

Horses an important specie in charrería, its management and welfare

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ABSTRACT

Objective: Describe the management practices provided to charrería horses in the state of Guerrero, Mexico and relate them to animal welfare.

Design/methodology/approach: Sixty-four owners of charrería horses were interviewed and 10% underwent an evaluation according to the protocol of the Welfare Quality[®]

Results: The most used breeds are Creole, Quarter Horse, Aztec, Spanish and Arabian. The starting age in charrería is two to four years. Hoof shoeing is done every 8 to 12 weeks in 54.3%. The diet is based on forage and commercial feed (82.8%). Deworming is every six months (60.9%), vaccinated against tetanus, rabies, and influenza. The most frequent diseases are digestive and locomotor, skin and respiratory. The stereotypes were rocking, nodding, kicking doors, chewing wood, and walking in circles. Abundant body condition ranged from good to obese in the animals. The majority had white hairs as an indication of injuries caused by the harnesses.

Limitations on study/implications: The lack of knowledge of the owners of horses dedicated to charro sport, to relate the five freedoms of well-being that must be given to every animal to improve their sporting performance, has caused problems in the animal's life quality.

Findings/conclusions: The findings observed in the horses indicate that the welfare conditions were affected, which led to the development of vices, poor body condition, sick animals, and skin lesions in the animals.

Keywords: Horses, management, sport, behaviors, well-being.

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INTRODUCTION

Mexico has a large population of equines worldwide, according to the Food and Agriculture Organization of the United Nations (FAO) (2021), it ranks first in horse



population with 12,955,040. specimens, fifth place in donkey population (3,284,347 specimens), and first place in mules with 3,287,994 specimens; These animals are used for various activities such as agricultural work and daily tasks, or as sport and recreation. Since Spanish colonization, the equid has played an important role in the history and culture of Mexico (Vázquez *et al.*, 2017). The need for these animals for transportation, loading, drafting, and handling of livestock has been disappearing in more developed places due to the introduction of new technologies. However, among people with a cultural heritage linked to horses, it continued as a means of coexistence through equestrian competitions, including charrería (Mota *et al.*, 2016). Charrería is a representative practice of Mexico, traditional due to its history and culture; dedicated to managing livestock with the help of horses (UNESCO, 2016). Unlike other sporting activities, it takes two individuals working together to be successful in the activity to be carried out, which is why the human-horse relationship is a fundamental aspect. However, in this interaction, human beings consciously or unconsciously neglect the basic principles of well-being that their animals must enjoy, to be free from suffering (Whay *et al.*, 2015). The World Organization for Animal Health (OIE) considers that an animal is in a state of well-being when it is free of disease, comfortable and well fed, can express normal behavior, and does not suffer pain, fear, or stress (Sanmartin *et al.*, 2015). Recently, welfare assessment models have been adapted for equids in order to measure and manage their quality of life; these can be used in working animals and in equestrian sports disciplines (Sommerville *et al.*, 2018). In the state of Guerrero, many families use horses for work, transportation, fun and even for sport. Despite this, there are no studies that objectively describe the welfare conditions of these animals due to the management they receive. For this reason, the objective of the study was to describe the management practices given to charrería equids in the state of Guerrero and determine their relationship with animal welfare.

MATERIALS AND METHODS

Description of study area

The study was carried out in the state of Guerrero, which is located in the south of the Mexican Republic in the tropical zone, between 16° 18' and 18° 48' north latitude and 98° 03' and 102° 12' west longitude. It borders to the north with the states of Mexico, Morelos, Puebla and Michoacán; to the south, with the Pacific Ocean; to the east with Puebla and Oaxaca; and to the west with Michoacán and the Pacific.

Study design and analysis

The sample size was 384 surveys determined by the equation described by Rojas (2013) for studies in large populations:

$$n = \frac{Z^2 \cdot p \cdot q}{E^2}$$

where, Z (confidence level) of 95%, p and q (variability of the phenomenon to be studied) of 50% and E (precision level) of 5%.

The sample was distributed into subsamples (n=64) by strata formed by the activity carried out by the horses in the state of Guerrero (1. Agricultural work, 2. Charrería, 3. Dancing, 4. Racing, 5. Walking, 6 Tourist work). To describe zootechnical management and its relationship with animal welfare, 64 owners of charrería equids were surveyed. For the interviews, a survey was used with closed questions on general aspects, basic management, feeding, housing and sanitary management of the animals. In addition, 10% of the surveyed population underwent an evaluation in accordance with the Welfare Quality[®] protocol for evaluating well-being in equines. The evaluation consisted of a physical or direct inspection of the animals and an indirect inspection, through the animals' environment; considering the four principles of well-being (Good Food, Good Housing, Good Health, and Good Behavior) based on the five freedoms (1. Free from thirst and hunger, 2. Free from discomfort, 3. Free from pain, injury, or illness, 4. Free to express normal behavior and 5. Free from fear and distress). The data of the variables included in the survey were analyzed by descriptive statistics for the preparation of tables and figures in the Microsoft Word Excel program.

RESULTS AND DISCUSSION

Of a total of 159 equids raised by 64 owners, the equid used for the equestrian activity of charrería is the horse (*Equus caballus*). The preferred breeds for the charro competition and festival are the Creole (horse native to the region that has evolved by natural selection), quarter horse, Aztec, Spanish and Arabian (Table 1). The exclusive identification of horses (*E. caballus*) as the only species used for charrería is attributed to the fact that although mules (*E. mulus*) are animals with adequate strength and resistance to carry out this type of activities, the General Official Regulations for Charro Competitions 2018-2020 of the Mexican Charrería Federation (2019), specifies that only the use of the horse is allowed for these competitions. Regarding the breeds used, the results coincide with those reported by Vázquez *et al.* (2017) who mentioned that the Creole horse is the predominant breed in Mexico due to its importance in agriculture and the Mexican equestrian tradition, although there is also a great variety of horses of various breeds such as Aztec, quarter mile, Spain thoroughbred, Lusitanians and Arabs, among others.

All horses are handled during competition and/or training with leather harnesses, mandatory material for the Mexican Charrería Federation (2019); However, according to the OIE Terrestrial Animal Health Code (2018), the harnesses used for the management

Table 1. Preferred breeds for Charrería activities in the state of Guerrero.

Breeds	Owner (n=64)	
	Number	%
Creole	32	50
Aztec	21	32.8
Mile quarter	24	37.5
Spain	3	4.6
Arabs	1	1.5

of equids must be of an adequate size and material to provide comfort during work without risks of pain or injury; Therefore, it is not a guarantee that they are free of discomfort or injuries due to poor adjustment or use of them. The age at which equids begin the charrería activity is early (2 to 4 years) in 48.4% of the animals, with long workdays between two-to-four-day hours in 81.2% of the horses, and only the 18.7% of owners work their animals between 30 minutes and 1 hour (Figure 1A). The recommended age to start working a horse is after five years of age, which is when the bone growth plates have completely closed, and the risk of development problems and future locomotor alterations decreases (Baxter, 2011). Furthermore, Dixon (2002) complements that at that age the horse's teeth are complete, and the use of bits and bits does not cause discomfort or injuries to the oral cavity. The hours that horses dedicate to their activity differ from what was reported by Mariscal and Córdoba (2015) in draft horses, in which the animals worked 6 to 8 hours a day; however, Mota *et al.* (2016) mentioned that during the charra lucks, the horses manifested physiological changes that altered respiratory exchange, acid-base, mineral and energy balance; as well as increased blood lactate and hematocrit levels, causing muscle fatigue and dehydration.

It is advisable to trim, and shoe hoofs every 4 to 6 weeks, because anatomically the hoof has an approximate growth rate of 1 cm per month (Obregón and Ramos 2011). In our study, most owners (54.3%) do not carry out this activity with the appropriate frequency, they do it every 8, 10 and after every 12 weeks; only 45.3% do what is recommended by these authors (Figure 1B). It is important to consider that equids that are shod with a longer interval may present locomotor alterations by not having natural wear due to impediment of the horseshoe, as well as excessive wear by not having it (Schade *et al.*, 2013). This implies that owners must periodically attend to the structure and integrity of their animals' hooves because excessive wear or growth can affect the balance and/or normal locomotion of the equids. All horses destined for charro sport were housed in stables, and of these, 45.3% are housed with manure bedding produced by the animals themselves, and to a lesser extent earth, shavings, and sand bedding are used, respectively (Figure 2A). However, the bedding material preferred by owners is not recommended because it becomes a dusty material that can cause respiratory conditions, in addition to providing a suitable environment for pathogens; On the other hand, straw is the ideal material, since it keeps the horse busy preventing unwanted behaviors (Kwiatkowska *et al.*, 2016). According to Ruet *et al.*

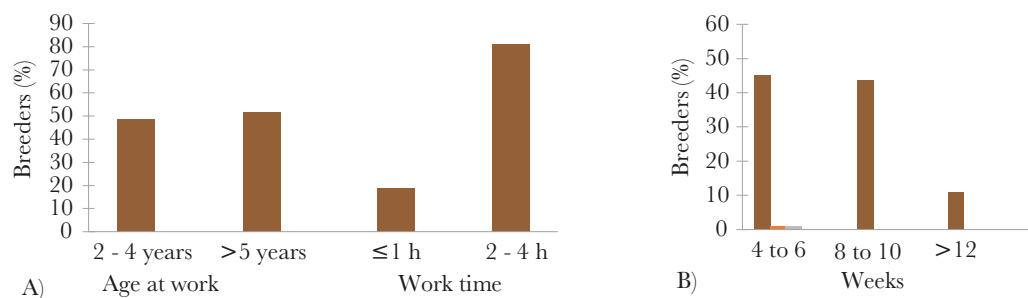


Figure 1. Start of charro work, time dedicated to equestrian activity (A) and frequency of hoof trimming and shoeing (B) of Charrería horses.

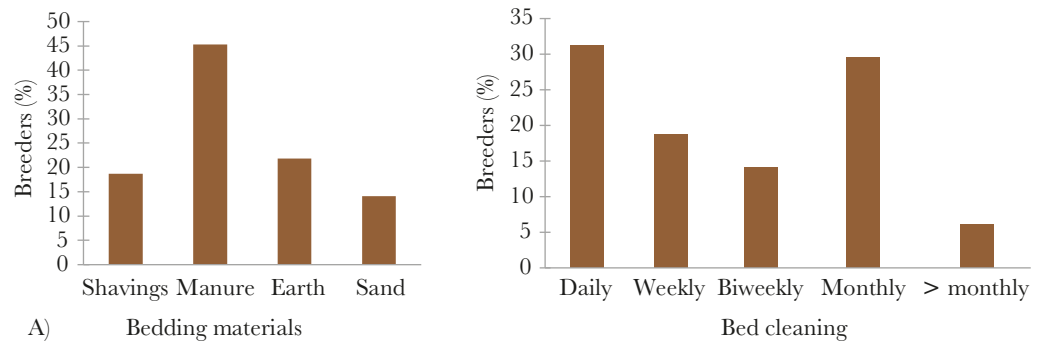


Figure 2. Materials and cleaning frequency of Charrería equid beds.

(2019) any bedding material is suitable if it provides a hygienic condition and a stable microclimate so that equids have a comfortable rest. In this study, a good proportion of horses receive bedding cleaning daily (31.2%), and about 62.4% receive cleaning between one to four weeks, and only 6.2% receive cleaning after one month, which can extend up to two months (Figure 2B).

Approximately 32.8% of the horses used for charra activity are raised in isolation, avoiding coexistence and interaction with other equids of this or a different species and a smaller proportion, 20.3% of the horses, are even isolated from contact with other animal species (bovines, sheep, goats among others) (Figure 3A). Having social contact with other equids is ideal because living together gives security to each individual and promotes freedom to express the behavior of their species (Zuluaga *et al.*, 2018). On the other hand, McBane (2008) and Robledo-Reyes *et al.* (2019) described that the interaction with animals of different species as happens in the study at least allows individuals to focus on their surroundings, although it limits the expression of their natural behavior.

In nutritional management, the majority of charrería horses are fed forage and commercial feed (82.8%), and in a smaller proportion (14.06%) they are fed with forage and homemade waste and only 3.1% receive only forage (Figure 3B); The diet was received by the horses in two portions and three portions daily in 60.9 and 37.5% respectively and in up to four portions in 1.5% of the animals (Figure 3C). Access to water was free in 96.8% of the horses and in 3.1% it was rationed in three doses during the day, in 21.8% of the cases the water was supplied with automatic drinkers and in the rest of the animals it was supplied in traditional drinkers (Figure 3D). The diet was at the discretion of the owners without considering age, physiological state, body weight, zootechnical activity, as recommended by the NRC (2007) for the equine species, which could cause deficiencies or excesses that affect the health and welfare of the animals. The feeding frequency was inadequate in most cases, considering that the food is kept in the stomach for a period of approximately 2 to 6 hours, stimulating the amount of saliva necessary to maintain the pH balance to protect the stomach from heartburn caused by the continuous secretion of hydrochloric acid (Merrit and Jullian, 2013; Weyenberg *et al.*, 2006). Luthersson and Nadeau (2013) reported that horses in confinement tended to spend more time without eating food, which decreased protection against gastric acidity and increased the risk of developing various

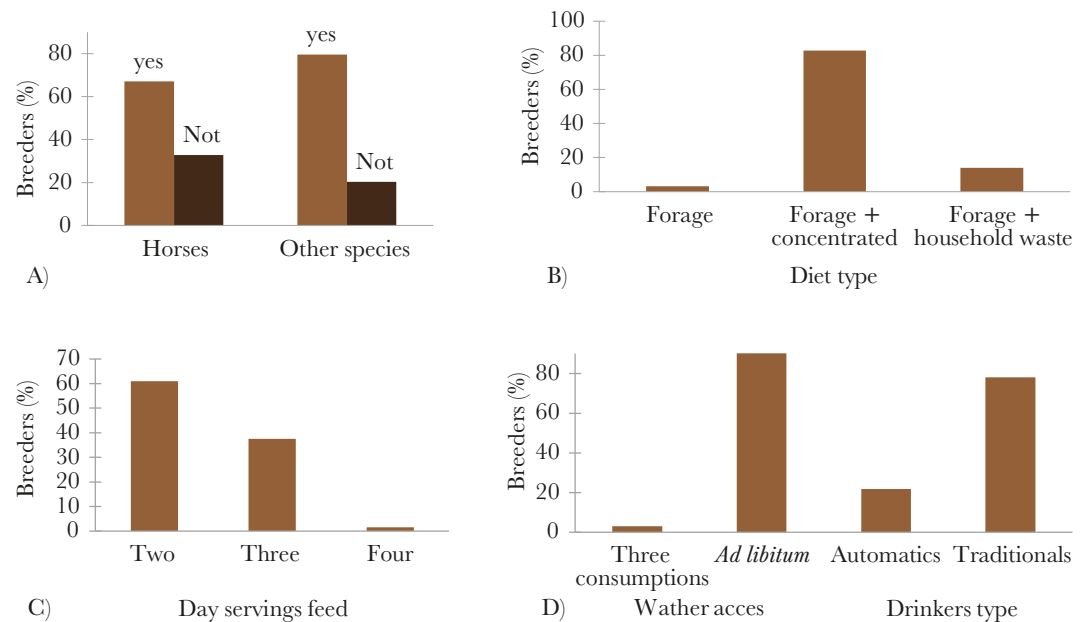


Figure 3. Social interaction (A), type and frequency of feeding (B and C) and access to drinking water (D) of charrería sport horses.

gastrointestinal problems; Proper management for these animals is to allow them free access to forage to produce a continuous flow of saliva and keep the stomach protected most of the day. Nyman and Dahlborn (2001) reported that horses prefer to consume water in a traditional bucket than in an automatic waterer, in addition to the fact that in these the daily consumption is unknown and water intake may decrease, causing serious clinical disorders.

In preventive medicine, the majority of charrería horses (60.9%) were internally dewormed every six months and less frequently every year and quarterly, but it is important to emphasize that a small proportion 3.1% of owners do not deworm their horses (Table 2). Kusmina *et al.* (2016) recommend deworming 3 to 4 times per year, as they reported a significant reduction in parasites compared to a deworming frequency of 2 or fewer times per year; However, it is worth mentioning that parasite control is due to many management factors. Furthermore, parasites reduce the productive efficiency and the activity carried out by animals, which is why deworming is of great importance as preventive medicine; However, inadequate management can increase anthelmintic resistance levels (Nielsen, 2012). Very few owners (17.1%) implemented vaccination against viral and/or bacterial diseases such as tetanus, rabies, and influenza (Table 2) and less than half request veterinary attention when their become ill animals (48.4%). These results differ from those reported by Márquez *et al.* (2010) where all owners provided veterinary care to their horses and carried out an adequate vaccination and deworming program.

The diseases that frequently affected horses were of the digestive and locomotor systems, followed by the integumentary, respiratory, eye and genitourinary systems (Table 3), attributed to poor nutritional and health management, as well as to the impacts and locomotor contractions caused by this equestrian activity. These data were similar to those

Table 2. Vaccination implemented by owners of charrería equids.

Variables	Owner (n= 64)	
	Number	%
Deworming		
Every 3 months	6	9.3
Every 6 months	39	60.9
Annual	17	26.5
Not deworming	2	3.1
Veterinary services	31	48.4
Vaccines		
Tetanus	11	17.1
Rabies	3	4.6
Influenza	2	3.1
Encephalitis	0	0
Rhinopneumonitis	0	0

Table 3. Most frequent conditions in charrería horses.

System	Conditions	Owner (n = 64)	
		Number	%
a) Diseases			
• Digestive	Abdominal pain, Diarrhea, Mouth ulcers, dental anomalies	59	92.1
• Locomotor	Limping, Deformities	59	92.1
• Integumentary	Wounds, Inflammations, Scabs, Pruritus	53	82.8
• Respiratory	Runny nose, Cough	50	78.1
• Eye	Wounds, Discharge, Ulcers	29	45.3
• Genitourinary	Abortions, placental retention, anestrus, dysuria	7	10.9
b) Annual period with a higher incidence of sick animals			
• Spring-Summer		32	50.0
• Autumn-Winter		23	35.9
• Occasional		9	14.1
c) Stereotypies in charrería horses			
• Balanced		14	21.8
• Head not		11	17.18
• Kick doors		10	15.6
• Wood chewing		9	14.06
• Circles walk		7	10.9

reported by Regan *et al.* (2105) who identified locomotor and respiratory conditions in working equids and differ from what was reported by Marquez *et al.* (2010) who presented skin conditions as the main problem due to improper use of harnesses. The year period with the highest incidence of disease animals occurs in autumn-winter (50%), and the lowest

in spring-summer (14.06%), 35.9% of the owners answered that their animals get sick at any time of the year (Table 3). Nelson (2004) mentions that during winter low temperatures stress animals, increasing their susceptibility to getting sick, and the lack of feed availability with the necessary nutrients decreases the immune function of the organism, because the immune system needs energy to deal with pathogens; likewise, short days physiologically affect several factors of the immune system.

The most frequently presented stereotypies in the study were rocking, followed by nodding the head, kicking doors, chewing wood, and circle walking (Table 3). Which can be attributed to several factors, Lesimple *et al.* (2019) related the abnormal behavior of horses to restricted housing space and poor social contact according to their needs as a species. Likewise, the same authors reported that the stereotypies observed were a consequence of the type of restriction that the horse experienced.

Physical inspection of animals

On a scale from 0 (very thin) to 5 (Very obese), the body condition (BC) of the horses evaluated was good (3/5) in 33.3% of the animals, obese (4/5) in 33.3 %, moderate (2/5) in 16.6% and Poor (1/5) in 16.6%, with a shiny (66.6%) and matte coat condition (33.3%) (Figure 4A). These results can be attributed to the nutritional management provided by the owners without considering what is recommended by the NRC (2007) according to the activity carried out by the horses. In the case of obese equids (CC4/5), excess consumption of digestible energy above what is required produces excessive accumulation of adipose tissue. In contrast, poor body condition is due to the loss of adipose and muscle mass due to energy consumption below the animals' requirements (Carter and Dugdale, 2013). 16.6% with poor body condition (1/5) had abnormal wear of incisors, which according to Welfare Quality[®] (2011) this wear will affect food consumption.

In the housing, the living space of the equids was adequate in 66.6% and inadequate in 33.3% of the cases (Figure 4B). McBane (2008) considered that an accommodation must have a living space of at least 4 m², thereby providing ease of movement and comfort of rest. Dalla *et al.* (2016) mentioned that very small accommodation considerably decreased the horse's ability to move freely, affected comfortable rest and social contact with other individuals. In addition, they acquired abnormal behaviors by depriving them of being able to express normal behavior according to their species, which affected the welfare quality (Ruet *et al.*, 2019).

In the inspection of the horse's integrity, white hairs were identified more frequently in the region of the withers and back, in the lower part of the legs (hock, carpus, shank, fetlock and pastern) and in the hindquarters (rump and thighs), and less frequently in the head and shoulders (Table 5). White hairs grew from non-pigmented skin because of loss of melanocytes, caused by skin injury (Stachurska and Phaff, 2012). According to Dalla *et al.* (2014) the presence of white hairs indicated an injury that occurred in the past, which could have been a consequence of the type and intensity of the work, due to the harnesses used, the presence of ectoparasites or aggressive social interactions.

The wounds presented were mostly in the region of the back and withers, hindquarters, lower part of the legs, snout, and head (Table 5). All the wounds presented were type 1

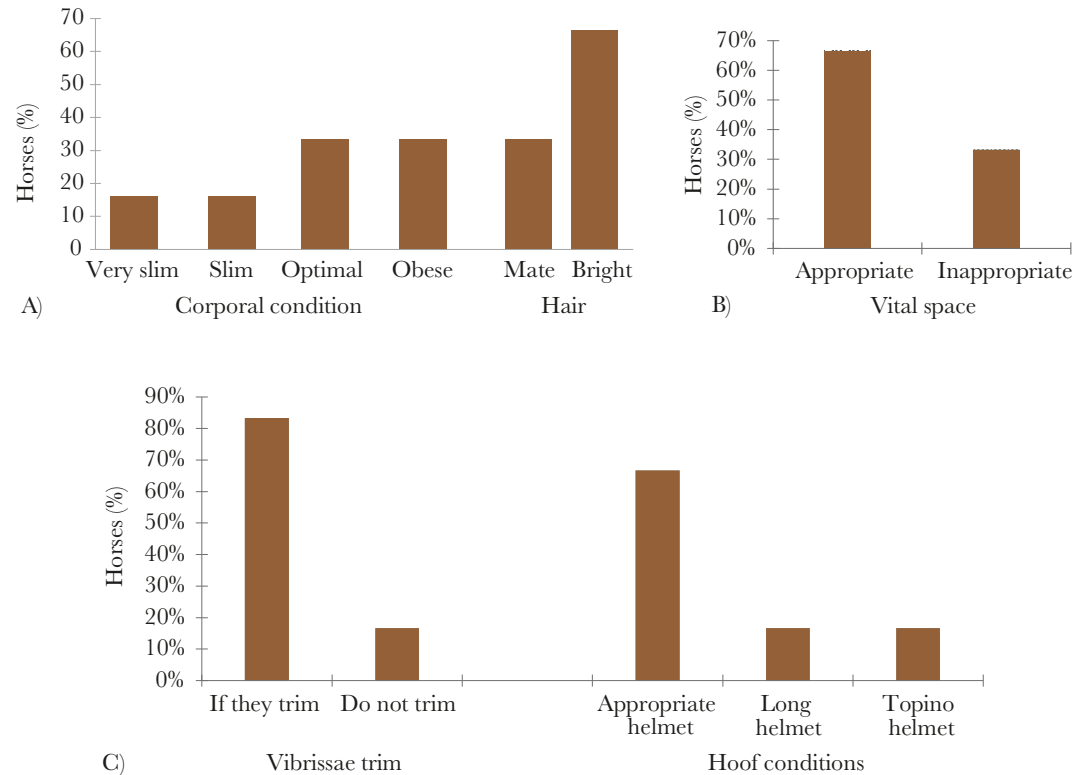


Figure 4. Corporal condition, vital space, and hoof condition in charrería horses.

(hair loss, stain, or scar) and type 3 (Superficial wound, scrape) according to the Welfare Quality[®] protocol (2011). Classifying the pain degree in the dorsal muscles into none (0), a little (1) and a lot (2), 50% of the animals showed a pain level of 1 in the region of the withers, and 16.6% a degree pain of 2 in the regions of the withers, back and loin (Table 5), attributing it to the improper use of harnesses according to the OIE (2018).

Most owners of the equids evaluated (83.3%) trim their animals' vibrissae from the ears and whiskers (Figure 4C) which, according to Yllera *et al.* (2016) is an inadequate practice, since they are sensory elements that serve as protection and guidance to explore their territory, making up for the lack of vision in their blind spots. The condition of the hooves was adequate in most of the equids (66.6%), 16.6% had long hooves and the other 16.6% had a topine hoof (Figure 4C). These abnormal conditions can present problems with locomotion and conformation of equids according to Baxter (2011).

In the human-horse relationship, 50% were alert and the other half were neutral; no animal was aggressive or avoided being manipulated, which indicates that there is a good interaction between the owner and his animal. A good human-equine relationship is essential to reduce negative states of animal welfare. This relationship is influenced by the interaction and trust that the equine feels in the presence of the human (Dalla *et al.*, 2015). The stereotypies observed were rocking, head nodding and wood chewing in 50% of the evaluated population (Table 4). These abnormal behaviors are attributed to the previously described by Lesimple *et al.* (2019). Similarly, Ruet *et al.* (2019) mentions

Table 4. Stereotypies prevalence presented in charrería horses.

Stereotypies	Owner (n=64)	
	Survey	Number
Physical Inspection		
Swinging	2	33.3
Head nod	1	16.6
Wood chewing	2	33.3

Table 5. Physical integrity of charrería horses.

	Owners (n=6)	
	Number	%
White hairs		
Cross and back	3	50
Hindquarters	2	33.3
Lower legs	2	33.3
Head and shoulder	1	16.6
Injuries		
Cross and back	4	66.6
Hindquarters	3	50
Lower legs	2	33.3
Head and shoulder	2	33.3
Pain in back muscles		
Cross	3	50
Back	1	16.6
Loin	1	16.6
Rump	0	0

that accommodation in inappropriate places can cause stereotypies, poor human-horse relationships, and stress; harming welfare.

CONCLUSIONS

Charrería horses are of great cultural and sporting importance for Mexico since they represent the traditional identity of Mexicans. In the state of Guerrero there are a great variety of equids that carry out this type of activity, but not all of them receive adequate management to provide them with a good life quality. A wide variety of management practices are inadequate, compromising in some way the well-being of the animals.

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