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RESEARCH PAPER

Welfare of Horses in Inner West Anatolia

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Abstract

This study was carried out to evaluate the feeding, management, and health practices in horse farms in Inner West Anatolia with the aspects of animal welfare. The study was carried out in 53 horse farms in Afyonkarahisar, Eskişehir, Kütahya, and Uşak provinces. The measurements, observations, and declarations of breeders were recorded on the questionnaire forms. Furthermore, a fecal parasitic examination was carried out. The breeds of horses were Arab, Thoroughbred, local, and crosses. The percentages of boxed and tied barns were 60.4 and 39.6%. The average temperature and humidity in the shelters were 20.7°C and 38.6%, the mean values for carbon dioxide, oxygen, and ammonia were measured as 848.0, 20.9, and 5.0 ppm respectively. Although antiparasitic applications were reported in the visited farms, 61.7% of the horses were found to have parasites in the parasitic examination. 90.6% of the interviewed personnel claimed that they were experienced in horse breeding but only 3.8% had knowledge about animal health and welfare. In conclusion, horse breeding in Inner West Anatolia is insufficient in terms of windows and chimney openings in shelters, shelter enrichment, paddock areas and exercise, dental care, antiparasitic applications, and trained personnel for animal health and welfare; while box dimensions, feeding standards, grooming, hoof care, tail docking, foal care and transport applications were in accordance with ideal standards.

Introduction

As interest for equestrian sports increases day by day, flat racing, javelin and pacing maintains their importance today. In addition, show jumping, dressage, endurance and eventing (three-day event) have shown improvement in recent years, as well as the number of equestrian clubs has increased and the hippotherapy centers have started to be opened. As is the case with all livestock, various situations that affect horses' well-being have manifested since their domestication. However, the number of studies on horse health and welfare is limited. When assessing horse welfare, environmental parameters such as the size of shelters and boxes, characteristics, litter, care and feeding, exercise status, and zoological parameters such as body condition scores, skin injuries, scars, and abnormal behaviors are used (Minero and Canali, 2009; Minero et al., 2015; Sommerwille et al., 2018; Czychall et al., 2019; Lesimple, 2020; Hausberger et al., 2020; Homes and Brown, 2022). When evaluating the subject of welfare in horses, it is necessary to know their behavior in natural environments. Understanding their behavior is essential in providing the most suitable environmental conditions for the animals, and optimum efficiency can be obtained from the animals with appropriate maintenance and feeding conditions (Schwean, 2005; Minero and Canali, 2009; McGreevy et al., 2018; Mellor and Burns, 2020; Auer et al., 2021; Arena et al., 2021).

In addition to European Union legal regulations, international organizations such as Food and Rural Affairs (DEFRA) (2018), Farm Animal Welfare Advisory Council (FAWAC) (2018), Royal Society for the Prevention of Cruelty to Animals (RSPCA) (2014) have determined criteria for the welfare of horses. Regulation number 28151 regarding the Welfare of Farm Animals (2011a) has been published in 2011 and regulation number 28152 regarding the Welfare and Protection of Animals During Transport (2011b) have been published in Türkiye.

This study has been carried out in order to examine the conditions of shelter, care and feeding, exercise status, personnel, herd health and some breeding practices and transportation of animals in the aspect of welfare of horse breeding enterprises in the Inner West Anatolia.

Materials and Methods

This study was approved by the Afyon Kocatepe University Animal Experiments Local Ethics Committee (49533702/323). This study was carried out at 53 horse farms in Afyonkarahisar, Eskişehir, Kütahya, and Uşak provinces. Observations and evaluations about the animal welfare were recorded on the evaluation forms prepared for this purpose.

The number of horses available in the visited equestrian establishments and the distribution of horses according to race, age and breeding purposes were determined. The sheltering standards, the dimensions of shelters, boxes, doors and windows were determined by using tape measures. The business owner was asked on their preference related to coat color and markings when raising horses.

The height of the windows was measured from the base of the shelter. Humidity, temperature, and gas concentrations in the air were measured (BW GasAlertMicro 5 IR) when animals were kept closed in the shelter. The types of shelter and shelter floor were determined, use of litter and litter material, its amount, and artificial lighting status were observed, farm owner was asked about the frequency of cleaning the shelters. It has been determined whether there is adequate shade and water in establishments that have paddock areas that enable pasturing, roaming, and socializing and whether there are individual paddocks or group paddocks according to age and sex. The owner was asked about the amount of the paddock, the annual and daily times that the horses spent on the paddock. The caretakers or establishment owners were asked about preparing the feed ration, the daily amount of roughage and concentrated feed drinking water source, and the availability of different feeding programs for pregnant horses and foals. Information about regular veterinary care, vaccination, mineral and vitamin supplements, and antiparasitic treatment applications were obtained.

Fresh feces samples were collected for parasitic examination from at least 5% of the horses raised on the farms. Feces samples were collected from the stall area of the relevant horse that was not in contact with the ground and put into separate transparent nylon bags. The collected feces were delivered to the laboratory of Afyon Kocatepe University, Faculty of Veterinary Medicine, Department of Parasitology without delay and examined macroscopically and microscopically. Fulleborn saturated brine flotation and Benedek sedimentation methods were used microscopically.

The opportunities for exercise which is very important for equine health and welfare were studied by noting whether a manege was available, the type of manege and manege floor type. The caretaker or owner was asked about the frequency of exercise of horses. Observations and evaluations about the maintenance of foals were made by asking the caretaker or owner. They were asked about the frequency of dental, grooming, and hoof care and whether the person providing dental care and the farrier were personnel of farm or independent professionals. The loading area ownership and dimensions of the transport vehicle used in horse transport within and outside the establishment, whether the loading area partitioning and side walls had sponge protection, availability of a loading and unloading ramp in the farm were determined. Feeding during journeys and transport time was also asked. Owner and personnel responsible for animal care and management, information on the total number of personnel, social security of the personnel, animal health and education, and the number of personnel trained in animal welfare was obtained.

All horses in the farms were observed for at least 20 min in order to evaluate animal-based welfare, during this observation, horses with at least one type of abnormal behavior were identified. In closed shelters where horses are tied, all horses were observed simultaneously, while horses in boxes were observed individually in each box. For the identification of horses that exhibit abnormal behavior in boxes, information provided by the animal caretaker, traces of kicking on the walls and gnawing on the troughs and fences, bites and scars on the bodies of the horses (Autoagression) were also taken into consideration.

The data obtained from the surveying and feeding standards, health and condition program, some cultivation practices, transportation, personnel and abnormal behavior were evaluated in this study. Descriptive statistics (percentages, means ± standard error of mean) were used for the analysis.

Results

The results for sheltering, feeding, health and, conditioning programs were presented in Table 1, and the other findings concerning identification, tooth, and hoof care, grooming, tail docking, foal care, transport, and personnel were showed in Table 2. Abnormal behavior rates were also given in Table 3.

Table 1

Generally, 34.0% of the farms raised horses for javelin, 30.2% for pacing, 30.2% for racing, and 5.6% for education, riding, or hippotherapy. 58.5% of the horses were Arab and Thoroughbreds and 41.5% were Turkish native horses or Arab crosses. The average herd size was 10.3 animals and the ratios of mares, stallions, geldings, and foals were 42.7 17.8, 0.7, and 38.8 respectively. At the time of selection, 14% and 15% of the farmers considered coat color (chestnut and bay) and the markings (low or no leg markings and black hoofs) on the horses as criteria.

Table 1: Findings about shelters, feeding, exercise and herd health in equine establishments

Factor	Variable	Value
Sheltering Standards	***Shelter conditions***	
	Shelter type (%)	Tied: 39.6, Box: 60.4
	Shelter width and length (m) ($\bar{x} \pm S\bar{x}$)	(4.3±0.52) × (7.5±2.08)
	Box width and length (m) ($\bar{x} \pm S\bar{x}$)	(3.6±0.11) × (3.7±0.11)
	Window width and length (m) ($\bar{x} \pm S\bar{x}$)	(0.6±0.03) × (0.8±0.05)
	Height of window from floor (m) ($\bar{x} \pm S\bar{x}$)	1.7±0.07
	Door height and width (m) ($\bar{x} \pm S\bar{x}$)	(1.4±0.12) × (2.0±0.04)
	Artificial lighting (%)	Yes: 100.0, No: 0.0
	Visual contact among horses (%)	Yes: 37.7, No: 62.3
	A specific box/stall per horse (%)	Yes: 90.6, No: 9.4
	Box equipped with toy (%)	Yes: 0.0, No: 100.0
	Quarantine section (%)	Yes: 20.8, No: 79.2
	Shelter internal air status	
	Shelter internal temperature (°C) ($\bar{x} \pm S\bar{x}$)	20.7±0.38
	Shelter internal humidity (%) ($\bar{x} \pm S\bar{x}$)	38.6±0.61
	Shelter internal carbon dioxide (ppm) ($\bar{x} \pm S\bar{x}$)	848.0±78.41
	Shelter internal oxygen (ppm) ($\bar{x} \pm S\bar{x}$)	20.9±0.00
	Shelter internal ammonium (ppm) ($\bar{x} \pm S\bar{x}$)	5.0±0.75
	Shelter floor type (%)	Concrete: 47.2, Soil: 45.2, Rubber: 5.7,Wood: 1.9
	Litter	
	Litter usage (%)	Yes: 62.4, No: 37.6
	Litter material (%)	Straw: 51.5, Sawdust: 24.2, Sheep manure: 9.1, Straw+ Sheep manure:6.1, Sawdust + Sheep manure: 9.1
	Litter amount (kg) ($\bar{x} \pm S\bar{x}$)	10.6±1.80
	Litter changing frequency (%)	Daily: 51.5, One time/two days: 9.1, One time/week: 21.2, One time/month: 18.2
	Outing area	
	Open outing area (%)	Yes: 66.0 , No: 34.0
	Average outing area (m^2) ($\bar{x} \pm S\bar{x}$)	24193.0±11131.13
	Paddock on outing area (%)	Yes: 62.9, No: 37.1
	Outing area surface (%)	Soil: 100.0
	Outing area vegetation cover (%)	Yes: 11.4, No: 88.6
	Outing area trees (%)	Yes: 8.6, No: 91.4
	Water supply on outing area (%)	Yes: 65.7, No: 34.3
	Departure and return times from outing area	Departure: 08:00-08:30, Return: 17:00-17:30
	Departure occasions to the outing area	All days weather permitting
Feeding Standards	Ration preparation (%)	Traditional mixed feed in the establishment: 86.8, Using a program in the establishment: 7.5, Veterinary surgeon: 5.7
	Daily roughage amount (kg/head) ($\bar{x} \pm S\bar{x}$)	3.3±0.24
	Daily concentrated feed amount (kg/head) ($\bar{x} \pm S\bar{x}$)	4.7±0.22
	Drinking water source (%)	City water: 34.0, Well water: 64.1, Flowing water: 1.9
	Feeding every day at the same time (%)	Yes: 98.1, No: 1.9
	Feeding every day at the same sequence (%)	Yes: 98.1, No: 1.9
	Separate feeding for gestating mares and foals (%)	Yes: 34.0, No: 1.9, No pregnant animals: 64.1
Health and Condition Program	***Condition***	
	Veterinary care (%)	Yes: 86.8, No: 13.2
	Vaccination (%)	Yes: 77.4, No: 22.6
	Vitamin and mineral supplements (%)	Yes: 83.0, No: 17.0
	Fly fighting method (%)	Spray: 77.3, Electrical device: 1.9, Sticky tape: 1.9, No: 18.9
	Manege (%)	Yes: 9.4, No: 90.6
	Manege type (%)	Closed: 40.0, Open: 60.0
	Manege floor (%)	Soil: 40.0, Sand: 60.0
	Exercise frequency (%)	Two times/day: 20.0,One time/day: 60.0,One time/week: 20.0
	Anti-parasite action	
	Anti-parasite treatment program (%)	Yes: 64.2, No: 35.8
	Anti-parasite treatment method (%)	Paste: 47.1, Pill: 23.5, Paste+pill: 11.8, Paste+injection: 17.6
	Rate of parasites observed in fecal samples	
	Flotation (%)	Yes: 61.7, No: 38.3
	Sedimentation (%)	Yes: 5.4, No: 94.6
	Maximum rate of parasites observed in fecal samples	
	With flotation (%)	*Strongylidae sp.*: 32.2
	With sedimentation (%)	*Eimeria sp.* : 2.7

Table 2 and Table 3

The proportions of farms with tied or boxed housing were 39.6%, and 60.4%. The percent of farms where horses facing one another with visual contact were 38.7%. No farm had toys like balls, tires, or any other objects. The ground was only soil in 82.8% of the roaming areas. It was seen that clover, vetch, and straw

Table 2: Findings related to identification, tooth, hoof care, grooming, tail docking, foal care, transport and personnel in horse breeding establishments

Factor	Variable	Value
Identification	Identification (%)	Yes: 30.2, No: 69.8
	Identification method (%)	Microchip: 100.0
Dental, hoof care, grooming and tail docking	Dental care (%)	Yes: 24.5, No: 75.5
	Dental care done by (%)	Veterinary surgeon: 15.4, Owner: 84.6
	Farrier (%)	Own farrier: 13.2, Outsourced: 81.1, Owner: 5.7
	Hoof trimming (%)	One time/one-two months: 60.3, One time/three-four months: 34.0, One time/six months: 5.7
	Hoof disease (%)	Yes: 0.0, No: 100.0
	Posture Disorder (%)	Yes: 20.8, No: 79.2
	Gait defect (%)	Yes: 0.0, No: 100.0
	Grooming (%)	Two times/day: 1.9, One time/day: 41.5, One time/two days: 11.3, One time/week: 30.2, One time/month: 3.8, When dirty: 11.3
	Grooming person (%)	Stableman: 30.2, Owner: 69.8
	Time of grooming (%)	Every day same time: 62.3, Irregular: 37.7
	Grooming session time (min) ($\bar{x} \pm S\bar{x}$)	18.5±1.10
	Tail docking (%)	Yes. 0.0, No: 100.0
Foal care	Foals kept with mothers (%)	Yes: 100.0, No:0.0
	Weaning age (month) ($\bar{x} \pm S\bar{x}$)	6.4±0.25
	Weaning method (%)	Abruptly: 95.5, Gradually: 4.5
Transport	Transport vehicle (%)	Yes: 28.3, No: 71.7
	Width and length of vehicle interior loading area (m) ($\bar{x} \pm S\bar{x}$)	(1.9±0.14) × (4.6±0.75)
	Width and length of vehicle interior partition (m) ($\bar{x} \pm S\bar{x}$)	(0.8±0.00) × (2.2±0.00)
	Shortest transport distance (km) ($\bar{x} \pm S\bar{x}$)	146.8±52.08
	Longest transport distance (km) ($\bar{x} \pm S\bar{x}$)	395.1±61.32
	Feed and water supply in vehicle (%)	Yes: 20.0, No: 80.0
	Loading and unloading ramp (%)	Yes: 100.0, No: 0.0
	Internal vehicle foam coating (%)	Yes: 100.0, No: 0.0
Personnel	Total number of personnel (%)	One-two people: 77.4, Three-four people: 13.2, Five-ten people: 9.4
	Personnel's social security (%)	Yes: 98.1, No: 1.9
	Personnel with instruction regarding animal health (%)	Yes: 3.8, No: 96.2
	Personnel with instruction regarding animal welfare (%)	Yes: 3.8, No: 96.2

Table 3: Findings regarding the rate of establishments where abnormal horse behavior is observed

Factor	Variable	Value (%)
Abnormal Behavior	Rate of establishments where abnormal behavior is observed	39.6
	Distribution of the types of abnormal behavior observed in establishments	
	Cribbing	20.8
	Wood chewing	18.9
	Kicking against the stall walls	17.0
	Weaving	17.0
	Manure eating and soil eating	13.2
	Self-mutilation (Autoaggression)	13.2
	Headshaking	9.4
	Tongue playing	9.4
	Heightened aggressiveness	9.4
	Excessive pawing	7.5
	Stall walking, fence walking and figure eight walking	7.5
	Excessive eating (Polyphagia nervosa)	5.7
	Excessive tail swishing	1.9
	Distribution of establishments according to the type of Observed abnormal behavior	
	1 abnormal behavior	11.3
	2 abnormal behaviors	13.2
	3 abnormal behaviors	3.8
	6 and more abnormal behaviors	11.3

were used as roughage in rations, while barley, bran, oat, and pelleted feeds were fed as concentrate. The most common postural deformities were perpendicular hoof and extroverted stance. Only 9.4% of the people performing shoeing procedures were trained in farriery, horse health, and welfare. In all farms, foals were kept with their mothers and the weaning age of foals showed variation (5-6 months in 68.2% and 7-8 months in 27.3%). The inner surfaces of the transport vehicles belonging to the enterprises were covered with foam and had a loading ramp. While 100% of the interviewed hostler reported that they had experience in livestock breeding and 90.6% in horse breeding, only 3.8% of them reported that they had knowledge about animal health and welfare.

Discussion

The average horse box dimensions were 3.6 x 3.7 m and were compliant with the international standards advised (3.65 x 3.65 m) for warm-blooded horses (NEWC, 2009; DEFRA, 2018; FAWAC, 2018). Similarly, indoor temperature and humidity values (20.7°C and 38.6%) were between the optimum values (5-30°C and 30-70%) reported for horses (Morgan et al., 1997; Ödber and Bouissou, 1999; Schwean, 2005; Parker, 2007; NFACC, 2018; Miller et al., 2019). The average ammonia level measured in barns was 5.0 ppm and lower than the recommended maximum of 10 ppm (NFACC, 2018; New Zealand Government, 2018; Miller et al., 2019) for horse barns. It was determined that the ventilation openings such as windows and chimneys were insufficient in the shelters, however, the reason for the good indoor air quality during the visit was the number of horses housed lower than the capacity of the barn (Curtis et al., 1996; Schwean, 2005). Good litter and manure removal frequency were also had a positive impact (Schwean, 2005; Parker, 2007).

While the litter was not available in one-third of the farms, 24.3% of them used dry sheep manure or a local litter obtained by mixing straw and sawdust. Farmers reported that they preferred this natural litter because the feces was dried during summer under the sun and composted as well as its ready availability and low cost. There was a wide variation in the use of litter among the farms and poor litter management has been reported to reduce shelter comfort and horse welfare.

24193.0 m2 per farm and 1660.3 m2 per horse were deemed to be inadequate. These values were lower than the 5000-10000 m2 / head values indicated as optimum outing and grazing areas reported for horses(DEFRA, 2018; NFACC, 2018). Furthermore, nutritional vegetation, such as grass or meadows, is also rare in these outing areas (11.4%). These results indicate that horses on farms cannot carry out feed exploration and collective group grazing activities to a significant degree. Although the existence of an outing area allows horses to exhibit some important comfort behaviors such as rolling around in the soil, 62.9% of the farms with an outing area keep horses in individual paddocks and therefore horses are prevented from exhibiting social behavior that is very important (Arnold and Grassia, 1982; Carson and Wood-Gush, 1983; Boyd, 1991; Araba and Crowell-Davis, 1994). Moreover, most of the pacing and javelin horse breeders had only one horse. The results show that the farms feed the horses sufficiently (Henderson and Waran, 2001). However, horses were not able to ad libitum access to fresh and clean water and may even be dehydrated for long hours. In the majority of the farms (77% or more), owners reported that they provided regular veterinary care to horses, made compulsory vaccinations and applied routine vitamin and mineral supplements. Contrary to these declarations, 61.7% of the horses determined at the appropriate sampling rate were found to have parasites in their feces. These results suggest that the health protection and antiparasitic methods used in the farm are not enough for successful breeding. Parasitic infections adversely affect horse health and welfare as in all livestock. The lack of a quarantine section in 79.2% of the farms constitutes a significant risk (DEFRA, 2018; NFACC, 2018; New Zealand Government, 2018). However, 81.1% of the farms reported that they used different methods to fight flies (Miller et al., 2019; Parker, 2007).

It was determined that there are few farms having a manege and horses exercise regularly (only 9.4%). In particular, due to inadequate exercise and limited social contact, an increase in abnormal behavior was observed in horses (Krzak et al., 1991; Jorgensen and Boe, 2007; DEFRA, 2018; Lesimplea et al., 2020). As a matter of fact, the abnormal behavior rate of farms was 39.6%. The variety and number of abnormal behaviors in horses is an important parameter indicating low welfare (RSPCA, 2014; Arena et al., 2021; Seabra et al., 2021; Krueger et al., 2021; Brolin, 2022). Only one or a few horses were determined in majority of farms throughout the study. This phenomenon may be thought to result in boredom and loneliness and therefore abnormal attitudes in the animals. Visual contact or environmental enrichment can reduce boredom (Mills, 2002; McAfee et al., 2002; Mills and 2005; Eicher, 2022; Mejia et al., 2022). Abnormal behaviors pose risks for both horses as well as caretakers. Buckley et al. (2010) reported that 60% of rider injuries were caused by behavior problems and the performance of horses with behavior problems decreased. Ödber and Bouissou (1999) reported that behavior problems had a significant role in the number of horses sent to the slaughterhouse in Italy.

In 30.2% of the farms, horses were identified with microchips. These farms are engaged in raising horses for flat racing and according to the Regulation regarding the Registration of Arab and Thoroughbred horses into the Studbook, their Export, and Import, Arab and Thoroughbred foals born in Türkiye in2006 and later must be identified with microchips in order to be included in the studbook (Türkiye Tarım ve Orman Bakanlığı, 2021).

The hoof trimming frequency indicated that shoeing and hoof care are managed well (Parker, 2007; DEFRA, 2018; FAWAC, 2018; NFACC, 2018; Miller et al., 2019). Frequent grooming in the farms has highly positive effects for horse welfare. Grooming contributes to between interactions of human and animal when disturbing substances such as dirt, mud, soil, fertilizer, and straw that accumulate on the bodies of horses are being removed and the grooming is considered as a need of horse (Miller et al., 2019). It is thought that the lack of dental care in a large majority of farms may affect animal welfare and performance negatively as it will cause tooth discomfort in horses and weight loss by preventing chewing. The absence of tail docking was also positive for horse welfare (The United Kingdom Legislation, 1949; Norwegian Animal Welfare Act, 2011; Finnish Centre for Animal Welfare, 2013; Austria Federal Act on the Protection of Animals, 2014). It is necessary for the horse to protect itself from flies. Tail is used to display some attitudes such as aggression, social behavior, and joy in communication with other horses and humans (Christie et al., 2004; Levebvre et al., 2007; Türkiye Tarım ve Orman Bakanlığı, 2011a).

Foals are weaned at the age of 6 months earliest. Keeping foals with their mothers until weaning, prevents stress in mares and foals (NFACC, 2018). However, the application of abrupt weaning in the farms is a practice that is stressful to foals and reduces their welfare (Schwean, 2005; Parker, 2007; New Zealand Government, 2018). Only one-third of the enterprises had their own transport vehicle that is foam-coated and had loading and unloading ramps to prevent the horses from being injured as a result of slipping, falling, and impact. The trailer area (1.76 m2) is in compliance with EU requirements (1/2005/EC) and Regulation on Welfare and Protection of Animals During Transport (Türkiye Tarım ve Orman Bakanlığı, 2011b) in Türkiye.

All of the interviewed personnel being experienced regarding farm animals. Most of them (90.6%) being experienced in horse breeding stated that an advantage in terms of providing good horse care. However, the fact that only 3.8% of the farms had technical personnel trained in animal health and welfare may be considered a disadvantage.

Conclusion

It is concluded that sheltering standards in the visited horse farms were good with the exception of window and chimneys. The feeding practice is thought to be adequate. Although the living area in individual boxes for the animals was sufficient, no enrichment was observed. Abnormal behaviors resulting from inadequate housing is an indication of high social stress in horses. It has been concluded that the absence of tail docking, frequent grooming, hoof care and good transport conditions reflect high standards of welfare in farms. In contrast, the lack of dental care, high parasite burden and potentially poor human-animal interactions caused by caretakers not trained in animal health and welfare pointed to low welfare standards.

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Conflict of Interest

The authors declared that there is no conflict of interest.

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