

Survey on management practices adopted in the transportation of vaquejada horses in the state of Rio Grande do Norte

Levantamento sobre práticas de manejo adotadas no transporte de equinos de vaquejada no estado do Rio Grande do Norte

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RESUMO

O cuidado no transporte de equinos tornou-se essencial na produção equina, sendo particularmente estressante para aqueles não familiarizados. Diante da falta de dados relacionados às práticas de transporte de equinos atletas adotadas no Brasil, este estudo teve por objetivo realizar um levantamento sobre os aspectos relacionados ao manejo no transporte de equinos de vaquejada no estado do Rio Grande do Norte. A população alvo deste levantamento foram residentes do estado do Rio Grande do Norte associados ao transporte rodoviário de equinos para fins esportivos. Após obter consentimento oral e/ou por escrito, os autores aplicaram individualmente os questionários aos entrevistados. Os proprietários responderam ao questionário de forma independente, exceto quando o entrevistado era analfabeto ou apresentava alguma deficiência sem, contudo, influenciar as respostas. Cada questionário possuía 45 perguntas, sendo 11 discursivas e 34 objetivas. As entrevistas foram realizadas em vaquejadas realizadas no estado do Rio Grande do Norte, e um total de 82 questionários foram respondidos. Os resultados obtidos destacam a importância da adoção e aprimoramento de práticas adequadas no manejo pré, durante e pós-transporte.

PALAVRAS-CHAVE: vaquejada; trailer; transporte de equinos.

ABSTRACT

The care in the transportation of horses has become essential in equine production, particularly stressful for those unfamiliar with it. Faced with a lack of data related to the transportation practices of athletic horses adopted in Brazil, this study aimed to conduct a survey on aspects related to the handling of transportation of rodeo horses in the state of Rio Grande do Norte. The target population for this survey was residents of the state of Rio Grande do Norte associated with the road transportation of horses for sports purposes. After obtaining oral and/or written consent, the authors individually applied the questionnaires to the respondents. Owners answered the questionnaire independently, except when the respondent was illiterate or had some disability, without influencing the responses. Each questionnaire consisted of 45 questions, including 11 open-ended and 34 objective questions. The interviews were conducted at rodeo events in the state of Rio Grande do Norte, and a total of 82 questionnaires were completed. The results highlight the importance of adopting and improving appropriate practices in pre-transport, during transport, and post-transport management.

KEYWORDS: trailer; horse transport; vaquejada.

INTRODUCTION

Horse farming in Brazil stands out as one of the four largest in the world, as reported by FAO (2021). With over 26 horse breeds, each characterized by distinct traits and breed standards, these animals are commonly assigned to activities that best match their aptitudes, whether for work, leisure, or sport.

For equine athletes to reach competition venues, they must be transported by trucks and/or trailers, which represents a critical aspect requiring attention in equestrian activities. This is a silent issue that often shows no perceptible signs but can directly impact animal health and performance, particularly when they are transported under inadequate conditions (ASSIS et al. 2022).

Breed itself is not considered a predisposing factor for transportation difficulties; rather, handling procedures during loading, transport and unloading, as well as the types of vehicles used, such as trailers and trucks, are the primary concerns. Furthermore, negative experiences during loading and unloading can significantly influence the behavior and health status of horses during transport, affecting their performance in competitions, unless there is adequate minimum rest time (LEE et al. 2001, ASSIS et al. 2022), which according to NAZARENO et al. (2015) and NIELSEN et al. (2022) must be at least 48 hours.

Resistance to adopting proper transport measures and techniques persists among breeders, competitors, and handlers regarding transport-related stress. Animals are removed from their stalls or paddocks and placed in often confined and sometimes enclosed spaces for transportation across varying distances between cities or events. Among stressors, the mode of transportation, whether by truck or trailer, plays a significant role. The distance to the destination is a critical factor, as water availability, feed supply and temperature may be inadequate during transport depending on the route, speed, travel time and compartment where the animal is housed, potentially leading to stress and fatigue (TATEO et al. 2012, NIEDŹWIEDŹ et al. 2013, NIELSEN et al. 2022).

The National Traffic Council (CONTRAN 2020) plays a vital role in establishing regulations governing animal transportation for economic, sporting, recreational, and exhibition purposes. According to CONTRAN guidelines, vehicles transporting live animals must display appropriate signage indicating live cargo. Transportation must be tailored to each species' specific requirements to minimize stress from environmental changes and transport instability, thereby preventing potential injuries. Furthermore, the regulation emphasizes the need to provide animals with a controlled, comfortable environment with adequate ventilation and protection from adverse weather conditions. The provision of adequate spaces for hydration and feeding during transport is considered essential to ensure animal welfare (CONTRAN 2020).

It is crucial to consider transport capacity, avoiding spatial conflicts and ensuring compliance with height and width specifications. Floor quality plays a crucial role by providing adequate support through slip-resistant surfaces. The use of non-slip flooring in these settings is essential for preventing falls and slips, ensuring safer and less stressful animal transport. Furthermore, the presence of openings and ramps in the cages contributes to the comfort and familiarity of the animals during boarding and unboarding (CONTRAN 2020).

Given the lack of data regarding athletic horse transportation practices in Brazil, this study aimed to survey aspects related to vaquejada horse transportation in Rio Grande do Norte state.

MATERIAL AND METHODS

This work was conducted during the period from August to December 2023. A população alvo deste levantamento foram residentes do estado do Rio Grande do Norte associados ao transporte rodoviário de equinos para fins esportivos. Participants were required to own at least one equine and have transported it at least once during the year prior to the survey. After obtaining verbal and/or written informed consent, participants completed questionnaires administered individually by the researchers.

Os proprietários responderam ao questionário de forma independente, exceto quando o entrevistado era analfabeto ou apresentava alguma deficiência sem, contudo, influenciar as respostas. Cada questionário possuía 45 perguntas, sendo 11 discursivas e 34 objetivas. The questionnaire collected data on respondents' involvement in the equine industry, their role (professional or amateur), specific equestrian activities, ability to identify sick horses, frequency of pre- and post-transport health assessments, transport training practices, journey details (number of horses under care, travel frequency and distances), and transport methods.

In addition to requesting the aforementioned information, respondents were asked to describe the most recent transport-related equine injury (including superficial or deep cuts/wounds, fractures, and hematomas). Data were collected from August to November 2023 and stored in Microsoft Excel® spreadsheets for

subsequent descriptive statistical analysis using Epi Info 7.2 software (Centers for Disease Control and Prevention 2023).

RESULTS AND DISCUSSION

The interviews were conducted at rodeos in the state of Rio Grande do Norte, and a total of 82 questionnaires were answered. The participants came from 32 different cities. Surveys are widely used in veterinary research and can provide valuable insights into scientific knowledge (CHRISTLEY 2016). Although surveys that use questionnaires to assess the level of knowledge of horse owners about various diseases or procedures adopted in the face of a certain disease are common practices in several countries (BOWDEN et al. 2020, GOLDING et al. 2023), this tool has been little used in Brazil. Recently, MEDEIROS et al. (2023) and COSTA et al. (2022) used questionnaires to assess knowledge of infectious diseases and the management of acute abdomen cases in horses, respectively, in the same population. Unlike the present study, owner and competitor compliance was substantially higher in both cited studies.

A potential limitation was conducting interviews during sporting events rather than utilizing digital surveys through social media platforms. The social media dissemination strategy could have achieved broad engagement, facilitating questionnaire access through networks where individuals interested in the research topic regularly interact and share information.

Results showed that 53% (43/82) of respondents used trucks for transport, while 47% (39/82) used trailers, with open trailers being predominant (70% - 27/39). The selection of equine transportation methods plays a crucial role, as it can significantly impact animal safety and welfare. The use of a controlled transport environment with minimal external interference is essential to prevent physiological disturbances, such as increases in body temperature, cortisol levels, heart rate, and respiratory rate (ONMAZ et al. 2011, TATEO et al. 2012, PADALINO & RAIDAL 2020).

In Brazil, horses are transported primarily by road using trucks or trailers. It is estimated that only 10% of equine transportation is carried out using trailers, and that the majority of animals are transported in cattle trucks as suggested by NAZARENO et al. (2015), which contrasts with the results of the present study. During data collection, significant variations were observed in the type, maintenance conditions and comfort levels of the transportation modes. Of these, 69.7% (30/43) were specifically manufactured for equine transport, while 30.3% (13/43) were adapted for this purpose. This discrepancy highlights the importance of considering not only the type of transport, but also its condition and suitability to ensure the comfort and safety of horses during transport (Fig. 1).

Trailer-related issues can be classified into two categories: loading operations and trailer handling. The positioning of the trailer axles affects cargo vibration levels since less trailer movement occurs in the axle zone. The trailer type affects vehicle stability and equine behavior, with two-horse trailers being predominantly used for vaquejada horses. Although trailers with the capacity to transport up to two horses are the most widely used, they are less stable than trucks and have been identified as a risk factor for injuries related to transport in transit (HALL et al. 2020). Furthermore, animals tend to have a greater phobia (fear) of this type of transport, when compared to cattle trucks (NAZARENO et al. 2015).

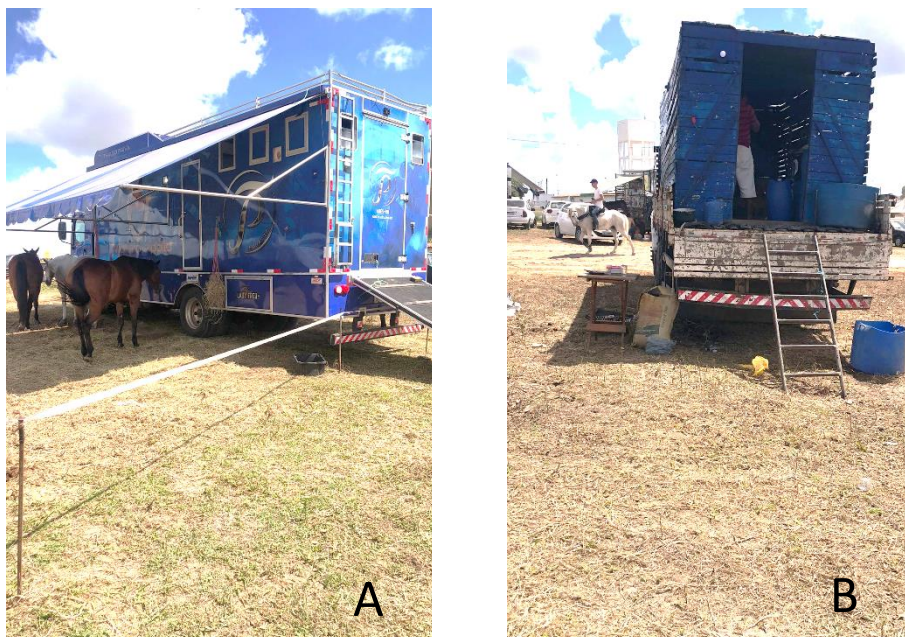


Figure 1. Vehicles used to transport horses. In A, a specialized horse transport truck is shown, while B displays a cargo truck adapted for equine transport with a wooden cage installation.

Transportation must be tailored to each species' specific requirements to minimize stress from environmental changes and transport instability, thereby preventing potential injuries. Furthermore, Conatran regulations highlight the importance of providing a ventilated, controlled and comfortable environment, protecting animals from adverse weather conditions (CONTRAN 2020).

Although many owners and competitors invest in transportation that provides ideal conditions for equine transport, some individuals involved in these activities still transport horses inadequately. In some cases, there is overcrowding of horses beyond vehicle capacity, use of poorly maintained vehicles with inadequate flooring, and inappropriate use of cargo trucks designed for non-live transport to move competition horses (ASSIS et al. 2022), as observed in this study in 0.02% of respondents (2/83).

In this context, HALL et al. (2020) states that if urine is not properly absorbed by bedding placed on the floor and/or the floor is not covered with non-slip mats, the surface may become slippery during transit, increasing the risk of balance loss and subsequent injuries. Vehicle characteristics, such as chest bars, stallion guards, inadequate partitions, and sharp objects inside the vehicle, were associated with increased risk of transport-related injuries.

Regarding the number of transported horses, respondents reported transporting at least two animals (Figure 2), which varied according to the transportation method used. Most respondents transported a maximum of two horses per trip, as two-horse trailers predominate in the study region, unlike other parts of the country.

There is no minimum space regulated by law for loading and transporting horses in relation to density. In this context, it is recommended to exercise sound judgment and consider ways to ensure animal welfare. However, research suggests that higher densities lead to increased spatial competition, raising the likelihood of accidents during transit (IACONO et al. 2007, NAZARENO et al. 2015). Reducing density, on the other hand, provides better well-being for animals, offering more space for accommodation and allowing them to take advantage of the environment to rest when the truck is stopped (NAZARENO et al. 2015).

Considering that horses can vary in body weight, expressing space allocation as stocking density (kg/m^2), rather than space allocation ($1.75 \text{ m}^2/\text{horse}$), is a better way of considering differences in body size according to NIELSEN et al. (2022). These authors suggest that a stocking density not exceeding $200 \text{ kg}/\text{m}^2$ contributes to the well-being of horses.



Figure 2. Number of horses transported per trip by the respondents.

When asked about transporting animals with evident clinical signs of infectious diseases (respiratory, neurological, etc.), 80.2% of respondents stated they did not transport such animals, while 19.8% reported they would still transport the horse to the event. Regarding animal transportation, 55.6% of respondents reported transporting animals exclusively from a single property, while 44.4% transported animals from multiple properties in the same vehicle.

These findings highlight the potential spread of infectious diseases among horses from different properties when using shared transportation, which may lead to significant economic losses related to veterinary costs, medications, and possible animal death (MEDEIROS et al. 2023). Furthermore, the act of transporting sick horses to sporting events can result in worsening of the patient's clinical condition, resulting in more serious complications, such as cases of upper respiratory tract infection that can progress to pneumonia or pleuropneumonia after transport (MELO & FERREIRA 2022, SILVA et al. 2023).

Grouping horses in the same transport vehicle is a common practice for logistical purposes, based on their intended destination. However, the mixing of groups disrupts social cohesion between equines in the original groups (VAN DIERENDONCK & SPRUIJT 2012) and can result in fights (biting, kicking etc.) to establish social hierarchy, potentially leading to injuries (HOUPPT & WICKENS 2014).

Survey data revealed that only 35.8% of respondents practiced prior transport habituation with their horses. This finding underscores the urgent need to raise awareness about the importance of this procedure, as this management measure plays a crucial role in animal spatial adaptation and stress reduction. Such awareness aims to enhance management practices, thereby providing horses with a more comfortable and stress-free transport experience.

The transportation of horses to sporting events, fairs, and exhibitions is a common practice in equine industry. However, the activity can be significantly less stressful when animals are properly conditioned to it. An effective approach to minimizing stress is to train the horse to board or introduce it to the vehicle beforehand, allowing it to become familiar with the vehicle environment before undertaking longer trips (TATEO et al. 2012).

From an animal welfare perspective, all horses should be trained for loading and transport (YORK et al. 2017). However, when members (trainers, owners, etc.) of the equine industry were interviewed in different countries, about 50-60% of respondents reported training horses for loading and transport (PADALINO et al. 2016, PADALINO et al. 2017, DAI et al. 2021).

Various training programs, including habituation protocols, can be implemented to prepare horses for loading and transport. YNGVESSON et al. (2016) in a study on Irish horses demonstrated that habituation training prior to transport significantly reduced loading times with successive attempts.

Regarding travel frequency in the past year, 40.7% of respondents transported their horses twice monthly for events, while 30.9% transported them once monthly (Fig. 3). Only 6.2% made weekly trips to events. The findings indicate that there is no consistent pattern in the number of trips made by horses, which likely depends on factors such as monthly competition schedules and owner financial resources.

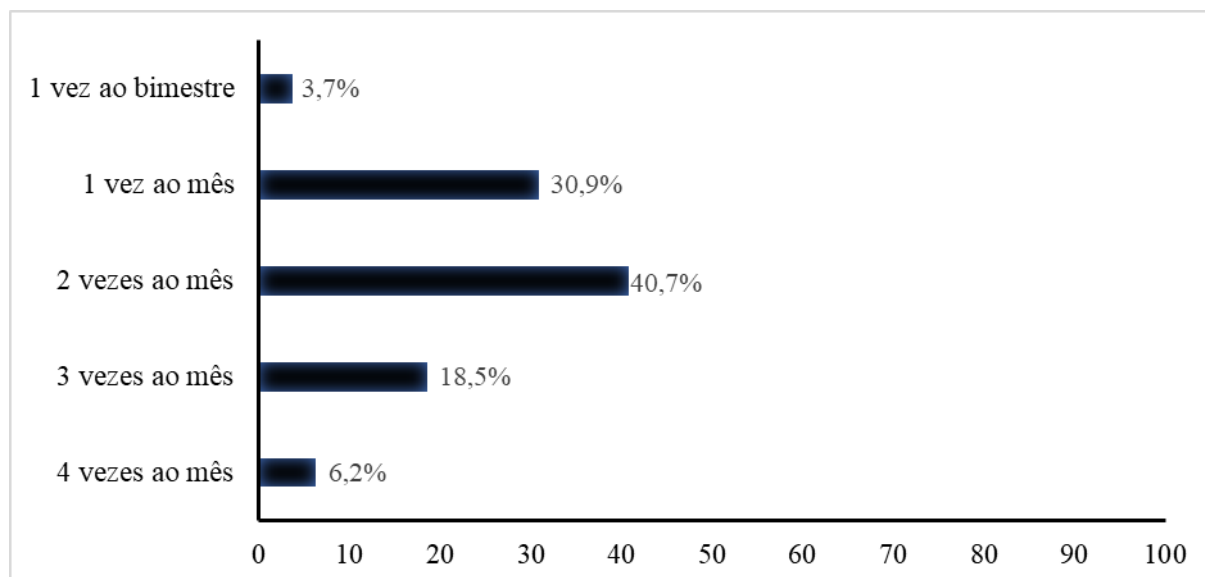


Figure 3. Frequency of trips made by horses under the responsibility of the respondents.

Horses subjected to transportation may experience significant changes in environmental temperature and relative humidity, as well as exposure to environmental contaminants during transit. Furthermore, they must adapt to various management strategies, including mixing with unfamiliar horses, confinement in novel spaces, and sudden movements. Sport horses accustomed to frequent travel may experience less adverse effects from loading and transport compared to those that travel infrequently. However, horses routinely transported by road may develop health issues associated with frequent travel. The demands placed on horses that travel frequently are associated with the high physical demand generated during transport and, consequently, fatigue, interrupted feeding patterns, weight loss and restricted movement (LEADON et al. 2008).

Due to the large number of equestrian events in the region, notably vaquejada, many animals are transported weekly from their origin to the cities where the events take place, resulting in excessive physical demand which may predispose these animals to low immunity (MILLER et al. 2021) and performance change (CONNYSOON et al. 2017). Although our survey data indicate that only 6.2% of animals are transported weekly, this figure may be underestimated due to low participant response rates.

When asked about equine transport schedules, 43.20% of respondents reported morning transport, while 39.5% conducted transport operations during nighttime (Fig. 4). When asked about transporting horses with clinical conditions to events, 80.2% reported not transporting horses upon disease identification, particularly infectious diseases, while 19.8% admitted to transporting horses even when clinical signs of illness were present.

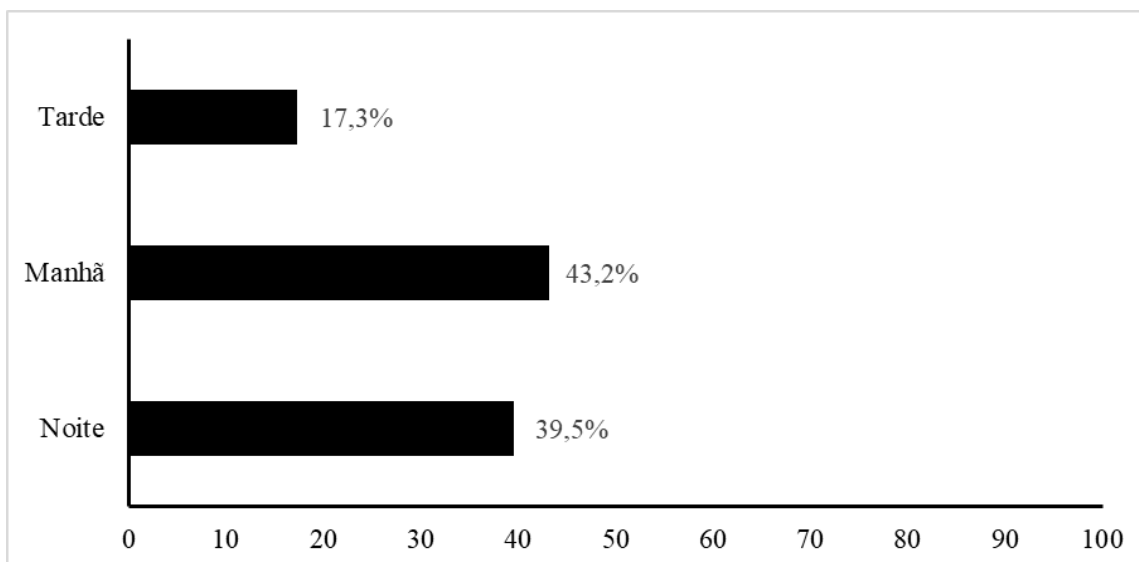


Figure 4. Time of day during which horses under the responsibility of the respondents are transported.

Survey results indicate that 52% of participants limit their competition-related travel to distances under 299 km, while 37% have traveled between 300 km and 699 km, and only 11% have traveled up to 1000 km for events. The need for breaks during longer journeys is highlighted, allowing animals to rest and recover to avoid significant changes in physiological parameters (NAZARENO et al. 2015, MILLER et al. 2021). However, all respondents reported not taking breaks between cities, particularly when the distance between their property and the event venue was relatively short.

The effects of transport as a stressor in horses have focused primarily on long-distance transport (i.e., ≥ 24 h duration), especially in studies where immune responses were assessed (STULL & RODIEK 2002, STULL et al. 2004). There is a growing body of research demonstrating that long-distance transport of horses leads to alterations in immune function, and that longer transport times (24 to 49 hours) increase the risk of disease (MILLER et al. 2021).

Careful assessment of travel duration and timing is crucial to ensure a smooth journey and safeguard equine welfare. Journeys that exceed 300 km in trucks or trailers represent an exhausting journey for horses. In addition, it is crucial to recognize that the animal requires a substantial period of rest, equivalent to 48 hours, to adapt to the new environment and recover its physical conditions (NAZARENO et al. 2015).

This period allows the animal to gradually acclimate to the environment, minimizing potential transport-related stress. Furthermore, it offers the animal the opportunity to recover physically, ensuring that it returns to its normal physiological state before resuming its activities (NIELSEN et al. 2022). Additionally, road conditions significantly impact transport, and it is essential to minimize vehicle vibrations and sudden movements to reduce stress in horses (NAZARENO et al. 2015, PADALINO et al. 2016).

Figure 5 shows the resting period allocated for horses upon arrival at the competition. The findings reveal that over half of the participants get less than six hours of rest after arriving at the event. Since travel often occurs on the same day as the event, some animals must compete immediately after arrival. These findings suggest that rest periods are often inadequate for optimal equine recovery and performance readiness, highlighting the need to reassess rest protocols and transport time management to enhance horse welfare and performance outcomes.

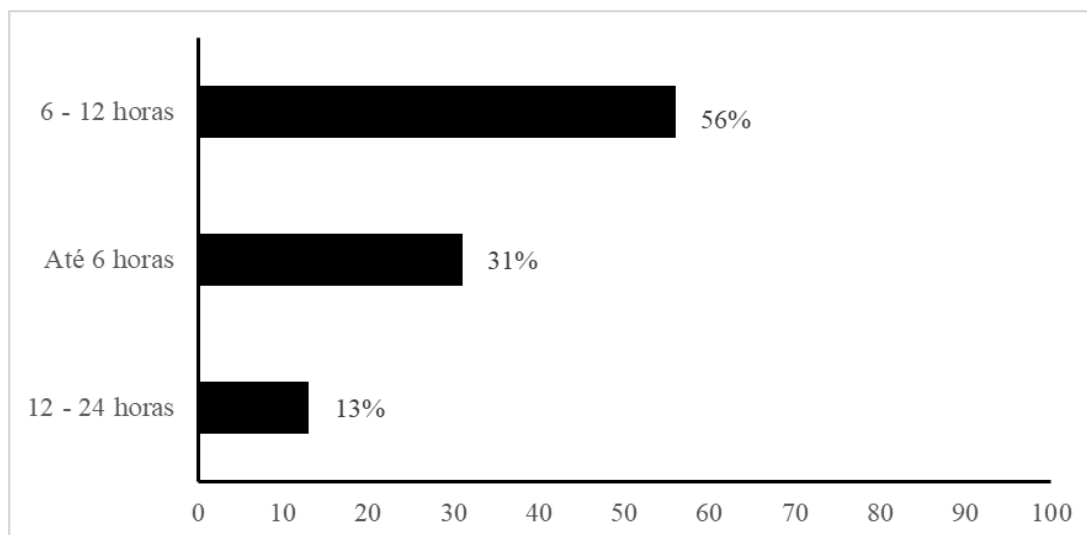


Figure 5. Average rest time provided by the respondents after unloading horses at the competition venue.

Regarding feeding management during equine transport, results showed that slightly more than half of respondents (Figure 6) provided only forage, in the form of hay, to the animals. Only 43.3% of the animals have access to water.

During transport, it is essential to consider the supply of water, bulky food and regular nutrition to avoid significant changes in the feeding routine, which could negatively impact the health status and muscle mass of horses (PALUDO et al. 2002, TATEO et al. 2012). Proper hydration and nutrition are essential to ensure animals arrive at their destination in good condition while minimizing sudden dietary changes, thereby reducing the occurrence of gastrointestinal disorders. Recently, MELO et al. (2021) demonstrated that prolonged fasting periods can significantly decrease gastrointestinal motility. Additionally, moistening the hay is recommended to prevent dust accumulation in the compartment, which could trigger respiratory issues such as asthma (HOTCHKISS et al. 2007, MELO et al. 2024).

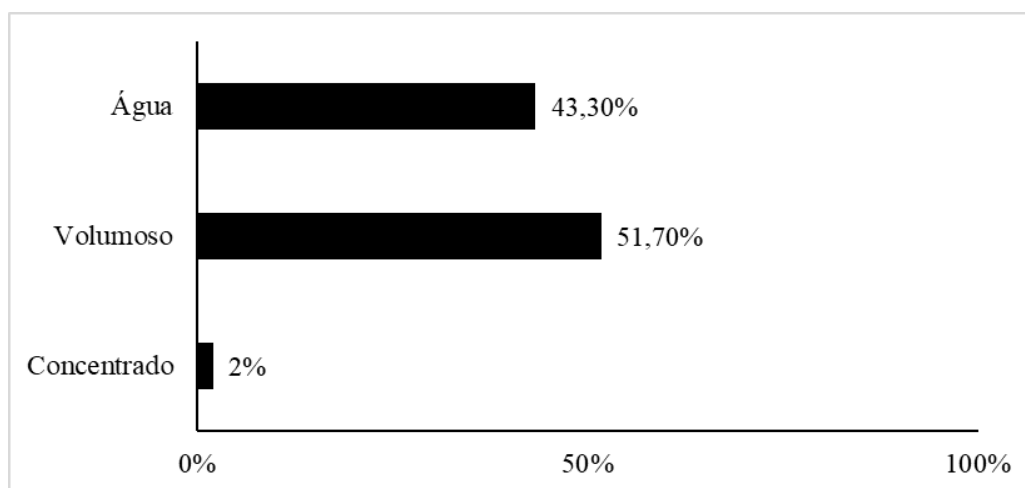


Figure 6. Feeding management practices adopted during the transport of horses to competitions in the state of Rio Grande do Norte.

Scientific evidence suggests that, in terms of transport conditions, providing water and/or food while the vehicle is moving may be ineffective, as some animals do not drink or consume food (IACONO et al. 2007). If they do so, their consumption may be reduced compared to non-transported horses (NIELSEN et al. 2022). However, food and water supply may be viable while vehicles are stopped (NAZARENO et al. 2015). As recommended by NIELSEN et al. (2022) during transport, horses should be provided with feed and water ad libitum at regular intervals (not exceeding 4 h) for 30-minute periods while the vehicle is stationary.

The healthy horse can tolerate simple starvation for 24 to 72 hours without significant systemic changes (MELO et al. 2022, MELO et al. 2023), however, long periods without food and water (> 12 hours) can lead to

the development of gastric ulcers (PADALINO & RAIDAL 2020) and should be avoided during the transport of horses.

Regarding medication and supplement administration, most respondents reported no pre-transport interventions (Fig. 7), while oral electrolyte supplementation was the primary post-transport practice (Fig. 8). The use of anti-inflammatory medication before and after travel was uncommon among participants.

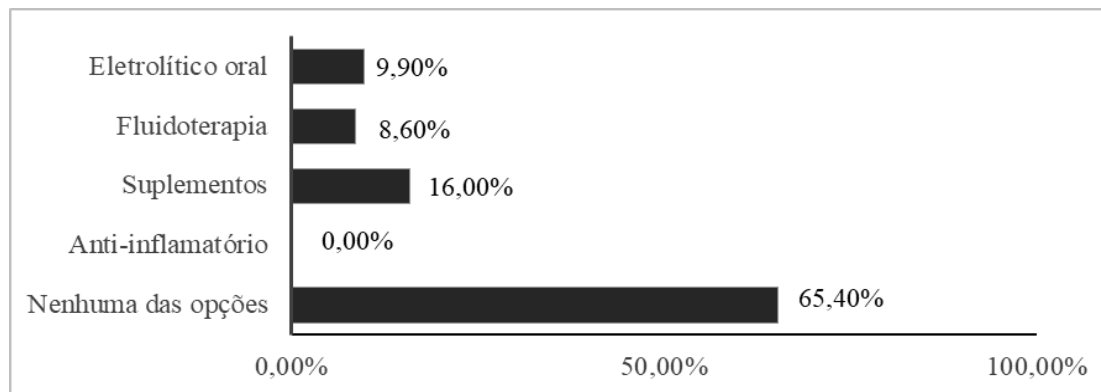


Figure 7. Strategies reported by the respondents for preparing horses for transport (the question allowed for multiple responses).

PADALINO et al. in a 2016 Australian study, researchers found that over 50% of equine transporters did not implement any pre-transport protocols, which aligns with the findings of this study. Although these preparatory practices are common in the equine industry, they may not always be appropriate, such as the administration of antimicrobials and sedation, despite not being mentioned in the present study. Taking supplements can help reduce anxiety and stress related to transportation. The use of pre-travel immunostimulants appears to be beneficial in reducing the occurrence of pleuropneumonia after transport (ENDO et al. 2017), but it is not practical in the population studied. The supplements mentioned by questionnaire respondents were energy supplements.

When asked about stereotypies or behavioral changes following transport, 87% of respondents reported behavioral manifestations including agitation, aggression, biting, and kicking, while 13% reported no changes.

There is extensive literature on horse transportation and its effects on physiological, behavioral and health parameters (CASELLA et al. 2012, PADALINO & RAIDAL 2020, MILLER et al. 2021). Research has shown that transportation is a highly stressful experience for horses, regardless of the distance traveled. This practice has been shown to have a direct impact on the physiological and endocrine parameters of horses, as evidenced by previous studies (PADALINO & RAIDAL 2020).

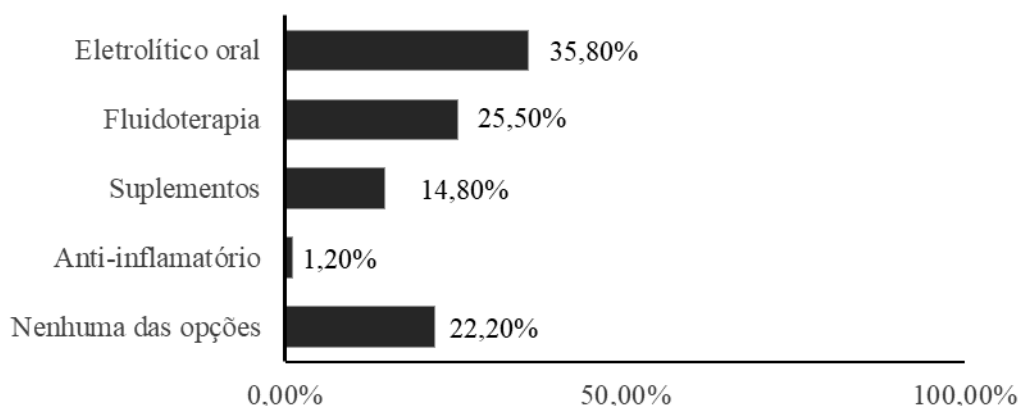


Figure 8. Strategies reported by the respondents after transporting the horses (the question allowed for multiple responses).

Increases in heart rate, respiratory rate, sweating, and blood concentrations of β -endorphin, free triiodothyronine, cortisol, and adrenaline have been reported as transport stress-induced responses. Anxiety, refusal to board, kicking, fighting and stereotypical behavior are the most common behavioral problems related

to transportation (PADALINO et al. 2016).

Regarding equine positioning during transport, respondents typically position horses either transversely to the vehicle's longitudinal axis or facing the direction of travel (Fig. 9).

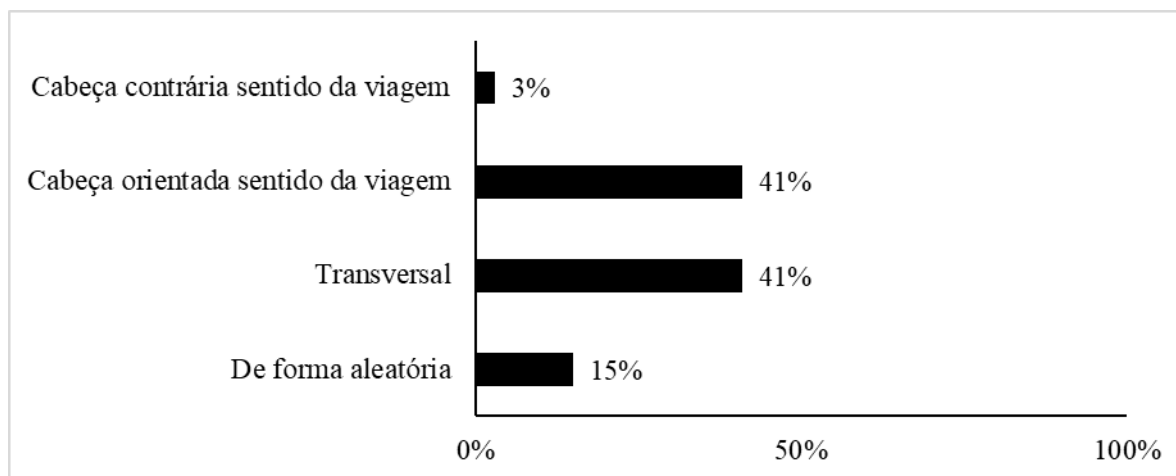


Figure 9. Position adopted for transporting horses according to the respondents.

During the transport of horses, several factors, including the position in which they are loaded into the vehicle, can be influenced by actions such as acceleration, braking, overtaking, among others (ARFUSO et al. 2023). This variation of factors during the journey can cause significant wear and tear to the horses due to the numerous attempts to maintain balance (NIELSEN et al. 2022).

Given that horses bear 60% of their weight on their hindlimbs and 40% on their forelimbs, maintaining balance during transport becomes challenging, exposing them to risks such as increased susceptibility to laminitis due to excessive strain (COLBORNE et al. 2021). Furthermore, there is a risk of severe complications, such as transport-related disorders (laminitis, colic syndrome, pleuropneumonia, among others), which can be fatal due to multiple contributing factors (SILVA et al. 2023).

This scenario becomes even more critical when the animal is unfamiliar with the transport environment and minimum conditions necessary to ensure their safety and welfare are not provided (NIELSEN et al. 2022). Therefore, it is suggested that, when transporting horses, the most appropriate position is with the head facing backwards in relation to the direction of travel (NAZARENO et al. 2015, NIELSEN et al. 2022). It was observed that this position is less stressful and safer, with less lateral impact and less risk of total loss of balance, when compared to the position with the head facing forward in the direction of travel or the equinus positioned transversely (NAZARENO et al. 2015). Despite this recommendation, it was the least adopted practice among study participants.

After analyzing the survey data, trucks undergoing preventive maintenance on their cages reported no animal incidents during transport. On the other hand, inadequate maintenance of transport vehicles led to accidents, primarily due to broken boards, protruding elements that injured horses, and falls. The majority of animal injuries (55%) were caused by protruding objects, such as screw tips and broken boards. The remaining 30% of incidents are attributed to inadequate flooring, leading to severe accidents due to animal slippage. Broken boards account for 15% of incidents, highlighting the need for preventive measures to ensure animal safety and welfare.

CONCLUSION

Despite extensive research, there remains a significant knowledge gap regarding transportation practices and their impact on equine health. The findings emphasize that proper pre-transport, transport, and post-transport management practices are crucial for minimizing stress and maintaining animal welfare, with essential protocols beginning with the animal's prior exposure to the transport environment for familiarization. During transport, driver awareness plays a vital role in acknowledging the presence of a living being that requires responsibility to ensure proper balance, thereby minimizing the impacts of instability. The research underscores the imperative to enhance transportation practices, pinpointing specific areas requiring optimization. The implementation of safety protocols and comfort measures during equine transportation is

paramount, as proper vehicle conditions in trucks and trailers not only preserve animal health but also ensure their welfare during transit.

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