

Evaluating the Feeding Management and Housing Conditions of Horses in Lesotho

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Abstract

Lesotho is proud of its horses, and there are many skilled riders in rural areas. A cross-sectional study was conducted from September to December 2020, involving 321 horse owners. The objective of the study was to assess the housing and feeding management of horses in Lesotho. The evaluation of feeding management focused on production systems, types of commercial feeds, and access to water. The housing conditions assessment was based on the horses' environment. The majority of horses were kept under a semi-enclosed framework. In rural, semi-urban, and urban areas, grazing alone failed to meet the nutritional needs of horses by 70.1%, 89.4%, and 85.1%, respectively. Regarding housing, the majority of horses were tied, while only a few were kept in clean stalls (8.2%, 3.1%, and 4.1%) with proper bedding. Based on the data obtained in this study, it can be concluded that the feeding and housing conditions for horses in Lesotho are inadequate. Therefore, horse owners should receive training on how to improve the feeding and housing practices for their horses.

Keywords

Horse; evaluation; feeding; housing

1. Introduction

Horses serve as the sole mode of transportation in certain regions of Lesotho due to the rugged terrain [1]. In some parts of the country, horses are used as draft animals for tasks such as plowing, planting, carding, and cultivating fields [2]. Their significance extends to being life-saving couriers, as Lesotho has few paved roads and 80% of the country is more than a mile high. Horses play a crucial role in delivering vital medical supplies, antiretroviral medicine (ARVs), mother-to-baby pregnancy kits, and laboratory samples to remote clinics that are inaccessible by cars [3].

The quality and quantity of an animal's food, along with the feeding practices employed, significantly impact its well-being. Thus, the type of feed and feeding methods represent relevant risk factors [4]. According to Davidson [5], a feeding system is considered satisfactory when it is tailored to meet horse's specific nutritional requirements, enables horses to

maintain a body condition score of three on a scale of one to five, and does not lead to behavioral issues associated with feeding frustration. Horses in extensive confinement typically fulfill their nutrient needs by selectively grazing on various forages for up to sixteen hours per day, with very rare voluntary fasting periods of no more than four hours [6].

The social conditions experienced by a horse can jeopardize its behavior, physiology, and overall well-being [7]. Inappropriate social environments, often associated with intensive horse management, have the potential to alter a horse's behavior and compromise its health and welfare [8]. Housing systems that restrict free movement, exploration, and social interaction, such as individual box stalls indoors, may make horses more susceptible to poor air quality [9]. Providing horses with social housing is generally not a feasible choice due to the risk of contamination, unwanted social interactions, or the cost of maintaining additional horses [10]. In light of these considerations, the aim of this study was

to evaluate the feeding management and housing conditions of horses in Lesotho.

2. Materials and Methods

2.1. Study Area

The study was conducted in the Mafeteng and Maseru districts, covering three regions: urban, semi-urban, and rural. Each region was represented by four resource centers. The urban region consisted of Masianokeng, Morija, Semonkong, and Ramokoatsi. The semi-urban region included Ramabanta, Ntsi, Tsákholo, and Thabana Morena, while Matelile, Mosala, Ribaneng, and Marakabei represented the rural region. Data collection took place between September and December 2020.

2.2. Study Design

A cross-sectional survey was conducted using a simple random sampling method. Horse owners were identified in their respective resource centers with the assistance of Ministry of Agriculture and Food Security extension personnel. Owners who owned at least one horse and were willing to participate were included in the study.

2.3. Data Collection Method

Data was collected using individual questionnaires. A total of 321 horse owners were interviewed at their homes in the local language, Sesotho. The distribution of interviews was as follows: 101 in the urban region, 113 in the semi-urban region, and 107 in the rural region. The number of horse owners interviewed in each resource center ranged from a minimum of 12 to a maximum of 36, depending on the number of households owning horses. The questionnaire consisted of six sections: location (district, region, resource center, sub-center, and village), general information about the horse owner (name, gender, and age), socio-economic factors (highest educational qualification, training sessions, horse associations, purpose of rearing horses, years in horse production, and sources of household income). The feeding section included information on production systems, grazing satisfaction, commercial feeds, water sources, and frequency of water provision. The housing section included questions about housing type, bedding, ventilation, housing surface quality, and the risk of injury in housing. The data were then entered into the individual questionnaire forms in English.

2.4. Data Analysis

The data from the 321 surveys were analyzed using Statistical Package for Social Sciences version 20. Descriptive statistics, such as percentages and frequency distributions, were used to describe the data. Chi-square tests were employed to determine whether the differences in the data were due to chance or a connection between the variables being studied. Statistical significance was considered at a level of $p < 0.05$. Standard errors were used to calculate confidence intervals, and a 95% confidence level was set.

3. Results and Discussions

3.1. Feeding Management of Horses

Horse owners in rural (70.1%), semi-urban (89.4%), and urban (81.6%) regions indicated that the production system mostly used is semi-intensive. Chi-square tests showed a significant association ($p < 0.05$) between the production system and the region where the animals are reared. In contrast to the present

findings, Buckley [11] reported that the majority of horses were kept on pasture and fed additional roughage, grains, or concentrates. However, Mellor *et al.* [12] found that only 10% of horses were permanently kept out at pasture. On the other hand, Fraser and Broom [6] indicated that horses kept under extensive conditions meet their nutritive requirements through selective grazing on a variety of forages for up to sixteen hours per day. Conversely, Thorne *et al.* [13] stated that horses maintained under intensive conditions such as stables have limited access to forage, which influences both their foraging behavior and welfare.

The results of this study, as reflected in **Table 1**, showed that the majority of horses did not derive satisfaction from grazing. The Chi-square tests revealed a significant relationship ($p < 0.05$) between horses being satisfied from grazing and the region where they graze. Furthermore, most farmers reported that they are unable to fulfill all the needs of horses due to their slim household income. Consequently, this puts horses at risk of malnutrition since their nutritional needs cannot be fully met, compromising their welfare.

In support of the present results, Bonde [4] emphasized that horses dependent on grazing alone are deficient in important nutrients. Kompi *et al.* [14] also reported that most horses were not nutritionally satisfied because they mainly depended on grazing as a source of feeding. However, Upjohn *et al.* [15] found that Lesotho owners are less dependent on communal grazing. The difference in results could be attributed to the fact that Upjohn *et al.*'s [15] study was conducted during a drought period, which is associated with low grazing availability.

Bonde [4] further stated that the welfare of an animal could be affected by the quality and quantity of feed it receives, as well as the feeding procedures themselves. Additionally, Davidson [5] noted that a feeding system could be considered satisfactory if it is adjusted to the nutritional needs of a horse.

Based on the findings of the current study, the majority of horse owners are unable to purchase commercial feeds for horses. This is supported by the fact that 60.7%, 54.95%, and 57.4% in rural, semi-urban, and urban regions, respectively, reported their inability to afford commercial feeds. In contrast to the findings of this study, Murray *et al.* [16] found that the majority of owners fed commercial premixed feeds to horses, despite having less knowledge about managing nutrition-related disorders. The reason for horse owners being unable to buy commercial feeds could be attributed to their inability to cover all the needs of horses based on their income. However, equine nutrition is increasingly significant in ensuring good health and welfare [16].

Bran (wheat or maize) is the most commonly fed commercial feed to horses, followed by lucerne, and lastly, barley, as illustrated in **Table 1**. In contrast to the results of the current study, Murray *et al.* [16] found that the majority (87%) of horse owners fed concentrates. Harris [17,18] further reported that barley was generally fed rolled or cooked to increase small intestinal digestibility. The preference for bran as the most common commercial feed might be due to its cheaper cost compared to other feeds such as barley and lucerne. Additionally, bran is easily found, with almost every village having a local grinding mill.

Table 1: Feeding management of horses in different regions.

Category	Rural (%)	Semi-urban (%)	Urban (%)	SE	X ²	Sig
Production systems						
Intensive	29.9	10.6	14.9	0.111	14.851 ^a	0.001
Semi-intensive	70.1	89.4	85.1	0.048		
Satisfaction from grazing						
No	70.1	89.4	85.1	0.048	14.851 ^a	0.001
None	29.9	10.6	14.9	0.111		
Commercial feeds						
Yes	60.7	54.9	57.4	0.060	0.781 ^a	0.677
No	39.3	45.1	42.6	0.068		
Kinds of commercial feeds						
Lucerne	19.6	10.6	6.9	0.122	9.180 ^a	0.164
Bran	39.3	43.4	48.5	0.068		
Barley	1.9	0.9	2.0	0.447		
None	39.3	45.1	46.2	0.068		
Water access						
Dam	11.2	20.4	34.7	0.090	22.970 ^a	0.000
River	60.7	66.4	47.5	0.056		
Tap water	28.0	13.3	17.8	0.108		
Drinking times per day						
1-3	100.0	100.0	100.0	0.045		

SE: Standard Error

X²: Pearson Chi-Square Value

Sig: Significant Value

The majority of horses have access to water from rivers, with 60.7%, 66.4%, and 47.5% in rural, semi-urban, and urban regions, respectively. A significant percentage of horses in urban regions access water from dams. This can pose a problem for horses as water from dams can accumulate impurities since it does not flow out. However, some horse owners provide tap water to the horses. Adequate water supply and quality are important for an animal's well-being, and water quantity and quality appear to be appropriate risk factors. Nonetheless, requirements differ based on the animal's age and physiological condition [4].

All horses in the current study were reported to drink water 1 to 3 times per day, as indicated in **Table 1**. Novak *et al.* [19] indicated that the body of a horse is mainly composed of water, which is essential for maintaining health. On average, a horse consumes approximately 25 to 55 liters of water per day, depending on the weather conditions, level of activity, and diet.

3.2. Health Management of Horses

As shown in **Table 2**, the findings of this study indicate that a minority of horse owners in rural (8.2%), semi-urban (3.1%), and urban (4.1%) regions keep their horses in stalls. The majority of horse owners reported that they tie up their horses. However, the Chi-square tests revealed no significant association ($p > 0.05$) between housing type and the region in which the horse is reared.

In support of the present study, Macleay [20] reported that only 2.1% of horses were permanently stabled. These results

are consistent with those of Thompson *et al.* [21], who also found that 2.0% of horses were permanently stabled, although slightly lower than the findings of McGowan *et al.* [22], who reported a stabling rate of 5% for horses. Mezgebu *et al.* [23] also reported that the majority of horse owners keep their horses in deprived stables without roofs.

Contrary to the findings of this study, Leme *et al.* [24] found that 90% of horses reared in cities were permanently stabled. Connysson *et al.* [9] also indicated that many horses are currently kept in individual box stalls indoors. However, Søndergaard and Ladewig [25] stated that horses are less likely to develop abnormal behavior if they spend more time outside the stable and are easier to break in.

As shown in **Table 2**, the housing of the majority of assessed horses had no bedding in rural (99.3%), semi-urban (99.4%), and urban (98.6%) regions. However, no horses were sweating because of proper ventilation. The housing floor surface was mostly non-slippery, indicating that only 11.6%, 15.6%, and 18.9% of horses in the rural, semi-urban, and urban regions, respectively, were at risk of injury.

The results of the present do not tally with the report of AWIN [26] which emphasized that the comfort around the resting place of a horse relies on suitable bedding material that is non-toxic, free of mold and excessive dust, and absorbent enough to maintain a dry bed. Stable air quality and the choice of bedding material are crucial for the health and well-being of both horses and people working or visiting horse stables [27].

Table 2: Housing conditions of horses in different regions.

Category	Rural (%)	Semi-urban (%)	Urban (%)	SE	X ²	Sig
Housing type						
Kraal	7.5	6.2	8.1	0.180	5.008 ^a	0.286
Tie-up	84.4	90.6	87.8	0.147		
Stall	8.2	3.1	4.1	0.040		
Bedding						
Presence of clean bedding	0.7	0.6	1.4	0.479	0.564	0.754
No bedding	99.3	99.4	98.6	0.038		
Ventilation						
No sweating or shivering	100.0	100.0	100.0	0.038		
Housing surface quality						
Anti-slip	100.0	98.8	100.0	0.038	3.704 ^a	0.157
Slippery	0.0	1.2	0.0	0.000		
Risk of injury in housing						
No risk of injuries	88.4	84.4	81.1	0.041	3.075 ^a	0.125
Risk of injuries	11.6	15.6	18.9	0.095		

SE: Standard Error

X²: Pearson Chi-Square Value

Sig: Significant Value

4. Conclusion

Based on the results of this study, it can be concluded that horses in Lesotho were reared under a semi-intensive production system. The primary source of nutrition for the horses was grazing on rangelands, which proved to be insufficient to meet their nutritional needs. Additionally, the horses relied on drinking water from rivers. The housing conditions did not meet the standards set by the World Organization for Animal Health, as the horses were either tied up or kept in stalls without bedding. Therefore, there is a need to change the behavior of horse owners through targeted educational sessions, with a focus on improving the management practices related to housing and feeding of horses in Lesotho.

Authors' Contributions

Moleboheng Bolibe: study design, data collection, analysis, and interpretation of data. Setsumi Molapo: study design, data analysis, and interpretation of data.

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Data Availability

The data supporting this study will be made available by the authors upon request.

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Conflicts of Interest

The authors declare that there are no conflicts of interest related to the work presented in this manuscript.

Ethical Approval

The study was approved by the Scientific and Ethics Committee of the Department of Animal Science, National University of Lesotho.

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