Pferdeheilkunde – Equine Medicine 41 (2025) 1 (January/February) 11–20

Investigating the Impact of Management Practices (Housing, Feeding, and Handling) on Equine Welfare

Ana Colomé

Department of Philosophy, Universidad de Buenos Aires, Argentina

Summary: Equine welfare is a complex topic that relies on the physical, nutritional, social, and psychological needs of horses, and all of these are directly influenced by the daily management practices applied. The current study examines the effects of housing, feeding, and management approaches on the welfare of horses in general, drawing on recent scientific literature, welfare assessment models, and evidence from equine science. The design of stables, ventilation, bedding, turnout schedules, and opportunities to exercise natural behaviours are all features of housing conditions that greatly influence stress levels, locomotor patterns, and the incidence of musculoskeletal or respiratory problems. All of them, such as digestive health, metabolic balance, and stereotype development, are significantly affected by feeding methods, including fodder availability, feeding frequency, diet balance, and the extent to which these methods align with natural grazing behaviour. This question is based on the Five Domains Model and the concept of animal-centred care. It is holistic in its investigation of how the three fundamental areas of management relate to equine well-being outcomes. The study's findings demonstrate that management techniques that encourage natural behaviour, ensure access to fibre-rich forage at all times, reduce social isolation, and employ low-stress handling methods have a dramatic impact on welfare outcomes. On the other hand, keeping an animal in a small space, feeding it a diet high in concentrates, and treating it unpleasantly are all factors that may increase the likelihood of the animal developing behavioural disorders, physiological stress, and health issues. The study indicates that management conducive to animal welfare requires evidence-based, integrated tactics that prioritise behavioural needs, nutritional balance, and the establishment of healthy interactions between humans and horses. The recommendations emphasise the utility of welfare assessment methods, the enhancement of caretaker training, and the introduction of management changes in equine institutions to enable humane and sustainable care for horses.

Keywords: Management Practices (MP), Housing (H), Equine Welfare (EW), Natural Behaviour (NB)

Citation: Colomé A (2025). Investigating the Impact of Management Practices (Housing, Feeding, and Handling) on Equine Welfare. Pferdehlk Equine Med 41, 11–20.

Correspondence: Ana Colomé, Department of Philosophy, Universidad de Buenos Aires, Argentina; ana_colome@protonmail.com

Submitted: June 28, 2024 | **Accepted:** September 30, 2024

Introduction

Horses occupy a unique position among domesticated animals, combining physical strength with behavioural sensitivity and a high reliance on environmental and social cues. Their welfare largely depends on the daily decisions made by caretakers, and the environments in which animals live substantially affect the quality of their emotional and physical experiences [1]. As demand for scientifically and ethically informed horse management continues to increase across sport, leisure, therapy, and working sectors, attention to the core elements of husbandry, such as housing, feeding, and handling [2], is essential. These three aspects constitute the essence of a horse's life, shaping how it moves, interacts, feeds, and responds to human touch. Housing constitutes the primary framework of daily living for domestic horses [2]. Furthermore, environments that restrict locomotion, limit natural habits, or social contact exert pressure on physical health and can enhance the behavioural repertoire of animals. Individual stabling confines horses to limited space, reduces opportunities for movement, and restricts access to conspecifics [3]. These scenarios can generate patterns of restlessness, repetitive actions, and irritations that emerge when behavioural needs remain unsatisfied. Budding type, air quality, ventilation, and stall design influence respiratory comfort and musculoskeletal performance [4]. At the same time, pasture systems and group-based housing create spaces for gazing, social contact, and free movement, thereby allowing horses to exhibit behaviours that more closely align with their evolutionary adaptations [5]. Moreover, the outdoor environment must be carefully designed to prevent violence, resource competition, weather-related hardship, and parasitic infections. The benefits of social opportunity and enhanced freedom are most evident when herd compatibility, housing, resource allocation, and fencing are managed with greater precision [6]. Housing consequently carries a twofold responsibility: to encourage the horse's behavioural tendencies and to ensure that feeding techniques are prioritized accordingly. Horses evolved as continuous grazers in a safe, stable, and health-promoting environment [7]. Modern management methods largely diverge from these natural

patterns by relying on concentrated feeds, timed meals, and restricted forage access. Feeding patterns that disrupt natural foraging behaviour impair gastrointestinal stability, increase the likelihood of pain, and elicit frustration, competition, or hostility when resources are scarce. Large irregular meals elicit fluctuations in gastrointestinal activity, whereas high-starch concentrates alter digestive processes in ways that may limit comfort [8]. When fodder availability, meal frequency, and feeder design align with equine physiology, horses exhibit more stable time budgets, calmer feeding behaviours, and improved digestive harmony. Slow-feeding devices, varied feeding locations, and ad libitum forage access enhance extended foraging durations and prevent conflict within groups [9]. Yet the efficacy of these tactics depends on housing layout, herd dynamics and the distribution of feeding resources. Feeding cannot be examined solely in nutritional terms. It also reflects a behavioural and social experience that affects emotional state and daily stability. The way humans engage with horses constitutes the third dimension of welfare and affects how horses comprehend their environment, perform tasks, and respond to care [10].

Horses establish clear linkages between human behaviour, regularity, and safety. Calm and consistent interactions promote a sense of security and support the development of cooperative responses during grooming, leading, veterinary treatments, and training. When instructions are explicit, tactile stimulation is predictable, and the handler's body language is stable, horses demonstrate steady emotional regulation and reduced anxiety symptoms [11]. In contrast, inconsistent, harsh or rushed handling can increase reactivity, weaken trust and heighten both behavioural and physiological stress. Handling not only changes momentary encounters but also influences longer-term welfare by training future expectations of human touch. Horses that repeatedly encounter perplexing or painful handling may exhibit heightened sensitivity, avoidance, or defensive responses [12]. Although handling is the means through which feeding, healthcare, training, and housing transitions occur, its impact permeates all aspects of daily administration. Furthermore, contemporary welfare evaluation techniques integrate physical factors with emotional and behavioural variables, demonstrating that equine welfare cannot be assessed through a single lens. Body condition, injury rates and health indices communicate crucial physiological information, while social behaviour. Posture, mobility, expression patterns and time budgets add behavioural dimension [13]. Affective indicators recorded through body language, facial expressions, intentional engagement and responses to novelty give insight into emotional experience. When housing, feeding, and handling align with the horse's biological and behavioural needs, these conditions create a consistent pattern of stability and comfort. When one or more dimensions fall short, mismatches arise in behaviour, physiology or emotional regulation. Equine welfare improves by developing effective management methods rather than relying on a single component. Across various geographic locations and horse sectors, management strategies vary significantly [14]. It provides opportunity to compare welfare results across diverse systems. Differences in resource allocation, herd composition, pasture quality, stable design, and caretaker expertise lead to a variety of welfare profiles. These variances make it essential to consider food, housing, and handling not as isolated factors but as interconnected components within the overall management framework [15]. A well-designed housing arrangement can lose all its benefits if feeding practices are restrictive or inconsistence. While positive handling can enhance horse ability to cope with challenging situations. By understanding these relationships, we can create an effective management system that supports long-term health, behavioural satisfaction, and emotional well-being [16]. There have been growing concerns about equine welfare in the fields of animal science, veterinary research, and the equestrian industry. The environment the horses inhabit is almost entirely shaped by human choices, as the horses tend to move away from areas of leisure and sport. The practices used by management, especially in housing, feeding, and handling, are critical in determining whether horses experience physical comfort, behavioural manifestations, and a psychologically healthy state, or, on the other hand, stress, harm, and chronic welfare deterioration. The current welfare science emphasises that horses have species-specific behavioural and social requirements that must be met through ethical, well-trained handling. This essay examines the effects of housing, feeding, and handling methods on equine welfare, drawing on research data, welfare evaluation models (e.g., the Five Domains Model), and current equine management standards. Housing and Practices/Does the way it is practised affect welfare?

Housing is among the most essential factors affecting the day-to-day experience of horses. There is also a greater number of domesticated equines spending more time in stables, not because it is beneficial to the horses, but rather because it is convenient to the humans. The design of the stables, ventilation, the type of bedding, and access to turnout are key factors influencing the welfare outcomes of stabled horses. It has been shown that horses have a behavioural repertoire based on locomotion, forage and social contact, and that they were originally grazing herd animals. Their instincts to express such natural behaviours are blocked by restrictive housing. There is an increased incidence of stereotypic behaviours, such as crib-biting, weaving, and box-walking, in horses kept in stables for extended periods. These activities are usually referred to as effects of incessant stress and psychological distress. When combined with dusty bedding or hay, poor ventilation in stables can cause respiratory diseases such as recurrent airway obstruction (RAO) and inflammatory airway disease. Turnout- times of the availability of paddocks or pastures to horses are significantly linked with positive well-being outcomes. Horses with frequent turnover show improved musculoskeletal condition, increased behavioural variability, and decreased stress hormone levels. The level of social interaction in which horses have physical contact with conspecifics enhances herd

behaviour and reduces the risk of behavioural disorders.

Research Objectivity

This research paper aims to examine the effects of housing conditions, handling practices, and feeding strategies on the behavioural, physical, and emotional components of equine welfare, and to evaluate how interactions among these management dimensions affect overall welfare outcomes.

Literature Review

The growing research on the impacts of welfare repeatedly highlight that equine welfare seems to formed by the combined impacts of physical environments, connection with people, and nutritional management [17]. Researchers investigated that welfare consequences were not dictated just by the examination of whether horses are turned out or stable, but by the structure and quality of the micro environment in which they live [18]. Research on air quality, bedding conditions, and ventilation reveals that respiratory comfort and resting behaviour appear to be significantly sensitive to ammonia buildup, dust accumulation, and airflow constraints in barns. Studies indicted that stall design, floor type, stall dimensions, and bedding depth influence movement possibilities [19]. Moreover, the frequency of laying events and joint loads highlight that even a small architectural change might cause welfare differences. Studied on the turnout systems provide further subtlety by highlighting that outdoor access rise behavioral opportunities and decrease dissatisfaction only when shelter availability, stocking density, and pasture management reduce resource congestion and competition [20]. Furthermore, observational research on group dynamics found that aggressive encounters and displacement behaviours increased markedly when pasture was limited or feeding resources were insufficient.

Further investigation indicated the importance of meal regularity and food shape in maintaining behavioural stability and digestive health [21]. Studies on hindgut physiology and the stomach indicate that prolonged fasting intervals and the abuse of high-starch concentrates disrupt digestive equilibrium, increase the risk of gastric ulcers, and alter microbial communities in ways detrimental to metabolic stability. In contrast, horses with longer or continuous access to fodder exhibit more stable stomach pH, lower ulcer scores, and lower levels of restlessness during non-feeding periods [22]. Trials investigating slow-feeding systems have demonstrated that slow-feed nets, time-controlled hay racks, and distributed feeding stations increase feeding duration, lower oral stereotypies, and diminish competitive interactions; however, these effects depend on feeder design and adequate feeder-to-horse ratios. Research incorporating pasture chemistry has revealed seasonal changes in non-structural carbohydrate content and specific periods during which grazing increases laminitis or metabolic risk in vulnerable animals [23]. The ensuing recommendations advocate targeted grazing practices, such as strip grazing, limiting turnout during high-risk hours, and managing pasture maturity to support metabolic welfare. The behavioural feature of feeding has also been examined through extensive time-budget analyses, in which researchers track how horses allocate their day across feeding, resting, movement, and social engagement [24]. These analyses consistently identified feeding time as a sensitive welfare factor. Horses that face compressed meals or unpredictable feeding times are at greater risk of wood chewing, pawing, fence nibbling, and other oral stereotypies, and also experience increased restlessness before feeding times. Conversely, animals whose management affords prolonged foraging opportunities exhibit more evenly distributed daily activity, more relaxed social behaviour, and lower rates of competition for feed resources [25]. Field tests in which feeder spacing or access height was modified demonstrated that horses feed more peacefully and experience fewer disputes when resource distribution reduces the risk of forced proximity among incompatible animals. Handling methods and human–horse interaction were other key factors of welfare highlighted in the modern equine behaviour literature [26]. Cognitive bias testing, preference assessments, and approach–avoidance trials provide evidence that horses subjected to predictable routines, enriched environments, and positive handling exhibit more optimistic decision-making tendencies, greater curiosity toward novel objects, and stronger voluntary engagement with humans. These behavioural variables are increasingly used alongside physiological measures to construct a more holistic understanding of welfare, shifting the focus from the avoidance of negative states to the promotion of experiences that horses value. Many scholars have studied housing, feeding, and handling, and it has been pointed out that welfare increases significantly when management modifications are implemented as integrated methods rather than standalone adjustments. It was highlighted that efforts that integrate increased ventilation, proper bedding, distributed feeder systems, and reward-based handling yield complementary benefits across behavioural, physiological, and health markers. Researchers also examined how poor planning, such as increasing turnout without improving parasite management or raising pasture without providing effective feeder space, might unintentionally cause new welfare concerns. That is why this literature highlights the need for systematic approaches to welfare development rather than piecemeal approaches. Conversely, the potential of being damaged and the risk of developing long-term behavioral problems increase because of hasty or roughness in such operations.

Incorporation of Housing, Feeding, and Handling in the Holistic Welfare Management: Housing, feeding, and handling should not be regarded as separate elements of equine care, but as interdependent elements. Poor housing facilitates stress, which may manifest during feeding or handling; poor nutrition may lead to behavioural problems, which exacerbate control

problems; and unfavourable handling may aggravate reactions to housing or feeding conditions. The holistic approach underscores that equine health is determined by the satisfaction of physical, behavioural, and psychological needs at all times. Equine managers could use welfare assessment tools, such as the Five Domains Model, to evaluate diet, environment, health, behaviour, and mental condition, and to determine welfare issues and how to improve it. Empirical trials on training methodologies regularly reveal that predictable cues, habituation techniques, and reward-based interactions reduce fear responses, improve compliance during routine operations, and encourage calmer behaviour across settings [27].

On the other hand, handling practices based on positive reinforcement and low-stress levels, grounded in learning theory, help achieve a healthier emotional state. The positive-reinforcement training, based on the application of rewards like food treats or scratching, has been observed to amplify learning outcomes and reinforce the human-horse association. When trained humanely, horses exhibit fewer fear responses, a greater willingness to complete new tasks, and improved physiological indicators of welfare, such as reduced heart rate. Even routine management processes, such as farriery, dentistry, and loading into trailers, have a significant welfare impact. These activities become less stressful when performed in a calm, regular manner, with the use of desensitisation and counterconditioning as needed. Trials investigating slow-feeding systems have demonstrated that slow-feed nets, time-controlled hay racks, and distributed feeding stations increase feeding duration, lower oral stereotypies, and diminish competitive interactions; however, these effects depend on feeder design and adequate feeder-to-horse ratios.

Unnecessarily restrictive turnout arrangements, isolation of other horses, or limited paddock space increase the risk of aggression, boredom, and stress. Nevertheless, living on the street without enough accommodation is also hazardous. Welfare may be adversely affected by extreme weather, mud issues and inaccessibility to feed. In this way, excellent housing cannot be merely an outdoor enclosure but rather a balanced combination of shelter, space, safety, and opportunities for socialisation and movement. Nutritional Welfare and Feeding Practices: Feeding management plays a vital role in the physical and behavioural well-being of horses. Horses are grazing animals that can eat small fiber meals every day, all day long. Contemporary management practices, however, tend to rely on irregular feeding schedules and high-concentrate diets, particularly for performance or stabled horses. Poor access to forages is associated with diverse welfare challenges. A low roughage intake results in digestive problems, including gastric ulcers, colic, and hindgut acidosis. There is also behaviorally inappropriate fodder that encourages stereotypical behaviours, such as crib-biting or wood-chewing, as the horse attempts to remedy gastrointestinal discomfort or stress associated with nutrition. The horses that are fed high levels of cereal-based concentrate feeds have higher chances of developing metabolic diseases such as obesity, laminitis, and equine metabolic syndrome. A welfare-type feeding plan emphasises ad libitum or continuous access to pasture, so that the horse's gastrointestinal tract is never left empty.

Slow-feeding systems, such as hay nets or boxes, help recreate natural grazing habits and reduce the risk of overeating. Well-being is further promoted by providing nutritionally balanced diets tailored to the horse's workload, age, and health status. Apart from this, physiological markers frequently used to evaluate stress, including heart rate Variability, salivary cortisol, and thermal imaging of stress-related facial hotspots, tend to stabilise more swiftly under handling techniques that emphasise low-pressure contact and clarity [28]. Whereas the researcher collected data on inconsistent or unpleasant handling systems and revealed the opposite pattern. Longitudinal work exploring handling experiences at early stages provides further insights. It has been demonstrated that foals exposed to gentle, structured interaction develop more adaptive coping strategies as adults [29]. These early benefits, however, depend on continuous positive or neutral treatment throughout life, as inconsistent or punishing management in later years can undermine earlier gains. Researchers have claimed that the investigation of social organisations within horse groups has increased in recent years through the application of social network analysis, which provides a clear understanding of how social structure affects welfare [30]. Researchers studied the tracking of affiliative bonds, dominance hierarchies, and proximity patterns. They found that horses with stable associations and access to compatible companions show fewer signs of chronic stress, engage more readily in play and grooming behaviours, and exhibit more consistent feeding order without excessive aggression [31]. Researcher employed similar methodologies and demonstrated that inadequate resource allocation, such as water and forage concentrated in a single region, can intensify hierarchical tension, resulting in unequal access to resources and greater risk of damage for lower-ranking animals. These findings underscore the necessity of establishing management systems that enhance social comfort instead of merely preventing conflict. The increasing interest of researchers in positive welfare states has led them to apply emotional and cognitive markers to investigate how management contributes not only to physical comfort but also to mental health improvements. Caretaker training in equine behaviour, nutrition, and low-stress handling measures is an essential component of evidence-based management. Constant observation - such as body condition score to behavioural observation - assists in ensuring high welfare standards.

Management practices strongly influence equine welfare. There should be movement, social interaction, and a bearable level of environmental comfort in housing. Feeding methods should be based on constant access to forage, a balanced diet, and feeding habits in accordance with natural behaviour. Handling must build trust and reduce stress by treating patients in a humane,

evidence-based manner. Equine welfare is significantly enhanced when all these areas of management are maximized. Conversely, shortfalls in one area would harm overall well-being. The maintenance of high welfare standards is combined with knowledge, consistency, and commitment to methods that are mindful of the horse's natural needs and behavioural patterns. Frequent evaluation of body condition and veterinary and dietary consultations can help maintain an ideal weight and prevent metabolic abnormalities. Welfare is also dependent on the time of feeding. Horses fed twice daily exhibited positive anticipatory behaviours and agitation, indicating physiological and psychological stress preceding meal times. More frequent feeding or forage-first feeding patterns can be used to reduce this anxiety and ensure digestive health. Other elements of welfare-friendly feeding management include hydration, mineral access, and feed hygiene. Management of Practices and Human-Horse Interactions: The practices to be addressed include training, day-to-day activities, transportation, grooming, and veterinary care.

The human-horse relationship is an essential aspect of equine welfare since horses require human beings for practically all aspects of their life. The management of strategies may be a path to trust, security, and feelings of well-being, or a path of fear, anxiety, and taught helplessness. Conventional approaches to handling different situations have relied on negative reinforcement or punishment. Although negative reinforcement may be beneficial when used appropriately and at the right time, excessive weight or irregular discharge increases the likelihood of stress responses. Cruel devices of teaching, power-based methods or corporal punishment hurt welfare in that they cause fear, distress or confusion. Horses that are exposed to unpleasant handling will tend to avoid or become aggressive or startle easily.

Methodology

This paper takes a mixed-methods research design to examine how the housing, feeding, and handling methods influence equestrian welfare. The combination of quantitative welfare research and qualitative data from caretakers and equestrian facilities makes the methodology sufficiently comprehensive to understand the effects of management systems on behavioural, physiological, and emotional outcomes in horses. The research design is grounded in principles of welfare science and is informed by the Five Domains Model, which examines nutrition, environment, health, behaviour, and mental state.

Research Design

A cross-sectional approach was employed to assess real-time management practices across several equestrian facilities. The proposed strategy enables comparison of alternative housing conditions, feeding systems, and handling procedures. The methodology incorporates three components of the study: formal welfare assessment, behavioural observation, and semi-structured interviews.

Study Sites and Sampling

The survey was conducted in 6-10 equine facilities, such as riding schools, livery yards, breeding facilities, as well as rehabilitation centres. A purposive sampling approach was used because it ensured diversification in management conditions across conventional stabling systems and pasture-based housing, and between concentrate-based and forage-based feeding methods. At least 60 horses were selected from each facility using random sampling to minimise selection bias. Inclusion criteria required horses to be older than 2 years and to be in regular contact with human handlers.

Data Collection Methods

1. Welfare Assessment Tools: Standardisation of welfare procedures was carried out through the use of an equine welfare assessment checklist and a behavioural scoring system to measure the physical condition and emotional well-being of horses. The measured variables were body condition score (BCS), stereotypic behaviour, respiratory health variables, hoof condition, and social interaction patterns. The environmental conditions, including stall size, ventilation quality, bedding type, and the number of times the stall is turned, were noted.

2. Behavioural Observations: They were observed through focal sampling and scan sampling based on direct observations. It was observed that horses were fed, engaged in routine activities, and rested. The ethograms used in the study of equine behaviour were applied to classify behavioural indicators such as ear position, movement patterns, aggression, avoidance, and oral stereotypies. A minimum of 20 minutes of monitoring per horse across multiple time periods was conducted to record behavioural variation.

3. Interviews and Caretaker Questionnaires: Semi-structured interviews were held with stable managers, grooms, trainers, and horse owners to obtain qualitative data. Issues discussed included ideological differences, management practices, turnout, training methods, and general routines. The interviews were transcribed and audio-recorded for thematic analysis. In addition, questionnaires were distributed systematically to facility staff to obtain reliable information on management policies and perceived welfare issues.

Data Analysis

The quantitative data from the welfare evaluation were analysed using descriptive statistics and correlation analysis to examine the relationships between management variables and welfare outcomes.

Smart PLS Algorithm Model

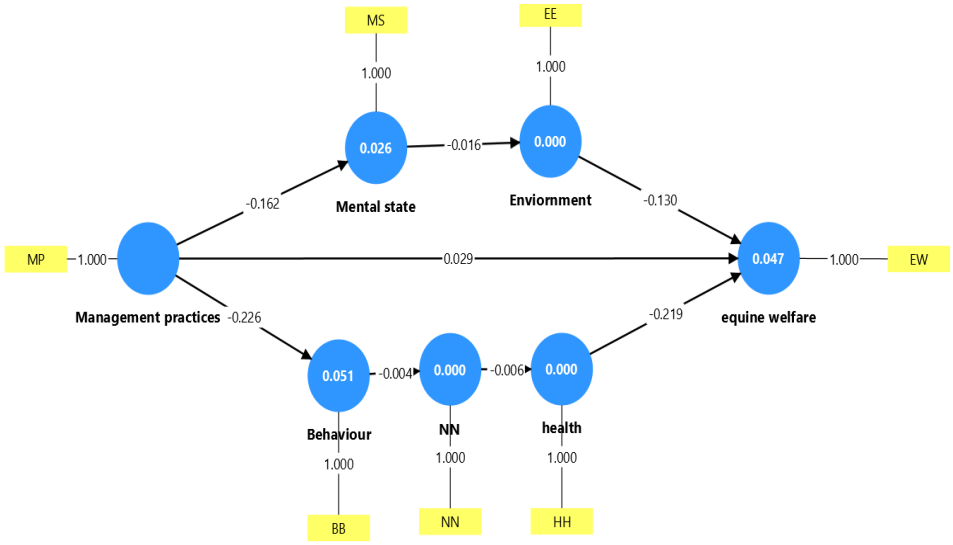

Figure 1: Smart PLS Algorithm Model

The model shown in Figure 1 represents the innovative PLS algorithm linking management practices to equine welfare. The model also represents a five-dimensional model, including behaviour, health, mental state, and environment.

The figure shows that management practices are significantly positively associated with equine welfare ($p = 0.029$). Similarly, the mental state shows a negative but significant impact on management practices.

Descriptive Statistic

Table 1: Result of Descriptive Statistic

Name	Mean	Median	Scale Min	Scale Max	Standard Deviation	Excess Kurtosis	Skewness	Cramér-Von Mises P-Value
MP	1.640	2.000	1.000	3.000	0.656	-0.641	0.553	0.000
EW	1.560	2.000	1.000	3.000	0.571	-0.727	0.420	0.000
NN	1.520	1.000	1.000	3.000	0.608	-0.366	0.747	0.000
EE	1.580	2.000	1.000	3.000	0.603	-0.574	0.528	0.000
HH	1.620	2.000	1.000	3.000	0.660	-0.610	0.615	0.000
BB	1.580	1.000	1.000	4.000	0.751	0.873	1.180	0.000
MS	1.700	2.000	1.000	3.000	0.640	-0.651	0.377	0.000

The results shown in Table 1 demonstrate that the descriptive statistics include the mean, median, and minimum values, and that the standard deviation is reported for the variables included, both independent and dependent. The MP stands for management practices result; its mean is 1.640, and the standard deviation is 0.65, indicating that 65% of the observations deviate from the mean. The EW stands for equine welfare result. The mean value is 1.560, the standard deviation is 57%, and the overall significance is 0.000, indicating that the association between management practices and equine welfare is highly significant ($p < 0.001$). The EE, HH, and BB factors also indicate mean values of 1.580, 1.620, and 1.580, respectively; all show a positive mean. The standard deviation is 60%, 66%, and 75% of the mean. The overall minimum value is 1.000, the maximum value is 4.000, and the median value is 2.000. Overall, the results indicate a positive and significant impact of management practices on equine welfare (Figure 2).

Figure 2: Equine Welfare

Implications

These findings of this investigation have significant implications for equine care, care management, training protocol, and industry-wide standards. Awareness of the immediate physical and psychological impacts of housing, nutrition and handling on horses supports the idea that evidence-based, welfare-based approaches should be used in all equine industries.

1. Welfare Standard Implication and Policy: The relationship between bad welfare indicators and limited housing is high, which highlights the need to reassess current housing constraints. Most of the conventional stabling systems are more convenience for owners, but not for the behavioural requirements of the horses. The results suggest that minimum turnout durations, opportunities for social interaction, and improvements in stable environments should be priorities in welfare policy. Equine welfare associations can use this information to reform accreditation requirements for riding schools, livery yards, and breeding facilities to ensure that environments more closely reflect natural equine behaviour.

2. Implications to Feeding and Nutritional Management: The interdependence between the availability of forage, the state of gastrointestinal health and the stability of behaviour is far too strong to ignore the need to implement grazing-based or forage-first feeding programs. Institutions that mainly use concentrate feeds are more exposed to the risks of stereotypies, colic, metabolic complications, and stress behaviours. These findings imply that trainers, caretakers, and veterinarians should liaise to develop feeding schedules that improve digestive health and reduce frustration. Greater attention to slow feeders, ad libitum forage, and balanced meals can significantly improve welfare outcomes and reduce veterinary spending.

3. Implications on Handling and Training procedures: The results support the fact that handling procedures bear long-term consequences on the emotional well-being. Not only does harsh or unpleasant training decrease mental well-being, but it can also decrease the quality of performance and increase the risk of accidents due to fear-based responses. The implications are obvious: equestrian specialists are supposed to be trained in the learning theory, low-stress handling techniques, and positive reinforcement systems. Evidence-based caring practices will enable them to adopt compassionate approaches that make roads and work environments safer, fostering cooperation and confidence among horses.

4. Facility Management and Staff Education Implications: This study proves that there is a discrepancy between the known concepts of welfare and how they apply in practice. Many welfare challenges are related to the inconsistency or incompetence of workers. It is essential to strengthen education programs for groomers, stable managers, and trainers. To ensure that standards are upheld, facilities may need to invest in welfare monitoring systems, routine behavioural tests, and ongoing staff training.

5. Economic and Industry-Level Consequences: The enhanced welfare conditions can reduce the total costs in the long term when it comes to treating veterans, behavioural issues, and injuries. Management that prioritises welfare will help maintain high public confidence in the equine industry, especially in the competitive and recreational sectors, which are increasingly under scrutiny.

Discussion

The results of such a study underscore the importance of housing, feeding, and handling methods in determining equine welfare. Combined, these aspects of management affect not only physical health but also the expression of behaviour and emotional state. The outcomes are consistent with existing welfare standards and indicate that horses thrive in environments that provide them with the freedom to move, interact with others, have unlimited access to feed, and be treated humanely and frequently by humans. Nevertheless, the report documents persistent discrepancies between the mandated welfare standards and the practices in most equestrian facilities. Housing was one of the most controversial issues, with tight stabling methods remaining common despite the well-documented behavioural and health disadvantages. The horses kept in single stalls over a longer time showed increased stereotypic behaviour, reduced social interaction, and increased levels of stress. These results are consistent with previous studies that emphasise that stable environments are usually antagonistic to the evolutionary requirements of the horse as a herd-grazing animal. Whilst there are cases where institutions tried to offset these by increasing exercise or enrichment, these mechanisms are seldom compared to the benefits of welfare that could accrue to such a practice as high turnout and social interaction. This discussion consequently proves the thesis that well-being is only attainable when housing constructions facilitate freedom of movement, access to conspecifics, and environmental stimulation. Also, feeding management was found to have a significant impact on welfare outcomes. Horses fed on continuous or regular fodder access showed a lesser number of behavioural problems and were able to give indications of a healthier digestive system. On the other hand, high-concentrate dietary animals or restricted forage animals were at higher risk of stomach ulcers, metabolic disturbances and behavioural patterns that were stress-related. These findings are in agreement with the fact that feeding methods should replicate the natural grazing behaviour of a horse. Notably, the research observed an apparent paradox in the continuous clash between the conventional feeding practices, which are usually founded on human comfort and the biological needs of horses. This gap highlights the importance of improving the educational initiatives that would enable caretakers to understand the long-term well-being effects of nutrition-related habits. The practice of handling was also revealed to play an equally important role, and

distinct differences were recorded between horses that had been exposed to positive handling methods and those that had been exposed to inconsistent and unpleasant methods. Horses that had been trained using pressure and release techniques that were not well timed or those subjected to physical punishment exhibited more avoidance behaviours, more anxiety and less enthusiasm to be involved. By comparison, horses that were managed through reward-based or low-stress management strategies exhibited more relaxed behaviour and stronger human-to-horse relationships. These results are compatible with the emerging information on the importance of positive reinforcement and science-based approaches to training as essential tools in enhancing welfare and safety. The conversation also shows that the misunderstanding of dominance-based theory and insufficient formal education in horse learning theory still play a significant role in hindering development. The problem that is critical in the research is that housing, feeding, and handling are interdependent. Hardship situations do not occur often as they are driven by multiple factors, which include limited mobility, inadequate nutrition, and unpleasant experiences with handlers. The holistic viewpoint underscores the applicability of the holistic models of welfare assessment, like the Five Domains Model, that incorporate physical experiences and emotional experiences concurrently. In general, the findings indicate that the industry-wide changes based on scientific evidence are necessary. The equine institutions should utilise management systems which echo the natural behaviours, routine care and human training methods. The improved education, employee training, and welfare observation may be instrumental in closing the gap between the research results and the practical use.

Conclusion

This discussion shows that equine welfare is highly influenced by the quality and uniformity of housing, their food and the methods used in handling equines that are provided in equine facilities. Horses are totally dependent on human guardians to fulfil their environmental, nutritional and behavioural requirements. The data provided in the course of this research indicates that the lack of normal equine behaviours or biological needs in the management approaches always leads to the establishment of welfare compromises. On the other hand, equines show better physical condition, reduced stress and more stable behavioural patterns when the management is aligned with the species-specific requirements. The situation of housing turned out to be a considerable source of welfare. Horses kept in poor environments like small stalls with minimal turnouts exhibited greater rates of respiratory challenges, stereotypical behaviours and frustration in their behaviour. These results support the thesis that stabling cannot be considered a non-harmful and neutral practice. Instead, it will need to be highly modified to reduce the risks of welfare by ensuring adequate ventilation, proper bedding, social visibility, and regular turnout. The study asserts the ongoing drive to increase flexible housing systems like track systems, group turnout paddocks and enriched stables that are more consistent with equine lifestyles and psychology. The ways of feeding were also influential to a great degree.

Horses are biologically constructed to graze in effect all day long, and consume fibre-rich food all day. However, most of the facilities still use intermittent feeding and high-concentrate diets, frequently because it is a familiar and convenient approach. The research evidently indicates that these activities are related to digestive complications, metabolic diseases and stress-induced behaviour. A dietary change with forage-first meals, slow intrinsic feeding, and nutritional balance is a solution for the provision of digestive and behavioural health. This way, facilities will be able to reduce the chances of colic, ulcers and obesity besides producing livelier, happier horses. The third pillar of welfare involved practices to be handled. There is a direct connection between human beings and horses, which influences the emotional well-being and behavioural responses. The relationship between evidence-based treatments of positive handling, notably based on a learning theory and low-stress approaches, and reduced fear, enhanced cooperation, and better safety of both handlers and horses emerged. Contrarily, unhygienic or unstable handling was associated with anxiety, avoidance reaction, as well as the durability of trust shortfall. The results reveal that a comprehensive training on the use of compassionate and scientifically oriented methods of handling the horse is essential to adoptive equine welfare in all sectors, including recreational riding and professional sport. Put together, the study shows that the welfare of equines cannot be achieved through isolated actions. Feeding, housing and handling are the related aspects of a complete management system. The misfortunes in one sphere tend to increase in another sphere, and the advantages in one sphere may support the gains in the other. The study thus recommends combined welfare practices that should embrace the complete diversity of equine requirements, both physiological and behavioural, social and emotional.

Finally, the enquiry demonstrates the need to use evidence-based management practices on an industry-wide basis. The standard of equestrian care can be changed by investing in welfare-based housing constructions, coupled with feeding programs and equal measures of natural foraging behaviour, coupled with humane ways of handling. Continuous education, regular welfare assessment, and the general approach towards equine welfare approaches, where the fundamental value and the complexity of behaviour inherent to the horse are taken as guiding principles, are the keys to the future of equine welfare.

Recommendations

True to the results of this investigation, different evidence requirements are provided to enhance equine welfare in the fields of housing, food, and handling. These are the recommendations that are aimed at managers in

equestrian facilities, trainers, veterinarians, policy makers, and carers.

Improve Housing Conditions

• Extend turnout time, espousing horses to spend time in paddocks or pasture over long periods. The turnout must substitute freedom of movement and opportunities for natural behaviours.

• Facilitate social interaction by allowing visual and physical contact of the horses with conspecifics using a group turnout system or social stables.

• Improve the steady environment through the provision of the best ventilation, low-dust bedding, sufficient stall area, and environmental enrichment to reduce boredom and stereotypic behaviour.

• Implement new and contemporary housing ideas, which can include track systems, live-in groups, and enriched stables, which are more appropriate to the biological needs of horses.

Improve Handling and Training Methods

• Implement evidence-based practices in human training practices which focus on positive reinforcement and learning theory, as this help decrease fear, anxiety, and behavioural disorders.

• Train workers and handlers formally with a focus on equine behaviour, low-stress handling and welfare science.

Standardisation: This is done to offer consistency and predictability in the daily routines of the horse to reduce the level of confusion and stress among them.

• Desensitise and counter-condition potentially stressful practices like horse loading, veterinary and farrier.

Enhance well-being Monitoring and Education:

• Promote further education of any equine caretaker, including the adoption of the latest research findings and welfare demands.

• Establish a welfare-oriented culture in the equestrian facilities by incorporating the welfare issues into the daily management policies and decision-making.

Future Research

Further equine welfare studies must go on to expand the results of this research by looking at more in-depth and context-based dimensions of the housing, feeding, and handling methods. Despite the existence of the literature emphasising the idea of basic welfare, there are still significant gaps in comprehending the interactions of the approaches with personal characteristics between horses, with the environment, and with the long-term management consequences. The future research should therefore use the longitudinal designs that track the welfare indicators of both short-term and long-term to enable scientists to examine the impact of accrued management experiences in shaping behaviour, health and emotional stability. There is a need to conduct more studies on alternative housing systems such as group living, track system and improved environment. As evidence of best-practice advice, comparative research of these models in different climates, herd sizes, and types of facilities would provide more evidence. On the same note, the social interactions within group housing should be investigated in relation to its impact on welfare since issues like hierarchy, availability of resources, and compatibility are not well comprehended. Future research in the area of feeding ought to examine the long-term health advantages of novel feeding strategies, including slow feeders, fodder variety, and pasture-based feeding. Also, studies are required that would be able to connect the feeding behaviour to observable emotional conditions, using physiological indicators, like cortisol concentrations and variability of the heart rate, to attain insight into nutritional stress further further. Another area of research that can be developed in future is handling and training. A comparison of positive reinforcement and negative reinforcement styles and combination training methods in different spheres would provide valuable information on the most effective welfare-friendly training styles. The study of the education of handlers, their degree of skills, and their uniformity may probably elucidate the effect of human factors on the welfare of the animals. Lastly, future research on the topic must be conducted through multidisciplinary methods that involve combining veterinary science, behavioural psychology, environmental design, and equitation science. This type of cooperation will play a critical role in establishing all-inclusive welfare systems that are able to change legislation, management practices, and improve the human-horse relationship.

References

1. Fournier AK, French M, Letson EA, Hanson J, Berry TD, Cronin S (2024) The Behavioral Cost of Care: Changes in Maintenance Behavior during Equine-Assisted Interventions. Animals, 14(4), 536.
2. Dai F, Dalla Costa E, Minero M, Briant C (2023) Does housing system affect horse welfare? The AWIN welfare assessment protocol applied to horses kept in an outdoor group-housing system: The 'parcours'. Animal Welfare, 32, e22.
3. Pereira-Figueiredo I, Rosa I, Sancho Sanchez C (2024) Forced handling decreases emotionality but does not improve young horses' responses toward humans and their adaptability to stress. Animals, 14(5), 784.
4. Grandgeorge M, Lerch N, Delarue A, Hausberger M (2024) From Human Perception of Good Practices to Horse (Equus caballus) Welfare: Example of Equine-Assisted Activities. Animals, 14(17), 2548.
5. Gobbo E, Maccario C, Zupan Šemrov M, Bovo M, Atallah E, Minero M, Dalla Costa E (2025) Exploring the impact of

housing routine on lying behavior in horses measured with triaxial accelerometer. Frontiers in veterinary science, 12, 1572051.
6. Kranenburg LC, van der Poel SH, Warmelink TS, van Doorn DA, van den Boom R (2023) Changes in management lead to improvement and healing of equine squamous gastric disease. Animals, 13(9), 1498.
7. Roig-Pons M, Bachmann I, Freymond SB (2025) Impact of feeding strategies on the welfare and behaviour of horses in groups: An experimental study. PloS one, 20(6), e0325928.
8. Mata F, Boyton G, Young T (2024) Anticipatory Behaviour During the Approach to Feeding Times as a Measure of Horse Welfare. Animals, 14(24), 3677.
9. Evci Ş, Eser E (2023) Can diet impress horse behaviour? Journal of Istanbul Veterinary Sciences, 7(2), 99-105.
10. Bihon A, Amognehegn D, Derbew G, Yirsa T (2025) Working equines: Assessment of welfare and management practices in and around Debre Markos District, Northwest Ethiopia. Equine Veterinary Journal.
11. Baumgartner M, Erhard MH, Zeitler-Feicht MH (2023) Which animal-to-feeding-place ratio at time-controlled hay racks is animal appropriate? Preliminary analysis of stress responses of horses. Frontiers in veterinary science, 9, 1005102.
12. Derbib T, Daru G, Kehali S, Alemu S (2024) The Role of Working Animals and Their Welfare Issues in Ethiopia: A Systematic Review and Meta-Analysis. Veterinary Medicine International, 2024(1), 7031990.
13. Robertson T, Thomas E, Starbuck G, Yarnell K (2024) Global distribution and gap analysis of equine housing research: The findings so far and where to go next. Animal Welfare, 33, e58.
14. Wolframm I, Le Belle FA, Elte Y (2024) What is welfare? A qualitative study into perceptions of equine welfare of the Dutch equestrian community. International Journal of Equine Science, 3(1), 37-50.
15. Arias-Esquivel AM, de Melo Vasco ACC, Lance J, Warren LK, Rodriguez-Campos LA, Lee MC, Rodriguez CN, Wickens CL (2024) Investigating the gastrointestinal physiology of mature horses with and without a history of cribbing behavior in response to feeding a digestive support supplement. Journal of Equine Veterinary Science, 132, 104964.
16. Bradshaw-Wiley E, Randle H (2023) The effect of stabling routines on potential behavioural indicators of affective state in horses and their use in assessing quality of life. Animals, 13(6), 1065.
17. Roig-Pons M Horses and slow-feeders: investigating consequences on horse health and behaviour University of Bern].
18. Phelipon R, Hennes N, Ruet A, Bret-Morel A, Górecka-Bruzda A, Lansade L (2024) Forage, freedom of movement, and social interactions remain essential fundamentals for the welfare of high-level sport horses. Frontiers in veterinary science, 11, 1504116.
19. Bondar A (2024) Welfare requirements for horse keeping.
20. Verwijs R (2024) The horse's behavioural and welfare needs for optimal foraging opportunities. UK-Vet Equine, 8(1), 26-34.
21. Smith N, Pailor L, Irving L, Hill K, Hunt G, Woods C, Millar B, Rippingale M (2025) Applied Equine Welfare, Health and Husbandry. Textbook of Equine Veterinary Nursing, 147-204.
22. Share ER (2025) Effects of Ohio Equine Industry Meal Feeding Practices on Herd Dynamics, Behavior, and Stress of Outdoor Group-Housed Horses The Ohio State University].
23. Zítek Š, Machová K, Prochazkova R, Vaníčková Z, Svobodova I (2025) Hair cortisol assessment of equine assisted therapy horses: Assessing long-term welfare and influencing management factors. Applied Animal Behaviour Science, 285, 106570.
24. Ellis AD, Hall C (2025) Environmental enrichment. In Equine Welfare in Clinical Practice (pp. 169-194). Elsevier.
25. Benedetti B, Felici M, Pigozzi G, Patroncini F, Padalino B (2025) Management and welfare of the Italian Heavy Draft Horse. Italian Journal of Animal Science, 24(1), 784-799.
26. Wells A, Hiney KM, Brady CM, Anderson KP (2025) Enhancing equine welfare: a qualitative study on the impact of RAiSE (Recognizing Affective States in Equine) as an educational tool. Translational Animal Science, 9, txaf033.
27. Ross M, Proudfoot K, Merkies K, Elsohaby I, Mills M, Macmillan K, Mckenna S, Ritter C (2023) Horse housing on Prince Edward Island, Canada: attitudes and experiences related to keeping horses outdoors and in groups. Animals, 13(2), 275.
28. Zollinger A, Wyss C, Bardou D, Bachmann I (2023) Social box: a new housing system increases social interactions among stallions. Animals, 13(8), 1408.
29. Rochais C, Akoka E, Amiot Girard S, Grandgeorge M, Henry S (2025) Through a Horse's Eyes: Investigating Cognitive Bias and Responses to Humans in Equine-Assisted Interventions. Animals, 15(4), 607.
30. Lindholm J (2023) Mapping of feeding strategies in Swedish riding schools with different housing systems and its impact on horse health and body condition. In: SLU, Dept. of Animal Environment and Health (until 231231).
31. Maurício LS (2023) Knowledge, beliefs and attitudes of equine practitioners and enthusiasts about behaviors, emotions and welfare in horses.