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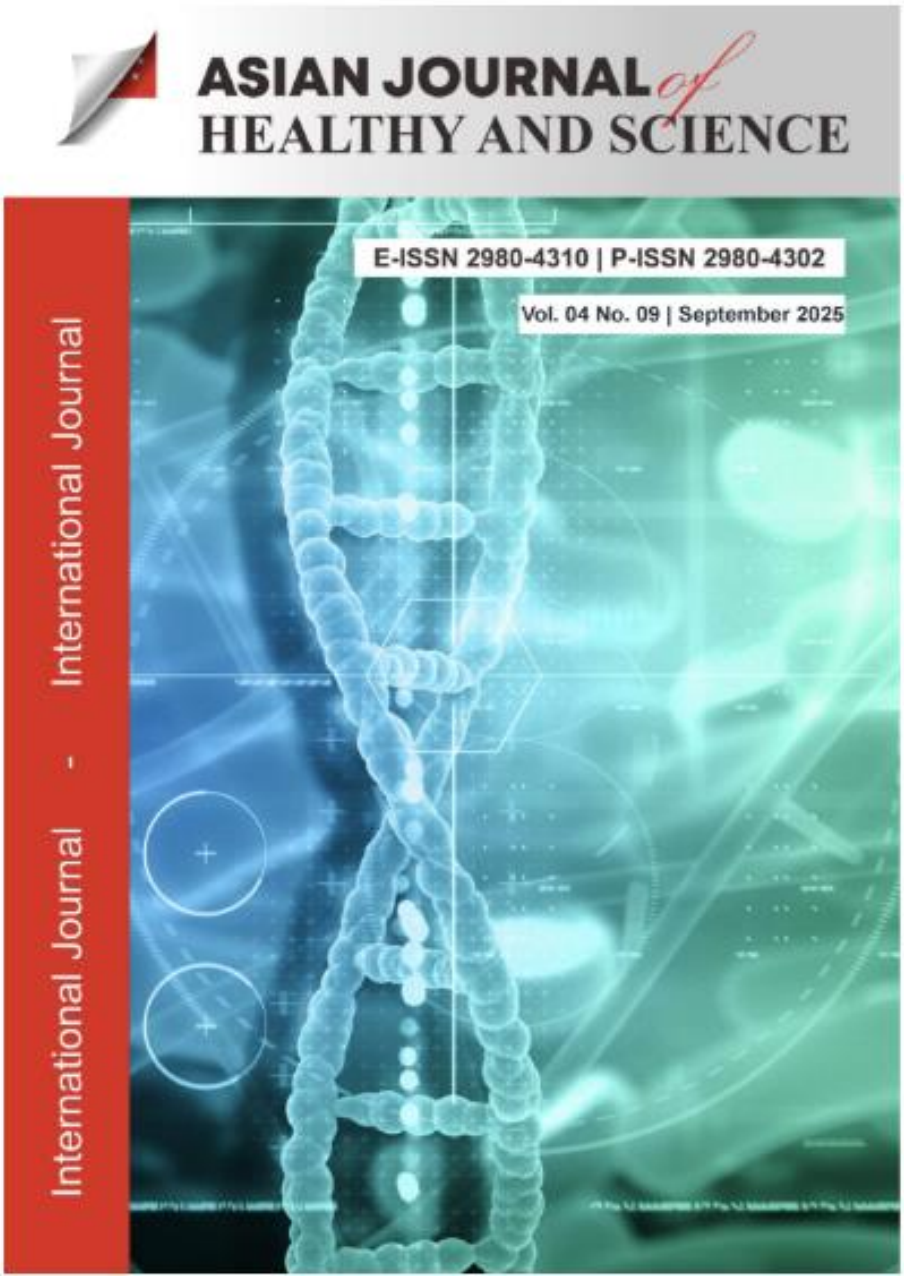

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Current Issue

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Experiences Of Sexuality Of Bisexual Hiv/Aids Patients (A Phenomenological Study In Madiun Regency)

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Distal Ureter Atresia Representing As Megaureter And Kidney Hypoplasia In 10 Years Male: A Rare Case Report

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How Equine Assisted Therapy Have Positive Effect on Hormone and Psychological

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How Equine Assisted Therapy Have Positive Effect on Hormone and Psychological

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Abstract

As individuals age, they encounter a variety of physical, psychosocial, and cognitive challenges. In response, Equine-Assisted Therapy (EAT) has emerged as a complementary approach within mental and physical health care. More broadly, Equine-Assisted Interventions (EAI) are gaining recognition as promising methods to enhance both physical and psychological well-being. EAI involves horses as active participants in therapeutic or recreational activities such as horseback riding, adaptive acrobatics, carriage driving, grooming, and direct interaction with horses. This study aims to analyze how EAT positively influences hormonal changes, specifically by increasing serotonin and oxytocin levels while reducing cortisol, thereby supporting mental and physiological health. Using a descriptive qualitative approach with a systematic literature review (SLR), this research examines various studies that investigate the hormonal and psychological effects of EAT. Findings across multiple studies highlight that EAT benefits both humans and horses. For individuals, EAT has been shown to reduce symptoms of post-traumatic stress disorder (PTSD) and stress, as evidenced by lowered cortisol levels and increased oxytocin, a hormone associated with social bonding and happiness. Participants also experience improved emotional regulation and psychological well-being. For horses, although acute stress indicators do not always shift significantly, reductions in cortisol following therapy sessions suggest decreased stress levels. These outcomes are often linked to horses' adaptation to routine therapy practices, though seasonal and environmental factors may also play a role. Overall, EAT demonstrates therapeutic value for both humans and horses. However, further research is necessary to account for environmental influences, seasonal variation, and individual differences that may affect outcomes.

Keywords: equine-assisted therapy, hormones, psychology

INTRODUCTION

As individuals age, they face various physical, psychosocial, and cognitive challenges. The World Health Organization (WHO) emphasizes the importance of early interventions that address behavioral and psychological symptoms while improving social functioning in older adults (Badin, et al., 2022). Equine-Assisted Interventions (EAI) have emerged as a promising approach for enhancing physical and mental health. EAI involves horses as active participants in therapeutic or recreational activities. These interventions include a wide range of activities, such as horseback riding, adaptive vaulting, horse-drawn carriage driving, grooming, and

interacting with horses. Research suggests that EAI can help address emotional, social, cognitive, and physical challenges in various healthcare contexts and has been used to manage neurological conditions (Palsdottir, et al., 2020), autism spectrum disorders (Borgi, et al., 2016), and psychiatric disorders (Earles, et al., 2015; Nurenberg and Schleifer, 2011).

Equine-Assisted Therapy (EAT), a form of equine-assisted intervention, has become a complementary approach in mental and physical health care. The interaction between humans and horses in this therapeutic context is believed to have a positive impact on hormonal balance and psychological well-being. In recent years, various studies have explored the effectiveness of EAT in enhancing individual well-being.

Research on EAI in the elderly population primarily highlights its physical benefits, particularly the unique three-dimensional movement of horseback riding, which helps maintain balance, strengthens core muscles, and improves posture control. Studies have shown that EAI can improve balance, gait patterns, muscle strength, and coordination compared to conventional walking exercises in older adults (Araujo, et al., 2011; Aranda-Garcia, et al., 2015). For example, a meta-analysis conducted by Hilliere et al. (2018) found significant improvements in mobility, such as stride length, walking speed, and movement speed, in individuals participating in EAI compared to control groups. Furthermore, a randomized controlled trial by White-Lewis et al. (2017) demonstrated significant reductions in physical pain among older adults with arthritis after participating in EAI sessions. These physical benefits are crucial for the elderly population as they support daily activities and reduce the risk of falls.

EAI also offers psychological benefits, including improved well-being, quality of life, and self-assessed positive health, even among individuals with various health conditions (Homnick, et al., 2015). A systematic review by White-Lewis et al. (2017) reported that 91% of the studies reviewed showed improvements in quality of life, self-efficacy, and well-being. Similarly, a meta-analysis on individuals with disabilities such as cerebral palsy, Parkinson's disease, and intellectual disabilities highlighted the psychological advantages of EAI (Prieto, et al., 2022; Srinivasan, et al., 2018). For older adults with neurological conditions such as Alzheimer's disease, non-riding EAI activities, such as horse grooming, have been shown to provide significant behavioral benefits (Wood, et al., 2017; Fields, et al., 2018), including reduced agitation and other behavioral issues associated with dementia. While fewer studies have explored the impact of EAI on cognitive function, the results are mixed, with some studies showing no effects and others reporting improvements (Boriono, et al., 2012; Frevel and Maurer, 2015).

EAI has also been linked to physiological changes, such as reduced stress hormone levels. For instance, Cho et al. (2015) observed increased serotonin levels and decreased cortisol levels following an eight-week EAI program for older adults, findings echoed in studies involving autistic populations (Tabares, et al., 2012). Moreover, EAI has been shown to enhance brain activity (Kim, et al., 2015; Cho, 2017). For example, Cho (2017) reported increased alpha wave activity after a 12-week EAI intervention, indicating improved psychological comfort, concentration, and reduced stress.

While evidence supporting the physical and psychological benefits of EAI in younger populations continues to grow, research on its impact on older adults remains limited (Dabelko-Schoany, et al., 2014). Additionally, the full effectiveness of EAI for this age group has not

been conclusively established. Therefore, a systematic review is needed to consolidate existing findings and provide a deeper understanding of the potential health benefits of EAI for the elderly population.

Interaction with horses during therapy sessions can trigger the release of hormones that play a role in mood regulation and stress response. One such hormone is endorphins, known as the "happiness hormone." Increased endorphin levels can lead to feelings of joy and relaxation. Additionally, this therapy can enhance the release of oxytocin, a hormone associated with social bonding and feelings of empathy (Sirait and Desiana, 2019).

EAT has been proven effective in reducing symptoms of stress, anxiety, and depression. Interaction with horses can have a calming effect, increase feelings of happiness, and reduce loneliness (Antari and Febrianti, 2022). Moreover, this therapy can enhance empathy and social attentiveness, contributing to improved mental health (Sirait and Desiana, 2019).

The mechanisms behind the effectiveness of EAT involve the physical and emotional interaction between individuals and horses. Activities such as stroking or grooming horses can lower cortisol levels, a hormone involved in the stress response (Antari and Febrianti, 2022). Additionally, the rhythmic movement during horseback riding can provide sensory stimulation that helps regulate emotions and improve focus.

A study published in the journal *Frontiers in Psychology* in 2015 showed that caring for and spending time with horses can alleviate anxiety and improve emotional well-being. Other research has also indicated that this therapy can be used as an effective intervention for addressing post-traumatic stress disorder (PTSD) and enhancing the quality of life in patients with autism spectrum disorders (Sirait and Desiana, 2019).

Equine-Assisted Therapy offers a holistic approach to improving hormonal and psychological well-being. With growing scientific evidence, EAT can be considered an alternative or complementary therapy in conventional programs for various mental health conditions.

This research aims to analyze how equine-based therapy (Equine-Assisted Therapy) provides positive effects on hormonal changes, such as increased serotonin levels and decreased cortisol, which can support mental and physiological health. Additionally, the study seeks to identify the psychological benefits of EAT, including improved well-being, quality of life, and reduced stress in various population groups, particularly individuals with psychological and neurological disorders. The research also aims to explore the mechanisms of human-horse interaction that contribute to emotional, social, and mental changes, integrating findings from various studies to understand how EAT can become part of a holistic rehabilitation therapy approach.

Theoretically, this study is expected to contribute to the development of theories related to animal-assisted therapy, particularly in understanding the impact of EAT on hormonal and psychological aspects. The research also has the potential to expand the scientific literature on the benefits of equine-based therapy in supporting mental and physiological health and provide a scientific basis for developing equine-assisted therapeutic interventions for various population groups.

Practically, this study offers recommendations for mental and physical health practitioners on the potential benefits of EAT in addressing stress, anxiety disorders, and depression. Furthermore, the research supports rehabilitation programs for individuals with

neurological or physical disabilities by providing in-depth knowledge about the benefits of EAT. It also encourages the adoption of EAT as an innovative approach in community-based healthcare programs and provides insights for managers of equine-assisted therapy centers to develop more effective programs tailored to the needs of individuals undergoing therapy. By focusing on hormonal and psychological aspects, this study is expected to integrate empirical findings from previous research to strengthen the implementation of EAT as a measurable and effective intervention.

RESEARCH METHODS

This research employs a descriptive qualitative approach using the systematic literature review (SLR) method to examine various studies related to the positive effects of Equine-Assisted Therapy (EAT) on hormonal and psychological aspects. The aim of this method is to identify, analyze, and synthesize the key findings from relevant scientific journals.

By utilizing descriptive and literature review methods, this study is expected to provide a more comprehensive understanding of how EAT contributes to hormonal improvements (such as increased serotonin and decreased cortisol levels) and psychological enhancements. The results are also anticipated to serve as a reference for the development of equine-based therapy in various clinical and rehabilitation contexts.

RESULTS AND DISCUSSION

This study focuses on analyzing the positive impacts of Equine-Assisted Therapy (EAT) on hormonal and psychological aspects through a literature review involving three journal articles. A descriptive analysis of the findings is as follows:

According to McDuffee et al. (2024), animal-assisted therapies (AAT) have long been utilized to promote mental and physical health in humans. One specific form of AAT, known as Equine-Facilitated Psychotherapy (EFP), has shown promising results in alleviating symptoms of Post-Traumatic Stress Disorder (PTSD) and related conditions, particularly among veterans. While EFP is considered effective in improving mental health, limited physiological data support its effectiveness, and the response of horses in this therapeutic setting remains largely unexplored. To address these gaps, a prospective cohort study was conducted, which included four EFP sessions over an eight-week period involving veterans diagnosed with PTSD. The study measured changes in stress-related hormones and heart rate variability (HRV) in both humans and horses, alongside assessments of PTSD symptoms in humans and behavioral responses in horses.

The results revealed that in humans, average daily cortisol levels decreased, while oxytocin levels increased after each session. Additionally, self-reports on mood, anxiety, and well-being showed significant improvements. The Sympathetic Nervous System Index increased, while the Parasympathetic Nervous System Index decreased following each session. In contrast, no significant changes were observed in the HRV, oxytocin levels, or stress-related behaviors of the horses, although cortisol levels did decline significantly from pre- to post-session.

These findings suggest that EFP offers substantial psychological and physiological benefits for individuals with PTSD while not negatively affecting the well-being of

participating horses. The integration of human biological data and horse behavioral observations enhances the understanding of the interplay within the human-horse therapy dynamic. Furthermore, the emotional responses of human participants, influenced by their individual states versus traits, present an area requiring further exploration. This aspect is especially notable since most participants had minimal or no prior experience with horses, which may have influenced their reactions to new tasks and close interactions with large animals.

In Rigby's (2023) study, the repetitive stress experienced by horse riders was found to potentially contribute to the physical and psychosocial outcomes observed in equine-based activities. The study highlights various neuroendocrine markers related to stress modulation, such as immunoglobulin A (IgA), serotonin, cortisol, progesterone, and oxytocin, and their effects on the riders' physiology before, during, and after horse-based therapy sessions. While the findings regarding the impact of these hormones varied, several studies indicated promising results in reducing stress levels. To enhance the quality of future research, interdisciplinary approaches are recommended, involving well-controlled experimental studies that consider external and internal factors affecting the physiology of riders.

In this context, the review discusses IgA, serotonin, cortisol, progesterone, and oxytocin within the scope of rider physiology during Equine-Assisted Services (EAS). While variations in hormone levels have been observed across the literature, many studies indicate that EAS positively influences stress modulation, contributing to physical and psychosocial benefits for people of various ages, health conditions, and riding experiences. However, periods of chronic stress, characterized by elevated glucocorticoid and catecholamine levels, could potentially impair the performance of horses during EAS and negatively affect the human-animal bond.

Due to the challenges in collecting and analyzing physiological samples, Rigby emphasizes the importance of including experts such as biologists, biochemists, and healthcare professionals (e.g., nurses or sports physiologists) in future studies. Several physiological variables, including the method of sample collection (e.g., saliva versus plasma), timing of sample collection (e.g., circadian rhythms), and participant characteristics (e.g., sex differences and menstrual cycle phases), should be considered to accurately quantify hormone concentrations. With more comprehensive research, EAS can be made more accessible and effective for broader populations.

Neff's (2013) research investigates the effects of equine-facilitated psychotherapy sessions on horses by measuring indicators of stress, such as heart rate, respiration, cortisol levels, and behaviors before and after sessions. Acute stress indicators, such as respiration rate and heart rate, showed no significant differences between pre- and post-session measurements during spring, summer, or fall. However, chronic stress markers, such as cortisol levels, significantly decreased after sessions in spring ($p = 0.004$) and summer ($p = 0.004$), while no significant changes were observed in fall ($p = 0.732$). The study concluded that horses experienced lower stress levels after therapy sessions, which may be attributed to learned or habitual behaviors developed over time. Seasonal factors, including environmental conditions, also played a role in influencing these outcomes.

Cortisol levels in many animals are known to vary seasonally, with environmental stressors such as extreme temperatures or drought impacting physiological systems. Studies on female baboons, for instance, found elevated cortisol levels during dry and hot seasons

compared to wet and cooler seasons. Similar findings suggest that animals experience increased stress during environmental extremes, which can manifest as elevated cortisol levels. Chronic exposure to high cortisol levels may lead to physiological challenges, including reduced growth, reproductive issues, and weakened immune responses.

Behavioral factors also influence stress assessments in horses. For example, grazing is generally considered a sign of low stress, and during clinical therapy sessions, many horses were observed grazing on hay or grass. None of the horses displayed aggressive behaviors, such as biting or charging, which also suggested low stress levels. Additionally, heart rate, a common physiological marker for stress, has been shown in previous studies to increase during stressful situations, such as long-distance transportation. However, training or familiarity with routines can reduce stress, as demonstrated in studies on pre-loading training for horses Shanahan and circadian adaptations in racehorses.

This study is among the first to evaluate the effects of therapeutic clinical sessions on horse stress. The field of equine-assisted psychotherapy remains relatively new, with most research focusing on human participants rather than the horses involved. However, studies like Trotter et al. on equine-assisted counseling (EAC) demonstrated significant improvements in behavioral outcomes for human participants, highlighting the potential success of such therapies. Future research should expand its focus on the effects of therapy on horses to ensure mutual benefits for both humans and animals involved.

Discussion

Several studies reviewed in the context of Equine-Assisted Therapy (EAT) demonstrate positive impacts on both individuals participating in therapy and the horses involved. These effects are associated with changes in stress-related hormones, such as cortisol and oxytocin, as well as psychological responses experienced by both humans and horses during therapy.

The study by McDuffee et al. (2024) indicates that Equine-Facilitated Psychotherapy (EFP) can reduce PTSD symptoms in humans, with significant reductions in cortisol levels and increases in oxytocin levels after therapy sessions. Lower cortisol levels in humans indicate reduced stress, while increased oxytocin, known as the bonding hormone, suggests improved emotional well-being. In horses, while no significant changes were observed in HRV or stress-related behaviors, a reduction in cortisol levels suggests that horses also experience a decrease in stress after sessions, although this effect is more noticeable in specific seasons (spring and summer). This decrease in cortisol indicates that horses may become accustomed to therapy sessions, contributing to their reduced stress levels after interactions with therapy participants.

Rigby's (2023) research explains that chronic stress experienced by horse riders can influence their physiological responses, including the effects of hormones such as cortisol and oxytocin. Horse-based therapy can serve as an effective stress modulation intervention, reducing stress hormone levels and increasing oxytocin, which is associated with feelings of happiness and safety. The reduction in cortisol levels in riders during and after sessions indicates that interaction with horses can have a therapeutic effect in reducing stress. On the other hand, this study also notes that repeated stress can affect the well-being of the horses, emphasizing the importance of maintaining a balance between benefits for humans and horses during equine-assisted therapy sessions. The study also highlights the importance of interdisciplinary research to optimize the outcomes of horse-based therapy.

Neff's (2013) study evaluates the effects of EAT on horses by measuring stress indicators such as heart rate, respiration, and cortisol before and after therapy sessions. Although there were no significant changes in acute stress indicators (heart rate and respiration) between sessions, a significant reduction in cortisol levels in horses during spring and summer suggests decreased stress experienced by horses after sessions. Cortisol, a hormone involved in stress responses in horses, indicates that while they may initially feel stressed, repeated therapy sessions can help horses adapt and experience reduced stress after several sessions. Seasonal factors also influenced these results, with horses tending to experience lower stress levels in the fall. This suggests that environmental factors, including temperature and season, can impact horses' stress levels during therapy.

Overall, the three studies indicate that equine-assisted therapy (EAT) not only provides psychological benefits for human participants but can also help reduce stress in the horses involved, although the effects on horses tend to be more complex and influenced by factors such as habituation and seasonality. The reduction in cortisol levels in horses, as a stress indicator, suggests that horses not only become more accustomed to the therapy routine but may also enjoy the interactions if therapy is conducted appropriately and in an environment that supports their well-being.

These studies highlight that EAT has great potential to provide physiological and psychological benefits for both humans and horses. However, further well-controlled research is needed to gain a deeper understanding of how environmental and individual factors can influence the outcomes of equine-assisted therapy for both humans and horses.

CONCLUSION

This study aimed to evaluate the dual impact of Equine-Assisted Therapy (EAT) on both human participants and horses. The findings confirm its effectiveness in reducing PTSD symptoms, lowering cortisol levels, and enhancing emotional well-being in humans, while also indicating potential stress adaptation in horses as reflected by decreased cortisol levels post-therapy. However, variability influenced by environmental and seasonal factors highlights gaps in standardized practice and welfare considerations. To address these limitations, future research should adopt multidisciplinary approaches—integrating biochemistry, physiology, psychology, and veterinary science—to develop evidence-based protocols that safeguard equine welfare while maximizing therapeutic outcomes for humans. Such contributions will not only strengthen the scientific foundation of EAT but also guide the creation of standardized, welfare-oriented frameworks that ensure the long-term sustainability and broader applicability of this therapy in diverse contexts.

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by Mulia

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Abstract

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INTRODUCTION

As individuals age, they face various physical, psychosocial, and cognitive challenges. The World Health Organization (WHO) emphasizes the importance of early interventions that address behavioral and psychological symptoms while improving social functioning in older adults (Badin, et al., 2022). Equine-Assisted Interventions (EAI) have emerged as a promising approach for enhancing physical and mental health. EAI involves horses as active participants in therapeutic or recreational activities. These interventions include a wide range of activities, such as horseback riding, adaptive vaulting, horse-drawn carriage driving, grooming, and

interacting with horses. Research suggests that EAI can help address emotional, social, cognitive, and physical challenges in various healthcare contexts and has been used to manage neurological conditions (Palsdottir, et al., 2020), autism spectrum disorders (Borgi, et al., 2016), and psychiatric disorders (Earles, et al., 2015; Nurenberg and Schleifer, 2011).

Equine-Assisted Therapy (EAT), a form of equine-assisted intervention, has become a complementary approach in mental and physical health care. The interaction between humans and horses in this therapeutic context is believed to have a positive impact on hormonal balance and psychological well-being. In recent years, various studies have explored the effectiveness of EAT in enhancing individual well-being.

Research on EAI in the elderly population primarily highlights its physical benefits, particularly the unique three-dimensional movement of horseback riding, which helps maintain balance, strengthens core muscles, and improves posture control. Studies have shown that EAI can improve balance, gait patterns, muscle strength, and coordination compared to conventional walking exercises in older adults (Araujo, et al., 2011; Aranda-Garcia, et al., 2015). For example, a meta-analysis conducted by Hilliere et al. (2018) found significant improvements in mobility, such as stride length, walking speed, and movement speed, in individuals participating in EAI compared to control groups. Furthermore, a randomized controlled trial by White-Lewis et al. (2017) demonstrated significant reductions in physical pain among older adults with arthritis after participating in EAI sessions. These physical benefits are crucial for the elderly population as they support daily activities and reduce the risk of falls.

EAI also offers psychological benefits, including improved well-being, quality of life, and self-assessed positive health, even among individuals with various health conditions (Homnick, et al., 2015). A systematic review by White-Lewis et al. (2017) reported that 91% of the studies reviewed showed improvements in quality of life, self-efficacy, and well-being. Similarly, a meta-analysis on individuals with disabilities such as cerebral palsy, Parkinson's disease, and intellectual disabilities highlighted the psychological advantages of EAI (Prieto, et al., 2022; Srinivasan, et al., 2018). For older adults with neurological conditions such as Alzheimer's disease, non-riding EAI activities, such as horse grooming, have been shown to provide significant behavioral benefits (Wood, et al., 2017; Fields, et al., 2018), including reduced agitation and other behavioral issues associated with dementia. While fewer studies have explored the impact of EAI on cognitive function, the results are mixed, with some studies showing no effects and others reporting improvements (Boriono, et al., 2012; Frevel and Maurer, 2015).

EAI has also been linked to physiological changes, such as reduced stress hormone levels. For instance, Cho et al. (2015) observed increased serotonin levels and decreased cortisol levels following an eight-week EAI program for older adults, findings echoed in studies involving autistic populations (Tabares, et al., 2012). Moreover, EAI has been shown to enhance brain activity (Kim, et al., 2015; Cho, 2017). For example, Cho (2017) reported increased alpha wave activity after a 12-week EAI intervention, indicating improved psychological comfort, concentration, and reduced stress.

While evidence supporting the physical and psychological benefits of EAI in younger populations continues to grow, research on its impact on older adults remains limited (Dabelko-Schoany, et al., 2014). Additionally, the full effectiveness of EAI for this age group has not

been conclusively established. Therefore, a systematic review is needed to consolidate existing findings and provide a deeper understanding of the potential health benefits of EAI for the elderly population.

Interaction with horses during therapy sessions can trigger the release of hormones that play a role in mood regulation and stress response. One such hormone is endorphins, known as the "happiness hormone." Increased endorphin levels can lead to feelings of joy and relaxation. Additionally, this therapy can enhance the release of oxytocin, a hormone associated with social bonding and feelings of empathy (Sirait and Desiana, 2019).

EAT has been proven effective in reducing symptoms of stress, anxiety, and depression. Interaction with horses can have a calming effect, increase feelings of happiness, and reduce loneliness (Antari and Febrianti, 2022). Moreover, this therapy can enhance empathy and social attentiveness, contributing to improved mental health (Sirait and Desiana, 2019).

The mechanisms behind the effectiveness of EAT involve the physical and emotional interaction between individuals and horses. Activities such as stroking or grooming horses can lower cortisol levels, a hormone involved in the stress response (Antari and Febrianti, 2022). Additionally, the rhythmic movement during horseback riding can provide sensory stimulation that helps regulate emotions and improve focus.

A study published in the journal *Frontiers in Psychology* in 2015 showed that caring for and spending time with horses can alleviate anxiety and improve emotional well-being. Other research has also indicated that this therapy can be used as an effective intervention for addressing post-traumatic stress disorder (PTSD) and enhancing the quality of life in patients with autism spectrum disorders (Sirait and Desiana, 2019).

Equine-Assisted Therapy offers a holistic approach to improving hormonal and psychological well-being. With growing scientific evidence, EAT can be considered an alternative or complementary therapy in conventional programs for various mental health conditions.

This research aims to analyze how equine-based therapy (Equine-Assisted Therapy) provides positive effects on hormonal changes, such as increased serotonin levels and decreased cortisol, which can support mental and physiological health. Additionally, the study seeks to identify the psychological benefits of EAT, including improved well-being, quality of life, and reduced stress in various population groups, particularly individuals with psychological and neurological disorders. The research also aims to explore the mechanisms of human-horse interaction that contribute to emotional, social, and mental changes, integrating findings from various studies to understand how EAT can become part of a holistic rehabilitation therapy approach.

Theoretically, this study is expected to contribute to the development of theories related to animal-assisted therapy, particularly in understanding the impact of EAT on hormonal and psychological aspects. The research also has the potential to expand the scientific literature on the benefits of equine-based therapy in supporting mental and physiological health and provide a scientific basis for developing equine-assisted therapeutic interventions for various population groups.

Practically, this study offers recommendations for mental and physical health practitioners on the potential benefits of EAT in addressing stress, anxiety disorders, and depression. Furthermore, the research supports rehabilitation programs for individuals with

neurological or physical disabilities by providing in-depth knowledge about the benefits of EAT. It also encourages the adoption of EAT as an innovative approach in community-based healthcare programs and provides insights for managers of equine-assisted therapy centers to develop more effective programs tailored to the needs of individuals undergoing therapy. By focusing on hormonal and psychological aspects, this study is expected to integrate empirical findings from previous research to strengthen the implementation of EAT as a measurable and effective intervention.

RESEARCH METHODS

This research employs a descriptive qualitative approach using the systematic literature review (SLR) method to examine various studies related to the positive effects of Equine-Assisted Therapy (EAT) on hormonal and psychological aspects. The aim of this method is to identify, analyze, and synthesize the key findings from relevant scientific journals.

By utilizing descriptive and literature review methods, this study is expected to provide a more comprehensive understanding of how EAT contributes to hormonal improvements (such as increased serotonin and decreased cortisol levels) and psychological enhancements. The results are also anticipated to serve as a reference for the development of equine-based therapy in various clinical and rehabilitation contexts.

RESULTS AND DISCUSSION

This study focuses on analyzing the positive impacts of Equine-Assisted Therapy (EAT) on hormonal and psychological aspects through a literature review involving three journal articles. A descriptive analysis of the findings is as follows:

According to McDuffee et al. (2024), animal-assisted therapies (AAT) have long been utilized to promote mental and physical health in humans. One specific form of AAT, known as Equine-Facilitated Psychotherapy (EFP), has shown promising results in alleviating symptoms of Post-Traumatic Stress Disorder (PTSD) and related conditions, particularly among veterans. While EFP is considered effective in improving mental health, limited physiological data support its effectiveness, and the response of horses in this therapeutic setting remains largely unexplored. To address these gaps, a prospective cohort study was conducted, which included four EFP sessions over an eight-week period involving veterans diagnosed with PTSD. The study measured changes in stress-related hormones and heart rate variability (HRV) in both humans and horses, alongside assessments of PTSD symptoms in humans and behavioral responses in horses.

The results revealed that in humans, average daily cortisol levels decreased, while oxytocin levels increased after each session. Additionally, self-reports on mood, anxiety, and well-being showed significant improvements. The Sympathetic Nervous System Index increased, while the Parasympathetic Nervous System Index decreased following each session. In contrast, no significant changes were observed in the HRV, oxytocin levels, or stress-related behaviors of the horses, although cortisol levels did decline significantly from pre- to post-session.

These findings suggest that EFP offers substantial psychological and physiological benefits for individuals with PTSD while not negatively affecting the well-being of

participating horses. The integration of human biological data and horse behavioral observations enhances the understanding of the interplay within the human-horse therapy dynamic. Furthermore, the emotional responses of human participants, influenced by their individual states versus traits, present an area requiring further exploration. This aspect is especially notable since most participants had minimal or no prior experience with horses, which may have influenced their reactions to new tasks and close interactions with large animals.

In Rigby's (2023) study, the repetitive stress experienced by horse riders was found to potentially contribute to the physical and psychosocial outcomes observed in equine-based activities. The study highlights various neuroendocrine markers related to stress modulation, such as immunoglobulin A (IgA), serotonin, cortisol, progesterone, and oxytocin, and their effects on the riders' physiology before, during, and after horse-based therapy sessions. While the findings regarding the impact of these hormones varied, several studies indicated promising results in reducing stress levels. To enhance the quality of future research, interdisciplinary approaches are recommended, involving well-controlled experimental studies that consider external and internal factors affecting the physiology of riders.

In this context, the review discusses IgA, serotonin, cortisol, progesterone, and oxytocin within the scope of rider physiology during Equine-Assisted Services (EAS). While variations in hormone levels have been observed across the literature, many studies indicate that EAS positively influences stress modulation, contributing to physical and psychosocial benefits for people of various ages, health conditions, and riding experiences. However, periods of chronic stress, characterized by elevated glucocorticoid and catecholamine levels, could potentially impair the performance of horses during EAS and negatively affect the human-animal bond.

Due to the challenges in collecting and analyzing physiological samples, Rigby emphasizes the importance of including experts such as biologists, biochemists, and healthcare professionals (e.g., nurses or sports physiologists) in future studies. Several physiological variables, including the method of sample collection (e.g., saliva versus plasma), timing of sample collection (e.g., circadian rhythms), and participant characteristics (e.g., sex differences and menstrual cycle phases), should be considered to accurately quantify hormone concentrations. With more comprehensive research, EAS can be made more accessible and effective for broader populations.

Neff's (2013) research investigates the effects of equine-facilitated psychotherapy sessions on horses by measuring indicators of stress, such as heart rate, respiration, cortisol levels, and behaviors before and after sessions. Acute stress indicators, such as respiration rate and heart rate, showed no significant differences between pre- and post-session measurements during spring, summer, or fall. However, chronic stress markers, such as cortisol levels, significantly decreased after sessions in spring ($p = 0.004$) and summer ($p = 0.004$), while no significant changes were observed in fall ($p = 0.732$). The study concluded that horses experienced lower stress levels after therapy sessions, which may be attributed to learned or habitual behaviors developed over time. Seasonal factors, including environmental conditions, also played a role in influencing these outcomes.

Cortisol levels in many animals are known to vary seasonally, with environmental stressors such as extreme temperatures or drought impacting physiological systems. Studies on female baboons, for instance, found elevated cortisol levels during dry and hot seasons

compared to wet and cooler seasons. Similar findings suggest that animals experience increased stress during environmental extremes, which can manifest as elevated cortisol levels. Chronic exposure to high cortisol levels may lead to physiological challenges, including reduced growth, reproductive issues, and weakened immune responses.

Behavioral factors also influence stress assessments in horses. For example, grazing is generally considered a sign of low stress, and during clinical therapy sessions, many horses were observed grazing on hay or grass. None of the horses displayed aggressive behaviors, such as biting or charging, which also suggested low stress levels. Additionally, heart rate, a common physiological marker for stress, has been shown in previous studies to increase during stressful situations, such as long-distance transportation. However, training or familiarity with routines can reduce stress, as demonstrated in studies on pre-loading training for horses Shanahan and circadian adaptations in racehorses.

This study is among the first to evaluate the effects of therapeutic clinical sessions on horse stress. The field of equine-assisted psychotherapy remains relatively new, with most research focusing on human participants rather than the horses involved. However, studies like Trotter et al. on equine-assisted counseling (EAC) demonstrated significant improvements in behavioral outcomes for human participants, highlighting the potential success of such therapies. Future research should expand its focus on the effects of therapy on horses to ensure mutual benefits for both humans and animals involved.

Discussion

Several studies reviewed in the context of Equine-Assisted Therapy (EAT) demonstrate positive impacts on both individuals participating in therapy and the horses involved. These effects are associated with changes in stress-related hormones, such as cortisol and oxytocin, as well as psychological responses experienced by both humans and horses during therapy.

The study by McDuffee et al. (2024) indicates that Equine-Facilitated Psychotherapy (EFP) can reduce PTSD symptoms in humans, with significant reductions in cortisol levels and increases in oxytocin levels after therapy sessions. Lower cortisol levels in humans indicate reduced stress, while increased oxytocin, known as the bonding hormone, suggests improved emotional well-being. In horses, while no significant changes were observed in HRV or stress-related behaviors, a reduction in cortisol levels suggests that horses also experience a decrease in stress after sessions, although this effect is more noticeable in specific seasons (spring and summer). This decrease in cortisol indicates that horses may become accustomed to therapy sessions, contributing to their reduced stress levels after interactions with therapy participants.

Rigby's (2023) research explains that chronic stress experienced by horse riders can influence their physiological responses, including the effects of hormones such as cortisol and oxytocin. Horse-based therapy can serve as an effective stress modulation intervention, reducing stress hormone levels and increasing oxytocin, which is associated with feelings of happiness and safety. The reduction in cortisol levels in riders during and after sessions indicates that interaction with horses can have a therapeutic effect in reducing stress. On the other hand, this study also notes that repeated stress can affect the well-being of the horses, emphasizing the importance of maintaining a balance between benefits for humans and horses during equine-assisted therapy sessions. The study also highlights the importance of interdisciplinary research to optimize the outcomes of horse-based therapy.

Neff's (2013) study evaluates the effects of EAT on horses by measuring stress indicators such as heart rate, respiration, and cortisol before and after therapy sessions. Although there were no significant changes in acute stress indicators (heart rate and respiration) between sessions, a significant reduction in cortisol levels in horses during spring and summer suggests decreased stress experienced by horses after sessions. Cortisol, a hormone involved in stress responses in horses, indicates that while they may initially feel stressed, repeated therapy sessions can help horses adapt and experience reduced stress after several sessions. Seasonal factors also influenced these results, with horses tending to experience lower stress levels in the fall. This suggests that environmental factors, including temperature and season, can impact horses' stress levels during therapy.

Overall, the three studies indicate that equine-assisted therapy (EAT) not only provides psychological benefits for human participants but can also help reduce stress in the horses involved, although the effects on horses tend to be more complex and influenced by factors such as habituation and seasonality. The reduction in cortisol levels in horses, as a stress indicator, suggests that horses not only become more accustomed to the therapy routine but may also enjoy the interactions if therapy is conducted appropriately and in an environment that supports their well-being.

These studies highlight that EAT has great potential to provide physiological and psychological benefits for both humans and horses. However, further well-controlled research is needed to gain a deeper understanding of how environmental and individual factors can influence the outcomes of equine-assisted therapy for both humans and horses.

CONCLUSION

This study aimed to evaluate the dual impact of Equine-Assisted Therapy (EAT) on both human participants and horses. The findings confirm its effectiveness in reducing PTSD symptoms, lowering cortisol levels, and enhancing emotional well-being in humans, while also indicating potential stress adaptation in horses as reflected by decreased cortisol levels post-therapy. However, variability influenced by environmental and seasonal factors highlights gaps in standardized practice and welfare considerations. To address these limitations, future research should adopt multidisciplinary approaches—integrating biochemistry, physiology, psychology, and veterinary science—to develop evidence-based protocols that safeguard equine welfare while maximizing therapeutic outcomes for humans. Such contributions will not only strengthen the scientific foundation of EAT but also guide the creation of standardized, welfare-oriented frameworks that ensure the long-term sustainability and broader applicability of this therapy in diverse contexts.

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