

Prevalence and Risk Factors of Musculoskeletal Disorders in Cart Horses in Hawassa and Shashemene, Ethiopia

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Abstract: A cross sectional study was conducted from November 2008 to April 2009 in two towns namely Hawassa and Shashemene to determine the prevalence and associated risk factors of musculoskeletal disorders in cart horses. Purposive sampling technique was employed. The overall prevalence of musculoskeletal disorders (MSD) in both towns was 28.7%. Standing in muddy stables for longer periods, improper shoeing and hoof care, poor harness design are potential predisposing factors for musculoskeletal disorders. A musculoskeletal disorders was found in the fore and hind limbs with prevalence of 54.3% and 41.4% respectively. The prevalence of lameness in heavily loaded horses (67.2%) was significantly higher than less loaded ones (32.8%) ($p < 0.001$, Chi sq. =22.2). The prevalence of lameness with respect to shoeing frequency indicated that it is highly prevalence in animals with shoeing frequency more than 4 time per month (84.5%) than those horses with shoeing frequency (15.5) ($p < 0.05$, Chi sq.=10.1). It was also evident from this study that the poor management of working horses were special areas of concern for almost all hoof associated problems encountered, hence training of traditional farriers in corrective farriery, improvement of working implements for shoeing and extension of educational service to owners especially in the area of management cares and early treatment of lame horses need to be implemented.

Key words: Cart Horses • Musculoskeletal Disorder • Prevalence • Risk Factors

INTRODUCTION

Ethiopia, located in Eastern Africa is predominantly an agricultural country with over 85% of its population engaged in agricultural activity. The country has diverse agro ecological zones which contributed to the evolution of different agricultural production system [1].

Ethiopia possesses about 2.03 million horses, 7.43 million donkeys and 0.4 million mules. In comparison with other equines, the horse usually has a larger and a more substantial frame [2]. It easily acquires conditioned reflexes, demonstrates draught ability and often shows great willingness to undertake such type of work. The horse is very fast in motion, quickly reacts to man's commands and submits readily to his will [3].

Eventhough horse considerably contributed to the existing rural and urban economy of nations, they receive less attention in terms of feeding, health and management

cares [4]. A variety of disease conditions hinder the optimum utilization of equine among which lameness contributes significant impact [5].

Problem involving the musculoskeletal system are common reasons for veterinary attention to all breed and type of horses. Survey in race horses of all countries has indicated that musculoskeletal problem is the most common reason for interruptions in training. Most horses are presented to clinics because of lameness with or without some degree of swelling in one or more of their limbs [6]. Heavy load and loading imbalance, disproportionate and poor harness designs are known to predispose the animals to more severe lesions and injuries are more severe in carthorses than donkeys [7, 8]. Foot is probably the most commonly affected by lameness and frustration in horses used for any purpose regardless of rigor or athletic in the distal limb. The major causes of lameness are thrush, nail puncture, foreign objects and cracks [9].

Forelimb lameness is most easily diagnosed by watching the horse walk and trot on a firm even surface both to ward and away from the observer. As weight is borne on the affected forelimb, the head is lifted and dropped when a weight is placed on the unaffected forelimb [6]. Problem with the quality of the hoof both the sole and wall are common in horses and can occur for a variety of reasons including poor nutrition severe environment, bad trimming shoeing and trauma [10]. "Sore back" originating in the thoracic, lumbar, or sacral area is a frequent problem in the horse [11].

In Ethiopia, in spite of the crucial role of cart pulling horses in the livelihoods of the owners and the economy of the country as a whole the impact of lameness on their health and welfare has not been formally documented [12]. Hence, the objective of this study was to assess the occurrence, cause and associated risk factors of musculoskeletal disorder in carthorses of Hawassa and Shashemene towns.

MATERIAL AND METHODS

Study Area: The study was conducted at Hawassa and Shashemene towns from November 2008 to April 2009. Hawassa is a capital of Southern Nations Nationality People Region (SNNPR), geographically located 275 km south from Addis Ababa. The city lies between 4°27' and 8°30' N latitude and 34°21' and 39°11' E longitude. Annual mean temperature of the area is 21.1 to 25°C and annual rainfall ranges from 801 to 1000 mm.

Shashemene is a small town that lies 25 km Northeast of Hawassa in Oromia Regional state. The altitude of the area ranges from 1500 to 2500 meter above sea level. Rain fall in the town is bimodal in distribution and with annual fall ranging between 900 to 1000 mm with annual mean temperatures ranging from 16°C to 27.5°C and mean relative humidity ranges from 35 to 68%.

Study Animal: The study animals comprised all carthorses that were presented to the mobile clinic of SPANA Ethiopia at Hawassa and Shashemene.

Sample Size Determination: The sample size was determined according to Thrusfield [13] for simple random sampling method for an infinite population using 95% confidence level, 5% desired absolute precision and 50% expected prevalence, since there was no previous information on the prevalence of MSD in the study areas. Accordingly, a total of 404 (207 from Hawassa, 197 from Shashemene) cart horses that visited SPANA clinics sited in both study sites were examined for MSD.

Study Protocol: Cross sectional study was carried out using purposive sampling technique based up on two clinics one each study site. Selected carthorses were assessed for the cause and occurrence of MSD. Clinical examination and questionnaire survey were carried out simultaneously.

Physical and Clinical Examination: All animals that visited to the mobile veterinary clinic during study period were examined for any MSD and clinical parameters were recorded. Horses with musculoskeletal health problems were further examined in detail. Type of lameness was determined (As supporting, limb swinging or mixed lameness) [14]. Furthermore, findings were systematically categorized to the MSD characterize based on extent of limb involvement and severity of the lameness.

Accordingly, grade 1 to 5 was used to categorize the severity where grade 1 and grade 5 show the least and most severe conditions, respectively. Animals were visually observed at rest and on exercise following to appropriate clinical history recorded. Manual palpation of the affected sites and flexion tests were then done whenever necessary. For identification of hoof related problems hoof tester and other farriery tools were used.

Questionnaire Survey: Semi-structured questionnaire was employed to collect data on cause and occurrence of MSD. Besides, factors associated with lameness such as feet care, average weight load/number of people transported at a time, working hours/day, shoeing interval were included. Accordingly, a total of 404 carthorse owners (207 from Hawassa and 197 Shashemene) were interviewed.

Data Analysis: Collected data were entered into Microsoft excel and analyzed using SPSS 13.0 for windows statistical software. Confidence level was held at 95% so that $p < 0.05$ was considered significant.

RESULTS

Recorded over all prevalence of musculoskeletal disorder in both towns was 28.7% (32.9% and 24.2 for Hawassa and Shashemene respectively). Major MSD problem identified were sub solar abscesses, arthritides, flexural dermities, trauma and joint dislocation (Table 1).

Only few cases (8.6%) were recorded from both fore and hind limbs while most (45.7%) of the incidence of MSD were registered from the forelimb compared to the hind limb (31.9%) (Fig. 1).

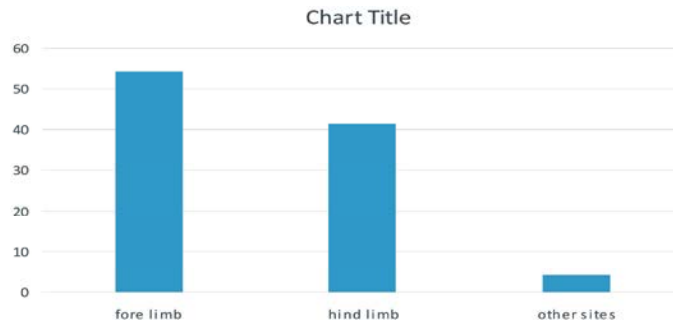


Fig. 1: Graphical representation of involvement of body parts with MSD (n=116)

Table 1: Summary of causes of MSD in cart horses in the study sites (n=404)

Cause	Number of cases	Percentage (%)
Solar abscesses	16	13.8
Arthritis	27	23.3
Branding	6	5.2
Flexural deformity	6	5.2
Joint dislocation	6	5.2
Hoof over growth	8	6.9
Poor harnessing	5	4.3
Poor shoeing	11	9.5
Trauma	20	17.2
Epizootic lymphangitis	4	5.4
Unidentified	7	6

According to the current study, majority of horses used in cart pulling were found to be older age groups with an average of 14.9 years and recorded average body condition score was 2.5. The average number of people transported at a time in all the town were three (Table 2). The cart owners were unable to disclose the exact distance covered per day. However, the working surface for cart horses in the two towns was found to be rough enough to wear and predispose to cracking.

Table 2: Age, body condition score and management practices of carthorses at study sites (n=404)

	Mean	SD	Minimum	Maximum
Age (years)	14.9	2.8	8	20
BCS	2.5	0.4	1.5	3.5
Working Hrs/day	5.9	0.9	4	11
Lameness score	2.89	1.4	0	5
Shoeing /month	3.6	1.0	1	4
Trimming /year	15.7	15.4	0	48
No. of people transported	3		3	4
Weight carried at a time (Kg)	229.6	70.3	150	350
Duration of lameness(days)	104.8	146.7	2	2190

In a survey made to see the management of carthorses, it was found that most of the cart owner keep their horses in open housing system that do not protect them from extreme weather conditions. The stable is stone paved floor bedding where animal manure and waste feed are not regularly cleaned. All cart owners interviewed replied as feed their horses with wheat bran and wheat straw at night as a supplement. Some still graze when off work.

The incidence of MSD in heavily working animals was found significantly higher than in those on moderate work burden (Table, 3). Incidence of MSD between horses having higher frequency of shoeing and those with lesser frequency varied. The cart horses whose shoe is changed 4 times a month had the highest risk of having lameness due to poor farrier (Table, 4).

Table 3: Incidence of musculoskeletal disorder with respect to workload (n=404)

Work load		MSD		Chi sq.	P-value
		No	Yes		
Heavy	Number (%) within MSD	119 (41.3%)	78 (67.2%)	22.2	0.00
Moderate	Number (%) within MSD	169 (58.7%)	38 (32.8%)		

MSD=musculoskeletal disorder

Table 4: The relationship of occurrence of musculoskeletal disorder with shoeing frequency in carthorses (n=404)

Shoeing frequency		MSD		Chi sq	P-value
		Yes	No		
Frequent >3 times/month	Count (%) within MSD	199 (69.1%)	98 (84.5%)	10.1	0.002
Less frequent <3 times/month	Count (%) within MSD	89 (30.9%)	18 (15.5%)		

MSD=musculoskeletal disorder

DISCUSSION

The current study indicated that MSD were among major health problem of cart horses in Hawassa and Shashemene with an overall prevalence of 28.7%. This finding is lower than previous reports of 67.9% (n=243) in Debre-Zeit, Mojo, Akaki and Debre-Brehan [7] and 43.9% (n=360) in Debre-Zeit, Debre-Brehan and Nazareth/Adama [15]. The difference could be due to variation on awareness level of carthorse owners in the study areas.

Major health conditions recorded associated with MSD included arthritis, flexural deformities, solar abscesses, joint dislocation, hoof over growth, poor shoeing and epizootic lymphangitis. In this study major predisposing factors identified were overloading, trauma, poor farriery, branding, poor harnessing and poor housing ground. These results are in line with prior findings [7, 15]. Higher proportion of arthritis (23.3%) among the other MSD may be associated with longer service year given by majority of the horses.

Fore and hind limbs were the most affected sites from other body parts contributing about 95% of the overall prevalence of MSD in the current study. This might be associated the nature of work, improper harnessing and management of cart horses associated with neglect and insufficient awareness of owners. In addition, the fore limbs are known to bear 60 to 65% of body weight of the horse. This means the fore limbs are subjected to more injuries and trauma than rear limbs [5].

Hoof associated problems were found common in cart horses, this is attributed to the fact that strenuous activity of cart horses by business oriented owners throughout the week for at least half a day. The fore limb was the most affected site identified in this study with 54.3% proportion. This result was lower than the study having the forelimb lameness of 64.4% among the total 258 lame horses and 41.4% of hind limb [15]. Lameness obtained in this study was higher than the study conducted by Haftom [15] who recorded hind limb lameness prevalence of 24.1%.

This study indicated managerial problems as the most associated causes of MSD. Wet muddy areas in stables at night and before and after work, rough and uncomfortable working ground over loading, abuse by drivers, loading imbalance, disproportionate harness design and lack of trained farrier were among the money managerial challenges.

Occurrence of MSD was higher in heavily loaded horses than moderate weight transporting ones. This might be associated with tendon stain and frequent

trauma from falling to the ground. The same trend was recorded on occurrence of MSD in carthorses with shoeing frequency (84.5%) greater than these horses with shoeing frequency of three times or less per month (15.5%). This could be due to poor farriery practice provided by untrained local farriers. These findings are in agreement to a prior study of Moti [7]. The present study also indicated that majority of the lame horses came late to clinic after the condition of lameness has progressed. The average duration of lameness was 104.8 days and the average AAEP lameness score was 2.9 in the scale of 5. This also indicated the severity of lameness and the neglect from their owners.

CONCLUSION

MSD are among the major health problems of carthorses in Hawassa and Shashemene with an overall prevalence of 28.7%. Major MSD problems identified were associated with managerial problems including arthritis, flexural deformities, solar abscesses, joint dislocation, hoof over growth, poor shoeing and epizootic lymphangitis. Risk factors for MSD were overloading, trauma, poor farriery, branding, poor harnessing and poor housing ground. Lameness of different severity has been diagnosed and found causing reduction in the productivity and loss of function of animals. Hence, improvement on management practices of carthorses through awareness enhancement on owners seems crucial.

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