Impact of equine assisted therapy on the cardiovascular parameters of the elderly

Edneia Correa Mello1, Lunna Honorato Diniz1, Janaine Brandão Lage1, Valéria Silva Monteiro2, Mariane Fernandes Ribeiro1, Rodrigo César Rosa3, Domingos Emanuel Bevilacqua Junior1, Fabrizio Antônio Gomide Cardoso5, Vicente de Paula Antunes Teixeira1, Ana Paula Espindula1,3

1Programa de Pós-Graduação em Ciências da Saúde em Patologia Humana, Universidade Federal do Triângulo Mineiro (UFTM) – Uberaba (MG), Brazil
2Educação Física, Associação de Pais e Amigos dos Excepcionais (APAE) – Uberaba (MG), Brazil
3Disciplina de Anatomia Humana, UFTM – Uberaba (MG), Brazil

ABSTRACT

Introduction: Physical activity programs in the elderly aim to prevent and/or reduce the functional decline resulting from the senescence process. Several studies provide evidence that Equine Assisted Therapy (EAT) is an effective means of improving health. However, studies addressing the effects of EAT on the cardiovascular system are scarce.

Objective: To evaluate the effect of Equine Assisted Therapy on the cardiovascular responses of participants divided into two groups: normotensive and hypertensive.

Methods: Twenty individuals participated, aged between 60 and 79 years, divided into three groups: Normotensive Group (n=14), Hypertensive Group (n=6) and all participants, Total Group (n=20). The Omron® HEM 742 blood pressure monitor was used to measure blood pressure and the Gerathem® portable finger oximeter to measure heart rate and blood oxygen saturation. Ten visits were made once a week, lasting 30 minutes.

Results: Between the first and tenth interventions, there was a reduction in blood pressure and heart rate, with statistical significance of systolic blood pressure for the Hypertensive Group (p=0.0478), the Total Group (p=0.0201) and diastolic pressure for the Total Group (p=0.0421). There was also a statistically significant difference in systolic blood pressure and heart rate during some visits. Blood oxygen saturation increased after the intervention, but without statistical significance.

Conclusion: Equine Assisted Therapy can promote a reduction in blood pressure in the elderly, especially hypertensive individuals.

Keywords: equine-assisted therapy; aged; blood pressure; heart rate.

INTRODUCTION

The aging process is progressive and dynamic, providing innumerable morphological, functional, biochemical, and psychological changes, resulting in the loss of individual capacity, which can lead to vulnerability and incidence of diseases. Population aging is a universal and irreversible phenomenon. Cardiovascular disease is the leading cause of adult death in the world, greatly increasing the incidence with the aging process. In the elderly with more than 75 years, it can reach 50%, being considered the main cause of morbimortality in the geriatric population. Systemic Arterial Hypertension is considered the main modifiable...
risk factor for cardiovascular diseases. Blood pressure is directly related to age, with prevalence of 60% for the age group over 65 years. In fact, Systemic Arterial Hypertension is a chronic non-transmissible disease, more prevalent among the elderly\textsuperscript{8}. It is a significant and often asymptomatic chronic disease, which requires optimal control and persistent adherence to prescribed medication to reduce the risks of cardiovascular, cerebrovascular, and renal disease. Multiple health organizations, including the American College of Preventive Medicine, emphasize physical activity, such as non-drug strategies, for blood pressure management\textsuperscript{7}.

The American Heart Association issued scientific statement reporting that contact with animals can reduce the risk of cardiovascular disease, dyslipidemia, obesity and improve the functionality, autonomy, and survival of people with cardiovascular disease\textsuperscript{9}. Animal-Assisted Therapy is not a practice for replacing conventional therapies and treatments, but a complement, a new line of therapy and research, recognized in several countries, which takes into account the influence of emotions on human health. Animals of different species can be used in this therapy, but the most commonly used are dogs and horses, because they are generally docile\textsuperscript{10-11}.

Equine-Assisted Therapy (EAT) is an effective way of improving many measures of physical health\textsuperscript{12,13}. However, studies approaching the effects of EAT on the cardiovascular system are scarce. A review of the literature concluded that cardiovascular responses to EAT remain poorly defined. At present, there is insufficient evidence to suggest that EAT has a residual or training effect similar to the generally expected from training to improve cardiovascular fitness\textsuperscript{14}. The cardiovascular fitness is a central measure of physical fitness and an independent predictor of chronic health conditions. So, it is a tremendous value for clinicians to understand cardiovascular responses promoted by EAT. This may lead to a greater demand for EAT to be recognized as beneficial by health insurance providers and ultimately result in it becoming more affordable and accessible\textsuperscript{15}.

In this context, the primary objective of this study was to evaluate the effect of EAT on cardiovascular responses in older adults. The secondary objective was to evaluate the effect of EAT on the cardiovascular responses of participants divided into two groups: normotensive and hypertensive. For this, data were collected on systolic and diastolic blood pressure, heart rate and partial oxygen saturation. The data were used to evaluate the cardiovascular response in two situations: between the first and the tenth intervention and during the EAT session. It is known that uncontrolled hypertension is a contraindication for EAT and that older adults usually have lower levels of oxygen saturation than younger adults. When the hypoxia process starts, it accelerates and the condition quickly becomes more serious\textsuperscript{16,17}. Therefore, the constant assessment of cardiovascular parameters during sessions keeps EAT interventions safer, especially for the geriatric population. We hypothesized that EAT provides positive cardiovascular responses for older adults, whether they are normotensive or hypertensive.

**METHODS**

This is a longitudinal, quantitative and descriptive study. The project was evaluated, and approved by the Research Ethics Committee (CEP) of the Universidade Federal do Triângulo Mineiro (UFTM) - under the protocol number 690.039 on 13/02/2014, by the UFTM Ethical Committee on the Use of Animals under protocol no. 266/2017on 21/07/2017 and by the Brazilian Registry of Clinical Trials (ReBEC) under protocol RBR-2kw6p9. The evaluation methods and intervention protocols used in this study adhered to the norms of Resolution 466/12 of the Brazilian National Health Council on Research Involving Human Beings and the Law 11.794/08 Decree 6.899/09 by the National Council for Animal Control and Experimentation (CONCEA).

Participants in this study provided written informed consent by signing a Free and Informed Consent Form.

**Participants**

In a sample of 90 individuals evaluated and following the inclusion and exclusion criteria, 20 individuals were selected. Inclusion and exclusion criteria were determined through clinical examination and anamnesis, in which information was obtained regarding personal data, lifestyle, clinical history, diseases and use of medications. Individuals with unmatched age (60 to 80 years), gait impairment, severe spinal disorders, hip dislocation, uncontrollable fear of horses, and/or physical training practitioners were excluded. Hypertension is a relative contraindication for EAT. However, frequent episodes of high blood pressure make it a contraindication to therapy. Therefore, individuals who had uncontrolled hypertension were not included in the study, which justifies the lower number of HG. As a discontinuity criterion, individuals who had more consecutive absences and/or did not complete the ten sessions were excluded. All participants started the practice of EAT with the Project. Participants were allocated into three groups: the normotensive group (NG) formed by 14 individuals, the hypertensive group (HG) by six individuals and the total group (TG) by 20 individuals, all participants. Normal blood pressure was defined as <120/80 mmHg and hypertension as ≥130/80 mmHg\textsuperscript{7}. Hypertensive individuals, who had previously been diagnosed, used their usual blood pressure medications. One individual used angiotensin-converting enzyme (Captopril), two individuals used angiotensin II receptor blockers (Losartan,Valsartan), one individual used beta-blocker (Atenolol), one individual used diuretic (Hydrochlorothiazide) and one individual used diuretic (Hydrochlorothiazide).
angiotensin II receptor blockers with diuretic (Benicar – Olmesartan Medoxomil with Hydrochlorothiazide)

The anthropometric variables were evaluated by means of a standardization of the International Society for the Advancement of Cineanthropometry (ISAK). Total body mass (TBM) and height were measured using a Filizola® balance with a precision of 100 grams with stadiometer coupled with a precision of 0.5 cm. The body mass index (BMI) was calculated using the previously obtained anthropometric measures, according to a predetermined equation14. The characterization of each group is in Table 1.

**Interventions**

The sessions were held at the Centro de Equoterapia Dr. Guerra of the Associação de Pais e Amigos dos Excepcionais (APAЕ) in the city of Uberaba, Minas Gerais, Brazil. The center of EAT contains an appropriate covered area, with rings, bays, saddlery, and platform of access. The proposed intervention protocol was in accordance with the experience of the hippotherapy center19,20. The platform of access. The proposed intervention protocol was in accordance with the experience of the hippotherapy center19,20. The ten sessions were performed with the horse at a pace, for 30 minutes, once a week. Three horses were used randomly, aged between 20, 18 and 9 years and with height of 1.56, 1.60 and 1.62 m, respectively. The riding equipment used was saddle, with the feet in the stirrups in the first 15 minutes, and with the feet out of the stirrups in the remaining 15 minutes. No type of activity or exercise was performed by the participant during the session, because the objective was to evaluate the effect of the three-dimensional movement provided by the equine. The sessions were conducted only by examiners previously qualified by the National Equine Therapy Association21.

**Evaluation procedures**

The validated and properly calibrated Omron® HEM 742 pressure monitor was used to measure blood pressure. The arm was supported at the heart level, with the palm facing upwards and the cuff placed two to three cm above the cubital fossa and centered on the brachial artery. The Gerathem® portable fingertip pulse oximeter, positioned on the left index finger, was used to measure heart rate and partial oxygen saturation. The data collection was performed in five moments: at initial rest (Pre-EAT), in the first minute of the session (1st minute), fifteenth minute (15th minute), in the thirty minute (30th minute) and ten minutes after the session (Post-EAT).

**Data Analysis**

The results were obtained through the descriptive analysis for each variable. Fordata with two variables, the t test for paired samples was used. For tests with more than two variables, Repeated Measures ANOVA, post-hoc Bonferroni were used. The analyses were conducted using the GraphPad Prism® software (version 5.0, San Diego, USA), considering a significance level of 5% and a confidence interval of 95%.

**RESULTS**

There were reductions in blood pressure and heart rate between the first and last intervention, with statistical significance of systolic blood pressure for HG (p=0.0478), TG (p=0.0201) and diastolic blood pressure for TG (p=0.0421). The three groups had the same ideal systolic, 120mmHg, and diastolic blood pressures, less than 80 mmHg. Partial oxygen saturation increased, however without statistical difference (Table 2).

There were statistical differences in systolic blood pressure on day 2 and diastolic blood pressure on days 1, 5 and 6 for NG (Table 3).

There were significant reductions in systolic blood pressure on day 4 and diastolic blood pressure on day 9 for HG (Table 4).

There were statistical differences in systolic blood pressure on day 1 and diastolic blood pressure on days 1 and 5 for TG (Table 5).

There were significant reductions in heart rate on days 2, 6, 7 and 9 for NG, on days 3 and 4 for HG, on days 2, 4 and 6 for TG, Table 6.

**Table 2: Systolic and diastolic blood pressure, heart rate and partial oxygen saturation of Normotensive, Hypertensive and Total Group Pre-EAT of the first and last intervention (Mean±SEM and statistical significance *p<0.05).**

|                     | Systolic Blood Pressure | Diastolic Blood Pressure | Heart Rate | Oxygen Saturation |
|---------------------|-------------------------|--------------------------|------------|------------------|
|                     | Session 1 | Session 10 | p  | Pre-EAT | Post-EAT | p  | Pre-EAT | Post-EAT | p |
| Normotensive        |                                                                     |                          |            |                  |                |            |                  |                |    |
| (n=14)              | 124.3±3.43 | 120.0±2.77 | 0.2536 |                     |                |            |                  |                |    |
| Hypertensive        | 138.3±6.54 | 120.0±3.65 | 0.0478* |                     |                |            |                  |                |    |
| (n=6)               | 129.0±3.31 | 120.0±2.17 | 0.0201* |                     |                |            |                  |                |    |
| Total               | 129.0±3.31 | 120.0±2.17 | 0.0201* |                     |                |            |                  |                |    |
|                     |                         |                          |            |                  |                |            |                  |                |    |
|                     | 77.14±2.85 | 70.71±2.86 | 0.0951 |                     |                |            |                  |                |    |
| Normotensive        | 83.33±3.33 | 73.33±5.57 | 0.1438 |                     |                |            |                  |                |    |
| Hypertensive        | 78.00±2.24 | 72.00±2.47 | 0.0421* |                     |                |            |                  |                |    |
| Total               | 83.33±3.33 | 73.33±5.57 | 0.1438 |                     |                |            |                  |                |    |
|                     |                         |                          |            |                  |                |            |                  |                |    |
|                     | 78.57±2.64 | 77.64±2.97 | 0.7904 |                     |                |            |                  |                |    |
| Normotensive        | 78.17±4.55 | 73.33±6.84 | 0.3401 |                     |                |            |                  |                |    |
| Hypertensive        | 78.35±2.22 | 78.50±2.57 | 0.9572 |                     |                |            |                  |                |    |
| Total               | 78.57±2.64 | 77.64±2.97 | 0.7904 |                     |                |            |                  |                |    |
|                     |                         |                          |            |                  |                |            |                  |                |    |
|                     | 96.45±0.49 | 96.86±0.22 | 0.4392 |                     |                |            |                  |                |    |
| Normotensive        | 96.45±0.49 | 96.86±0.22 | 0.4392 |                     |                |            |                  |                |    |
| Hypertensive        | 96.45±0.49 | 96.86±0.22 | 0.4392 |                     |                |            |                  |                |    |
| Total               | 96.45±0.49 | 96.86±0.22 | 0.4392 |                     |                |            |                  |                |    |

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Table 3: Systolic and diastolic blood pressure of Normotensive Group Pre-, during [first (1°), fifteenth (15°), thirtieth (30°) minute] and Post-EAT (Mean±SEM and same letter is statistical significance *p<0.05, **p<0.01).

| Day | Pre-EAT | 1° minute | 15° minute | 30° minute | Post-EAT |
|-----|---------|-----------|------------|------------|----------|
| 1   | 124.3±3.43 | 132.1±3.65 | 124.3±4.28 | 120.7±4.25 | 120.7±3.70 |
| 2   | 121.4±4.55 | 127.9±4.34 | 122.9±4.37 | 120.7±4.12** | 132.1±3.94** |
| 3   | 122.9±3.54 | 122.9±4.11 | 122.9±1.63 | 125.0±3.10 | 119.3±3.22 |
| 4   | 120.0±3.31 | 123.6±3.86 | 123.6±4.00 | 122.9±5.18 | 117.1±4.73 |
| 5   | 122.9±3.21 | 122.9±4.50 | 118.6±3.29 | 122.1±2.80 | 116.4±2.69 |
| 6   | 123.6±4.00 | 120.7±3.70 | 119.3±3.22 | 120.0±2.96 | 116.4±3.86 |
| 7   | 120.0±2.77 | 118.6±2.05 | 117.9±2.38 | 117.1±2.84 | 118.6±2.53 |
| 8   | 116.4±2.25 | 114.3±2.50 | 117.1±2.85 | 117.1±2.20 | 117.1±2.44 |
| 9   | 120.7±2.86 | 117.1±2.65 | 115.7±4.53 | 115.7±3.58 | 121.4±2.93 |
| 10  | 120.0±2.77 | 124.3±2.27 | 119.3±3.54 | 120.0±2.77 | 119.3±3.54 |

| Day | Pre-EAT | 1° minute | 15° minute | 30° minute | Post-EAT |
|-----|---------|-----------|------------|------------|----------|
| 1   | 77.1±2.85*** | 80.7±2.45 | 76.4±2.69 | 75.7±3.09 | 69.7±2.10*** |
| 2   | 80.7±4.74 | 80.0±2.77 | 78.5±2.74 | 77.1±3.04 | 78.5±2.74 |
| 3   | 77.8±2.99 | 78.5±2.74 | 79.2±3.22 | 77.8±2.80 | 73.5±2.69 |
| 4   | 75.00±2.51 | 75.00±2.51 | 79.2±3.05** | 76.4±3.14 | 70.7±2.45** |
| 5   | 69.2±1.95*** | 75.7±2.27 | 79.2±2.86*** | 77.8±1.80*** | 72.8±2.65 |
| 6   | 74.2±2.71 | 75.0±3.27 | 77.8±2.60** | 77.8±1.86** | 69.2±1.95*** |
| 7   | 72.1±2.99 | 74.2±3.88 | 75.0±2.72 | 76.4±3.24 | 72.1±2.14 |
| 8   | 77.8±3.50 | 74.2±2.71 | 74.2±2.27 | 75.7±2.27 | 70.7±2.86 |
| 9   | 70.7±2.21 | 76.4±3.07 | 75.7±2.91 | 77.8±2.99 | 77.1±2.85 |
| 10  | 70.7±2.86 | 76.4±3.24 | 72.8±3.69 | 77.8±3.17 | 73.5±3.57 |

Table 4: Systolic and diastolic blood pressure of Hypertensive Group Pre-, during [first (1°), fifteenth (15°), thirtieth (30°) minute] and Post-EAT (Mean ± SEM and same letter is statistical significance *p<0.05, **p<0.01).

| Day | Pre-EAT | 1° minute | 15° minute | 30° minute | Post-EAT |
|-----|---------|-----------|------------|------------|----------|
| 1   | 138.3±6.54 | 138.3±11.08 | 136.7±11.74 | 136.7±9.18 | 130.0±7.30 |
| 2   | 133.3±6.14 | 141.7±10.46 | 138.3±11.95 | 138.3±9.09 | 126.7±4.94 |
| 3   | 130.0±10.33 | 131.7±8.72 | 133.3±10.85 | 121.7±7.49 | 126.7±10.85 |
| 4   | 151.7±10.78 | 155.0±8.06** | 138.3±7.49 | 135.0±8.06 | 133.3±6.14** |
| 5   | 125.0±8.06 | 131.7±7.92 | 125.0±6.70 | 130.0±8.16 | 128.3±6.00 |
| 6   | 113.3±6.66 | 125.0±5.62 | 118.3±5.64 | 123.3±7.60 | 118.3±9.45 |
| 7   | 16.7±11.45 | 121.7±7.03 | 128.3±4.01 | 118.3±9.09 | 130.0±3.65 |
| 8   | 120.0±11.25 | 131.7±10.46 | 126.7±8.81 | 125.0±7.63 | 125.0±4.28 |
| 9   | 123.3±11.74 | 126.7±9.54 | 125.0±8.06 | 130.0±7.30 | 125.0±8.46 |
| 10  | 120.0±3.65 | 126.7±4.21 | 121.7±7.03 | 116.7±4.94 | 115.0±8.46 |

| Day | Pre-EAT | 1° minute | 15° minute | 30° minute | Post-EAT |
|-----|---------|-----------|------------|------------|----------|
| 1   | 83.3±3.33 | 81.6±4.77 | 81.6±6.00 | 81.6±7.49 | 81.6±4.77 |
| 2   | 73.3±4.21 | 80.0±6.32 | 81.6±6.00 | 78.3±6.54 | 75.0±5.00 |
| 3   | 73.3±4.21 | 75.0±3.41 | 73.3±4.94 | 66.6±4.21 | 71.6±6.00 |
| 4   | 80.0±6.32 | 85.0±8.46 | 75.0±5.00 | 80.0±5.16 | 73.3±4.05 |
| 5   | 66.6±6.14 | 73.3±4.94 | 76.7±7.14 | 75.0±5.62 | 68.3±4.01 |
| 6   | 66.6±4.94 | 65.0±5.00 | 65.0±5.00 | 71.6±4.01 | 70.0±5.77 |
| 7   | 58.3±4.77 | 68.3±7.03 | 75.0±5.62 | 71.6±6.00 | 76.7±5.57 |
| 8   | 73.3±9.18 | 83.3±6.66 | 71.6±4.77 | 75.0±6.70 | 70.0±8.56 |
| 9   | 78.3±7.03 | 86.6±4.94 | 81.6±6.00 | 88.3±6.00** | 73.3±7.14** |
| 10  | 73.3±5.57 | 80.0±6.32 | 70.0±3.65 | 70.0±5.16 | 73.3±6.66 |

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tole, isolated systolic hypertension. At rest, the older heart works pressure during systole and normal blood pressure during dias-

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Table 5: Systolic and diastolic blood pressure of Total Group Pre-. during [first (1st), fifteenth (15th), thirtieth (30th) minute] and Post- EAT (Mean ± SEM and same letter is statistical significance *p<0.05, **p<0.01).

| Day | Pre-EAT | 1st minute | 15th minute | 30th minute | Post-EAT |
|-----|---------|------------|-------------|-------------|----------|
| 1   | 129.0±3.31*<sup>a</sup> | 135.5±3.87 | 129.0±4.52 | 126.0±4.29<sup>b</sup> | 123.5±3.42<sup>c</sup> |
| 2   | 125.0±3.80 | 133.0±4.41 | 128.5±4.71 | 126.5±4.24 | 130.5±3.11 |
| 3   | 125.0±3.67 | 127.5±4.46 | 128.0±3.81 | 124.5±3.03 | 122.0±3.88 |
| 4   | 129.0±4.52 | 132.5±4.34 | 128.5±4.05 | 129.0±3.32 | 122.5±4.03 |
| 5   | 123.2±3.50 | 126.3±4.84 | 121.1±4.43 | 126.3±3.54 | 121.1±3.14 |
| 6   | 126.5±3.803 | 123.0±3.25 | 121.5±2.32 | 120.0±1.36 | 120.5±2.34 |
| 7   | 119.5±3.66 | 120.0±3.12 | 121.5±2.32 | 120.0±1.36 | 120.0±2.39 |
| 8   | 118.0±3.44 | 120.5±3.36 | 120.0±2.81 | 120.0±2.17 | 120.0±2.17 |
| 9   | 121.5±3.85 | 119.5±3.43 | 118.0±3.94 | 119.5±3.58 | 121.5±3.18 |
| 10  | 121.0±2.16 | 126.5±1.95 | 122.0±3.12 | 120.5±2.56 | 121.0±3.47 |

DISCUSSION

The results of the present study show that the EAT promoted a reduction in blood pressure and a low oscillation of the heart rate, which characterizes the intervention as a light physical activity and without risk for hypertensive patients, and maintains the oxygen saturation values within normal limits. These findings validate our hypothesis that EAT provides positive cardiovascular responses for older adults, whether they are normotensive or hypertensive. To our knowledge, this is the first study to compare blood pressure measurements in normotensive and hypertensive participants.

Over the life course, the heart progressively remodels. Typical age-related cardiac remodeling involves increasing left ventricular wall thickness, decreasing left ventricular dimensions, and increasing concentricity, all of which are associated with risk factors and incidence of adverse cardiovascular events, such as coronary artery disease, heart attack, and stroke. Age-related changes in vascular function generally include increasing endothelial dysfunction and arterial stiffness, accompanied by increasing systolic blood pressure and pulse pressure. In elderly individuals, it is common for there to be abnormally high blood pressure during systole and normal blood pressure during dia-

The increase or decrease in blood pressure and heart rate during some sessions were reported in other studies. A study of veterans with post-traumatic stress disorders showed a decrease in heart rate in only one session, but this was not seen in the other four days of EAT intervention. Another study showed that hippotherapy can benefit children with disabilities attributable to

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neurological disorders by eliciting an acute autonomic response during the intervention and the recovery period\(^i\). Limited information exists on the cardiorespiratory responses to EAT in part because of a host of factors that confound measurement precision. Movements of the rider in response to the horse augment the variability. Environmental conditions, such as temperature and humidity, and the logistics of collecting data as the horse and rider move throughout a large space add to the difficulties in characterizing the physical responses to horseback riding\(^i\).

The low heart rate values maintained during all sessions imply that EAT is a safe physical activity for older individuals. The intensity of the exercise without risk can be calculated from the equation (220 minus the age of the individual). This predictive maximum heart rate (MHR) equation is recognized and applied worldwide\(^i\). Exercises that fluctuate between 50-60\% of the MHR are considered light, between 61-80\% moderate and between 81-90\%, intense\(^i\). Thus, the heart rate oscillation remained on average between 65-83 bpm (<60\% MHR), deducing that EAT is a light activity. These findings corroborate with previous studies that evaluated the effect of hippotherapy in participants with Down Syndrome\(^i,2,4\). The lowest heart rate averages were for HG. One explanation for this is that antihypertensive drugs, such as beta-adrenergic blockers, may alter baseline heart rate as well as during exercise\(^i,9\).

### Table 6: Heart rate of Normotensive, Hypertensive and Total Group Pre-, during [first (1st), fifteenth (15th), thirtieth (30th) minute] and Post-EAT (Mean±SEM and same letter is statistical significance *p<0.05, **p<0.01).

| Day | Normotensive | Hypertensive | Total |
|-----|--------------|--------------|-------|
| Pre-EAT | 1st minute | 15th minute | 30th minute | Post-EAT |
| 1 | 78.57±2.64 | 79.57±2.13 | 79.21±2.23 | 79.21±2.53 | 77.07±2.43 |
| 2 | 79.43±3.14** | 78.21±2.57 | 78.86±2.60 | 78.43±2.84 | 74.86±3.04** |
| 3 | 80.00±2.95 | 82.57±2.59 | 79.79±2.33 | 81.57±4.96 | 7736±1.99 |
| 4 | 82.79±2.45 | 81.36±2.41 | 81.50±2.49 | 83.43±2.22 | 78.64±2.43 |
| 5 | 77.71±2.43 | 80.43±3.02 | 78.93±2.65 | 81.57±3.28 | 7764±2.80 |
| 6 | 78.71±3.55 | 79.57±2.46** | 78.14±3.00 | 79.43±2.72** | 74.50±2.91** |
| 7 | 79.21±3.24 | 80.79±3.05** | 78.64±2.30 | 79.00±2.27 | 75.50±2.41** |
| 8 | 81.79±2.92 | 83.43±3.18 | 82.43±3.07 | 81.93±2.81 | 80.60±2.95 |
| 9 | 82.71±3.75** | 83.14±3.66*** | 81.57±3.26 | 81.21±3.46 | 77.86±3.21*** |
| 10 | 77.64±2.97 | 81.21±2.80 | 76.71±2.99 | 79.93±2.75 | 7757±2.99 |

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Oxygen saturation values remained within normal limits during all sessions, indicating that EAT is safe for normotensive and hypertensive individuals. These findings are consistent with a study about neurological disorders and hippotherapy. The cardiovascular responses to EAT remain poorly defined. Therefore, this study helps to elucidate its effects in elderly population. Our findings suggest that it is a safe and efficient therapy for this growing population. In addition, EAT is a differentiated intervention in relation to the outpatient and hospital environment. The limitations of this study include few studies on this topic and having a more comprehensive cardiovascular profile. Future research could include cardiorespiratory data integrated with functional tests in order to improve the understanding of physical changes with EAT from a dynamic standpoint.

Conclusions

Our results suggest that Equine Assisted Therapy can reduce blood pressure in older adults, especially hypertensive individuals.

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