study. *Journal of Applied Gerontology*, 34, 118–126. <https://doi.org/10.1177/0733464812467398>
- Hyun, G. J., Jung, T., Park, J. H., Kang, K. D., Kim, S. M., Son, Y. D., . . . Han, D. H. (2016). Changes in gait balance and brain connectivity in response to equine-assisted activity and training in children with attention deficit hyperactivity disorder. *Journal of Alternative and Complementary Medicine*, 22, 286–293. <https://doi.org/10.1089/acm.2015.0299>
- International Association of Human-Animal Interaction Organizations. (2018). The IAHAIO definitions for animal assisted intervention and guidelines for wellness of animals involved in AAI. Retrieved from http://iahaio.org/wp/wp-content/uploads/2019/01/iahaio_wp_updated-2018-19-final.pdf
- Jang, B., Song, J., Kim, J., Kim, S., Lee, J., Shin, H., . . . Joung, Y. (2015). Equine-assisted activities and therapy for treating children with attention-deficit/hyperactivity disorder. *Journal of Alternative and Complementary Medicine*, 21, 546–553. <https://doi.org/10.1089/acm.2015.0067>
- Johansen, S. G., Wang, C. E. A., & Binder, P. (2016). Facilitating change in a client's dysfunctional behavioural pattern with horse-aided psychotherapy: A case study. *Counselling & Psychotherapy Research*, 16, 222–231.
- Johns, L., Bobat, S., & Holder, J. (2016). Therapist experiences of equine-assisted psychotherapy in South Africa: A qualitative study. *Journal of Psychology in Africa*, 26, 199–203.
- Johnson, R. A., Meadows, R. L., Haubner, J. S., & Sevedge, K. (2008). Animal-assisted activity among patients with cancer: Effects on mood, fatigue, self-perceived health, and sense of coherence. *Oncology Nursing Forum*, 35, 225–232. <https://doi.org/10.1188/08.ONF.225-232>
- Kern-Godal, A., Brenna, I. H., Kogstad, N., Arnevik, E. A., & Ravndal, E. (2016). Contribution of the patient-horse relationship to substance use disorder treatment: Patients' experiences. *International Journal of Qualitative Studies on Health and Well-Being*, 11, 1–12. <https://doi.org/10.3402/qhw.v11.31636>
- *Kim, M. J., Kim, T., Oh, S., & Yoon, B. (2018). Equine exercise in younger and older adults: Simulated versus real horseback riding. *Perceptual & Motor Skills*, 125(1), 93–108. <https://doi.org/10.1177/0031512517736463>
- *Kim, S., & Lee, J. (2015). The effects of horse riding simulation exercise on muscle activation and limits of stability in the elderly. *Archives of Gerontology and Geriatrics*, 60(1), 62–65. <https://doi.org/10.1016/j.archger.2014.10.018>
- Kwon, J., Chang, H. J., Yi, S., Lee, J. Y., Shin, H., & Kim, Y. (2015). Effect of hippotherapy on gross motor function in children with cerebral palsy: A randomized controlled trial. *Journal of Alternative and Complementary Medicine*, 21(1), 15–21. <https://doi.org/10.1089/acm.2014.0021>
- Lac, V. (2017). Amy's story: An existential-integrative equine-facilitated psychotherapy approach to anorexia nervosa. *Journal of Humanistic Psychology*, 57, 301–312. <https://doi.org/10.1177/0022167815627900>
- Lee, P., & Makela, C. (2018). Mental health practitioners' strategies in equine-assisted psychotherapy: Implications for social work. *Social Work Education*, 37, 119–135. <https://doi.org/10.1080/02615479.2017.1378318>
- Llambias, C., Magill-Evans, J., Smith, V., & Warren, S. (2016). Equine-assisted occupational therapy: Increasing engagement for children with autism spectrum disorder. *American Journal of Occupational Therapy*, 70, 1–9.
- *McNamara, J. (2017). Equine facilitated therapy for children and adolescents: A qualitative pilot study. *Journal of Creativity in Mental Health*, 12, 412–427. <https://doi.org/10.1080/15401383.2017.1340215>
- Merkies, K., McKechnie, M. J., & Zakrajsek, E. (2018). Behavioural and physiological responses of therapy horses to mentally traumatized humans. *Applied Animal Behaviour Science*, 1–26. <https://doi.org/10.1016/j.applanim.2018.05.019>
- *Morgan, B. M. (2017). Stress management for college students: An experiential multi-modal approach. *Journal of Creativity in Mental Health*, 12, 276–288. <https://doi.org/10.1080/15401383.2016.1245642>
- Mueller, M., & McCullough, L. (2017). Effects of equine-facilitated psychotherapy on post-traumatic stress symptoms in youth. *Journal of Child & Family Studies*, 26, 1164–1172. <https://doi.org/10.1007/s10826-016-0648-6>
- Nelson, A., Signal, T., & Wilson, R. (2016). Equine assisted therapy and learning: A survey of methodologies in

- Australia. *Society & Animals: Journal of Human-Animal Studies*, 24, 337–357. <https://doi.org/10.1163/15685306-12341418>
- Nightingale, F. (1860). *Notes on nursing: What it is, and what it is not* (1st American ed.). D. Appleton. Retrieved from <https://digital.library.upenn.edu/women/nightingale/nursing/nursing.html>
- Nurenberg, J. R., Schleifer, S. J., Shaffer, T. M., Yellin, M., Desai, P. J., Amin, R., . . . Montalvo, C. (2015). Animal-assisted therapy with chronic psychiatric inpatients: Equine-assisted psychotherapy and aggressive behavior. *Psychiatric Services*, 66(1), 80–86. <https://doi.org/10.1176/appi.ps.201300524>
- Pham, C., & Bitonte, R. (2016). Hippotherapy: Remuneration issues impair the offering of this therapeutic strategy at Southern California rehabilitation centers. *NeuroRehabilitation*, 38, 411–417. <https://doi.org/10.3233/NRE-161332>
- Professional Association of Therapeutic Horsemanship International (PATH Intl.). (n.d.a). EAAT Definitions. Retrieved from <https://www.pathintl.org/resources-education/resources/eaat/193-eaat-definitions#vaulting>
- PATH Intl. (n.d.b). Higher education membership. Retrieved from <https://www.pathintl.org/path-intl-membership/higher-education-membership>
- Reis, D., Walsh, M. E., Young-McCaughan, S., & Jones, T. (2013). Effects of nia exercise in women receiving radiation therapy for breast cancer. *Oncology Nursing Forum*, 40, E374–E381. <https://doi.org/10.1188/13.onf.e374-e381>
- Rigby, B. R., Gloeckner, A. R., Sessums, S., Lanning, B. A., & Grandjean, P. W. (2017). Changes in cardiorespiratory responses and kinematics with hippotherapy in youth with and without cerebral palsy. *Research Quarterly for Exercise & Sport*, 88(1), 26–35. <https://doi.org/10.1080/02701367.2016.1266458>
- Roy, C. (2009). *The Roy adaptation model*. Pearson Education.
- Schneider, M. S., & Harley, L. P. (2016). The impact of therapeutic riding for people with disabilities on variables related to mental health. *Anthrozoos*, 29(1), 59–72. <https://doi.org/10.1080/08927936.2015.1069987>
- Schroeder, K., Stroud, D., & Erdman, P. (2018). Leading equine-assisted mental health groups: An exploratory survey of practitioner characteristics, practices, and professional development. *International Journal of Group Psychotherapy*, 68, 204–214. <https://doi.org/10.1080/00207284.2017.1417737>
- Steele, E., Wood, D. S., Usadi, E. J., Applegarth, D. M., & Usadi, E. J. (2018). TRR's warrior camp: An intensive treatment program for combat trauma in active military and veterans of all eras. *Military Medicine*, 183, 403–407. <https://doi.org/10.1093/milmed/usx153>
- Tallier, P. C., Reineke, P. R., & Frederickson, K. (2017). Evaluation of healthy living wellness program with minority underserved economically disadvantaged older adults. *Nursing Science Quarterly*, 30, 143–151.
- Tan, V. X., & Simmonds, J. G. (2018). Parent perceptions of psychosocial outcomes of equine-assisted interventions for children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 48, 759–769. <https://doi.org/10.1007/s10803-017-3399-3>
- Thomas, S. L. (2017). Embodied conflict resolution: The use of body psychotherapy, gestalt equine psychotherapy, and aikido to resolve conflict amongst adolescents. *International Body Psychotherapy Journal*, 16(1), 28–37.
- Tsantefski, M., Briggs, L., Griffiths, J., & Tidyman, A. (2017). An open trial of equine-assisted therapy for children exposed to problematic parental substance use. *Health & Social Care in the Community*, 25, 1247–1256. <https://doi.org/10.1111/hsc.12427>
- Wilson, K., Buultjens, M., Monfries, M., & Karimi, L. (2017). Equine-assisted psychotherapy for adolescents experiencing depression and/or anxiety: A therapist's perspective. *Clinical Child Psychology and Psychiatry*, 22(1), 16–33. <https://doi.org/10.1177/1359104515572379>
- Yoo, J. H., Oh, Y., Jang, B., Song, J., Kim, J., Kim, S., . . . Jung, Y. (2016). The effects of equine-assisted activities and therapy on resting-state brain function in attention-deficit/hyperactivity disorder: A pilot study. *Clinical Psychopharmacology and Neuroscience*, 14, 357–364. <https://doi.org/10.9758/cpn.2016.14.4.357>